Executive Summary

E.S.1 Background, Purpose, Scope, Process, and Regulatory Context

A Scoping Study prepared for the Coachella Valley Association of Governments (CVAG) by the Coachella Valley Mountains Conservancy (CVMC) in 1994 recommended that a Multiple Species Habitat Conservation Plan (Plan) be prepared for the entire Coachella Valley and surrounding mountains to address current and potential future state and federal Endangered Species Act issues in the Plan Area. (See Figures 1-1 and 1-2 in Section 1 for maps of the Plan Area and its regional context.) A Memorandum of Understanding ("Planning Agreement") was developed to govern the preparation of the Plan. In late 1995 and early 1996, under the auspices of CVAG, the cities of Cathedral City, Coachella, Desert Hot Springs, Indian Wells, Indio, La Quinta, Palm Desert, Palm Springs, and Rancho Mirage; County of Riverside (County); U.S. Fish and Wildlife Service (USFWS); California Department of Fish and Game (CDFG); Bureau of Land Management (BLM); U.S. Forest Service (USFS); and National Park Service (NPS) signed the Planning Agreement to initiate the planning effort. Subsequently, Caltrans, Coachella Valley Water District (CVWD), Imperial Irrigation District (IID), Riverside County Flood Control and Water Conservation District (County Flood Control), Riverside County Regional Park and Open Space District (County Parks), Riverside County Waste Resources Management District (County Waste), California Department of Parks and Recreation (State Parks), and CVMC decided to participate in the Plan.

In late 1996 and early 1997, the Parties to the Planning Agreement approved an amendment stipulating that the Plan will meet the intent of the Natural Community Conservation Planning Act (NCCP Act) as well as the California Endangered Species Act (CESA) and the Federal Endangered Species Act (FESA), and, further, that the Planning Agreement constitutes an agreement to prepare a Natural Community Conservation Plan (NCCP) as specified in California Fish and Game Code Section 2810.

The Plan and Final EIR/EIS were released in early 2006 for local jurisdiction approval. In June 2006, the City of Desert Hot Springs voted not to approve the Plan. The CVAG Executive Committee then rescinded its approval of the Plan and directed that the Plan be revised to remove Desert Hot Springs as a Permittee and reflect other project description modifications that had been suggested during public review. This recirculated Draft Plan implements that direction. Subsequent to the original approved Plan, the City of Desert Hot Springs and Mission Springs Water District became Permittees through a Major Amendment.

The Plan balances environmental protection and economic development objectives in the Plan Area and simplifies compliance with endangered species related laws. The Plan is intended to satisfy the legal requirements for the issuance of Permits that will allow the Take of species covered by the Plan in the course of otherwise lawful activities. The Plan will, to the maximum extent practicable, minimize and mitigate the impacts of the Taking and provide for Conservation of the Covered Species.

The Plan has been prepared under the direction of CVAG, which contracted with CVMC for Plan preparation. A Project Advisory Group (PAG), composed of representatives of the Parties to the Planning Agreement; other public agencies, including CVWD and the University of California (UC); and private sector groups, including the Building Industry Association, the Sierra Club, The Nature Conservancy (TNC), the Center for Natural Lands Management (CNLM), and the Riverside County Farm Bureau, has provided a forum for input from an array of interests. All PAG meetings have been public meetings to provide an opportunity for public input. Public forums were held in 1998, 1999, and 2000, and special meetings and contact by mail have provided opportunities for potentially affected landowners to offer input into the planning process.

A Scientific Advisory Committee (SAC) provided technical expertise on biological issues. The SAC is made up of biologists from BLM, NPS, USFS, UC, initially TNC and subsequently CNLM, and CVWD, and one non-biologist who provided liaison with the PAG. USFWS and CDFG (Wildlife Agencies) have also attended most SAC meetings. A Geographic Information Systems (GIS) Team, composed of staff from BLM, CVAG, CVMC, and the County, has provided GIS services, including developing data layers, natural communities and species distribution mapping and modeling, gap analysis, and reserve design and corridor mapping.

The proposed term of the Permits is 75 years, which is the length of time required to fully fund Plan implementation. The acquisition program is projected to require 30 years to acquire all the Permittee obligation land. Full funding of the endowment for the Monitoring Program, the Management Program, Adaptive Management, and ongoing administration costs is projected to require 75 years

E.S.2 Plan Area Profile

The Coachella Valley is a broad, low elevation, northwest-southeast trending valley comprising the westernmost limits of the Sonoran Desert. It is located in the eastern portion of Riverside County, approximately 100 miles east of Los Angeles. Riverside County as a whole covers over 4,700,000 acres (7,310 square miles), making it California's fourth largest county and roughly equal in size to Connecticut.

The Plan Area boundaries were chosen to maximize inclusion of the Coachella Valley watershed. Portions of the watershed outside Riverside County or outside the jurisdictional boundaries of CVAG were not included in order to avoid institutional and administrative complexity. The Plan Area extends westward to Cabazon where it is bounded by the range line common to Range 1 East and Range 2 East. This is approximately the limit of the Sonoran or Colorado Desert in the San Gorgonio Pass area. The easternmost extent of the Plan Area is the range line common to Range 13 East and Range 14 East. Either the ridgeline of the Little San Bernardino Mountains or the boundary line with San Bernardino County where the ridgeline extends north of the county line bounds the Plan Area on the north. On the south, either the ridgeline of the San Jacinto and Santa Rosa Mountains or the boundary line with San Diego and Imperial Counties forms the Plan Area boundary. The Plan Area encompasses approximately 1.2

million acres. Of this, approximately 69,000 acres are Indian Reservation Lands, which are not included in the Plan, leaving a total of approximately 1.1 million acres addressed by the Plan.

Based on census data, the average annual growth rate in the 1970s in the Plan Area was just over 4.1%. This rose to over 5.8% in the 1980s. The annual growth rate between 1990 and 2000 was approximately 3.4%. The rate is projected to decline thereafter to less than 3% per year according to the Southern California Association of Governments Regional Transportation Plan Growth Forecast. It should be noted, however, that the estimated increase in population remains significant after the year 2000, with nearly an anticipated 145,000 new people added between 2000 and 2020. That is more than the total population of the Plan Area in 1980.

The cities of Cathedral City, Coachella, Desert Hot Springs, Indian Wells, Indio, La Quinta, Palm Desert, Palm Springs, and Rancho Mirage lie within the Plan Area, principally on the floor of the Coachella Valley. Together their jurisdictions make up approximately 16% of the Plan Area. The remaining 84% of the Plan Area is unincorporated. Approximately 41% of the land covered by the Plan is privately held. Though not included in the Plan, Indian Reservations within the Plan Area include the Morongo, Agua Caliente, Santa Rosa, Cabazon, Twenty-Nine Palms, Torres-Martinez Band, and Augustine. The balance of the Plan Area is public land managed by various local, state, and federal agencies, including BLM, USFS, NPS, USFWS, Bureau of Reclamation (BOR), CDFG, State Parks, UC, CVMC, and special districts, and open space lands owned by the Cities of Cathedral City, Coachella, Desert Hot Springs ~~(which is not a Permittee)~~, Indian Wells, Indio, La Quinta, Palm Desert, Palm Springs, and Rancho Mirage and the County.

Data derived from the Plan database indicate that approximately 6.0% of the Plan Area is currently urbanized, 1.0% is in rural development, 7.5% of the land is under agriculture, 0.5% has wind energy development on it, and 28.0% is vacant land under private or public non-conservation ownership. Of the remaining land in the Plan Area, 4.0% is covered by the Salton Sea, and 53.0% is public or Private Conservation Land.

While public land and Private Conservation Lands in some areas constitute large blocks of Habitat, in other areas the Habitat on public lands is fragmented by the checkerboard pattern of public lands and Private Conservation Lands with non-conservation private lands. The Conservation lands are not distributed in such a way as to provide adequate protection for all types of Habitat, or to protect Essential Ecological Processes for some Habitats, and Biological Corridors and Linkages for wildlife movement between major open space areas.

E.S.3 Plan Development

The conservation plan was developed in consultation with the SAC, using best available science. The SAC developed a methodology for use in assessing the relative biological value of lands within the Plan Area and the subsequent development of a Preferred Alternative conservation plan. The Peninsular bighorn sheep conservation strategy was primarily based on the *Recovery Plan for Bighorn Sheep in the Peninsular Ranges, California* (USFWS 2000).

The Plan recognizes that there is inevitably an uncertainty factor in scientific information about biological systems. The Monitoring and Adaptive Management Program is designed to increase the level of knowledge about species covered by the Plan, conserved natural communities, ecological processes, and connectivity. Changes in management of the Conservation Areas, and minor boundary changes, could result from such increased knowledge. Any such changes would be consistent with the No Surprises Assurances Rule of USFWS and CDFG assurances.

The conservation planning process reflects the broadest goals of the Plan, which are:

- Represent native ecosystem types or natural communities across their natural range of variation in a system of conserved areas.
- Maintain or restore viable populations of the species included in the Plan so that Take Permits can be obtained for currently Listed animal species and Non-listed animal species can be covered in case they are listed in the future.
- Sustain ecological and evolutionary processes necessary to maintain the viability of the conserved natural communities and Habitats for the species included in the Plan.
- Manage the system adaptively to be responsive to short-term and long-term environmental change and to maintain the evolutionary potential of lineages.

The planning process consisted of the steps described below.

1. *Determine the species and natural communities to be included in the Plan.* The planning team developed the initial list of species and natural communities to be considered. The list was narrowed down through the planning process as described in Section 3.2.
2. *Gather information on the species and natural communities*. Information was gathered on individual species from the following sources: (1) existing information from the literature, including Environmental Impact Reports (EIRs) and other environmental documents, museum records, and other reports on species distribution and ecological requirements; (2) California Natural Diversity Data Base (CNDDB) records; (3) presence/absence surveys for species about which more information was needed in selected areas where they have a probability of occurring and some potential to be protected; and (4) information and location maps provided by individual biologists. Information on the natural communities was gathered from: (1) the University of California at Santa Barbara Gap Map (2) LANDSAT satellite thematic mapping imagery, (3) color infrared aerial photographs, (4) blue-line aerial photographs of the Plan Area; (5) aerial photographs from 1939 and 1954 for historic natural communities, and (6) the CNDDB and the Palm Springs Desert Museum for desert fan palm oases.
3. *Prepare accounts of individual species and natural communities*. These accounts summarize available information on species' life history, habitat and ecological requirements, overall range, distribution within the Plan Area, threats, and conservation needs. Similar accounts were prepared on the composition and distribution of natural communities, threats, and conservation needs.
4. *Gather other pertinent information*. Information was also gathered and entered into the GIS database regarding existing conservation lands, topography and other natural

features, watersheds, ecological processes, roads, and current land uses. Information on projected land uses, parcel configuration, and political boundaries was also gathered for use in developing implementation measures.

5. *Prepare a Natural Communities Map.* A Natural Communities Map was prepared to delineate the distribution of the natural communities in the Plan Area. This information was used in (1) modeling species' habitat distribution, (2) developing the Site Identification Maps, and (3) evaluating whether adequate protection will be afforded to the conserved natural communities on which the Plan focuses pursuant to the NCCP Act.

6. *Analyze biological resource information to map species' distribution*. Species' Habitat distribution maps were prepared for all species except burrowing owl using known occurrences, Habitat associations based on the Natural Communities Map, and, where relevant, elevation ranges of the species, landform data, sand source data, and soils data. Consensus was then obtained as to the adequacy and accuracy of information about the distribution of species in the Plan Area. Models were prepared for species for which sufficient data existed to use in developing a model. For the burrowing owl only known location information was used in conservation planning.

7. *Develop Site Identification Maps*. Site Identification Maps were developed by mapping at the quarter-section level and analyzing data regarding species richness, natural community richness, habitat heterogeneity, and habitat fragmentation, and refining the resulting maps using information about Essential Ecological Processes necessary to sustain Habitats, Core Habitat, endemic species occurrences, and other pertinent information. The Site Identification Maps delineate the areas of highest biological resource value in the Plan Area. See Appendix I for a detailed description of the Site Identification process.

8. *Delineate Core Habitat areas, Essential Ecological Process areas, and Biological Corridors and Linkages.* For each of the species for which sufficient data were available, Core Habitat areas were delineated, defined as areas of unfragmented Habitat with intact Essential Ecological Processes large enough to sustain a viable population of the species. See Appendix I for additional information on this process. Areas needed to maintain Essential Ecological Processes to sustain Core Habitat, and Biological Corridors and Linkages were also identified.

9. *Develop Conservation alternatives.* Three Conservation alternatives were initially developed for consideration. Conservation Alternative 1 consisted of existing public lands and Private Conservation Lands only. This alternative was included to assess the extent to which Existing Conservation Lands would suffice to protect the Covered Species and the conserved natural communities included in the Plan. Based on the Site Identification Maps, Conservation Alternative 2 was developed to provide Core Habitat for the Covered Species, protect Essential Ecological Processes to sustain those Habitat areas, provide Biological Corridors among Conservation Areas, and conserve natural communities as functioning ecosystems. The Biological Corridors were intended to provide not only for movement of Covered Species, but also for other species, including coyotes, bobcats, mountain lions, and foxes, necessary to maintain predator-prey relationships, general biological diversity, and the opportunity for species adaptation in response to potential climate change. Conservation Alternative 3 included additional areas with potential Conservation value as Habitat, corridor, and ecological process areas. A statistical analysis of the Conservation alternatives was prepared to provide

information about the acreage of Habitat protected for each species and natural community under each alternative. The statistical analysis provided quantitative information on species and natural community protection, which was useful in conjunction with the qualitative analysis conducted in Step 10 using the conservation criteria.

10. *Develop and use criteria for evaluating the conservation alternatives.* Criteria were created to evaluate whether or not the Conservation Areas provide adequate protection for the species and natural communities on which the Plan focuses.
11. *Conduct Independent Science Advisors (ISA) Review*. During the course of the planning process, two workshops were held with leading conservation biologists Dr. Reed Noss, Dr. Michael Soulé, and Dr. C. Richard Tracy to get their input on the conservation plan. The ISA included the aforementioned conservation biologists as well as other scientists. (See Appendix I for additional information.) In early 2001, the ISA reviewed the work completed to date. In addition, a preliminary draft of a study titled Long-term Sand Supply to Coachella Valley Fringe-toed Lizard (*Uma inornata*) Habitat in the Northern Coachella Valley, California (United States Geological Survey 2000) was made available.
12. *Develop a Preferred Alternative*. The Conservation Area maps prepared by CVAG were discussed in a series of meetings among CDFG, USFWS, CVAG staff, and local jurisdictions to evaluate land use, and economic and biological considerations. Through this process, the proposed Conservation Areas were further refined and a preferred alternative was developed
13. *Delineate Conservation Goals and Objectives*. Conservation Goals and specific Conservation Objectives were developed for each Covered Species, natural community, Essential Ecological Process, Biological Corridor, and Linkage in the Conservation Areas to ensure that Conservation would be accomplished and that the tools for compliance monitoring were in place.

Covered Species and Conserved Natural Communities

The Planning Agreement identified 52 species to be considered for inclusion in the Plan and targeted all the natural communities in the Plan Area. As information was gathered through the planning process, the Planning Team continuously reviewed the list. Other experts on individual species were also consulted. The 27 species ultimately included in the Plan are listed in Table 3-1 in Section 3 of the Plan. There are five plants, two insects, one fish, one amphibian, three reptiles, eleven birds, and four mammals.

The Planning Agreement listed 23 natural communities known to occur in the Plan Area. Through the planning process a total of 46 natural communities were identified in the Plan Area. Of these, 27 natural communities provide Habitat for the Covered Species and are the focal point for establishment of Conservation Areas. The natural communities included in the Plan's Conservation Areas are listed in Table 3-3 in Section 3 of the Plan. The other natural communities are not included in the Conservation Areas established under this Plan; however, with three exceptions, these other natural communities are already adequately protected in the Plan Area on public lands. The three exceptions that are not either currently protected or proposed for protection under this Plan are active shielded desert dunes, Riversidean desert

scrub, and tamarisk scrub. Only a fragment of the active shielded desert dunes, surrounded by urbanization and shielded from Essential Ecological Processes, occurs in the Plan Area. Riversidean desert scrub is restricted to the San Gorgonio Pass in the Plan Area, where it occurs primarily on the Morongo Indian Reservation, which is not part of the Plan. It is more common in the western part of the County, where it is addressed in the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP). Tamarisk scrub is not a "natural" community in that it is dominated by an exotic plant species, i.e. tamarisk. In areas where some tamarisk scrub is included in the Conservation Areas, the intent is to restore it to the appropriate natural community to the maximum extent practicable.

Conservation Alternatives Considered

CEQA requires that a range of conservation alternatives be considered and Section 10(a)(2)(A)(iii) of FESA requires that an HCP analyze alternative actions which would not result in Take of Listed Species (animal species) or would reduce such Take below levels anticipated for the project proposal and state the reasons why such alternatives are not being utilized. In addition to the Plan itself, the conservation alternatives described below have also been considered.

Conservation Alternative 1. This alternative includes all local, state, and federal agency land, and Private Conservation Land, in the Plan Area with Conservation Levels 1, 2, and 3. No new areas would be acquired for Plan purposes. As a result, sand transport, watershed, and other Essential Ecological Processes would not be adequately protected and Biological Corridors would not be conserved, and Core Habitat areas would be fragmented in many instances.

Conservation Alternative 2. This alternative would establish Conservation Areas intended to protect Core Habitat for the Covered Species and conserved natural communities included in the Plan, Essential Ecological Processes necessary to sustain these Habitats, and Biological Corridors and Linkages. The Conservation Areas include most of the Conservation Alternative 1 lands as well as private lands essential for Core Habitat, Essential Ecological Processes, and Biological Corridors and Linkages. Based on comments in the ISA report, comments received from CDFG and USFWS, and additional information in the Long-term Sand Supply to Coachella Valley Fringe-toed Lizard (*Uma Inornata*) Habitat in the Northern Coachella Valley, California (United States Geological Survey, 2000), Conservation Alternative 2 was subsequently revised to develop the Preferred Alternative.

Conservation Alternative 3. This alternative expanded on Conservation Alternative 2 by including all additional areas that were recommended for further consideration by USFWS and CDFG in their response to the Site Identification Maps. This alternative would result in less Take than the Preferred Alternative; however, it was determined that this alternative was not Feasible based on representations from various Local Permittees and analysis of land ownership patterns.

Conservation Alternative 4. In their joint letter dated April 17, 2000, the Wildlife Agencies recommended inclusion of an alternative that "fully protects those areas encompassed by the current composite modeled distribution and known locations of target species in the Plan Area." By seeking to protect all Habitat for the Covered Species in the Plan, this alternative would result in a significant reduction in Take Authorization and significant increase in costs.

Thus, Conservation Alternative 4 was determined to not be feasible and was not analyzed further.

No Project Alternative. The No Project Alternative entails no Plan being developed and no Permits issued. Individual projects would have to seek their own Incidental Take Permits or avoid Incidental Take by not developing portions of the project site that would result in Take of a listed species (animal species). The No Project Alternative is likely to be incapable of conserving certain Essential Ecological Processes, particularly the fluvial sand deposition and aeolian transport areas, which are necessary to support occupied Habitat by Covered Species in the dunes and other blowsand Habitats. There would not be a coordinated system of Biological Corridors and Linkages provided to connect Conservation Areas and the ability to provide Linkages through project by project mitigation may be precluded over time through continued Development. Further, the No Project Alternative would not provide protection for non-listed species or for natural communities that do not provide Habitat for Listed Species. Over time, Non-listed species would likely become listed, thereby increasing regulatory burdens and difficulty for Development.

E.S.4 Establishment of the MSHCP Reserve System

The Conservation Plan includes the establishment of an MSHCP Reserve System, setting Conservation Objectives to ensure the Conservation of the Covered Species and conserved natural communities in the MSHCP Reserve System, provisions for management of the MSHCP Reserve System, and a Monitoring Program, and Adaptive Management. The MSHCP Reserve System will be established from lands within 21 Conservation Areas. Because some Take Authorization is provided under the Plan for Development in Conservation Areas, the actual MSHCP Reserve System will be somewhat smaller than the total acres in the Conservation Areas. When assembled, the Reserve System will provide for the Conservation of the Covered Species in the Plan Area.

For each Conservation Area, Conservation Objectives are articulated for conserving Core Habitat for Covered Species, Essential Ecological Processes necessary to maintain Habitat viability, Biological Corridors and Linkages as needed, and the less common conserved natural communities. Core Habitat has not been delineated for all species. Where it has not been delineated, Conservation Objectives are stated for either acres of Habitat or known occurrences.

The MSHCP Reserve System will be established within 21 Conservation Areas from the following components:

- Existing Conservation Lands, managed by local, state, or federal agencies, or non-profit conservation organizations
- Complementary Conservation
- Additional Conservation Lands

The MSHCP Reserve System will be assembled as shown below:

1996	2006	Lands
458,800	484,600	Existing federal lands in MSHCP Reserve System[1]
32,700	44,600	Existing state lands in MSHCP Reserve System
900	19,100	Existing non-profit organization lands in MSHCP Reserve System[2]
4,000	8,800	Existing Local Permittee Conservation lands in the MSHCP Reserve System
496,400	***557,100***	**SUBTOTAL**
69,290	29,990	Acres of Complementary Conservation
39,850	21,390	Acres to be acquired by state and federal agencies
~~7,500~~7,700	~~7,500~~7,700	Additional Local Permittee acres for which there will be cooperation to conserve
93,100	88,900	Acres to be acquired or otherwise conserved by the Local Permittees
10,800	10,800	Non-Permittee public and quasi-public lands
7,800	7,800	Fluvial sand transport area where the Conservation Objective is met through non-acquisition. Development consistent with Conservation Objectives is allowed.[3]
~~228,340~~228,540	***~~166,380~~166,580***	**SUBTOTAL - COMPLEMENTARY CONSERVATION AND ADDITIONAL CONSERVATION LANDS**
22,660	22,420	Potential Development within Conservation Areas from Table 5-1.
~~747,400~~747,600	***~~745,900~~746,100***	**TOTAL – CONSERVATION AREAS**

[1] The acreage includes lands purchased by non-profit organizations and donated to federal agencies.
[2] The acreage includes lands owned by non-profit organizations but acquired with State grant funds or local funds.
[3] These acres are in the Cabazon, Long Canyon, and West Deception Canyon Conservation Areas.

Implementation of the Plan must ensure that the Conservation Objectives delineated for each Conservation Area are achieved. Implementation relies on cooperation among all the signatories to the IA, including local, state, and federal agencies. Assembly of the MSHCP Reserve System is a necessary component of Plan implementation.

Existing Conservation Lands within Conservation Areas

The Conservation Areas contained approximately 496,400 acres of Existing Conservation Lands as of 1996. By November 2006, this had increased to approximately 557,100 acres. These are lands in public or private ownership that are managed for Conservation and/or open space values, and which contribute to the Conservation of the Covered Species and the conserved natural communities included in the Plan. Federal lands within the MSHCP Reserve System that will contribute to the Conservation of the Covered Species include lands administered by the BLM, BOR, NPS, USFWS, and USFS. State lands within the MSHCP Reserve System that will contribute to the Conservation of the Covered Species include lands administered by the CDFG, State Parks, CVMC, and UC. The federal and state Existing Conservation Lands are summarized in Table 4-2 in Section 4.1. The Local Permittees will cooperate to conserve identified Local Permittee-owned land in perpetuity in the MSHCP Reserve System. The existing Local Permittee and CVFTL HCP Mitigation Lands and their status are summarized in Table 4-3 in Section 4.1. Various non-profit conservation organizations own land in the MSHCP Reserve System, which they acquired for conservation purposes. CVCC will seek agreements with these non-profit organizations to ensure the permanent Conservation and management of these lands pursuant to the Plan, including providing access to the property for biological monitoring and management purposes. Non-profit conservation organization Existing Conservation Lands are shown in Table 4-4 in Section 4.1.

The Existing Conservation Lands include the CVFTL Preserve system established pursuant to the CVFTL HCP, approved in 1986. Three preserves were established: Coachella Valley (Thousand Palms), Whitewater River Floodplain, and Willow Hole-Edom Hill. As described in Section 16.2 of the IA, it is the Parties' intent that the lands acquired under the CVFTL HCP will be subsumed into and managed as part of the MSHCP Reserve System. The Coachella Valley fringe-toed lizard is a Covered Species under the MSHCP.

Complementary Conservation

Several acquisition efforts for conservation purposes pre-date the MSHCP, and are ongoing efforts expected to conserve approximately 29,990 acres in the MSHCP Reserve System from November 2006 on. These include BLM and USFS acquisition programs in the Santa Rosa and San Jacinto Mountains National Monument, BLM Wilderness inholdings acquisitions, and inholdings acquisitions in Joshua Tree National Park. These acquisition programs pre-date the MSHCP, have broader rationales than the MSHCP program, and are independent of the MSHCP effort. They complement implementation of the MSHCP, but are not a Permittee obligation for purposes of the authorization of Take.

Additional Conservation Lands

A minimum of 129,690 acres in the Conservation Areas will be conserved as Additional Conservation Lands, to be acquired or otherwise conserved through state and federal acquisitions and Permittee contributions. The Local Permittees will also protect the fluvial sand transport Essential Ecological Process on approximately 7,800 acres in the Cabazon, Long Canyon, and West Deception Canyon Conservation Areas through application of general plan land use designations and policies, and flood control guidelines.

Through the MSHCP and its IA, the federal and state governments have agreed to partner with the Local Permittees in assembling, managing, and monitoring Reserve Lands. The federal and state governments will acquire approximately 21,390 acres of privately owned lands (this federal and state obligation is beyond any mitigation obligations for Development authorized by Local Permittees pursuant to the Plan) in the Conservation Areas after November 2006, as well as manage certain federal and state Existing Conservation Lands in the MSHCP Reserve System, and participate in the Monitoring and Adaptive Management Program for Reserve Lands. The Permittees (Local and State) have an obligation to conserve approximately ~~115,140~~115,340 acres in the Conservation Areas through:

- Conservation of ~~7,500~~7,700 acres of currently non-conserved Local Permittee-owned lands. [See *Section 4.2.2.2.1*.]
- Conservation of 88,900 acres of Additional Conservation Lands by the Local Permittees and Caltrans through acquisition or other means, such as planning tools and land use regulation, and acquisition of 640 acres by State Parks (after 1996), of which 100 acres can be developed for State Park facilities. [See *Section 4.2.2.2.2*.]
- Management of 18,200 acres of Permittee Existing Conservation Lands consistent with the MSHCP. [See *Section 4.2.2.2.3*.]

In addition, the Permittees will maintain the fluvial sand transport Essential Ecological Process in the Cabazon, Long Canyon, and West Deception Canyon Conservation Areas as described in Section 4.2.2.2.4.

In addition to acquisition, land in the Conservation Areas may be conserved through dedication, deed restriction, or granting of a conservation easement in conjunction with Development approvals and conservation incentives. Habitat conserved through planning tools and land use regulation shall be protected, prior to issuance of a grading permit, by fee title transfer, granting a conservation easement to CVCC or other approved entity, or recordation of a deed restriction. Rights of access for monitoring and management of the lands by CVCC, the Wildlife Agencies, or their designees shall be provided.

Conservation Areas

The Plan will result in the establishment of the MSHCP Reserve System, assembled from lands within 21 Conservation Areas, which, combined with the Monitoring Program and the Management Program, are designed to achieve the following Conservation Goals:

1. Represent native ecosystem types or natural communities across their natural range of variation in a system of conserved areas.
2. Maintain or restore self-sustaining populations or metapopulations of the species included in the Plan to ensure permanent Conservation so that Incidental Take Permits can be obtained for currently Listed animal species and Non-listed animal species can be covered in case they are listed in the future.
3. Sustain ecological and evolutionary processes necessary to maintain the functionality of the natural communities and Habitats for the species included in the Plan.

4. Maximize connectivity among populations and avoid habitat fragmentation within Conservation Areas to conserve biological diversity, ecological balance, and connected populations of Covered Species.
5. Minimize adverse impacts from off road vehicle use, illegal dumping, edge effects, exotic species, and other disturbances in accordance with the Management and Monitoring Programs.
6. Manage the Conservation Areas adaptively to be responsive to short-term and long-term environmental change and new science.

Required Avoidance, Minimization, and Mitigation Measures

The Plan includes certain requirements for Covered Activities in the Conservation Areas to avoid, minimize, and mitigate impacts to bighorn sheep Habitat, Biological Corridors, burrowing owl, covered riparian bird species, crissal thrasher, desert tortoise, fluvial sand transport, Le Conte's thrasher, mesquite hummocks and mesquite bosque natural communities, triple-ribbed milkvetch, Palm Springs pocket mouse, and Little San Bernardino Mountains linanthus. These measures do not apply to single-family homes and any non-commercial accessory uses and structures including but not limited to second units on an existing legal lot. The measures have limited application to O&M activities. To assist Permittees with implementation of these measures, CVCC will maintain maps of modeled Habitat and a Natural Communities Map and provide them to each of the Permittees. CVCC will also maintain a list of Acceptable Biologists who may be used to conduct surveys for specified Covered Species. CVCC will also maintain a list of survey protocols approved by either or both CDFG and USFWS.

Land Use Adjacency Guidelines

The purpose of the Land Use Adjacency Guidelines is to avoid or minimize indirect effects from Development adjacent to or within the Conservation Areas. Such indirect effects are commonly referred to as edge effects, and may include noise, lighting, drainage, intrusion of people into the adjacent Conservation Area, and the introduction of non-native plants and non-native predators such as dogs and cats. Edge effects will also be addressed through reserve management activities such as fencing.

Anticipated Take and Habitat Loss

Anticipated Take for Covered Species for which Habitat distribution models have been developed is measured in terms of Habitat acres affected by the Covered Activities both outside and within the Conservation Areas. For purposes of this calculation, it is assumed that all non-federal lands outside the Conservation Areas may be subject to Take. This represents a worst-case scenario, and Take or Habitat loss at that level is not likely to occur within the 75-year term of the Take Permits. The acres of Take or Habitat loss were determined by overlaying Habitat maps with the Plan Area map, and calculating the Habitat areas outside the Conservation Areas. In addition, a small percentage of Take can occur within the Conservation Areas under the Plan. The amount of such Take or Habitat loss has been calculated for each species and natural community and is shown in the tables in *Section 4.6*.

E.S.5 Costs of and Funding for Plan Implementation

Costs for Plan Implementation

Plan implementation costs include the direct and indirect costs associated with land acquisition, the Monitoring Program, and the Management Program. Additional costs include staff costs associated with Plan administration. Cost projections are intended to provide a realistic estimate of the costs for Plan implementation. This also assists the Wildlife Agencies in determining if the Plan meets Permit issuance criteria. The actual costs over time may turn out to be more or less than those projected in this Plan.

As shown in Table 5-1, Conservation through acquisition and other means that needed to occur as of November 2006 for Reserve System Assembly was 159,680 acres. As described in Section 4.2, 29,990 acres of this is projected to occur through Complementary Conservation, leaving a balance of 129,690 acres. Of this, 10,800 acres are public-quasi public lands belonging to non-Permittees. As explained in Section 4.2.2.3, the Plan does not provide Take Authorization for activities on these lands and assumes that this acreage will be conserved through other means, which are not an obligation of the Permittees. That leaves a balance of 118,890 acres, of which 21,390 acres will be conserved by state and federal agencies as their Plan implementation contribution (this federal and state obligation is beyond any mitigation obligations for Development authorized by Local Permittees pursuant to the Plan). This includes 640 acres of acquisition by State Parks, of which 100 acres can be developed for State Park facilities, as one of its mitigation obligations as a Permittee. In addition to State Parks' acquisition, the Permittees will conserve an additional 97,500 acres through acquisition or other means. Of this, ~~7,500~~7,700 acres are already owned by Permittees and that acreage will be conserved through the Plan. Thus the Permittees will acquire or otherwise conserve 90,000 acres as of November 2006. For purposes of estimating the maximum Plan implementation costs, it is assumed that all the approximately 90,000 acres to be conserved by the Local Permittees will be purchased. The actual acreage acquired by the Local Permittees could be less if some land is conserved through conditions of approval on Development or other means.

The projected Permittees' costs for Plan implementation are shown in the following tables:

Summary of Permittees' Expenditures and Balances over the 75-Year Term of the Permits

Amount	*Item*
$115,414,000	Non-acquisition program administration costs (from Table 5-3b)
$254,294,000	Monitoring Program (from Table 5-3b)
$221,252,000	Management Program (from Table 5-3b)
$14,903,000	Adaptive Management (from Table 5-3b)
$526,705,000	Land acquisition costs (from Table 5-3c l)
$9,080,000	Land improvement costs (from Table 5-3c)
$24,565,000	Acquisition program administrative costs (from Table 5-3c)

Amount	*Item*
$5,000,000	Management Contingency Fund (from Table 5-3b
$1,171,213,000	**TOTAL Expenditures**
$860,741,000	Endowment Fund balance in Year 75 (from Table 5-3d)
$5,386,000	Fund balance in Operating Fund in Year 75 (from Table 5-3b)
$1,200,000	Repayment of Conservation Trust Fund advance to complete Plan
$2,038,540,000	***TOTAL***

In addition to the Permittees' monitoring and management responsibilities described in the preceding sections, CVWD and MSWD have~~s~~ additional responsibilities, the costs of which are not included in the cost and revenue projections presented in Section 5. CVWD is required to fund the costs of the following:

- Establishing and providing a permanent water source for permanent Habitat for the California black rail and Yuma clapper rail in the Coachella Valley Stormwater Channel and Delta Conservation Area. See Section 4.3.20.
- Establishing and providing a permanent water source, as needed, for riparian Habitat for Covered riparian bird Species in the Coachella Valley Stormwater Channel and Delta Conservation Area. See Section 4.3.20.
- Establishing and providing a permanent water source for desert pupfish Habitat, and developing and implementing a monitoring and adaptive management program for desert pupfish in the agricultural drains and flood control channels. See Section 4.3.20.
- Restoring and enhancing mesquite and Coachella Valley round-tailed ground squirrel Habitat on CVWD land in the East Indio Hills Conservation Area if a study undertaken by the CVCC demonstrates the feasibility of mesquite restoration, and providing water, as needed, for maintaining the mesquite once established. See Section 4.3.15.

As a signatory to the IA, MSWD will be responsible for the costs of implementing the following:

- Providing funds to be used for water monitoring wells or other means of gathering data on groundwater levels related to mesquite hummocks, to enhance understanding of the hydrological regimes that support mesquite hummocks in the CVMSHCP area and provide baseline data for the ongoing monitoring of mesquite hummocks. See Section 6.6.1.
- Providing funds to CVCC to be used for the removal of non-native tamarisk from the Willow Hole Conservation Area, to improve the water available to mesquite hummocks. See Section 6.6.1.
- Contributing to and participating in research conducted by CVCC to evaluate the relationship between mesquite hummocks and groundwater through the Monitoring Program. MSWD will contribute to and participate in this research for the mesquite hummock areas within their district boundary. See Section 6.6.1.
- Working with CVCC, the Wildlife Agencies, and other relevant Permittees to identify and implement a plan to enhance, restore, and maintain the mesquite hummocks natural community and to address changed circumstances, identified in the CVMSHCP, that affect this natural community as a part of their CVMSHCP implementation activities. See Section 6.6.1.

Funding for Plan Implementation

To accomplish the acquisition program in 30 years and fund the Monitoring Program and the Management Program endowment in 75 years, the Permittees will use a combination of annual revenues and debt financing in the form of the issuance of revenue bonds. This would provide the necessary funding for acquisition and establishment of the endowment in advance of the collection of all the revenue needed for those purposes.

The Permittees and the Wildlife Agencies will annually evaluate the performance of the funding mechanisms and, notwithstanding other provisions of the Plan, will develop any necessary modifications to the funding mechanisms to address additional funding needs. If deficiencies are identified through this evaluation, then the Permittees and the Wildlife Agencies will develop strategies to address any additional funding needs consistent with the terms and conditions of the Plan. The funding plan is intended to keep the rate of Conservation of Permittee Additional Conservation Lands roughly proportional with the amount of Development occurring in the Plan Area.

Summary of Revenue Sources

Amount	*Revenue Source*
$516,802,000	Local Development Mitigation Fee (from Table 5-3c)
$227,604,000	Conservation Trust Fund (from Table 5-3b)
$31,077,000	Regional Road Projects Mitigation (Measure A Sales Tax total contribution to acquisition and endowment; and freeway interchange/associated arterials contribution to endowment)
$~~60,208,000~~60,318,000	Regional Infrastructure Mitigation (Caltrans, CVWD, ~~and~~ IID, and MSWD contributions to acquisition and endowment)
$247,500,000	Eagle Mountain Environmental Mitigation Trust Fund (from Table 5-3b)
$3,200,000	Transfer from CVFTL HCP Endowment
$952,149,000	Interest on Investments (from Tables 5-3b, 5-3c, and 5-3d; interest generated on money in the Operating Fund, the Land Acquisition and Improvement Fund, and the Endowment Fund)
$2,038,540,000	***TOTAL Revenues***

If at the end of any five (5) year period the "rough proportionality" test has not been met, the Local Permittees and the Wildlife Agencies will meet within ninety (90) days to begin to develop a strategy to address the need for a balance between Conservation and Development.

Maintaining the Permits does not depend on the state and federal governments' adhering to any specific schedule for land acquisition, nor on any specific appropriations to state and federal agencies for land management. State and federal agencies, including BLM, USFS, NPS, USFWS, Wildlife Conservation Board (WCB), CDFG, and CVMC, may receive funds from a variety of sources to implement their obligations under the Plan. Potential state and federal funding sources include, but are not limited to:

- State appropriations
- Federal Land and Water Conservation Fund
- Land exchange
- State Bond Acts
- FESA Section 6 funds.

E.S.6 Plan Implementation

Organizational Structure

Implementation of the Plan will be overseen and administered by the Coachella Valley Conservation Commission (CVCC), a joint powers authority formed by the Local Permittees pursuant to the requirements of the California Government Code and other appropriate legal authorities. CVCC shall sign the IA and shall be a Permittee under the Permits. CVAG shall organize the first meeting of CVCC representatives who will formally establish CVCC and adopt its by-laws consistent with all applicable legal requirements. CVCC is comprised of members of

the Riverside County Board of Supervisors ~~whose districts include a portion of the Plan Area~~, an elected official from each of the Cities, and a member of the Board of Directors of CVWD, ~~and a member from~~ IID, and MSWD. Each of these entities may also designate an alternate, who shall also be an elected official. Each voting member of CVCC shall have one vote at meetings of CVCC. CVCC shall provide the policy direction for the implementation of the MSHCP and will provide opportunities for public participation in the decision-making process. The duties of CVCC and its Executive Director are enumerated in Sections 6.1.1.2 and 6.1.1.3.

To assist in implementing its duties under the MSHCP, CVCC shall form an Acquisition and Funding Coordinating Committee to provide input on funding priorities and Permittee acquisitions. Acquisitions will be only from a willing seller at market value as determined by an appraisal.

The Reserve Management Oversight Committee (RMOC) is the primary inter-agency group that will coordinate implementation of the conservation plan. The RMOC shall report to CVCC and shall be assembled within one hundred twenty (120) days of the issuance of the Permits. CVCC shall appoint the chair of the RMOC from among those listed below. The RMOC shall be composed of, at a minimum, one representative each from BLM, CDFG, State Parks, CVCC, USFWS, County, and up to five other private or public entities that hold land dedicated to Conservation within the MSHCP Reserve System as appointed by CVCC. NPS and USFS will be *ex officio* members. The duties of the RMOC are set forth in Section 6.1.3.

Within one hundred twenty (120) days of the issuance of the Permits, a Reserve Management Unit Committee (RMUC) shall be established by CVCC for each of the Reserve Management Units (RMUs), which are geographic areas within the MSHCP Reserve System where coordinated management by different entities is needed to achieve the Conservation Objectives. RMUs consist of one or more Conservation Areas and were identified based on ownership and natural community patterns and similarities of anticipated management needs. Six RMUs have been designated and are described in Section 6.1.4. A Land Manager, as identified in Section 6.1.5, shall represent CVCC and the Local Permittees, on the RMUCs. Through the Land Manager's participation in the RMUCs, CVCC will ensure that management of Local Permittee Mitigation Lands is consistent with the Plan Conservation Goals and Objectives. Through the RMUCs, CVCC will also seek to coordinate land management with the other entities that manage conservation land in the RMUs to optimize the management of all conserved land. The RMUCs' duties and responsibilities are described in Section 6.1.4.

The CVCC is responsible for Monitoring Program Administration. Final responsibility will rest with the CVCC Executive Director. The Executive Director may appoint a staff member as his or her designee for purposes of overseeing Monitoring Program Administration, but ultimate responsibility will remain with the Executive Director. Day to day responsibility for Monitoring Program Administration will be part of the contract for the Monitoring Program, and a specific individual will be identified by the contractor as the Monitoring Program Administrator (MPA). That individual will report to the CVCC Executive Director or his/her designee. To ensure that Monitoring Program Administration is adequately addressed the CVCC shall consult with the Wildlife Agencies regarding the provisions for the MPA in developing the Request for Proposals for the Monitoring Program contract.

CVCC or its designee shall work with the RMUCs to develop a MSHCP RMU Plan (RMUP) for review and approval by the RMOC to define specific management actions,

schedules, and responsibilities. The RMUP shall be prepared within three years after Permit issuance, and may be composed of a series of coordinated plans for each of the RMUs. The RMUP shall incorporate the general management measures and Adaptive Management activities in Section 8 with appropriate refinements. The RMUP shall generally contain the following elements:

Annual Reporting

To ensure that the Permittees are in compliance with the Plan, there will be an Annual Report prepared by CVCC and submitted to the Wildlife Agencies and Permittees. The Annual Report will include an overview of the status of the Conservation Areas; results of the Monitoring Program and the Management Program, identification of Adaptive Management actions, and whether or not such actions were implemented; a description of reserve management activities for the previous year; and an accounting of the number of acres acquired (in fee or conservation easement), conserved through MOUs for cooperative management, or otherwise protected during the previous year to achieve identified Conservation Objectives; an evaluation of any significant issues encountered in Plan implementation during the previous year and their proposed resolution; expenditures for acquisition and Reserve Lands management over the previous year and applicable budgets for the upcoming fiscal year; and a summary of compliance activities required of Permittees such as adoption of ordinances, general plan changes, etc. This information will be used to delineate the progress made toward achieving each of the Plan's Conservation Goals and Objectives and to demonstrate that the Species Conservation Goals and Objectives remain achievable.

Rough Step and Rough Proportionality Analyses

The MSHCP Reserve System will be assembled over time and, when assembly is completed, must be in a configuration, and contain suitable Habitats (both location and acres), that provide for the Conservation of Covered Species. Acquisition is an essential component of Reserve System Assembly. As the Additional Conservation Lands are acquired, the Parties and the public must be able to determine that:

1. Lands being conserved within the Conservation Areas achieve the Conservation Goals and Objectives for Covered Species;
2. Development on lands within the Conservation Areas is not substantially reducing the opportunity to conserve the Additional Conservation Lands and thereby protect those areas that are critical to meeting Covered Species and natural community Conservation Goals and Objectives; and
3. Acquisition priorities at any point in time are appropriately focused on conserving parcels within the Conservation Areas needed to meet Covered Species and conserved natural communities Conservation Goals and Objectives.

To assist the Parties in this evaluation, there will be an annual Rough Step analysis conducted by the CVCC for each Conservation Area. The annual Rough Step analysis will be done for each Conservation Objective**.** In addition, a real-time Rough Step analysis will be prepared for a Conservation Area whenever a Development is proposed in that Conservation Area. Rough Step analysis ensures, on an annual basis, that Conservation of Additional

Conserved Lands is within 10% of the level needed to stay in balance with the level of Development. If the Rough Step rule is not met during any analysis period, the Permittees must conserve appropriate lands necessary to meet a specific Conservation Objective within the Rough Step Analysis Unit to bring the Plan back into the parameters of the rule prior to authorizing additional loss of the Core Habitat, Essential Ecological Process area, Biological Corridor or Linkage, or natural community for which the rule was not achieved.

Obligations of the Permittees

The Local Permittees will conserve 96,400 acres (inclusive of Caltrans' obligation) in the Conservation Areas. Of this, ~~7,500~~7,700 acres are already owned by Permittees and that acreage will be conserved through the Plan. The Local Permittees shall establish an endowment to fund the Monitoring and Management Programs for those lands in perpetuity. The Local Permittees shall also fund an endowment for the Monitoring and Management Programs. The Local Permittees must also comply with all other terms and conditions of the MSHCP, including, but not limited to ensuring achievement of the Plan's Conservation Objectives in each Conservation Area and attainment of the Species Conservation Goals and Objectives, ensuring that Habitat preservation is occurring in rough proportionality with Development and that Reserve Assembly occurs as contemplated in the MSHCP; and imposing adopted Local Development Mitigation Fees.

For purposes of overseeing compliance with the requirements of the MSHCP and the IA, a Joint Project Review Process shall be instituted by CVCC. This process shall in no way limit the Local Permittees' land use authority. The purpose of the Joint Project Review Process is to allow CVCC to facilitate and monitor implementation of the MSHCP. CVCC staff shall participate in the Joint Project Review Process to ensure consistent Plan implementation and oversight. CVCC shall have neither jurisdiction over land use decisions by Permittees, nor the authority to prevent a Permittee from approving a project. The application will not be deemed complete by the Permittee prior to completion of CVCC Joint Project Review Process. The review process is described in Section 6.6.1.1.

To mitigate the impacts of the interchange and related arterial projects identified in Section 7.2.1, Caltrans, CVAG, and CVCC will acquire 1,795 acres in Conservation Areas in accordance with the mitigation matrix shown in Section 6.2 of Appendix I to contribute to Plan implementation and contribute $1,077,000 to the endowment for the Monitoring Program, Management Program, and Adaptive Management of those lands. To mitigate the impacts of those transportation projects identified as Covered Activities in Section 7.2.3, CVAG shall contribute $30 million from Measure A or other funds toward acquisition and the Monitoring Program, the Management Program, and Adaptive Management. If the Permits issued in conjunction with the Plan are ever suspended or revoked, these transportation projects will, as described in the IA, be mitigated through the establishment of a conservation bank that incorporates and recognizes the contributions made by CVAG to Plan implementation as adequate mitigation for the projects.

The State Permittees are Caltrans, CVMC, and State Parks. Caltrans' obligations under the Plan include: (1) not later than in three phases in 2005, 2010, and 2015 acquire and convey to CVCC or provide sufficient funding to the CVCC to acquire 5,791 acres of Additional Conservation Lands in the Conservation Areas as a contribution to Plan implementation for

Caltrans' Covered Activities; (2) not later than in 2011 provide $7.6 million to CVCC for the monitoring, management, and Adaptive Management of the approximately 5,791 acres referenced above; and (3) implement all applicable avoidance, minimization, and mitigation measures identified in Section 4.4 for Caltrans' Covered Activities, and comply with Land Use Adjacency Guidelines set forth in Section 4.5, where applicable.

CVMC will cooperate with CDFG and other agencies as appropriate to ensure management and monitoring of the approximately 2,600 acres of CVMC Existing Conservation Lands and any additional lands CVMC acquires in the Conservation Areas.

State Parks will participate as a member of the RMUC for RMUs within which State Parks manages lands; provide for the management and monitoring of the 6,800 acres of State Parks Existing Conservation Lands in the MSHCP Reserve System and any additional lands it acquires in the Conservation Areas; and implement all applicable avoidance, minimization, and mitigation measures identified in Section 4.4 for State Parks' Covered Activities, and comply with Land Use Adjacency Guidelines set forth in Section 4.5, where applicable.

Review of State Permittee Projects within the Conservation Areas

The Wildlife Agencies and the appropriate State Permittee shall jointly review proposed State Permittee projects that are within the Conservation Areas. State Permittees shall submit project information to the Wildlife Agencies and CVCC, including, at a minimum, a project description and a concept map indicating the location of the proposed project. The Wildlife Agencies or State Permittee may schedule a meeting to discuss a proposed project. CVCC shall be invited to participate in this meeting.

Actions by Federal and State Governments

The Wildlife Agencies will contribute to Plan implementation by monitoring and managing their lands in the Conservation Areas in a manner consistent with achieving the Plan's Conservation Goals and Conservation Objectives. The Wildlife Agencies will participate in a coordinated Biological Monitoring Program, and will facilitate ecological research or restoration activities by other entities on federal and state lands that benefit MSHCP resources. The Wildlife Agencies will acquire Additional Conservation Lands in the Conservation Areas. The Wildlife Agencies will review the Annual Report prepared by CVCC and will meet annually with Local Permittees to discuss progress in implementing the Plan. The Wildlife Agencies will expeditiously review proposed boundary adjustments and Plan or Permit amendments, and expeditiously determine conservation measures needed and conservation responsibilities for newly Listed Species and species proposed for listing that are not on the Covered Species list.

Time Frame for Implementation

The Permits will be for a 75-year term. The MSHCP Reserve System will be assembled as described in Section 4.2. The non-acquisition components of MSHCP Reserve System Assembly will be ongoing for the life of the Plan. The acquisition component of Reserve System Assembly is anticipated to occur in the first 30 years of the Permits. The rate at which land in the Conservation Areas is acquired will depend on the availability of funds and Development patterns. Rough proportionality will be maintained between Conservation and Development. If

the Local Permittees do not maintain the rough proportionality between Development and Conservation, the Wildlife Agencies, CVCC and other applicable Local Permittees shall meet to discuss potential actions to meet the Plan's rough proportionality requirements. In the event that these Parties do not reach agreement on such potential actions, the Wildlife Agencies may initiate revocation or suspension of all or part of the Permits as set forth in Section 23.5 of the IA.

Assurances for Unforeseen and Changed Circumstances

In accordance with the Habitat Conservation Plan Assurances Rule (No Surprises Rule; 63 Federal Register 8859, as codified in 50 C F.R. Sections 17.3, 17.22[b] and 17.32[b]), it is acknowledged that the purpose of the Coachella Valley MSHCP is to provide for the Conservation of Covered Species and the mitigation, minimization and compensatory measures required in connection with Incidental Taking of the Covered Species in the course of otherwise lawful and permitted activities within the MSHCP Plan Area. Accordingly, except as otherwise required by law and/or provided under the terms of the MSHCP and except for Unforeseen Circumstances, no further mitigation or compensation shall be required by the USFWS to address impacts of Covered Activities undertaken by the Permittees, entities with Third Party Take Authorization, and Participating Special Entities, pursuant to FESA. Pursuant to 50 Code of Federal Regulations (C.F.R.), Sections 17.22(b)(5) and 17.32(b)(5), the USFWS shall not require from the Permittees, entities with Third Party Take Authorization, Participating Special Entities, or other individuals or entities receiving Take Authorization under the Permits the commitment of additional land or financial compensation or additional restrictions on the use of land or other natural resources with regard to Covered Activities and their impact on Covered Species beyond that provided pursuant to the Coachella Valley MSHCP, provided that the Permittees are properly implementing the Plan, the IA and the Permits. In the event that the USFWS makes a finding of Unforeseen Circumstances and such Unforeseen Circumstances warrant the requirement of additional mitigation, enhancement or compensation measures, any such additional measures shall be restricted to modification of the management of the Additional Conservation Lands, and shall be the least burdensome measures available to address the Unforeseen Circumstances. Unforeseen Circumstances are defined and described in Section 6.8.1.

Changed Circumstances

Changed Circumstances are defined under the Federal "No Surprises" rule as "changes in circumstances affecting a Covered Species or geographic area covered by a conservation plan, including the MSHCP, or agreement that can reasonably be anticipated by plan or agreement developers and USFWS and that can be planned for." Changed Circumstances potentially affecting the MSHCP Reserve System are defined as future events for which it is reasonably foreseeable that such an event may occur during the life of the MSHCP Permit, and that such an event may negatively affect the Covered Species and/or their associated Habitat within the MSHCP Reserve System. Changed Circumstances addressed by the MSHCP include drought, fire, invasion by exotic species, lowering of the water table, and new listings of species not covered by the Plan. These are described in detail in Section 6.8.3.

Pursuant to the No Surprises Rule at 50 C.F.R. 17.22(b)(5)(ii), the USFWS may not require (1) any conservation or mitigation measures in addition to those provided for in the Plan in response to a Changed Circumstance; or (2) additional conservation or mitigation measures

for any Changed Circumstance that is not identified in the Plan without the consent of the Permittees, provided the Permittees are properly implementing the MSHCP Plan. As recognized in the No Surprises Rule at 50 C.F.R. 17.22(b)(6) and 17.32(b)(6), the USFWS, any federal, state or local agency, or a private entity may take additional actions at their own expense to protect or conserve a Covered Species within the MSHCP Plan Area.

Section 7 Consultations

USFWS shall evaluate the direct, indirect, and cumulative effects of the Covered Activities in its internal FESA Biological Opinion issued in connection with the MSHCP and issuance of the Section 10(a) Permit. As a result, and to the maximum extent allowable, in any consultation under Section 7 of FESA subsequent to the Effective Date involving the Permittee(s) or entity with Third Party Take Authorization with regard to Covered Species and Covered Activities, USFWS shall ensure that the FESA Biological Opinion issued in connection with the proposed project that is the subject of the consultation is consistent with the internal FESA Biological Opinion. Such project must be consistent with the terms and conditions of the MSHCP and the IA. Any reasonable and prudent measures included under the terms and conditions of a FESA Biological Opinion issued subsequent to the Effective Date with regard to the Covered Species and Covered Activities shall, to the maximum extent appropriate, be consistent with the implementation measures of the MSHCP and the IA. USFWS shall not impose measures in excess of those that have been or will be required by the Permittee(s) or entity with Third Party Take Authorization pursuant to the MSHCP and this Agreement.

The Plan does not address Section 404 of the Clean Water Act. Projects that currently require a Section 404 permit will continue to do so notwithstanding the Plan. USFWS, in administering its responsibilities with respect to consulting with the U.S. Army Corps of Engineers (ACOE) on Section 404 permits, will encourage the adoption of project proposals and conservation measures consistent with the objectives of the Plan. To the maximum extent allowable by law, adoption of these conservation measures shall be deemed to satisfy the requirements of FESA and NEPA for Covered Species.

State Assurances

Pursuant to California Fish and Game Code Section 2820(f), CDFG "may provide assurances for plan participants commensurate with long-term conservation assurances and associated implementation measures pursuant to the approved plan." Further, in accordance with California Fish and Game Code Section 2820(f)(2), if there are Unforeseen Circumstances, additional land, water, or financial compensation, or additional restrictions on the use of land, water, or other natural resources shall not be required without the consent of the Permittees for a period of time specified in the IA, unless CDFG determines that the Plan is not being implemented consistent with the substantive terms of the IA.

Relationship to Existing Wetland Regulations

Projects that affect wetland natural communities shall be required to comply with the applicable regulatory standards related to wetlands functions and values. The purpose of this discussion is to identify current regulatory processes and indicate their relationship to the process set forth in the MSHCP. It should be noted that current wetland regulatory processes beyond the process described in this section are not relied upon for coverage of species addressed in the MSHCP. Many wetland communities (e.g., freshwater marsh, riparian forests, riparian woodlands, open water, flood channel, river and stream beds) within the Plan Area include areas subject to California Fish and Game Code (CFG Code) Section 1600 et seq. and the federal Clean Water Act (Sections 401, 402 and 404). Such areas will continue to be regulated by state and federal agencies. The ACOE shall continue to consult with the USFWS pursuant to Section 7 of the FESA on projects that may affect federally listed species within ACOE jurisdictional wetlands and waters. The CDFG shall continue to work closely with the ACOE, USFWS, and local jurisdictions to ensure that the CDFG Code Section 1600 et seq. agreements are consistent with the mitigation required for Covered Species. In addition, other existing regulations related to wetland Habitats, such as the Porter-Cologne Act shall continue to apply.

Modifications, Like Exchanges to Conservation Areas, and Amendments to the MSHCP

MSHCP modifications and amendments are not anticipated on a regular basis. However, certain events may trigger modifications or Minor or Major Amendments to the MSHCP. Any signatory to the IA may seek a modification or amendment to the MSHCP.

Clerical changes to the MSHCP shall be made by the CVCC on its own initiative or in response to a written request submitted by any Permittee or Wildlife Agency, which includes documentation supporting the proposed clerical change. Clerical changes shall not require any amendment to the MSHCP, the Permits or the IA. Clerical changes include corrections of typographical, grammatical, and similar editing errors that do not change the intended meaning and corrections of any maps or exhibits to correct insignificant errors in mapping. The Parties anticipate that most clerical changes to the MSHCP will occur during the first ten (10) years of the Permits. Annual Reports shall include a summary of clerical changes made to the MSHCP in the preceding calendar year.

The Parties agree that the adoption and amendment of general plans, specific plans, community plans, zoning ordinances and similar land use ordinances, and the granting of implementing land use entitlements by the County and the Cities are matters within the sole discretion of the County and Cities and shall not require amendments to the IA, MSHCP, or the Permits, or the approval of other Parties to the IA. However, the Parties agree that: (1) no such action by the County or the Cities shall in any way alter or diminish their obligations under the IA, the MSHCP, or the Management and Monitoring Program; and (2) approval of certain projects may lead to revocation or suspension of the Permits pursuant to Section 23.5 of the IA.

Except as otherwise provided, changes to avoidance, minimization, compensation and MSHCP Conservation Area management strategies developed through and consistent with the Adaptive Management Program described in Section 8 of this document shall not require any amendment to the MSHCP, the IA, or the Permits.

The design of the Conservation Areas focused on natural communities, Core Habitat for Covered Species, Essential Ecological Processes, Biological Corridors and Linkages. The natural communities and Covered Species also occur outside of the Conservation Areas. In some instances it may be possible to achieve the Plan's Conservation Goals while not increasing the level of Take analyzed in the Plan through a different configuration of one or more Conservation Areas. Like Exchanges are changes proposed by a Permittee to modify the boundary of one or more Conservation Areas in exchange for reducing or modifying the boundary of a Conservation Area. A Like Exchange must result in equal or greater benefits to Covered Species and natural communities as compared to those benefits analyzed in the Plan. In addition, the level of Take of Covered animal species, habitat loss for Covered Species, and loss of acres of conserved natural communities must be no greater than that analyzed in the Plan. The criteria and procedures are described in Section 6.12.2.

Minor Amendments are amendments to the MSHCP of a minor or technical nature where the effect on Covered Species, level of Take, and Permittees' ability to implement the MSHCP are not significantly different than those described in the MSHCP as originally adopted. Minor Amendments to the MSHCP shall not require amendments to the IA or the Permits. The types of Minor Amendment are described in Section 6.12.3. Some types require Wildlife Agencies' concurrence.

For the Minor Amendments requiring Wildlife Agencies' concurrence, any non-concurrence must occur within 60 days of receipt of written notice as referenced above. If the Wildlife Agencies concur, or if they fail to respond within the 60-day period, the Minor Amendment may be approved.

Major Amendments are those proposed changes to the MSHCP and the Permits that are not modifications or Minor Amendments. Major Amendments to the MSHCP shall require a subsequent amendment to the IA and the Permits, and public notice as required by applicable laws and regulations. The CVCC shall submit any proposed Major Amendments to the Wildlife Agencies. Major Amendments are described in Section 6.12.4. Major Amendments shall require the same process followed for the original MSHCP approval. A Major Amendment will require an amendment to the MSHCP and the IA addressing the new circumstances, subsequent publication and public notification, CEQA/NEPA compliance and intra-Service Section 7 consultation, if one is deemed necessary. Major Amendments shall be subject to review and approval by the CVCC and other Permittees as appropriate, at a noticed public hearing. The Wildlife Agencies shall use reasonable efforts to process proposed Major Amendments within one hundred twenty (120) days after approval by the Permittee(s).

Annexations

Each of the Permittees shall enforce the terms of the Plan and the IA with respect to all individuals or entities subject to its jurisdiction, including lands in the Plan Area annexed into the Permittee's jurisdiction after Plan approval. Any land annexed within the MSHCP Plan Area shall receive Take Authorization pursuant to the Permits, provided the Minor Amendment requirements of Section 20.4 of the IA have been met. If the Minor Amendment requirements cannot be met, a Major Amendment will be required.

In the event of the deannexation of any land within the Plan Area to another jurisdiction that is not a Permittee, the Parties shall seek to enter into an agreement among the Permittees, the Local Agency Formation Commission (LAFCO), the annexing jurisdiction, and the Wildlife Agencies as part of the annexation process to ensure that any Development of the annexed lands proceeds in accordance with the Conservation Objectives of all affected Conservation Areas. If an agreement can be reached, that jurisdiction shall become a Permittee after executing an addendum to the IA. If agreement cannot be reached, or if the MSHCP requirements are not imposed by LAFCO, then the deannexed land will not receive Take Authorization pursuant to the Permits. Additionally, such deannexation may result in the revocation or suspension of the Permits pursuant to Section 23.5 of the IA. Parties with deannexed land that qualify as Participating Special Entities may receive Take Authorization as set forth in Section 11.7.1 of the IA.

E.S.7 Take Authorization for Covered Activities and Term of Permit

The proposed action is the issuance of long-term (75-year) Permits for the Take of Covered Species (animal species) to the Permittees. Covered Species include both Listed and Non-listed Species that are adequately conserved by the Plan. The Permits provide for the Take of these species or loss of their Habitat, so long as compliance with the Plan requirements is achieved. Although fully protected species are included in the list of Covered Species, Take of these species is not authorized in the NCCP Permit and is prohibited by the California Fish and Game Code. The following species in the MSHCP are fully protected under the California Fish and Game Code: (1) Peninsular bighorn sheep; (2) Yuma clapper rail; and (3) California black rail. The CDFG acknowledges and agrees that if the measures set forth in the MSHCP are fully complied with, the Covered Activities are not likely to result in Take of these species.

Covered Activities outside Conservation Areas

The Permits will provide Take Authorization for the following types of Covered Activities outside Conservation Areas:

- Development permitted or approved by Local Permittees.
- Public facility construction, operations and maintenance, and safety activities by the Local Permittees for existing and future facilities, including both on and off site activities.
- Emergency response activities by Permittees required to protect the public health, safety, and welfare.

The MSHCP does not provide Take Authorization for agricultural operations.

Transportation Projects within and outside Conservation Areas

The Permits will provide Take Authorization for the following Caltrans' interchange projects: Indian Avenue I-10 Interchange, Palm Drive/Gene Autry Trail I-10 Interchange, Date Palm Drive I-10 Interchange, Bob Hope Drive I-10 Interchange, and Jefferson Avenue I-10 Interchange. Widening of the local arterials associated with these interchange projects are also Covered Activities; these are shown in Table 7-1 in Section 7.2.1. The Caltrans' projects listed in Table 7-2 in Section 7.2.2 are also Covered Activities. The Plan also provides Permits for the local transportation projects shown in Table 7-3 in Section 7.2.3.

County Flood Control Projects within Conservation Areas

The Permits will provide Take Authorization for the construction, operation, and maintenance of the flood control facilities shown in Tables 7-8a and 7-8b in Section 7.3.

Covered Activities in Conservation Areas

The Permits will provide Take Authorization for the following Covered Activities in Conservation Areas:

- ***Construction and maintenance of trails, public access facilities, and campground facilities, except on federal land, as provided for in this Plan consistent with the Species Conservation Goals and the Conservation Objectives for the Conservation Areas, and consistent with the guidelines for trails and public access in Section 7.3.4.2***.
- ***Specific projects and operation and maintenance activities listed in Tables 7-1 through 7-11.***
- ***Development permitted or approved by Local Permittees***.
- ***Expansion of mining operations on non-federal land***.

For additional details, see Section 7.3.1.

The Permits do not provide Take Authorization for agricultural operations.

The Take Authorization does not cover approved Development Projects with legal vested rights as of the date the Permits are issued. Development Projects with legal vested rights (as of the date of Permit issuance) could obtain take coverage if the applicable Permittee requires the Project Applicant comply with all applicable Plan requirements. Alternatively, a Project Applicant with legal vested rights (at the time of Permit issuance) could seek Take Authorization directly from the Wildlife Agencies.

Covered Operation, Maintenance, and Safety Activities within Existing Rights-of-Way or Easements

Section 7.3.1.1 describes the types of activities that may occur in conjunction with the projects delineated in Tables 7-1 through 7-12. As indicated in the tables, some of these activities are subject to the applicable avoidance and minimization measures described in Section 4.4.

Allowable Uses in Conservation Areas

The following activities are considered to be compatible with the Species Conservation Goals and Conservation Objectives on non-federal Reserve Lands.

- ***Emergency, safety, and police services.***
- ***Emergency response activities by Permittees required to protect the public health, safety, and welfare***.

  For additional discussion, see Section 7.3.2.1.

Section 7.3.2.2 describes pesticide use as an Allowable Use inside and outside the Conservation Areas as follows:

Pesticide use. Pesticide use on non-Covered Species is an Allowable Use, but any Take of Covered Species resulting from toxicological effects of the use of pesticides pursuant to applicable requirements is not a Covered Activity.

Compatible Activities

Activities that may occur on non-federal Reserve Lands and are Covered Activities are:

- ***Emergency repairs by Permittees of public infrastructure facilities***.
- ***Reserve management and monitoring.***

For additional details, see Section 7.3.3.1.

The Permits will provide Take Authorization for the construction of specified trails and for the use of identified trails on non-federal land. The names of all the trails, both on federal and non-federal land, are provided in the Plan for informational purposes to provide context for the reader. The portions of the trails on federal land are subject to a separate permitting process through a Section 7 consultation between BLM and USFWS. That process is anticipated to be a parallel action to the MSHCP. Use of trails on CDFG land is subject to the regulations of the California Fish and Game Commission. The MSHCP trails planning process has coordinated with CDFG to seek CDFG concurrence on trail use on CDFG land.

The trails management program in the Santa Rosa and San Jacinto Mountains Conservation Area has adopted an Adaptive Management approach with an emphasis on research. The Trails Plan will initially focus on multi-agency scientific data gathering to evaluate the effects of recreational trail use on Peninsular bighorn sheep health, habitat selection, and

long-term population dynamics. The overarching goal of this research program is to obtain empirical data from the Plan Area to guide trails management. This research program will be coordinated with monitoring of human trail use, and will be integrated with educational and public awareness efforts, and other trail management prescriptions.

The trails management program is composed of eight elements, which are described below. In addition, the public use and trails management plan addresses other public access issues, such as dogs and cross country travel, in Section 7.3.3.2.2. The eight elements, detailed in the following sections, are summarized here: (1) use of existing trails, which will remain open all year; manipulation of use levels on some trails may occur as part of the research program; (2) initiation in Plan year 1 of a research program designed to ascertain bighorn sheep response to, and any significant adverse impacts from, recreational trail use in the Santa Rosa and San Jacinto Mountains. This research may include manipulation or limitation of use levels or closures on selected trails as an element of the study design to address specific hypothesis-based research questions; (3) gathering of data on human trail use, primarily on trails within sensitive bighorn sheep lambing habitat and other trails as appropriate. A year-round mandatory self-issue permit system for selected trails, and other methods as appropriate, will be part of the human use monitoring program. Ongoing monitoring of bighorn sheep populations will be expanded to include regular monitoring of the distribution, abundance, recruitment, survival and cause-specific mortality of bighorn sheep throughout the Plan Area; (4) closure of three trails from June 15 through September 30 to minimize the potential impediments for access to water by bighorn sheep and other wildlife during the hot season; (5) deferral of construction of new trails, pending the results of the initial research program, monitoring of trail use, and monitoring of bighorn sheep populations; (6) implementation of a public awareness and education program; (7) annual review of the effectiveness of the public use and trails management program, including results of monitoring, research, and trail management prescriptions. This annual review will consider prudent management actions, including potential trail closures, in response to scientific data or sheep population declines below identified threshold levels; and (8) rerouting and decommissioning of trails to protect sensitive resource values, pending results of the five-year research program.

Due to specific resource concerns associated with the Art Smith Trail and the Mirage Trail, management actions to benefit Peninsular bighorn sheep recovery are addressed separate from the Trails Plan and will be initiated prior to issuance of the Take Permits. These actions include rerouting the easternmost segment of the Art Smith Trail to incorporate the southern Schey Trail; restricting access to Dead Indian Canyon and the decommissioned segment of the Art Smith Trail, including the constructed segment of the trail that begins at the Art Smith Trailhead and proceeds westerly along the south side of Dead Indian Canyon; constructing the Hopalong Cassidy perimeter trail; closing the upper portion of the northern Schey Trail; providing an alternate access to the Mirage Trail; closing the upper Mirage Trail; and implementing an education, signage, and enforcement program to support these actions. Environmental documentation for, and approval of, these actions are separate from the Trails Plan.

The Trails Management Subcommittee will annually review effectiveness of the overall public use and trails management program. Annual review will include progress reports and recommendations from the researcher(s) working on bighorn sheep within the Plan Area; an assessment of bighorn sheep population trends; recreational trail use data; compliance with the

hot season closures, mandatory self-issue permits, and other trail management prescriptions; and other new data acquired.

Until such time as the initial phase of the monitoring and research program is completed [see Trails Management Program Elements (2) and (3) above], the annual review will consider the best information available to evaluate the public use and trails management program and any effects on the Peninsular bighorn sheep. Best information available will include, but is not limited to, Peninsular bighorn sheep demographic data, results from ongoing agency monitoring programs, and interim results of the monitoring and research program.

The Subcommittee will make recommendations to both the RMOC and the Santa Rosa and San Jacinto Mountains National Monument Advisory Committee regarding modifications to the public use and trails management program. The RMOC will make recommendations to CVCC for the portions of trails on non-federal land. The Monument Advisory Committee will make recommendations to BLM and USFS regarding trails on federal land. See Section 6.3 for additional information regarding the Trails Management Subcommittee. Authorization for new trails, unidentified existing trails, and decommissioning and removing trails will be evaluated through a Section 7 consultation on federal lands.

Trails are available for use by all means of non-motorized conveyance (e.g., on foot, bicycle, horse, etc.), except for certain trails that are closed to bicycles.

Construction and use of new perimeter trails described in this section will be a Covered Activity unless research results indicate that the proposed trails would adversely affect bighorn sheep. Current analysis indicates that these perimeter trails will not substantially impact Peninsular bighorn sheep populations, nor result in Take. Additional research will be conducted through Element 2 (described above) to further analyze impacts to Peninsular bighorn sheep from recreational trail use, thereby confirming and expanding upon previous impact assessments. Proposals to construct perimeter trails and other new trails will be deferred until the initial phase of the monitoring and research program has been completed. This deferral will ensure that trail conditions (e.g., use levels) are as consistent as possible once the research and monitoring programs are initiated. Once the research is completed, perimeter trails will be constructed unless the research results indicate that perimeter trails will substantially impact Peninsular bighorn sheep. Subsequent CEQA and/or NEPA analysis of these trails will also be required.

An alignment for a trail connecting the interpretive loop trail south of the Santa Rosa and San Jacinto Mountains National Monument Visitor Center with the northwest portion of La Quinta Cove has been identified and is known as the Palm Desert to La Quinta Connector Trail. Portions of the preferred alignment traverse areas used by wild sheep. Therefore, the portion of the Palm Desert to La Quinta Connector Trail between the Visitor Center and the *Living Desert* will be a Covered Activity when the research program evaluating the effects of recreational trail use on wild sheep in the Conservation Area and a subsequent research program evaluating the effects of this portion of the Connector Trail on captive sheep at the Bighorn Institute have been completed. When research is pursued on the captive sheep at the Bighorn Institute, the permission of the Bighorn Institute will be obtained prior to the study being initiated. If impacts to wild and/or captive breeding populations would result as determined through the research programs and Feasible mitigation measures cannot be implemented to reduce impacts, then all or a portion of the preferred alignment of the Connector Trail will not be constructed. If research

results are less than definitive, then wildlife management principals, professional judgment, and the best available science will be used to assess impacts and develop mitigation measures. Mitigation measures will be considered that will reduce potential adverse impacts to levels that are less than significant. Subsequent CEQA and/or NEPA analysis of the Connector Trail will be conducted.

Future proposals for new trails in the Santa Rosa and San Jacinto Mountains Conservation Area, other than the identified perimeter trails, will be addressed on a case-by-case basis, subject to existing regulations, policies, and land management plans. Such trail proposals will require an Amendment to the Plan with Wildlife Agency concurrence.

Trails will be rerouted to protect sensitive resource values (e.g., cultural resources, wildlife habitat, soils) where feasible. "Feasible" trail reroutes are those that can be accomplished without extraordinary expenditures or efforts, i.e., the benefits derived are commensurate with the expenditure of funds and/or the level of effort. Reroutes are assumed to replace, not augment, trails or trail segments.

Identification of trails to be rerouted to protect bighorn sheep will be based on habitat use patterns, home ranges, and distribution of bighorn sheep and other available research. Proposals regarding specific reroutes will be considered on a case-by-case basis, except as pertains to segments of the Goat Trails, the Guadalupe Trail, and a portion of the North Lykken Trail (see below). Outside Essential bighorn sheep Habitat, proposals for trail reroutes will also be addressed on a case-by-case basis.

Because the Santa Rosa and San Jacinto Mountains Conservation Area provides Essential Habitat for the Peninsular bighorn sheep, the Plan also must address other forms of public access and use on non-federal land in addition to trails. Prior to Permittees' authorizing cross-country travel, camping, pets, pack stock, Murray Hill facilities, noncommercial/noncompetitive organized group activities, non-motorized commercial recreation activities, motorized commercial recreation activities, competitive recreation events, motorized-vehicle use of trails, or other similar activities, they shall develop a management plan that describes consistency with Conservation Objectives and protection of Peninsular bighorn sheep and other biological resources. This plan will be developed as part of the RMUP for the Santa Rosa and San Jacinto Mountains Conservation Area.

Trails in Conservation Areas outside the Santa Rosa and San Jacinto Mountains have been established primarily in association with existing parks, preserves, and Wilderness areas. These trails are considered as Allowable Uses under the Plan and are those portions of the following trails not on federal land:

- A system of trails on the Thousand Palms Preserve
- The Pacific Crest National Scenic Trail traversing the Snow Creek/Windy Point and Stubbe and Cottonwood Canyons Conservation Areas
- Trails on non-federal lands within Dos Palmas Preserve/ACEC

Conditionally Compatible Uses

The conditionally compatible public access uses within the Conservation Areas consist of trails, facilities, and passive recreational activities. The primary public access component within the Conservation Areas will be trails. In addition to the trails, trailheads, and interpretive facilities in Conservation Areas, passive recreational activities will also be Allowable Uses within the Conservation Areas. These include passive recreation activities that do not impact land within the Conservation Areas and cause minimal disturbance to biological resources. Passive recreation includes hiking, bird watching, photography, and under specified locations identified in the following guidelines, mountain biking, horseback riding, picnicking, scientific research, and hunting. Other activities associated with public access and recreation that will be Allowable Uses include the installation of signs and barriers.

Excessive or uncontrolled access within the Conservation Areas can result in Habitat degradation and disruption of breeding and other critical wildlife functions at certain times of the year. In order to provide sufficient protection for natural and biological resources within the Conservation Areas, policies and guidelines have been developed to regulate the public access Covered Activities described above. These guidelines are separated into two categories: (1) siting and design and (2) operations and maintenance, and are described in Section 7.3.4.2.

Before a new trail or other public access facility can be constructed in a Conservation Area, the lead agency will submit the proposal to the appropriate RMUC and the Trails Management Subcommittee for review and comment. The project will be subject to CEQA/NEPA review. Approval of the trail or other public access facility will require a Minor Amendment to the Plan.

Participating Special Entity

Any public service facility provider, such as a utility company or a public district, including, but not limited to, a school, water, or irrigation district, that operates facilities and/or owns land within the Plan Area may request Take Authorization for its activities from CVCC pursuant to the Permits as a Participating Special Entity. Such activities must be consistent with the terms and requirements of the Permits, the Plan, and the IA. The process for submitting an application, review by CVCC and the Wildlife Agencies, and granting of Take Authorization is delineated in Section 11.7 of the IA. Participating Special Entities shall contribute to Plan implementation through payment of a fee or other appropriate mechanism based on the type of proposed activity, which shall be applicable to all activities in the Plan Area.

E.S.8 MSHCP Reserve Lands Management and Monitoring

Section 8 describes a framework for the implementation of a Monitoring program, Management Program, and Adaptive Management to provide for the Conservation of species and natural communities in the Reserve System and a Monitoring Program to assess the condition of species and natural communities in the Reserve System. The framework Management Program addresses ongoing responsibilities and Adaptive Management approaches. This framework is

adaptive and subject to modification as system stressors change and as new information on how to better manage Reserve Lands to achieve the species and habitat goals becomes available. The Monitoring Program will be implemented in phases starting with the collection of baseline data, which will be used to evaluate conceptual monitoring strategies followed by implementation of long-term species and natural communities monitoring. The Monitoring Program will also be adaptive to ensure that new protocols and techniques can be incorporated as appropriate. The goals in making future modifications to the Monitoring Program will be to improve efficiency and increase the reliability of the data. The Monitoring Program data will be used both to determine if the Plan is meeting its Conservation Objectives and to identify the need for and the success of Adaptive Management of Reserve Lands.

The Monitoring and Management Program is designed to: (1) demonstrate that the Plan is achieving its Conservation Goals and Objectives for the Covered Species and conserved natural communities; (2) specify the primary components of Reserve Lands management; and (3) identify how Adaptive Management strategies will be used to address changes in Habitat condition, natural communities and/or species health (distribution and numbers). These changes may be the result of anthropogenic and natural forces. The Management and Monitoring Program focuses on identifying changes in identified conserved natural communities and Covered Species condition (numbers, distribution, etc.) and what factors may be causing the identified changes. The data from the program will help identify the thresholds that would trigger when Adaptive Management actions are appropriate and test their efficacy.

Monitoring Program

The Monitoring Program will provide scientifically reliable data on: (1) the status and spatial and temporal dynamics (amplitude and magnitude) of key ecosystem components for the Covered plant and animal Species and conserved natural communities, and (2) the threats to these species and conserved natural communities. The program will also identify, develop, and evaluate the extent to which, management practices and policies are sustaining the plant and animal species and conserved natural communities covered under the Plan. This includes the collection and analysis of scientifically reliable data to enable Conservation Area managers to identify threats and to assess the effectiveness of management actions.

The detailed monitoring protocols will be developed during the first two (2) years of implementation and will be modified based on the baseline data collect during the first monitoring cycle and thereafter as appropriate.

Monitoring efforts have been ongoing on some of the Existing Conservation Lands, in some cases for many years. These monitoring efforts contribute to the base of knowledge used to develop this Monitoring Program.

Baseline Phase of Monitoring Program

Initially the Monitoring Program will gather quantitative baseline data for all Covered Species for which such quantification is possible. The primary objective of the baseline phase will be to conduct baseline surveys and to develop and test methods and protocols. It will be used to test methods to aggregate these species in a manner that increases monitoring efficiency. The baseline phase will also be used to assess the potential for integration of monitoring for species,

conserved natural communities, and ecological processes. The need for this baseline phase stems from the essential requirement to distinguish natural fluctuations in population size from those with anthropogenic causes. Identifying trigger points for management actions without the ability to separate the effects of natural fluctuations from anthropogenic threats can be problematic. An additional objective during this first phase will be to determine if certain Covered Species, habitat level variables, or landscape metrics can serve as effective surrogates, umbrella species, or other indicators, for species groups or associations within natural community assemblages. Partially or completely meeting this objective could significantly reduce monitoring costs without losing critical information necessary to manage and protect the species and communities included in the MSHCP Reserve System.

Monitoring at Multiple Scales

The body of scientific literature on ecological monitoring is largely focused on individual species. It does not provide explicit methods directly applicable to tracking multiple species or give clear guidelines for monitoring Habitats and assessing trends. In this regard, theory is lagging behind the need for monitoring large-scale systems. Therefore, it is necessary to create a system that is flexible enough to adjust to each species situation, but is formal enough to allow evaluations of entire preserves -- an ecosystem approach.

Threat monitoring is woven into the framework at all levels of monitoring. Threats operate at different and often multiple scales concurrently, including landscapes, natural communities, and in the case of diseases, at the level of individual species. Known threats are identified in the conceptual models; potential new threats will be identified as scientists evaluate monitoring data, recent literature, and report their field observations from the Plan Area.

Species-level monitoring aims to provide data on the extent to which Conservation Goals for species are being met. Species monitoring will involve tracking Covered Species and invasive species that may pose a threat to Covered Species. This monitoring needs to sample in both space and time, to address both distribution and trends in Covered Species. It also tracks species responses to resource fluctuations and the level at which threats are affecting species.

Landscape-level monitoring focuses on geographically large areas with functional ecosystem processes and coarse-scale conservation targets. Landscapes are defined at a scale that includes multiple ecosystems, natural communities, and/or where there is a transfer of energy, or movement of nutrients or materials between those units. Landscape monitoring includes regional weather, Essential Ecological Processes, and groundwater levels. It also includes satellite-based evaluations of the extent of changes in vegetation/natural community polygons over time. This monitoring focuses on processes that affect the condition and dynamics of landscapes.

Natural community-level monitoring focuses on the local-scale threats to conserved natural communities and Habitats, such as non-native invasive species. Natural community level monitoring will involve two primary elements. The first of these is refinement and update of the Natural Communities Map and the species distribution models originally developed in the reserve design process for the Plan. The refinement of the current Natural Communities (vegetation) Map will better describe the occurrence and distribution of both conserved natural communities and the Covered Species that depend on them. The second element for conserved

natural communities monitoring is the evaluation and development of a "Rapid Assessment" of several natural community-level characteristics and trends (e.g., CNPS 2003).

Management Program

The goal of the Management Program, including Adaptive Management actions, is to provide for the Conservation of the Covered Species as anticipated by the Plan. To accomplish this goal requires on-going management activities on reserve lands such as fencing and fence maintenance, public use management, enforcement of appropriate laws and regulations, and the implementation of other actions identified in reserve management plans. Adaptive Management actions will also be implemented using an integrated multidisciplinary approach addressing management practices, evaluating management actions, and assessing threats using appropriate experimental approaches at species, natural community, and landscape levels. The Management Program includes:

- The development of a reserve management plan(s) within three (3) years of Permit issuance including evaluation of existing management activities.
- A research component that will be funded and implemented by the Permittees. Research needs will evolve over time and will be identified by the same process used to evaluate monitoring and management protocols and results.

Integration of the Management and Monitoring Programs

The Monitoring Program and the Adaptive Management component of the Management Program must be integrally linked. The analyses of species and natural community monitoring data (and information regarding on-going preserve management issues) will be used to identify if and where Adaptive Management actions should be considered. If Adaptive Management actions are implemented, the Monitoring Program will need to evaluate the response of species and/or conserved natural communities to the Adaptive Management action. Linking the Monitoring Program with the implementation of Adaptive Management actions will require:

- Use of available data to structure a range of alternative response models to address a given threat or stressor affecting a Covered Species or natural community and evaluation of the models.
- Development of cost estimates, staffing needs, and schedules for implementation of Adaptive Management actions.
- Development of a program implementation structure which helps identify potential Adaptive Management options and associated monitoring to determine their effectiveness, and evaluates the Adaptive Management action for further use or modification. This implementation structure will include both MPA and staff and Land Managers.

Management and Adaptive Management of Reserve Lands

The management of the Reserve System will integrate management of Existing and Additional Conservation Lands. The goal of the Management and Adaptive Management program is to implement management actions and prescriptions that ensure Conservation of the

Covered Species and conserved natural communities within the Plan Area. Responsibilities for specific activities associated with reserve management are divided amongst the RMOC (Section 6.1.3), the Land Manager (Section 6.1.5), and the RMUCs (Section 6.1.4). Their responsibilities include facilitating consistent and continuing exchange of information among all individuals and committees involved in reserve management and monitoring. The specific responsibilities of each of these entities are detailed in the identified sections.

The MPA (Section 6.1.6) is responsible for coordinating with reserve managers to facilitate the exchange of Monitoring Program data. Likewise, the Land Manager has the responsibility to facilitate the exchange of information regarding all completed and proposed management and Adaptive Management actions. Annual reports are prepared by the Land Manager and MPA and require review by the CVCC, RMOC, and appropriate RMUCs. Section 8.7 describes the elements of the annual reports and the process for review and evaluation of these reports. The organizational structure also provides for input and recommendations from ISA on specific issues concerning scientific aspects of the Plan.

Management programs and plans already in place on Existing Conservation Areas will serve as the basis for the Management Programs for Additional Conservation Lands in the MSHCP Reserve System. As part of the Plan implementation, land management agencies will coordinate to bring their management programs into conformance with the goals of the Plan for Covered Species and conserved natural communities. Section 8.2.3 describes the Existing Conservation Lands and current management.

Proposed Management

A framework for development of proposed management prescriptions, a process for their evaluation, and implementation of Adaptive Management actions on Reserve Lands has been developed. Management actions are subject to the Adaptive Management approach in that they will be evaluated and modified based on feedback from the Monitoring Program. Proposed management actions that are identified on Reserve Lands will be initiated by the Land Manager, the public or private land management agency, and/or the RMUCs with input from the RMOC. While each agency with land ownership within the Conservation Areas will have ultimate responsibility for managing their land, implementation of the Plan will reinforce the existing close coordination and cooperation in management of Reserve Lands. This coordinated management approach also incorporates feedback from the Monitoring Program.

On Reserve Lands, ongoing management actions will include:

1. Control of habitat disturbance from unauthorized OHV use or trespass in Conservation Areas, by installation of signage, fencing, and gates; patrolling; law enforcement; and installation of barriers.
2. Control of habitat disturbance from unauthorized dumping, by removal of non-organic debris, installation of barriers, gates, and fences.
3. Control of non-native or invasive species and other habitat restoration projects.
    a. Control of tamarisk. Tamarisk is an exotic pest plant that competes with native species and reduces the habitat value for Covered Species including Peninsular bighorn sheep, least Bell's vireo, and other riparian birds. A program to control

tamarisk has already been implemented in many areas within the MSHCP Reserve System (Thousand Palms Conservation Area, Dos Palmas Conservation Area, Santa Rosa and San Jacinto Mountains Conservation Area). This invasive species control project is considered as ongoing management because the need for tamarisk eradication and the techniques to it have already been determined.

b. Control of cowbirds in riparian areas. Surveys done for the Monitoring Program in spring 2003 determined that cowbirds are present in all areas where riparian birds nest. Methodologies for cowbird control are well established and can be implemented in riparian Habitat areas.

These management activities will be implemented on Additional Conservation Lands as they are added to the MSHCP Reserve System. They will be subject to evaluation of their efficacy and review of benefits and impacts, through the work of the Land Manager and the reserve management committees. Ongoing management activities such as habitat perimeter fencing and signing may need to be evaluated through Adaptive Management.

Adaptive Management

In its simplest form, Adaptive Management is "learning by doing" (Walters and Holling 1990). More specifically, Adaptive Management is the application of the scientific method to management strategies. It requires the development of hypotheses, regarding for example either the impacts of potential threats and/or the efficacy of management actions to control those threats, testing of the hypotheses, and then either a restatement of the hypotheses and further evaluation, or the initiation of tested management actions on a wider scale. The Plan will utilize Adaptive Management strategies as applicable on Reserve Lands.

Adaptive Management can range from an experimental approach which involves monitoring the response of identified factors to a treatment where a control area is also evaluated to a broader view where monitoring is conducted within the context of hypothesis testing (Walters and Holling 1990, Holling 1999, Johnson 1999) to determine the effect of management. Hypotheses are generally based on insights derived from conceptual models.

The Adaptive Management Program will address management uncertainty, including the following issues:

1. Management action as responses to findings of the Monitoring Program in regards to unanticipated changes, in the needs of individual species, groups of species, or conserved natural communities, including fluvial and aeolian transport and sorting of sand.
2. Reserve and species management techniques and actions.
3. Enhancement of the conservation values of lands in the Conservation Areas.
4. Management actions to address Changed Circumstances as addressed in Section 6.8.3.

Linking the Monitoring Program with Adaptive Management actions will inform reserve managers of the status of Covered Species, conserved natural communities, and Essential Ecological Processes in a manner that provides data to allow informed management actions and decisions. Existing information about both the impact of threats and the management strategies

for addressing those threats will be used extensively in designing the initial management program for each Conservation Area.

Ecosystem Models

Section 8.2.5 presents an initial conceptual model that has been developed for the monitoring and management framework. Under this approach, Covered Species will be treated as affiliated with six natural community/habitat assemblages that are grouped due to similar natural processes and threat regimes. The broad habitat associations include aeolian sand, alluvial fan, riparian, marsh, alkali flat and playa, and mountain, each of which includes one or more of the 27 conserved natural communities included in the Plan Area. Within each of these habitat associations, monitoring and management protocols are provided at several scales: (1) landscape, (2) natural community/habitat, and (3) species. In many cases, these protocols involve measurements at multiple trophic levels. A process is proposed for evaluating monitoring results, for modifying monitoring protocols to provide more insightful data, and for recommending management actions. A variety of approaches will be evaluated to monitor landscapes, conserved natural communities, and species, during the baseline phase and on an ongoing basis.

The multiple scales designed into the framework should provide biologists and managers sufficient information to identify:

1. Natural patterns and fluctuations within the typical dynamics of this habitat assemblage.
2. The occurrence and extent of perceived threats within a time frame to enable managers to respond with appropriate management tools.
3. The range of impacts that stressors or threats have on site-specific habitat characteristics and species assemblages, across trophic levels.
4. The scope of impacts those threats have on the distribution of Covered Species across a landscape that includes multiple conservation sites, each with different physical attributes (climate, sand delivery sources and conduits, vegetation patterns).
5. Success or failure in the implementation of management actions aimed at controlling threats.

Data Storage & Analysis

To enable managers and Wildlife Agencies to evaluate the efficacy of conservation measures, it is essential that collection of sufficiently robust monitoring data occurs. However, these efforts will be wasted if the data are not analyzed, evaluated, and stored in a manner that allows easy retrieval and understanding by all stakeholders. To ensure efficient and consistent data handling the following standard practices will be adopted:

1. At the beginning of each year, all MSHCP data collectors (reserve monitors, Reserve Managers etc.) will meet to discuss data collection protocols to ensure scientific validity and consistency through time. Field data forms used by various reserve monitors will be standardized.
2. As data are processed, all versions of a data set will be archived, from raw data to a fully checked and verified form. The methods and steps used to process data will be described.

The primary purpose of this practice is to make it possible to recover from data mishandling during manipulation of the original source data. It also makes it possible to verify data processing methodologies at a later date should it become necessary.

3. Metadata will accompany all data generated by this project. The current standard is the Federal Geographic Data Committee (FGDC) Metadata Standard. Any future standard will be agreed upon by the RMOC.

The responsibility for storing the official record associated with MSCHP compliance will rest with CVCC. The MPA will be responsible for compiling the data generated from the Monitoring Program. Copies of these data will be provided to the appropriate parties, including CDFG, USFWS, and BLM. A process of "mirroring," maintaining identical copies of entire file systems on computer servers in different locations, will be followed. The mirrored file systems will create redundancy and will place the entire data set closer to those who use it most.

Coordination of data compilation will be the responsibility of the Biological Monitoring Program Administrator. Field crews will be responsible for entering the data collected during the field season into the program database and for verifying the integrity of the data. Once data are compiled, the database management personnel will be responsible for organization and storage. Data analysis will be handled by the data analysis team in conjunction with the program administrator. The analysis may involve nested integration of the monitoring levels (landscape, habitat, and species) to provide the robust power intended by the monitoring protocol design.

Program Reporting and Evaluation

Annual monitoring reports that summarize the results of each year's monitoring efforts will be provided to the RMOC, RMUCs, and the Land Manager. The MPA will be responsible for preparing and distributing these reports. The Biological Monitoring Report will include, at a minimum, the following:

1. Objectives for the Monitoring Program for that year
2. Effects on Covered Species and conserved natural communities
3. Location of sampling sites
4. Methods for data collection and variables measured
5. Frequency, timing, and duration of sampling for the variables
6. Description of the data analysis in terms of what, how, and by whom
7. Evaluation of progress toward achieving measurable biological goals and objectives
8. Suggested changes/feedback for Adaptive Management
9. Cause-and-effect relationships
10. Results of data analysis
11. The priorities for next year

The MPA will be responsible for reviewing the annual reports working in cooperation initially with the program biologists, the Land Manager and RMUCs. The administrator, Land

Manager, and the respective RMUCs will evaluate the results of annual monitoring, and will address relevant questions including the following:

1. Are the protocols providing data with sufficient resolution to detect significant changes? If not, what alternatives are available? Proposals for changes should be considered, discussed, modified per the discussion, and agreement on an implementation strategy should be reached.
2. Do any of the data collected with respect to species or conserved natural communities indicate early signs of decline or degradation (independent of natural fluctuations in resources) in response to the changed occurrence of known threats? If so, are more precise data required? How should the monitoring design be modified to acquire more precise data?
3. What are the appropriate management responses and ways to implement them? If no management responses are readily available, proposals and funding for research to develop and test potential management tools should be recommended.
4. Do monitoring data indicate management actions have been effective? What are the appropriate measures of success in response to a management action? Is the design and placement of monitoring stations sufficiently sensitive to measure management effects when they occur? If the management tools are ineffective, propose and fund research to develop and test new tools.
5. Are data analyses sufficient to answer the questions above? Is the nested integration of data on landscape, natural community, and species level monitoring occurring? Does it provide the desired level of resolution and understanding? If not, review procedures, and if necessary, fund training for data analysts and lead biologists on appropriate data analysis tools.

This annual Biological Monitoring Report review and evaluation will result in an analysis of the results and a series of recommendations. The results of the initial review process will be presented to the RMOC.

Work Plan, Schedule, and Budget

Section 8.8 describes the work plan, personnel needs, and budget for the baseline monitoring phase (years 1 – 5) and the long-term monitoring phase (ongoing), and for the Management Program. The cost estimates for the implementation of both the monitoring and management components of this program are dependent on assumptions regarding how, and by whom, these tasks will be completed. Since this is, by definition, an adaptive program, change is inevitable.

Detailed budgets for biological monitoring, land management, and Adaptive Management are presented in Section 8.8.3. The total costs for these are included in the cost summary in ES 5 above.

E.S.9 Species Accounts and Conservation Measures

The following conservation approaches involve acquisition, biological monitoring, and Adaptive Management actions that will be used to achieve Conservation of the Covered Species.

1. Conserve, restore, and manage sustainable populations in as many Core Habitat areas as Feasible within the Plan Area. The maximum number of Core Habitat areas available is delineated for Conservation. Tables 9-1a and 9-1b shows the Conservation Areas where each species is conserved and identifies Core Habitat areas.

   1a. Within Core Habitat areas, maintain the ecological integrity of large habitat blocks, ecosystem function, and biological diversity.

2. Conserve Other Conserved Habitat, representative of the range of environmental conditions within which the species is known to occur. Incorporate a range of environmental gradients (e.g., slope, elevation, aspect) and high habitat diversity to provide for shifting species distributions.
3. Provide for population fluctuation, which may include spatial shifts through time as a result of responses to local environmental conditions. Provide opportunities for dispersal and resultant genetic and demographic exchange among populations, which fosters genetic diversity.
4. Protect Essential Ecological Processes that sustain Core Habitat and Other Conserved Habitat areas. Essential Ecological Processes, including sand source areas and sand transport systems, hydrological systems, watershed features, and flooding regimes, will be protected.
5. Maintain Biological Corridors and Linkages among Core Habitat areas to sustain the effective movement and interchange of organisms between habitat areas inside and outside the Plan Area to the Maximum Extent Feasible.
6. Implement a Monitoring Program that identifies trends in species and community level resources protected under the Plan.
7. Implement an Adaptive Management Program that includes species-specific actions to secure and enhance habitat quality and provide for long-term population viability.
8. Identify activities, and any restrictions on those activities, allowed within Conservation Areas that are compatible with the Conservation of species, habitats, conserved natural communities, and their associated ecological functions.
9. Control threats, which may include habitat fragmentation, invasive plant and animal species, OHV use, and edge effects.

The application of these measures throughout the Plan Area varies depending on the species. Section 9 in the Plan describes individual Conservation Strategies for each species together with background information on the species. These species Conservation Strategies are arranged by taxonomic group, beginning with plants. The individual species accounts include all

Species Conservation Goals and Objectives that relate to each of the Covered Species, such that a summary of the conservation approach for each species is found in Section 9.

Tables 9-1a and 9-1b in Section 9.1.3 provide a summary of the occurrence of each Covered Species within each Conservation Area. They also provide a description of whether modeled Habitat for a given species involves Core Habitat or Other Conserved Habitat, or both. The number of acres of each habitat type to be conserved is also provided. These tables are intended to provide an overview of the Habitat for each Covered Species to be conserved within each Conservation Area.

The plants proposed for coverage include two federal Endangered Species, the Coachella Valley milkvetch and the triple-ribbed milkvetch, and three species with no official status, Little San Bernardino Mountains linanthus, Mecca aster, and Orocopia sage. Some of the features of the biology of plant species warrant special note with regard to the general Conservation Strategies. General measures common to all of these plants are listed below and measures specific to a given species are described in the Species Conservation Goals and Objectives, and the species-specific Adaptive Management discussion for each plant in Section 9.2.

1. Maintain Essential Ecological Processes for plants, including pollination, seed dispersal, soil characteristics, mychorrhizal relationships, and nitrogen fixation.
2. Restore and enhance degraded Habitat, using native vegetation only, as necessary according to monitoring results.
3. Evaluate whether establishment of a seed bank to guarantee against extinction is needed.

The two insect species covered under this Plan are the Coachella Valley giant sand-treader cricket and the Coachella Valley Jerusalem cricket, both endemic to the Coachella Valley and the Plan Area. Some of the features of the biology of insect species warrant special note with regard to the general Conservation Strategies. General measures common to both of these insects are listed below, and measures specific to either species are considered in the individual species descriptions in Section 9.3.

1. Maintain habitat features and ecological processes essential to insects, including availability of food plants and suitable local environmental conditions such as vegetation and soil microclimates.
2. Limit, to the maximum extent Feasible, general application of pesticides or other toxic chemicals within Conservation Areas. Application of pesticides or toxic chemicals outside Conservation Areas should be designed to avoid contamination within Conservation Areas.
3. Restore and enhance degraded Habitat as necessary according to monitoring results.

The only fish species covered under this Plan is the desert pupfish. Conservation measures specific to the desert pupfish are found in Section 9.4. The only amphibian covered under this Plan is the federally endangered arroyo toad. Conservation measures specific to the arroyo toad are found in Section 9.5.

Three species of reptile are covered under this Plan: the desert tortoise, listed as threatened by the federal and state governments; the Coachella Valley fringe-toed lizard, listed as a state Endangered and a federally Threatened Species; and the flat-tailed horned lizard, a species proposed for federal listing. General measures common to all of these reptiles are listed below and measures specific to a given species are considered in the Conservation Strategy for each of the species in Section 9.6.

1. As part of the Monitoring and Adaptive Management Program, evaluate the impact of "artificial" perches for predators, including power poles and landscape trees, along the edges or adjacent to Conservation Areas. Some evidence from the Thousand Palms Preserve suggests that predation rates may be increased due to these artificial perches.

Eleven bird species are covered under this Plan. The birds include species that are resident in the Coachella Valley, including the burrowing owl, California black rail, crissal thrasher, and Le Conte's thrasher. A number of the species are migratory, occurring in the Coachella Valley primarily during migration, or during the nesting season. The migratory species include the gray vireo, Yuma clapper rail, and five riparian bird species, including the least Bell's vireo, southwestern willow flycatcher, summer tanager, yellow warbler, and yellow-breasted chat. For the riparian bird species, consideration was given in the conservation plan to Habitat used for breeding and Habitat used during migration. General measures common to all of these birds are listed below and measures specific to a given species that are not addressed in the general conservation measures are listed as species-specific conservation measures in Section 9.7.

1. Avoid impacts to Habitat during nesting season, generally from February through July, for all bird species.

The mammals covered under the Plan are the federally endangered Peninsular bighorn sheep, and three small mammals with no formal status, the Palm Springs pocket mouse, the Coachella Valley round-tailed ground squirrel, which has recently been given federal candidate for listing status, and the southern yellow bat. Measures specific to a given species are described in Section 9.8.

E.S.10 Natural Community Accounts and Conservation Measures

The natural communities conserved under the Plan provide the Habitats for the Covered Species. Conservation of these natural communities also includes Conservation of the rich biological diversity of the Plan Area on an ecosystem-wide basis, consistent with the state's Natural Community Conservation Plan Act goals.

The following conservation approaches involve acquisition, biological monitoring, and Adaptive Management actions that will be applied to achieve Conservation of the natural communities.

1. Conserve, restore, and manage representative stands of each natural community in one or more Conservation Areas. The maximum number of available natural community stands is delineated for Conservation wherever feasible. Table 10-1 shows the Conservation Areas where each natural community is conserved and identifies the number of acres conserved.
2. Conserve natural community occurrences representative of the range of environmental conditions within which the community is known to occur. Incorporate a range of environmental gradients (e.g. slope, elevation, aspect) and high habitat diversity.
3. Protect Essential Ecological Processes that sustain conserved natural communities. Essential Ecological Processes, including the sand source areas and sand transport systems, hydrological systems, including watershed features and flooding regimes, and fire regimes will be conserved.
4. Implement a Biological Monitoring and Adaptive Management Program to contribute to maintenance of conserved natural communities within Conservation Areas. Additional research on natural community composition, ecology, and dynamics may be included in these actions.
5. Restore and enhance degraded natural communities, using native species only, as necessary according to monitoring results.
6. Identify activities, and any restrictions on those activities, allowed within Conservation Areas that are compatible with the Conservation of species, habitats, and conserved natural communities, and their associated ecological functions.
7. Control threats, which may include habitat fragmentation, invasive plant and animal species, alteration of ecological processes, including hydrological regimes and sand transport, OHV use, and edge effects.

Table 10-1 in Section 10.1.3 provides a summary of the occurrence of each natural community within each Conservation Area. The number of acres of each natural community to be conserved is also provided. This table is intended to provide an overview of the natural communities to be conserved within each Conservation Area.

For each of the seven sand-affiliated communities included in the Plan, Section 10.2 contains a natural community Conservation Strategy and a natural community account, including natural community characteristics, typical species, and significant threats. General conservation measures, which are common to all these sand dune and sand field types, are listed below.

1. Conserve the sand source/transport systems to ensure sustainability of the sand dunes and sand fields. Maintain, and enhance where feasible, aeolian (wind-blown) and fluvial (water-borne) sand transport systems and existing hydrological regimes.
2. Control disturbance and compaction of sand dunes and sand fields.
3. Avoid stabilization of sand dunes due to spread of non-native plant species and effects from adjacent Development.

Section 10.3 contains a summary description, including natural community characteristics, typical species, and significant threats, for the three desert scrub communities

included in the Plan. General conservation measures, which are common to all these desert scrub types, are listed below.

1. This natural community may be subject to increased fire frequency as a result of invasive annual grasses and other non-native plant species. As part of the Adaptive Management and Monitoring Plan, establish a research element that addresses the impact of non-native species.
2. This natural community is adaptively managed, according to an approved Adaptive Management and Monitoring Plan, which would include management to prevent damage from OHV activity and other threats.

Section 10.5 contains a summary description, including natural community characteristics, typical species, and significant threats, for each of the four chaparral communities included in the Plan. General conservation measures, which are common to all these chaparral types, are listed below.

1. As part of the Adaptive Management and Monitoring Program, evaluate the need to manage fire to avoid senescence of vegetation due to fire suppression. Develop appropriate fire management prescriptions for chaparral natural communities. This may include the use of prescribed fire and/or standards for controlling wildfires to maintain or restore these communities.
2. Essential Ecological Processes, including fire regimes, are protected to ensure sustainability of the community. Please refer to the Section 4.3 subsections for specific goals for ecosystem processes.

Section 10.6 contains a summary description, including natural community characteristics, typical species, and significant threats, for the two marsh communities proposed for coverage in the Plan. General conservation measures, which are common to these marsh types, are listed below.

1. Ecological processes, including water availability, are protected to ensure sustainability of the community. Please refer to the Section 4.3 subsections for specific goals for ecosystem processes.
2. To the extent activities are under Plan authority, maintain water levels, water quality and proper functioning condition of ponds, springs, and other wetlands.
3. Control of non-native plants, particularly tamarisk, is implemented.
4. As part of the Monitoring and Adaptive Management Plan, complete hydrologic studies for the Salt Creek area to determine if the water sources for marsh areas are adequately protected or if additional water sources may be needed.
5. This natural community is adaptively managed, according to an approved Adaptive Management and Monitoring Plan.

Section 10.7 contains a summary description, including natural community characteristics, typical species, and significant threats, for each of the four riparian communities

and the desert fan palm oasis community proposed for coverage in the Plan. Riparian communities are considered to be at great risk throughout Southern California (Bowler 1990, Davis et al. 1996). General conservation measures, which are common to all these riparian types, are listed below.

1. Ecological processes, including flooding regimes and water table continuity, are protected to ensure sustainability of the community. Please refer to the Section 4.3 subsections for specific goals for ecosystem processes.
2. To the extent activities are under Plan authority, maintain water levels, water quality and proper functioning condition of springs, streams, and other natural water sources that support these conserved natural communities.
3. Riparian Habitat along the Whitewater River channel from Indio south that is currently subject to periodic removal during maintenance of the Channel to maintain flood capacity will be replaced by the establishment of permanent riparian Habitat as a result of an agreement, and/or Plan participation, with the CVWD.
4. Remove and control invasive non-native plants, including tamarisk and arundo (very limited in occurrence).
5. This natural community is adaptively managed, according to an approved Adaptive Management and Monitoring Plan.
6. As part of the Monitoring and Adaptive Management Plan, complete hydrologic studies for the Salt Creek area to determine if the water sources for marsh areas are adequately protected or if additional water sources may be needed.

Section 10.8 contains a summary description, including natural community characteristics, typical species, and significant threats, for desert dry wash woodland and mesquite bosque. General conservation measures, which are common to these dry wash community types, are listed below.

1. Ecological processes, including flooding regimes, are protected to ensure sustainability of the community. Please refer to the Section 4.3 subsections for specific goals for ecosystem processes.
2. Potential changes, including proposed Development, are evaluated based on the impacts to the watershed, or drainage basin, for dry wash communities.
3. Reduce and control the spread of non-native tamarisk and other invasive species.

Section 10.9 contains a summary description, including natural community characteristics, typical species, and significant threats, for each of the two pinyon and juniper woodland communities proposed for coverage in the Plan. General conservation measures, which are common to both of these communities, are listed below.

1. Through the Monitoring and Adaptive Management program, develop appropriate management prescriptions for pinyon-juniper woodland natural communities. This may include the use of prescribed fire and/or standards for controlling wildfires to maintain or restore these communities.

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1.0 Background, Purpose, Scope, Process, and Regulatory Context

This section of the Plan describes the background, purpose, scope, and planning process of the Coachella Valley Multiple Species Habitat Conservation Plan/Natural Community Conservation Plan (Plan). This section also discusses the federal and state laws on which the Plan is based.

1.1 Background

In 1986, the U.S. Fish and Wildlife Service (USFWS) approved the Coachella Valley Fringe-toed Lizard Habitat Conservation Plan (CVFTL HCP). This plan, the second habitat conservation plan ever prepared in the United States, created three preserves to protect Habitat for the Coachella Valley fringe-toed lizard, a state Endangered and federally Threatened Species, and provided an Incidental Take permit under the Federal Endangered Species Act (FESA) for lawful activities outside the preserves.

As the Coachella Valley continued to grow in ensuing years, other species and their habitats were impacted by human activities. Further, the Habitat of many species whose ranges are broader than just the Coachella Valley was also impacted elsewhere. As a result of impacts within and outside the Plan Area, a total of 11 species in the Plan Area are now either state or federally listed as threatened or endangered. A number of other species are either endemic or nearly endemic to the Coachella Valley and could be threatened by future Development, or are rare in the Plan Area and require protection to persist in the Plan Area.

A scoping study prepared for the Coachella Valley Association of Governments (CVAG) by the Coachella Valley Mountains Conservancy (CVMC) in 1994 recommended that a Multiple Species Habitat Conservation Plan be prepared for the entire Coachella Valley and surrounding mountains to address current and potential future State and Federal Endangered Species Act (ESAs) issues in the Plan Area. Subsequently, a Memorandum of Understanding (Planning Agreement) was developed to govern the preparation of the Plan. In late 1995 and early 1996, the cities of Cathedral City, Coachella, Desert Hot Springs, Indian Wells, Indio, La Quinta, Palm Desert, Palm Springs, and Rancho Mirage; the County of Riverside; USFWS; the California Department of Fish and Game (CDFG); the Bureau of Land Management (BLM); the U.S. Forest Service (USFS); and the National Park Service (NPS) (Parties) signed the Planning Agreement to initiate the planning effort.

In late 1996 and early 1997, the Parties to the Planning Agreement approved an amendment stipulating that the Plan will meet the intent of the Natural Community Conservation Planning Act and FESA, and, further, that the Planning Agreement constitutes an agreement to prepare a Natural Community Conservation Plan (NCCP) as specified in Fish and Game Code Section 2810. Hereinafter in this document, “Plan” or “MSHCP” refers to the Coachella Valley Multiple Species Habitat Conservation Plan/Natural Community Conservation Plan.

1.2 Purpose

The overall goal of the MSHCP is to enhance and maintain biological diversity and ecosystem processes while allowing future economic growth. This goal would allow preservation of a quality of life characterized by well-managed and well-planned growth integrated with an associated open-space system. The primary goals of the MSHCP are to:

- Protect Core Habitat for 27 species and 27 natural communities, maintain the Essential Ecological Processes to keep the Core Habitat viable and link Core Habitat to maximize the Conservation value of the land.
- Improve the future economic development in the Coachella Valley by providing an efficient, streamlined regulatory process through which Development can proceed in an efficient way. The Plan is intended to provide a means to standardize mitigation/compensation measures for the Covered Species so that, with respect to public and private development actions, mitigation/compensation measures established by the Plan will concurrently satisfy applicable provisions of federal and state laws pertaining to Endangered Species protection.
- Provide for permanent open space, community edges, and recreational opportunities, which contribute to maintaining the community character of the Coachella Valley.

The purpose of the MSHCP is to obtain Take Authorization (Take Permits) pursuant to FESA and the NCCP Act for Covered Activities in the Coachella Valley while balancing environmental protection with regional economic objectives and simplifying compliance with the State and Federal Endangered Species Acts and other applicable laws and regulations. The term "Permits" refers, collectively, to the Section 10(a)(1)(B) Permit and NCCP Permit issued by USFWS and CDFG, collectively (Wildlife Agencies) to Permittees for Take of Covered Species pursuant to FESA and the NCCP Act and in conformance with the MSHCP and the Implementing Agreement (IA), a contractual obligation between the individual Permittees and the Wildlife Agencies. The term of the Permits is 75 years, which is the length of time required to fully fund Plan implementation. Section 5 describes the costs and funding for Plan implementation. The Plan will result in the establishment, monitoring and management of a Reserve System consisting of approximately 723,480 acres, as further described in Section 4.

The traditional project-by-project process for resolving conflicts between species preservation and development involves a costly expenditure of time and money. Moreover, this piecemeal process results in uncoordinated preservation of scattered Habitat areas set aside as mitigation for individual project impacts. These generally small, unconnected Habitat areas do not necessarily guarantee the continued viability of species populations or ecosystem functions, which generally depend on large interconnected Habitat areas designed and managed in a coordinated manner. The proposed MSHCP would replace the current piecemeal approach to project approval and mitigation with a coordinated, comprehensive approach based on the basic conventions of biological reserve design. This approach ensures that project mitigation is directed to those areas most critical to maintenance of ecosystem function and species viability.

The proposed Plan would conserve 27 species indigenous to this area of Riverside County that either have special status under the FESA and/or the California Endangered Species

Act (CESA) or species that are likely to become listed during the term of the Permit. These include species that are listed as "endangered" or "threatened" under the FESA or that have been "proposed" or are "candidates" for such listing. Additionally, 27 natural communities are included in the MSHCP. This ecosystem or natural community based approach protects general biological diversity in the Plan area, resulting in healthier ecosystems, reduced conflicts with development activities, and reduced potential for any additional species to be proposed for listing in the future.

Each Permittee participating in the proposed Plan would be a signatory to the IA. Upon issuance of the Permits, the Permittees would be granted Take Authorization for otherwise lawful actions, such as Development, that may result in Take. Local Permittees would be required to ensure future Development is consistent with the MSHCP. Authority for the issuance of Federal and State Take Authorizations is set forth in Section 10(a)(1)(B) of FESA and Section 2835 of the California Fish and Game Code, respectively.

1.3 Scope

The Plan Area includes approximately 1.2 million acres in the Coachella Valley and surrounding mountains in central Riverside County in southern California. (See Figure 1-1, Regional Context Map.) Because Indian reservation lands are not included in the Plan, the acreage covered by the Plan is approximately 1.1 million acres. Of the seven Indian reservations in the Plan Area, only the Agua Caliente Indian Reservation is the subject of a Tribal MSHCP. Implementation of this Plan and the Agua Caliente Tribal MSHCP will be coordinated to the maximum extent Feasible. Boundaries and characteristics of the Plan Area are described in Section 2, Plan Area Profile. (See Figure 1-2, Plan Area Map.)

1.4 Planning Process and Public Participation

The MSHCP planning process has included the local agencies, which will be Local Permittees and signatories to the IA. These are eight of the nine cities within the Coachella Valley (Cities), the County of Riverside (County), Coachella Valley Water District (CVWD), Imperial Irrigation District (IID), Riverside County Flood Control and Water Conservation District (County Flood Control), Riverside County Regional Park and Open Space District (County Parks), and Riverside County Waste Resources Management District (County Waste). The California Department of Transportation (Caltrans), California Department of Parks and Recreation (State Parks), and CVMC will be State Permittees and signatories to the IA. BLM, NPS, and USFS are managers of significant public lands in the Plan Area and will participate in Plan implementation through Planning Agreements. Subsequent to the original approved Plan, the City of Desert Hot Springs and Mission Springs Water District became Permittees through a Major Amendment.

The Plan has been prepared under the direction of CVAG, which contracted with CVMC for Plan preparation. A Project Advisory Group (PAG) has provided a forum for input from an array of interests. The PAG is composed of representatives of the Parties to the Planning Agreement; other public agencies, including CVWD and the University of California (UC); and

private sector groups, including the Building Industry Association, the Sierra Club, The Nature Conservancy (TNC), the Center for Natural Lands Management (CNLM), and the Riverside County Farm Bureau. A representative of the Agua Caliente Band of Cahuilla Indians attended many PAG meetings. All PAG meetings have been public meetings to provide an opportunity for public input. Public forums were held in 1998, 1999, and 2000, and special meetings and contact by mail have provided additional opportunities for potentially affected landowners to offer input into the planning process. See Section 1.1 in Appendix I for a complete list of public meetings held. CVAG also met with the County Agricultural Commissioner in September, 2003 to discuss the proposed Plan's relationship to agricultural lands and activities in the Plan Area.

The Scientific Advisory Committee (SAC) has provided additional technical expertise on biological issues. A Geographic Information Systems (GIS) team, composed of staff from CVMC, BLM, CVAG, and the County, has provided GIS services, including developing data layers, natural communities and species distribution mapping and modeling, gap analysis, and reserve design and corridor mapping.

A group of Independent Science Advisors (ISA) provided independent scientific input for use in Plan development, including initial guidance on biological issues and subsequent review of the SAC's recommendations.

Local, state, and federal agencies have participated actively in the preparation of the Plan. The Wildlife Agencies and BLM biologists have conducted many of the biological surveys; the Wildlife Agencies and BLM have also provided funding for Plan preparation, and BLM has contributed toward a GIS staff person. Other agencies, including Cities, the County, and CVWD have actively participated by providing staff time, data, and maps.

1.5 Regulatory Context

This section describes the state and federal regulatory context governing the Plan. The regulatory context of the Plan derives primarily from federal and state laws governing the protection and Take of Threatened and Endangered Species. These laws include FESA, the National Environmental Policy Act (NEPA), the California Fish and Game Code (including the NCCP Act), and the California Environmental Quality Act (CEQA).

1.5.1 FESA (Federal Endangered Species Act)

Section 10(a) of FESA authorizes the issuance of Take permits and establishes standards for the content of habitat conservation plans.

1.5.2 NEPA (National Environmental Policy Act)

USFWS, as the lead agency under NEPA, has prepared an Environmental Impact Statement (EIS), which is part of the joint Environmental Impact Report/Environmental Impact Statement (EIR/EIS). The EIS analyzes the potential effects of the approval and implementation of the Plan and the issuance of a Permit by USFWS. The document was made available for public review and noticed in the *Federal Register*.

1.5.3 NCCP Act (California Natural Community Conservation Planning Act)

Fish and Game Code Section 2835 authorizes CDFG to permit the Take of any Covered Species whose Conservation and management are provided for in an approved NCCP.

1.5.4 CEQA (California Environmental Quality Act)

Similar to NEPA, CEQA requires state and local agencies, when making discretionary decisions, to evaluate the environmental effects of a proposed project before project approval.

Accompanying the Plan is a joint Environmental Impact Report/Environmental Impact Statement (EIR/EIS) that serves as the CEQA environmental document for review by responsible and other interested agencies and the public. CVAG is the lead agency under CEQA.

1.6 Relationship to Other Plans and Programs

Other plans and programs relevant to this Plan include the adopted general plans of the Permittees and other non-Permittees, various land use management plans governing state and federal lands in the Plan Area, species management plans approved by state and/or federal agencies, and habitat conservation plans in adjoining or overlapping areas.

Plans considered in the preparation of this Plan are listed below.

<u>Bureau of Land Management</u>

- California Desert Conservation Area (CDCA) Plan
- 2002 CDCA Plan Amendment for the Coachella Valley
- Big Morongo Canyon Area of Critical Environmental Concern (ACEC) Management Plan
- Chuckwalla Bench ACEC Management Plan
- Dos Palmas ACEC Management Plan
- Whitewater Canyon ACEC Management Plan
- Whitewater Floodplain Reserve Management Plan
- Willow Hole-Edom Hill ACEC Management Plan

U.S. Forest Service

- San Bernardino National Forest Land Use Management Plan

National Park Service

- Backcountry and Wilderness Management Plan
- Joshua Tree National Park General Management Plan
- Land Protection Plan for Joshua Tree National Park

U.S. Fish and Wildlife Service

- Arroyo Toad Recovery Plan
- Bighorn Sheep in the Peninsular Ranges, California, Recovery Plan
- Desert Pupfish Recovery Plan
- Desert Tortoise Recovery Plan
- Yuma Clapper Rail Recovery Plan

California Department of Fish and Game

- Carrizo Canyon Ecological Reserve Management Plan
- Hidden Palms Ecological Reserve Management Plan
- Magnesia Spring Ecological Reserve Management Plan
- Oasis Springs Ecological Reserve Management Plan

California Department of Parks and Recreation

- Mount San Jacinto State Park Management Plan
- Salton Sea State Recreation Area Management Plan

Multiple Agency Plans

- Coachella Valley Fringe-toed Lizard Habitat Conservation Plan
- Coachella Valley Preserve System Management Plan
- Flat-tailed Horned Lizard Rangewide Management Strategy (1997)
- Northern and Eastern Colorado Desert Coordinated Management Plan
- Santa Rosa Mountains Wildlife Habitat Management Plan
- Santa Rosa and San Jacinto Mountains National Monument Management Plan
- West Mojave Plan
- Western Riverside County Multiple Species Habitat Conservation Plan

Local Plans

- City of Cathedral City General Plan

- City of Coachella General Plan
- City of Desert Hot Springs General Plan
- City of Indian Wells General Plan
- City of Indio General Plan
- City of La Quinta General Plan
- City of Palm Desert General Plan
- City of Palm Springs General Plan
- City of Rancho Mirage General Plan
- County of Riverside General Plan
- Transportation Improvement Program for the County of Riverside
- Coachella Valley Water District Water Management Plan
- Riverside County Flood Control and Water Conservation District's proposed West Desert Hot Springs Master Drainage Plan
- Riverside County Flood Control and Water Conservation District's existing Master Drainage Plans for the Cathedral City, Desert Hot Springs, Garnet Wash, Long Canyon Wash, and Palm Springs Areas
- Bureau of Reclamation and Coachella Valley Water District Coachella Canal Lining Project and Biological Opinion
- Corps of Engineers Thousand Palms Flood Control Project

Tribal Plan

- Agua Caliente Band of Cahuilla Indians Tribal MSHCP

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2.0 Plan Area Profile

This section describes the Plan Area's regional setting and boundaries, population and land use trends, general biological resources, and existing conservation areas. Specific information on natural communities and species addressed in the Plan is presented in Section 4 and in Sections 9 (species) and 10 (natural communities).

2.1 Plan Area Boundaries and Regional Setting

The Coachella Valley is a broad, low elevation, northwest-southeast trending valley comprising the westernmost limits of the Sonoran Desert. It is located in the eastern portion of Riverside County, approximately 100 miles east of Los Angeles. Riverside County as a whole covers over 4,700,000 acres (7,310 square miles), making it California's fourth largest county and roughly equal in size to Connecticut. (See Figure 1-1, Regional Context Map.)

The Plan Area boundaries were chosen to maximize inclusion of the Coachella Valley watershed. Portions of the watershed outside Riverside County or outside the jurisdictional boundaries of CVAG were not included in order to avoid institutional and administrative complexity. The western boundary of the Plan Area is the eastern boundary of the Western Riverside County MSHCP.

The external boundaries of the Plan Area encompass approximately 1.2 million acres, or approximately 1,850 square miles, encompassing the Coachella Valley and the surrounding mountains up to the ridgeline. (See Figure 1-2, Plan Area Map.) Indian reservation lands within the Plan Area, however, are not covered by the Plan; therefore, the actual area covered by the Plan is approximately 1.1 million acres. The Plan Area extends westward to Cabazon where it is bounded by the range line common to Range 1 East and Range 2 East. This is approximately the limit of the Sonoran or Colorado Desert in the San Gorgonio Pass area. The easternmost extent of the Plan Area is the range line common to Range 13 East and Range 14 East. Either the ridgeline of the Little San Bernardino Mountains or the boundary line with San Bernardino County where the ridgeline extends north of the county line bound the Plan Area on the north. On the south, either the ridgeline of the San Jacinto and Santa Rosa Mountains or the boundary line with San Diego and Imperial Counties forms the southern Plan Area boundary.

2.2 Population Trends

Table 2-1 shows the general growth trends in the Plan Area since 1970. Table 2-2 presents historic and projected population information for each city and the unincorporated portion of the Plan Area.

Table 2-1: Growth Trends

Year	Plan Area Population[2]	Increase From Previous Period[2]	*Percent Change*	Cumulative Change
1970	86,900	-----	-----	-----
1980	130,500	43,600	50.0%	50.0%
1990	230,900	100,400	77.0%	166.0%
2000	332,800	101,900	44.0%	283.0%
2010[1]	418,300	85,500	26.0%	381.0%
2020[1]	518,500	100,200	24.0%	497.0%

[1] Projected growth based on forecasts prepared by the Southern California Association of Governments (SCAG). SCAG's growth forecast is generally more conservative than the forecast prepared by the California Department of Finance.

[2] Population figures are rounded to the nearest one hundred persons.

Table 2-2: Historic and Projected Population[1]

Jurisdiction	1970	1980	1990	2000	2010	2020
Cathedral City	N/A[2]	N/A[2]	30,085	38,070	45,219	52,373
Coachella	8,353	9,129	16,896	22,127	24,894	29,283
Desert Hot Springs	2,378	5,941	11,668	16,064	19,180	22,714
Indian Wells	760	1,394	2,647	3,394	4,003	4,669
Indio	14,459	21,611	36,793	46,606	56,330	65,797
La Quinta	N/A[2]	N/A[2]	11,215	21,490	29,697	41,508
Palm Desert	N/A[2]	11,801	23,252	37,087	43,543	48,821
Palm Springs	20,936	32,359	40,181	45,332	51,514	53,825
Rancho Mirage	N/A[2]	6,281	9,778	11,671	14,985	19,308
Unincorporated	39,980	42,000	48,350	90,953	128,917	180,183
TOTAL	**86,866**	**130,516**	**230,865**	**332,794**	**418,282**	**518,481**

[1] 1970 - 2000 data are from U.S. Census; 2010 and 2020 data are from SCAG 2001 Regional Transportation Plan Growth Forecast. Population figures are rounded to the nearest 100 persons and include Indian reservation land even though it is not part of the Plan.

[2] City not yet incorporated; census data not available.

Based on census data, the average annual growth rate in the 1970s in the Plan Area was just over 4.1%. This rose to over 5.8% in the 1980s. The annual growth rate between 1990 and 2000 was approximately 3.8%. The rate is projected to decline thereafter to less than 3% per year according to SCAG's Regional Transportation Plan Growth Forecast. It should be noted, however, that the actual increase in population remains significant after the year 2000, with approximately 185,700 people added between 2000 and 2020. That is more than the total population of the Plan Area in 1980.

2.3 Land Use

The cities of Cathedral City, Coachella, Desert Hot Springs ~~(which is not a Permittee)~~, Indian Wells, Indio, La Quinta, Palm Desert, Palm Springs, and Rancho Mirage lie within the Plan Area, principally on the floor of the Coachella Valley. Together their jurisdictions make up approximately 16% of the Plan Area. (See Table 2-3.) The remaining 84% of the Plan Area is unincorporated. Approximately 45% of the land covered by the Plan is privately held. Though not included in the Plan, Indian reservations within the Plan Area include the Morongo, Agua Caliente, Santa Rosa, Cabazon, Twenty-Nine Palms, Torres-Martinez Band, and Augustine. The balance of the Plan Area is public land managed by various local, state, and federal agencies, including the BLM, USFS, NPS, USFWS, Bureau of Reclamation (BOR), U.S. Army Corps of Engineers (ACOE), CDFG, State Parks, UC, the CVMC, water districts, and open space lands owned by the cities of Palm Springs, Rancho Mirage, Palm Desert, Indian Wells, and La Quinta. State and federal areas are described in Section 2.4.

Table 2-3: Area of Cities

City	Acres[1]	Percent of Plan Area
Cathedral City	12,530	1.00%
Coachella	32,150	3.00%
Desert Hot Springs	14,790	1.00%
Indian Wells	9,320	1.00%
Indio	16,770	1.00%
La Quinta	20,420	2.00%
Palm Desert	15,930	1.00%
Palm Springs	60,340	5.00%
Rancho Mirage	15,760	1.00%

[1] Acreage is rounded to the nearest 10 acres and is reported as of June 30, 2002.

As shown in Table 2-4, approximately 6.0% of the Plan Area is currently urbanized, 1.0% is in rural development, 7.5% of the land is under agriculture, 0.5% has wind energy development on it, and 28.0% is vacant land under private or public non-conservation ownership. Of the remaining land in the Plan Area, 4.0% is covered by the Salton Sea, and 53.0% is public or Private Conservation Land. Land ownership is shown in Table 2-5. Figure 2-1 shows current land ownership in the Plan Area. Figure 2-2 shows land status as of June 1, 2003. Figure 2-3 shows projected future land use in the Plan Area without the Plan (based on general plans).

Table 2-4: Existing Land Use

Use	Total Acres	Percent of Plan Area
Urban	67,400	6.00%
Rural, Rural Residential	12,500	1.00%
Agriculture	84,900	7.50%
Lake (includes the Salton Sea)[1]	43,500	4.00%
Reservoir[2]	800	.00%[3]
Wind Energy Uses	4,400	.50%
Quarry	900	.00%[3]
Landfill	400	.00%[3]
Public and Private Non-Conservation Lands[4]	320,600	28.00%
Open Space-Public and Private Conservation Lands[5]	601,000	53.00%
TOTAL AREA COVERED BY PLAN	**1,136,400**	**100.00%**
Indian Reservation Lands - Not Part of Plan	69,600	
TOTAL OF ALL ACRES IN PLAN AREA	**1,206,000**	

The data source for this table is the Natural Communities Map prepared for the Plan, which includes eight non-vegetation types. Delineation of the eight non-vegetation types for the Natural Communities Map was done using September 1998 aerial photographs at a scale of 1:1000, provided by CVWD. These eight types include all lands considered as "developed" for purposes of the Plan; the remainder of the lands were assigned to either lands used for conservation purposes or lands used for non-conservation purposes. Acreage is rounded to the nearest 100 acres. The total acreage in the Plan Area in this table differs with the acreage in Table 2-5 by approximately 0.6%. Such statistically insignificant differences result from the use of different data sources for deriving the statistics in each table.

[1] Includes the Salton Sea and other natural water bodies. Approximately 19,200 acres of land under the Salton Sea are Indian reservation lands. These are not included in the total of Indian reservation lands reported in the second to the last line of the table.

[2] Includes Lake Cahuilla, Whitewater River recharge ponds, and other artificial water bodies.

[3] The total is statistically insignificant.

[4] Includes private lands which are primarily undeveloped and public lands owned by Riverside County, County Flood Control, Metropolitan Water District, the State Lands Commission, cities, CVWD, and the military, which are used for non-conservation purposes.

[5] Includes public lands dedicated to open space and conservation purposes and private lands owned by land trusts or conservation organizations, or protected by a conservation easement or deed restriction.

Table 2-5: Land Ownership in Plan Area[1]

Land Ownership[2]	Total Acres	Percent of Total
Bureau of Land Management	296,600	27%
Bureau of Reclamation	2,000	0%
California Department of Fish and Game	29,300	3%
California State Parks	18,700	2%
Caltrans	500	0%
Cities	~~6,100~~6,200	1%
Coachella Valley Association of Governments	1,600	0%
Coachella Valley Mountains Conservancy	2,700	0%
Coachella Valley Water District	8,400	1%
Private Conservation	28,300	3%

Land Ownership[2]	**Total Acres**	**Percent of Total**
Imperial Irrigation District	1,200	0%
Mission Springs Water District	100	0%
National Park Service	166,000	15%
Non-Permittee Public & Quasi-Public Entities	10,900	1%
Private, non-conservation	428,800	39%
Riverside County	2,700	0%
Riverside County Flood	400	0%
Riverside County Park and Open Space District	400	0%
State Lands Commission	4,800	0%
The Nature Conservancy	900	0%
U.S. Fish and Wildlife Service	3,700	0%
U.S. Forest Service	92,400	8%
University of California (Natural Reserve System)	6,400	1%
TOTAL AREA COVERED BY PLAN	**~~1,112,800~~1,113,000**	**100%**
Indian Reservation Lands - Not Part of Plan[3]	69,400	
TOTAL AREA WITHIN PLAN BOUNDARY	**~~1,182,200~~1,182,400**	

[1] The baseline year is 2006. Acreage is rounded to the nearest 100 acres.
[2] Information on land ownership is from the Plan land ownership database maintained by CVAG.
[3] Includes all reservation lands, including Tribal trust, allotted lands, and fee (privately owned) lands other than the approximately 19,200 acres that are under the Salton Sea.

The Plan Area is diverse in character. The westernmost portion of the Plan Area is the San Gorgonio Pass (Pass), which is the westernmost extension of the Sonoran Desert (also referred to as the Colorado Desert) and is a transition area between natural communities of the desert and those of the less arid interior valleys of southern California. The Pass is a narrow corridor between the San Jacinto Mountains and the San Bernardino Mountains. The I-10 freeway and a major rail line run through the Pass, and some regional commercial development occurs along the freeway. The area is entirely unincorporated, but does contain the small rural community of Cabazon. Portions of this area are within the Morongo Indian Reservation, and are not part of the Plan.

The Pass opens into the Coachella Valley itself, a broad and long valley trending northwest to southeast between the San Jacinto and Santa Rosa Mountains on the southerly side and the Little San Bernardino Mountains on the northerly side. The Indio Hills run parallel to the Little San Bernardino Mountains on the north side of the valley and north of I-10, which bisects the Coachella Valley.

The western portion of the Plan Area consists of the San Jacinto and Santa Rosa Mountains, where elevations range up to 10,804 feet. In 2000, this area was designated as the Santa Rosa and San Jacinto Mountains National Monument. The majority of the mountains are in public ownership, principally USFS land, BLM land, State Park land, CDFG land, and UC land. There are also significant Indian reservation lands in the mountains belonging to the Agua Caliente Band of Cahuilla Indians and the Santa Rosa Band of Cahuilla Indians. A small, rural

residential community occurs off Highway 74 in the Santa Rosa Mountains. Much of the mountains are in Wilderness or Ecological Reserve status, although there are areas where there is a significant checkerboard of privately owned lands. The San Jacinto and Santa Rosa Mountains contain only a few acres above the toe of slope that may be considered urban. Most of the alluvial fans below the toe of slope in the cities along the San Jacinto and Santa Rosa Mountains have been developed or development is proposed on portions of the remaining alluvial fans.

On the south side of the valley, the cities of Palm Springs, Cathedral City, Rancho Mirage, Palm Desert, Indian Wells, and La Quinta generally occupy the area between the base of the San Jacinto and Santa Rosa Mountains and the I-10 freeway. The City of Desert Hot Springs ~~(which is not a Permittee)~~ lies well north of I-10 near the northwest edge of the valley at the foot of the Little San Bernardino Mountains. Also north of the freeway is the unincorporated community of Thousand Palms, and several other areas of scattered rural residential development, especially north of the Indio Hills in an alluvial plain between the Indio Hills and the Little San Bernardino Mountains, which form the northern border of the Plan Area. Most of the Little San Bernardino Mountains are within Joshua Tree National Park. To the northeast of Thousand Palms lies the Coachella Valley Fringe-toed Lizard Preserve (CVFTL Preserve), established in 1986. It includes portions of the Indio Hills and a sand dune system south of the Indio Hills.

The cities of Indio and Coachella lie in the central portion of the Coachella Valley east of all the other cities. Southeast of these cities lies an extensive agricultural area. Major agricultural crops include grapes, citrus, and dates. Portions of this area are within the Torres-Martinez, Cabazon, Twenty-Nine Palms, and Augustine Indian Reservations. At the southern edge of the agricultural area is the northernmost part of the Salton Sea, which was created in 1905 and 1906 when Colorado River floodwaters broke through levees to inundate an ancient lakebed in Imperial and Riverside Counties. On the east side of the Salton Sea are the Salton Sea State Recreation Area and the Dos Palmas ACEC, bounded on the north by the Coachella Valley Canal. North of the canal are the Mecca Hills and Orocopia Mountains Wilderness Areas and farther north is Joshua Tree National Park. The area north of the canal is also within the Northern and Eastern Colorado Desert Plan (NECO Plan) area. The NECO Plan area extends well beyond the MSHCP area to the east, southeast, and north. It is a multiple agency plan for federal lands. The MSHCP is being coordinated with the NECO Plan.

2.4 Public and Private Conservation Lands

Approximately 53% of the Plan Area is either public land with some level of conservation management or Private Conservation Land (in the baseline year of 1996). While public and Private Conservation Lands in some areas constitute large blocks of Habitat, in other areas the Habitat on public lands is fragmented by the checkerboard pattern of public and Private Conservation Lands with non-conservation private lands. The Conservation lands are not distributed in such a way as to provide adequate protection for all types of Habitat, or to protect Essential Ecological Processes for some Habitats and Linkages for wildlife movement between major open space areas.

Figure 2-4 identifies the existing public and Private Conservation Lands. Lands owned by public and private conservation organizations that are not part of the MSHCP Reserve System

may not be shown due to the map scale. Table 2-5 lists land ownership and acreage. The public lands and Private Conservation Lands in the Plan Area are described in detail in Section 8.2.3.

For Plan analysis and development purposes, Existing Conservation Lands were classified into three levels based upon levels of disturbance and existing uses. The Conservation level classification of lands is as follows:

LEVEL 1. Level 1 consists of state and federal Wilderness Areas. All Development is precluded. Conservation Level 1 lands in the Plan Area are:

Joshua Tree National Park Wilderness

Joshua Tree National Park Wilderness Study Areas

Joshua Tree National Park Backcountry Areas

Mecca Hills Wilderness

Mt. San Jacinto State Park Wilderness

Orocopia Mountains Wilderness

San Gorgonio Wilderness (BLM)

San Gorgonio Wilderness (USFS)

San Jacinto Wilderness (USFS)

Santa Rosa Mountains Wilderness (BLM)

Santa Rosa Wilderness (USFS)

LEVEL 2. The primary management objective for Level 2 lands is maintenance of natural values, but some existing uses that impact natural qualities occur. Conservation Level 2 lands in the Plan Area are:

Big Morongo Canyon Preserve/ACEC

Carrizo Canyon Ecological Reserve

Chuckwalla Desert Wildlife Management Area/ACEC

City of Cathedral City (open space with deed restriction)

City of Indian Wells/Living Desert (Eisenhower Mountain)

City of La Quinta (open space with deed restriction)

City of Palm Desert (open space with deed restriction)

City of Palm Springs (open space with deed restriction)

City of Rancho Mirage/CVMC conservation easement

CVFTL Preserve (Includes BLM, CDFG, State Parks, CNLM, and TNC lands)

CVAG lands

CVMC lands

Coachella Valley National Wildlife Refuge System (USFWS portion of CVFTL Preserve)

Dos Palmas Preserve/ ACEC (Includes BLM, CDFG, and CNLM lands)

Friends of the Desert Mountains lands

Hidden Palms Ecological Reserve

Indio Hills Palms unit of the State Parks system

Joshua Tree National Park (non-wilderness)

Magnesia Springs Ecological Reserve

Mt. San Jacinto State Park (non-wilderness)

Oasis Springs Ecological Reserve

Santa Rosa and San Jacinto Mountains National Monument (federal lands portion only)

Sky Valley Ecological Reserve

UC Deep Canyon Desert Research Center

UC Oasis de los Osos

Whitewater Canyon ACEC

Whitewater Floodplain Preserve (part of CVFTL Preserve system - owned by CVWD)

Wildlands Conservancy lands

Willow Hole-Edom Hill Preserve/ACEC

LEVEL 3. Management objectives for Level 3 lands are for multiple use while providing significant Conservation value. Conservation Level 3 lands in the Plan Area are:

BLM multiple use land

BOR land (Take is not authorized under the Plan on federal land.)

Living Desert (Shumway Ranch)

Riverside County Regional Park and Open Space District - Devils Garden

Riverside County Regional Park and Open Space District - Fish Traps County Park

Salton Sea State Recreation Area

San Bernardino National Forest (non-wilderness)

2.5 Non-Conservation Lands

For Plan analysis and development purposes, lands not included in Levels 1 – 3 were designated as Level 4. These are private or public lands without mandates to protect natural qualities. Level 4 lands in the Plan Area are:

City of Desert Hot Springs unrestricted land

City of La Quinta unrestricted land

City of Palm Springs unrestricted land

CVWD land (except as conserved under the CVFTL HCP)

IID land

Lake Cahuilla County Park

MSWD land

Non-Permittee public and quasi-public lands

Private land (except deed restricted and non-profit conservation organization lands)

County land

County Flood Control land

State Lands Commission lands (except in Joshua Tree National Park, which is protected by agreement)

2.6 Description of General Biological Resources in the Plan Area

The desert floor of the Coachella Valley ranges in elevation from more than 150 feet below sea level at the southeast end to nearly 2,000 feet at the northwest end of the valley on the alluvial fans. The mountains surrounding the Coachella Valley range in elevation up to 10,804 feet, with elevations on the southern side of the valley substantially higher than those on the north side. This range of elevations and accompanying differences in temperature, precipitation, and other environmental variables are significant factors contributing to the area's high biological diversity.

Many canyons in the mountains support riparian areas not typical of a desert environment. Streams and seeps also support many desert fan palm oases, especially in the Santa Rosa Mountains. Where the water drains into the sands, desert dry wash woodlands result. The alluvial fans associated with the canyon mouths provide still another major land form and distinctive biological community.

Another feature contributing to the biological diversity are the strong winds that funnel through the San Gorgonio Pass from the west through areas of sand deposition from the San Gorgonio and Whitewater rivers and create an aeolian dune system. Historically, this dune system occupied much of the center of the valley.

The San Andreas Fault zone has created a unique corridor of desert fan palm oases stretching along the southern side of the Indio Hills where water is forced to or near the surface by the damming action of the fault. Mesquite hummocks and mesquite bosques are also associated with the fault in some areas. The Salton Sea also contributes to biological diversity through the creation of marsh, mudflat, and other wetland habitats. The low elevation of the Salton Sea trough creates an arid, hot environment, which, combined with the salinity of the soils, produces an uncommon desert sink scrub community.

California is noted as an area especially rich in native plant species, with approximately 5,057 species. This is more than are present in the entire central and northeastern United States and adjacent areas of Canada, an area ten times larger in size. According to Peter Raven, writing in Terrestrial Vegetation of California, "California contains the most remarkable assemblage of native plant species in all of temperate and northern North America." One of the two highest centers of endemism in California for relict species (those that have persisted from earlier geologic periods in California) is the northern and western margin of the Colorado Desert, from the Little San Bernardino Mountains along the east slope of the San Jacinto and Santa Rosa Mountains, the Borrego Valley area, and southward into Baja California.

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3.0 Plan Development

This section describes the development of the Plan, including the conservation planning methodology, the Covered Species and conserved natural communities addressed in the Plan, the mapping process used to identify areas of high Conservation value, and the alternatives considered. The resulting Conservation plan is described in Section 4.

3.1 Overview of Conservation Planning Process

The conservation planning process reflects the broadest goals of the Plan, which are to:

- Represent native ecosystem types or natural communities across their natural range of variation in a system of conserved areas.
- Maintain or restore viable populations of the species included in the Plan so that Take Permits can be obtained for currently Listed animal species and Non-listed animal species can be covered in case they are listed in the future.
- Sustain ecological and evolutionary processes necessary to maintain the viability of the natural communities and habitats for the species included in the Plan.
- Manage the system adaptively to be responsive to short-term and long-term environmental change, including climate change.

CVAG worked with the Scientific Advisory Committee (SAC), the Wildlife Agencies, CVMC, the County, BLM, and GIS specialists from BLM, the County, and CVAG to develop the Plan. For purposes of this document, this group is referred to as the planning team.

3.1.1 Role of the Scientific Advisory Committee (SAC)

The Plan was developed in consultation with a SAC, using best available information. (See Section 3.1 in Appendix I for additional information on the SAC.) The SAC developed a methodology for use in assessing the relative biological value of lands within the Plan Area and the subsequent development of a preferred alternative conservation plan. Major emphasis was placed on the integration of defensible science throughout all phases of the planning process. The SAC was established in 1994 to provide input on a Scoping Study, which was prepared to determine if a multiple species habitat conservation planning effort was needed in the Coachella Valley.

When the planning effort began, the SAC was charged with developing a recommendation for a biologically based Conservation program for the protection of the Covered Species and conserved natural communities in the Plan. The Peninsular bighorn sheep conservation strategy was primarily based on the *Recovery Plan for Bighorn Sheep in the Peninsular Ranges, California*, which was approved by BLM, USFS, the Agua Caliente Band of Cahuilla Indians, CDFG, State Parks, and USFWS.

Throughout the planning process, the SAC provided input into the development of the Plan. The SAC also participated in workshops in 1996 and 1999 with the ISA. The SAC sought input from other scientific experts through hosting workshops. SAC members made site visits to various locations during the reserve design process; provided assistance in the identification and delineation of species' habitat parameters, ecosystem processes, and other significant features in the GIS mapping effort; and reviewed map products and draft documents whenever necessary.

The conservation planning methodology is described in greater detail in Section 3.2 of Appendix I.

3.1.2 Role of the Independent Science Advisors

The ISA are scientists who provided information for use in, and peer review of, the Plan. Three of the ISA participated in early phases of the planning process at a workshop in 1996 to provide suggestions and information for use in developing the conservation planning process and at a second workshop in 1998 to provide peer review of components of that process, including species habitat modeling and the Site Identification Process. Other scientists also participated as ISA by providing information and expertise regarding specific species. To incorporate independent peer review of the species distribution models, these knowledgeable individuals with expertise on one or more Covered Species reviewed and critiqued the habitat distribution models for these species.

In 2001, a peer review process by ISA was facilitated by TNC. This team was provided with a series of questions and asked to respond to the questions in their review. The questions were assembled through suggestions from the SAC and the Wildlife Agencies. In addition, the PAG provided an opportunity for any interested person to propose a question. In January 2001, documents providing information on the conservation planning process, including maps of Conservation Alternatives 1, 2, and 3; species distribution models and known occurrence maps and associated documentation; maps illustrating land ownership, natural features, parcel boundaries, and natural communities within the Plan Area; and information regarding target species and natural community conservation strategies were distributed to the ISA. A meeting was held in February 2001 to provide an opportunity for the ISA to discuss the conservation planning process with the SAC. The ISA also met with outside participants to discuss the Plan. In mid-April 2001 they submitted a report detailing their findings. The report, "Independent Science Advisors' Review: Coachella Valley Multiple Species Habitat Conservation Plan/Natural Community Conservation Plan (MSHCP/NCCP)" is included in its entirety in Section 3.3 of Appendix I.

3.1.3 Best Available Science Standard

The planning team used the best available scientific data in developing the Plan. The data used in Plan development was a combination of existing biological data and new data collected during Plan development. The location and extent of biological data gathered during Plan development was determined by available funding and access to private property. Survey areas for species were selected to help identify the likely limits of distribution of the species in the

Plan Area. A list of all the surveys conducted to assist with the preparation of this Plan is found in Section 3.4 of Appendix I. Annual plant species surveys were conducted only in years when sufficient amounts of rainfall resulted in germination of the plant species. In addition to a fine filter approach for a select group of species, a coarse filter approach (Noss 1987, Noss and Cooperrider 1994, TNC 2000) was utilized. The coarse filter approach emphasizes Conservation of Core Habitat areas, conserved natural communities, and Essential Ecological Processes, Biological Corridors, and Linkages.

3.1.4 Planning Process

Identification of the Conservation Areas involved the steps described below.

1. *Determine the species and natural communities to be included in the Plan.* The planning team developed the initial list of species and natural communities to be considered. The list was narrowed down through the planning process, as described in Section 3.2.
2. *Gather information on the species and natural communities*. Information was gathered on individual species from the following sources: (1) existing information from the literature, including EIRs and other environmental documents, museum records, and other reports on species distribution and ecological requirements; (2) Natural Diversity Data Base (CNDDB) records; (3) presence/absence surveys for species about which more information was needed in selected areas where they have a probability of occurring and some potential to be protected; and (4) information and location maps provided by individual biologists. Information on the natural communities was gathered from: (1) the University of California at Santa Barbara Gap Map (Davis et al. 1995), (2) LANDSAT satellite thematic mapping imagery, (3) color infrared aerial photographs, (4) blue-line aerial photographs of the Plan Area, (5) aerial photographs from 1939 and 1954 for historic natural communities, and (6) the CNDDB and the Palm Springs Desert Museum for desert fan palm oases woodland.
3. *Prepare accounts of individual species and natural communities*. These accounts summarize available information on species' life history, Habitat and ecological requirements, overall range, distribution within the Plan Area, threats, and Conservation needs. Similar accounts were prepared on the composition and distribution of conserved natural communities, threats, and Conservation needs.
4. *Gather other pertinent information*. Information was also gathered and entered into the Geographic Information Systems (GIS) database regarding existing conservation areas, topography and other natural features, watersheds, ecological processes, roads, and current land uses. Information on projected land uses, parcel configuration, and political boundaries was also gathered for use in developing implementation measures.
5. *Prepare a Natural Communities Map*. A Natural Communities Map was prepared to delineate the distribution of the natural communities in the Plan Area. This information was used in a variety of ways: (1) in modeling species' Habitat distribution, (2) in developing the Site Identification Maps, and (3) in evaluating whether adequate protection will be afforded to the conserved natural communities on which the Plan

focuses pursuant to the NCCP Act. (See Section 3.5 of Appendix I for information on the development of the Natural Communities Map.)

6. *Analyze biological resource information to map species' distribution*. Species' Habitat distribution maps were prepared for all species except burrowing owl using known occurrences, Habitat associations based on the Natural Communities Map, and, where relevant, elevation ranges of the species, landform data, sand source data, and soils data. Consensus of the planning team was then obtained as to the adequacy and accuracy of information about the distribution of species in the Plan Area. Models were prepared for species for which sufficient data existed to use in developing a model. For the burrowing owl only known location information was used in conservation planning. Specific information on the model used for each species is found in Section 3.6 of Appendix I.

7. *Develop Site Identification Maps*. Site Identification Maps were developed by mapping at the quarter-section level and analyzing data regarding species richness, natural communities richness, habitat heterogeneity, and habitat fragmentation, and refining the resulting maps using information about ecological processes necessary to sustain habitats, Core Habitat, endemic species occurrences, and other pertinent information. The Site Identification Maps delineate the areas of highest biological resource value in the Plan Area. See Section 3.7 of Appendix I for a detailed description of the Site Identification Process and how it led to the development of conservation alternatives.

8. *Delineate Core Habitat areas, Essential Ecological Process areas, and Biological Corridors and Linkages*. For each of the Covered Species for which sufficient data were available, the planning team delineated Core Habitat areas, defined as areas of unfragmented Habitat with intact ecological processes large enough for a self-sustaining population of the species. Areas needed to maintain Essential Ecological Processes, Core Habitat, Biological Corridors and Linkages were also identified.

9. *Develop Conservation alternatives*. Three Conservation alternatives were initially developed for consideration. Conservation Alternative 1 consisted of existing public and Private Conservation Lands only. This alternative was included to assess the extent to which Existing Conservation Lands would suffice to protect the Covered Species and conserved natural communities included in the Plan. Based on the Site Identification Maps, Conservation Alternative 2 was developed to provide Core Habitat for the Covered Species, protect Essential Ecological Processes to sustain those habitat areas, provide Biological Corridors and Linkages among Conservation Areas, and conserve natural communities as functioning ecosystems. The corridors were intended to provide not only for movement of Covered Species, but also for other species, including coyotes, bobcats, mountain lions, and foxes, necessary to maintain predator-prey relationships, general biological diversity, and the opportunity for species adaptation in response to potential climatic change. Conservation Alternative 3 included additional areas with potential Conservation value as habitat, corridor, and process areas. A statistical analysis of the Conservation alternatives was prepared to provide information about the acreage of Habitat protected for each Covered Species and natural community under each alternative. The statistical analysis provided quantitative information on species and natural community protection, which was useful in conjunction with the qualitative analysis conducted in Step 10 using the conservation criteria.

10. *Develop and use criteria for evaluating the conservation alternatives*. Criteria were created to evaluate whether or not the Conservation Areas provide adequate protection for the species and natural communities on which the Plan focuses. (See Section 3.4 for details.)
11. *Conduct ISA Review*. During the course of the planning process, two workshops were held with leading conservation biologists Dr. Reed Noss, Dr. Michael Soulé, and Dr. C. Richard Tracy to get their input on the Plan. In early 2001, the ISA reviewed the work completed to date. The ISA included the aforementioned conservation biologists as well as other scientists. In addition, a preliminary draft of a study titled Long-term Sand Supply to Coachella Valley Fringe-toed Lizard (*Uma inornata*) Habitat in the Northern Coachella Valley, California (United States Geological Survey (USGS) 2002) was made available.
12. *Develop a Preferred Alternative*. The Conservation Area maps prepared by CVAG were discussed in a series of meetings among the Wildlife Agencies, CVAG staff, and local jurisdictions to evaluate land use, economic, and biological considerations. Through this process, the proposed Conservation Areas were further refined and a Preferred Alternative was developed.
13. *Delineate Conservation Goals and Objectives*. Conservation Goals and specific Conservation Objectives were developed for each Covered Species, natural community, Essential Ecological Process, Biological Corridor, and Linkage in the Conservation Areas to ensure that Conservation would be accomplished and that the tools for compliance monitoring were in place.

The following is a general chronology of the development of the Plan:

1994 - 1995 Development of initial list of species and natural communities to be included in the Plan.

1995 - 1996 Initial biological surveys conducted; initial Natural Communities Map developed.

1997 - 1998 Natural Communities Map refined and initial Habitat Distribution Models developed.

1999 - 2000 Site Identification Mapping and development of initial alternatives.

2001 ISA conducted peer review. The planning team developed preliminary draft Preferred Alternative.

2002 - 2004 Review and analysis, with local jurisdictions, CDFG, and USFWS, of planning team preliminary draft Preferred Alternative, followed by completion of the Public Review Draft and DEIR/EIS.

2004 - 2006 The draft Plan was finalized and released for public review, and responses to comments were prepared for comments received during public review. The Plan and Final EIR/EIS were released in early 2006 for local jurisdiction approval. In June 2006, the City of Desert Hot Springs voted not to approve the Plan. The

CVAG Executive Committee then rescinded its approval of the Plan and directed that the Plan be revised to remove Desert Hot Springs as a Permittee and reflect other project description modifications that had been suggested during public review. Subsequent to the ~~original~~2008 approved Plan, the City of Desert Hot Springs and Mission Springs Water District became Permittees through a Major Amendment.

3.2 Species and Natural Communities Considered

This section delineates the species and natural communities identified in the Planning Agreement and identifies those now included in the Plan. Species considered but not covered by the Plan, and natural communities not included in the Conservation Areas are also identified. Information on the Covered Species and conserved natural communities that are protected in the Conservation Areas is presented in Sections 9 and 10.

3.2.1 Review of Species Identified in the Planning Agreement

The Planning Agreement among the local, state, and federal agencies comprising the Plan Participants that initiated development of the Plan identified 52 species to be considered for inclusion in the Plan and targeted all the natural communities in the Plan Area. As information was gathered through the planning process, the planning team continuously reviewed the list. Other experts on individual species were also consulted. The Covered Species in the Plan are listed in Table 3-1. These are species for which sufficient information existed or was gathered during the planning process to enable the development of Conservation measures.

Table 3-2 lists the species from the Planning Agreement that are not proposed for coverage under the Plan. Generally, the reasons for not covering a species include lack of known locations in the Plan Area or insufficient data to facilitate Conservation planning. Section 3.8 of Appendix I provides additional information on reasons why these species are not proposed for coverage.

Table 3-1: Species Covered under the Plan

Plants
Mecca aster, *Xylorhiza cognata*[1]
Coachella Valley milkvetch, *Astragalus lentiginosus* var. *coachellae* (FE)
Triple-ribbed milkvetch, *Astragalus tricarinatus* (FE)
Orocopia sage, *Salvia greatae*[1]
Little San Bernardino Mountains linanthus, *Linanthus maculatus (*or *Gilia maculata)* [1]

Invertebrates - Insects
Coachella Valley giant sand-treader cricket, *Macrobaenetes valgum*
Coachella Valley Jerusalem cricket, *Stenopelmatus cahuilaensis*

Fish
Desert pupfish, *Cyprinodon macularius* (FE/SE)

Table 3-1: Species Covered under the Plan (cont.)

Amphibians
Arroyo toad, *Bufo californicus* (FE/CSC)

Reptiles
Desert tortoise, *Gopherus agassizii* (FT/ST)
Flat-tailed horned lizard, *Phrynosoma mcallii* (CSC)
Coachella Valley fringe-toed lizard, *Uma inornata* (FT/SE)

Birds
Yuma clapper rail, *Rallus longirostris yumanensis* (FE/ST/SFP)
California black rail, *Laterallus jamaicensis* (ST/SFP)
Burrowing owl, *Athene cunicularia* (CSC)
Southwestern willow flycatcher, *Empidonax traillii extimus* (SE/FE)
Crissal thrasher, *Toxostoma crissale* (CSC)
Le Conte's thrasher, *Toxostoma lecontei* (CSC)
Least Bell's vireo, *Vireo bellii pusillus* (FE/SE)
Gray vireo, *Vireo vicinior* (CSC)
Yellow warbler, *Dendroica petechia brewsteri* (CSC)
Yellow-breasted chat, *Icteria virens* (CSC)
Summer tanager, *Piranga rubra*[1]

Mammals
Southern yellow bat, *Lasiurus ega* or *xanthinus*[1]
Coachella Valley round-tailed ground squirrel, *Spermophilus tereticaudus chlorus* (C/CSC)
Palm Springs pocket mouse, *Perognathus longimembris bangsi* (CSC)
Peninsular bighorn sheep, *Ovis canadensis nelsoni* (FE/ST/SFP)

(Footnotes are explained below.)

The status codes used in the table are identified in the following key, as listed in the *California Natural Diversity Data Base Special Animals List and Special Plants List* from July 2000 (CNDDB 2000).

Key:	FE	=	Federal Endangered
	FT	=	Federal Threatened
	FC	=	Federal Candidate
	SE	=	State Endangered
	ST	=	State Threatened
	SC	=	State Candidate
	SFP	=	State Fully Protected
	CSC	=	Species of Special Concern (a state list of species that are at risk due to habitat modification or destruction, over-collecting, disease, or other threats)
	CNPS	=	Rare in California

[1] These species have no official status at this time; however, USFWS, CDFG, and the SAC have recommended inclusion of the species because of the likelihood of their being elevated to listing status in the coming years due to their rarity and decline. Note, also, that the Department of the Interior eliminated the category of FC2 subsequent to the adoption of the Planning Agreement.

Table 3-2: Species Considered but Not Proposed for Coverage under the Plan

Plants
California ditaxis, *Ditaxis californica*
Cliff spurge, *Euphorbia misera*
Flat-seeded spurge, *Chamaesyce platysperma*
Glandular ditaxis, *Ditaxis clariana*
Robison's monardella, *Monardella robisonii*

Invertebrates - Insects
Casey's June beetle, *Dinacoma caseyi*
Coachella Valley grasshopper, *Spaniacris deserticola*
Pratt's dark aurora blue butterfly *Euphilotes enoptes cryptorufes*

Invertebrates - Other
Morongo desert snail, *Eremarionta morongoana*
Thousand Palms desert snail, *Eremarionta millepalmarum*

Amphibians
California red-legged frog, *Rana aurora draytonii* (FT)
Desert slender salamander, *Batrachoseps aridus* (FE)
Lowland leopard frog, *Rana yavapiensis*
Mountain yellow-legged frog, *Rana muscosa* (FE)

Reptiles
California legless lizard, *Anniella pulchra pulchra*
San Diego horned lizard, *Phrynosoma coronatum blainvillei*

Mammals
California leaf-nosed bat, *Macrotus californicus*
California (Western) mastiff bat, *Eumops perotis californicus*
Fringed myotis, *Myotis thysanodes*
Long-eared myotis, *Myotis evotis*
Long-legged myotis, *Myotis volans*
Pallid bat, *Antrozous pallidus*
Pocketed free-tailed bat, *Nyctinomops femorosaccus*
Townsend's (Western) big-eared bat, *Corynorhinus townsendii pallescens*
Western small-footed myotis, *Myotis ciliolabrum*
Yuma myotis, *Myotis yumanensis*

3.2.2 Review of Natural Communities Identified in the Planning Agreement

The Planning Agreement listed 23 natural communities known to occur in the Plan Area. Through the planning process a total of 46 natural communities were identified in the Plan Area. Of these, 27 natural communities provide Habitat for the Covered Species and are the focal point for the establishment of Conservation Areas. The conserved natural communities included in the

Plan's Conservation Areas are listed in Table 3-3, as named and described in *Preliminary Descriptions of the Terrestrial Natural Communities of California* (Holland 1986), with the addition of five new natural community types developed by the SAC to distinguish better among the blowsand communities in the Plan Area. Figure 3-1 depicts the natural communities within the Plan Area, as well as developed areas.

Table 3-3: Natural Communities Included in the Plan

Active desert dunes
Stabilized and partially stabilized desert dunes
Active desert sand fields
Ephemeral desert sand fields
Stabilized and partially stabilized desert sand fields
Stabilized shielded desert sand fields
Mesquite hummocks
Sonoran creosote bush scrub
Sonoran mixed woody and succulent scrub
Mojave mixed woody scrub
Desert saltbush scrub
Desert sink scrub
Chamise chaparral
Red shank chaparral
Semi-desert chaparral
Interior live oak chaparral
Cismontane alkali marsh
Coastal and valley freshwater marsh
Southern arroyo willow riparian forest
Sonoran cottonwood-willow riparian forest
Mesquite bosque
Desert dry wash woodland
Desert fan palm oasis woodland
Southern sycamore-alder riparian woodland
Arrowweed scrub
Mojavean pinyon and juniper woodland
Peninsular juniper woodland and scrub

The other natural communities are already adequately protected in the Plan Area on public lands outside the Conservation Areas, except for tamarisk scrub, active shielded desert dunes, and Riversidean desert scrub. This existing protection adds to the overall Conservation value of the Plan in protecting watersheds, providing Habitat for large predators, protecting overall biological diversity in the Plan Area, providing buffers for Conservation Areas established under this Plan, and providing areas that could become important to Covered Species under conditions of potential future climatic change. With regard to tamarisk scrub, it is not a "natural" community in that it is dominated by an exotic plant species, i.e. tamarisk. In areas where some tamarisk scrub is included in the Conservation Areas, the intent is to restore it to the appropriate natural community to the maximum extent possible. The natural communities that are not included in the Plan are listed in Table 3-4. Additional information about these natural communities and why they were not included in the Plan is found in Section 3.9 of Appendix I.

Table 3-4: Natural Communities Considered but Not Included in the Plan

Tamarisk scrub
Active shielded desert dunes
Riversidean desert scrub
Mojave mixed steppe
Blackbush scrub
Upper Sonoran mixed chaparral
Upper Sonoran manzanita chaparral
Mixed montane chaparral
Northern mixed chaparral
Scrub oak chaparral
Canyon live oak forest
Black oak forest
Coulter pine forest
Bigcone spruce-canyon oak forest
Westside ponderosa pine forest
Sierran mixed coniferous forest
Jeffrey pine forest
Jeffrey pine-fir forest
Southern California subalpine forest

3.3 Sources of Biological Data

Biological data for the Plan were obtained from a variety of sources. The data were compiled, analyzed, and stored to support various components of the Plan preparation and implementation process. The occurrence information for Covered Species and conserved natural communities used in this Plan include:

- Field data collected during surveys for the Plan in 1995, 1997, 1998, 1999, 2002, and 2003. These surveys were conducted by participating agency biologists and biologists working under contract to conduct focused surveys for some of the Covered Species. Surveys were generally conducted during the spring months. Survey protocol were developed and approved by the Wildlife Agencies. Information on location, habitat characteristics, range and other variables for species surveyed were described in written reports submitted to CVAG.
- EIRs, Biological Assessments, and other environmental documents prepared throughout the Plan Area since 1979.
- CNDDB records.
- CDFG, BLM, NPS (Joshua Tree National Park), State Parks, USFWS, and other agency data.
- Data collected from biologists and others knowledgeable about the Plan Area and/or a given species. Data were obtained in meetings and a September 1997 workshop hosted by

the SAC to gather information about known locations and the distribution of target species. Biologists and other individuals with expertise on one or more of the species participated in the workshop. Records provided by individuals were carefully documented; records were mapped on 7.5 minute topographic quads and later digitized into a GIS data layer. Relevant information was obtained on each record before it was included in the database.

- Location data from voucher specimens held in museums, herbaria, and public-trust institutions.
- Published records and species distribution information from peer-reviewed journal articles, where information on species or natural community distribution has been described at an appropriate scale.

These data are maintained in GIS (digital) coverages and on GIS maps that can be identified by area based on jurisdiction boundaries, township/range information, or other map parameters. All data were assembled into a GIS database using Environmental Systems Research Institute (ESRI) software. The vast majority of the GIS data is in vector format. Calculations of existing natural communities acreages and overlay analyses of various project scenarios and alternatives were completed using this database. Calculations involving two or more vector layers may have minor overlapping polygons or polygon slivers with blank attribute records, resulting in slightly different acreage calculations when conducting re-analyses of alternatives and scenarios. These discrepancies are minor and do not alter the overall conclusions of the analysis or comparison of the relative merits of various alternatives and scenarios. Over the course of this decade-long planning effort, various vector layers were updated with more current and higher resolution data. These updates also result in minor deviations from previously calculated acreages, not affecting overall analysis conclusions, but allowing for more reproducible results should re-analyses of alternatives and scenarios be conducted in the future. As noted in Appendix I, Section 3.5.2, an accuracy assessment was completed for the natural communities mapping. For additional details on biological data sources, see Section 3.10 of Appendix I.

3.4 Evaluation of Initial Conservation Alternatives

The planning team evaluated the three Conservation alternatives described in Section 3.5 using the following measures of adequacy.

1. **Size of Habitat patches**. For each Covered Species, the planning team assessed whether a Conservation Area provided Core Habitat. The Core Habitat concept was not applied to species that were considered to occur as metapopulations; these are burrowing owl, Le Conte's thrasher, Yuma clapper rail, California black rail, the riparian bird species, and southern yellow bat. A Conservation Area was not deemed inadequate because of the lack of Core Habitat for these species. The concept of Core Habitat was not used with conserved natural communities.

2. **The number of Core Habitat areas protected in Conservation Areas for each Covered Species**. Where possible, the planning team sought to conserve a minimum of three Core Habitat areas for each Covered Species. In some cases, more than three Core Habitat areas for a Covered Species occurred in the Conservation Areas. In other instances, fewer than three Core Habitat areas for a Covered Species occurred in the Plan Area to include in the Conservation Areas.
3. **Representative range of environmental conditions, including temperature, moisture, and elevation gradients, under which the species or natural community occurs in a viable population**. For each Covered Species, the planning team assessed whether the Conservation Areas included Other Conserved Habitat that provided for the conservation of the range of environmental conditions in which the species occurs in the Plan Area.
4. **Essential Ecological Processes**. These could include hydrological processes (both subsurface and surface), blowsand movement, erosion, deposition, substrate development, soil formation, and biological processes such as reproduction, pollination, dispersal, and migration. The planning team assessed the Conservation Areas to evaluate whether the Essential Ecological Processes necessary to sustain Covered Species' Habitat and conserved natural communities present were included in the Conservation Areas.
5. **Biological Corridors and Linkages**. For each Covered Species, the planning team assessed whether connectivity of the population in each Conservation Area was maintained with populations in other Conservation Areas and to populations outside the Plan Area to the maximum extent Feasible.

The tables in Section 9 show the extent to which the Conservation Areas in the Preferred Alternative, which evolved from Conservation Alternative 2 developed by the planning team at this stage of the process, contain Core Habitat (and how many Core Habitat areas) and Other Conserved Habitat. The conservation analysis for each Covered Species in Section 9 describes the protection of Essential Ecological Processes in the Conservation Areas and the Biological Corridors and Linkages between Conservation Areas that are protected.

3.5 Conservation Alternatives Considered

Section 10(a)(2)(A)(iii) of FESA requires that an HCP analyze alternative actions which would not result in Take of Listed Species (animal species) or would reduce such Take below levels anticipated for the project proposal and state the reasons why such alternatives are not being utilized. Therefore, the following alternatives are analyzed in the Plan. (More information on and analysis of the alternatives is found in the EIR/EIS.)

3.5.1 Preferred Alternative

The Preferred Alternative is the Plan, as described in Section 4.

3.5.2 Alternative 1, Public Lands Alternative

This alternative includes all local, state, and federal agency land, and Private Conservation Land, in the Plan Area with Conservation Levels 1, 2, and 3 (See Figure 3-2). No

new areas would be acquired for Plan purposes. The local jurisdictions would contribute to the management of the Existing Conservation Lands as mitigation for the Habitat loss allowed under the Plan. Covered Activities would be the same as under the Preferred Alternative.

Under this alternative, substantial areas would be protected in the mountainous portions of the Plan Area: the San Gorgonio Wilderness and Whitewater Canyon ACEC in the San Bernardino Mountains; Mission Creek west of Highway 62, Morongo Canyon ACEC, and Joshua Tree National Park, in the Little San Bernardino Mountains; portions of the CVFTL Preserve in the Indio Hills; the Mecca Hills Wilderness in the Mecca Hills; the Orocopia Mountains Wilderness in the Orocopia Mountains; the Santa Rosa Mountains Wilderness, Deep Canyon Desert Research Center, Hidden Palms Ecological Reserve, Carrizo Canyon Ecological Reserve, Magnesia Springs Ecological Reserve and portions of the new Santa Rosa and San Jacinto Mountains National Monument in the Santa Rosa Mountains; and portions of the Santa Rosa and San Jacinto Mountains National Monument, the San Jacinto Wilderness, Mount San Jacinto State Park, and Oasis de los Osos in the San Jacinto Mountains. Some of these areas are well protected, but habitat fragmentation is a problem in other areas where considerable private lands still exist. On the valley floor, the only significant Conservation Areas would be the three existing CVFTL preserves and Dos Palmas ACEC.

This alternative entails no land acquisition; only Core Habitat, Essential Ecological Processes, and Linkages that happen to be on existing public conservation lands or Private Conservation Lands would be protected. As a result, sand transport, watershed, and other ecological processes would not be adequately protected; Biological Corridors would not be conserved; and Core Habitat areas would be fragmented in many instances. As a result, the Conservation Goals and Objectives for the Covered Species and conserved natural communities would not be met. This alternative is fully analyzed in Section 4 of the EIR/EIS, which also discusses this alternative's ability to meet the basic project objectives, its feasibility, and ability to reduce project impacts.

3.5.3 Alternative 2, Core Habitat with Ecological Processes

This alternative would establish Conservation Areas intended to protect Core Habitat for the species and natural communities included in the Plan, as well as ecological processes necessary to sustain these Habitats. (See Figure 3-3.) Covered Activities would be the same as under the Preferred Alternative.

The Conservation Areas include most of the Alternative 1 lands as well as private lands to conserve Core Habitat and ecological processes. This alternative would protect private lands in the mountains surrounding the Coachella Valley. On the valley floor, this alternative builds on the existing CVFTL preserves and Dos Palmas ACEC by adding adjacent Habitat and ecological process areas for the species and natural communities included in the Plan. In addition, this alternative creates new preserve areas in the Snow Creek area, east of Highway 62 along Mission Creek and Morongo Wash, and at the Whitewater River delta at the northwest end of the Salton Sea. Based on comments in the ISA report, comments received from CDFG and USFWS, and additional information in the Long-term Sand Supply to Coachella Valley Fringe-toed Lizard (*Uma Inornata*) Habitat in the Northern Coachella Valley, California (USGS 2000) this alternative was subsequently revised to develop the Preferred Alternative.

The Conservation Goals and Objectives for the Covered Species and conserved natural communities would not be fully met under this Alternative. This alternative is fully analyzed in Section 4 of the EIR/EIS, which also discusses this alternative's ability to meet the basic project objectives, its feasibility, and ability to reduce project impacts.

3.5.4 Alternative 3, Enhanced Conservation Alternative

This alternative expanded on Alternative 2 by including all additional areas that were recommended for further consideration by USFWS and CDFG in their response to the Site Identification Maps. Alternative 3 is depicted in Figure 3-4. Covered Activities would be the same as under the Preferred Alternative.

This alternative would result in less Take than the Preferred Alternative; However, due to the minimal additional biological value, significant land use conflicts, high acquisition and management costs, severe edge effects and the potential impossibility of creating a manageable reserve configuration, the enhanced Conservation alternative was not selected as the preferred alternative. Based on field visits with the SAC and representatives from various jurisdictions, it was determined that not all areas included in this alternative were biologically viable or feasible to conserve. Additionally, much of the area anticipated for Conservation under this alternative would cause significant land use conflicts and increased costs. Some of the proposed area already has approved development, greatly increasing acquisition costs. Existing Development near these areas would also create severe edge effects. Additionally, the additional Conservation are proposed under this Alternative would include existing ground water recharge basins operated by CVWD, which would require realigning the recharge basins at great cost. This alternative would have increased the number of acres to be conserved by approximately 10,200 acres even though the amount of Habitat included in the Preferred Alternative is sufficient to adequately conserve all of the Covered Species. Thus, the Enhanced Conservation Alternative would significantly increase the cost of the Project without significantly increasing the Habitat value of the Reserve. This alternative would also conflict with Project Objectives because it would not be economically efficient and would not limit the expenditure of public and private funds to the amount necessary to maintain a reserve that can adequately conserve the Covered Species. This alternative is fully analyzed in Section 4 of the EIR/EIS.

3.5.5 Alternative 4, Full Protection Alternative

In their joint letter dated April 17, 2000, the Wildlife Agencies recommended inclusion of an alternative that "fully protects those areas encompassed by the current composite modeled distribution and known locations of target species in the Plan Area." By seeking to protect all Habitat for the Covered Species in the Plan, this alternative would result in a significant reduction in Take Authorization and significant increase in costs. Thus, this alternative was determined to be not Feasible and was not analyzed further.

3.5.6 No Action/No Project Alternative

The No Project alternative entails no Plan being developed and no Permits issued. Individual projects would have to seek their own Take Permits or avoid Take by not developing portions of the project site that would result in Take of a Listed Species (animal species). While

this alternative would preclude impacts to Listed Species from Take authorized under the Plan, Conservation of species and Habitats provided through mitigation and compensation under the existing regulatory framework would likely result in a pattern of Conservation that is fragmented and managed in a piecemeal fashion. The No Project Alternative is incapable of conserving certain Essential Ecological Processes, particularly the fluvial sand deposition and aeolian transport areas, which are necessary to support occupied Habitat by Covered Species in the dunes and other blowsand Habitats. There would not be a coordinated system of Biological Corridors and Linkages provided to connect Conservation Areas, and the ability to provide Linkages through project-by-project mitigation may be precluded over time through continued Development. Further, the No Project Alternative would not provide protection for Non-listed Species or for natural communities that do not provide Habitat for Listed Species. Over time, Non-listed Species would likely become listed, thereby increasing regulatory burdens and difficulty for Development.

3.6 Plan Benefits for Covered Species and Conserved Natural Communities

This section discusses the benefits of the Plan for the Covered Species and the conserved natural communities. With respect to impacts likely to result from the proposed Take of the Covered Species, Section 4.6 provides summary tables that quantify the loss of habitat for each Covered Species and the amount of loss of the conserved natural communities. An additional table in Section 4.6 summarizes the effects of this loss on each Covered Species. Complete descriptions of the impacts resulting from Plan implementation are presented in Section 9 in the species accounts.

Pursuant to the FESA, all Take authorized under the Permit will be incidental to otherwise lawful activities and not the purpose of such activities. Covered Activities for which Take is provided are described in Section 7. As described there, Take associated with the implementation of the Management and Monitoring Programs is also authorized by the Permit.

To issue a Permit, USFWS must find that Take has been avoided, minimized, and mitigated to the maximum extent practicable. Similarly, CDFG must have sufficient information demonstrating that the Plan will provide for the Conservation of the Covered Species. The Plan provides the following benefits to Covered Species and conserved natural communities and minimizes and mitigates impacts of the Take of Covered Species to the maximum extent practicable as follows:

- *Reserve System Assembly*. As described in Section 4.2, a Reserve System will be established to conserve Core Habitat for the Covered Species, conserve the natural communities included in the Plan, protect Essential Ecological Processes, and maintain Biological Corridors and Linkages. The specific goals of establishing the Reserve System are to:

  (1) Represent native ecosystem types or natural communities across their natural range of variation in a system of conserved areas.

  (2) Maintain or restore self-sustaining populations or metapopulations of the species included in the Plan to ensure permanent Conservation so that Take Authorization can

be obtained for currently Listed species (animal species) and Non-listed Species can be covered in case they are listed in the future.

(3) Sustain ecological and evolutionary processes necessary to maintain the functionality of the natural communities and Habitats for the species included in the Plan.

(4) Maximize connectivity among populations and avoid Habitat fragmentation within Conservation Areas to conserve biological diversity, ecological balance, and connected populations of Covered Species.

The Conservation Areas have been designed to ensure that the Reserve System can conserve the highest quality Habitat for the Covered Species, as well as protect the Essential Ecological Processes necessary to maintain Habitat quality and maintain connectivity among large blocks of Habitat. The Reserve System has been designed to support viable populations of the Covered Species or, in the case of species which may not have viable populations in just the Plan Area, to conserve the best Habitat available for the species in the Plan Area and support connectivity with populations outside the Plan Area. Absent the Plan, future Development in the Plan Area would be expected to fragment this high quality Habitat, disrupt the Essential Ecological Processes that sustain the Habitat, and create significant edge effect problems. The Plan focuses Development in areas of lesser quality Habitat, typically where Habitat fragmentation and edge effects are already impacting Habitat quality. As delineated in Table 4-1 in Section 4.0 the Permittees mitigation obligation relative to Reserve System Assembly includes:

- Conservation of 88,900 acres through acquisition or other means.
- Management consistent with the MSHCP of 8,800 acres of Existing Conservation Lands by the Local Permittees.
- Conservation of ~~7,500~~7,700 acres of land owned by the Permittees but not currently conserved.
- Management consistent with the MSHCP of 6,800 acres of Existing Conservation Lands by State Parks.
- Acquisition of 640 acres by State Parks.
- Management consistent with the MSHCP of 2,600 acres of Existing Conservation Lands by CVMC.
- In addition, the Permittees will maintain the fluvial sand transport process in designated areas in the Cabazon, Long Canyon, and West Deception Canyon Conservation Areas through means other than acquisition, as described in Section 4.2.2.2.4.

➢ *Reserve System Monitoring Program.* The lands described above, which are a Permittee mitigation obligation, total 115,140 acres. Habitat on the Permittee mitigation lands in the Conservation Areas will be preserved, enhanced as needed, and permanently monitored and managed to maximize the values of the mitigation lands for the Covered Species. The biological value of these lands will also be enhanced by the Existing Conservation Lands, Complementary Conservation lands, and the Additional Conservation Lands contributed by state and federal agencies. As described in Sections 4.1 and 4.2, these lands will be part of a Reserve System that also includes Existing Conservation Lands, Complementary

Conservation Lands, and Additional Conservation Lands to be acquired by the state and federal governments. The Reserve System in its entirety will include approximately 723,480 acres.

As described in Section 8, the Plan provides a comprehensive Monitoring Program in perpetuity for all Reserve System lands to ensure adequate information on which to base management decisions and determine when Adaptive Management actions designed to ensure the biological success of the Reserve System are needed. During the first 75 years of the Plan, a total of $254,294,000 is budgeted for the Monitoring Program. Thereafter, funding in perpetuity will be provided from the Endowment Fund established to fund the Monitoring Program, the Management Program, and Adaptive Management. See Section 5.14 for details on funding for the Monitoring Program.

- *Reserve System Management Program.* Section 8 provides detailed information on the Management Program, which includes Adaptive Management. The goal of the Management Program is to implement management actions and prescriptions that ensure Conservation of the Covered Species and conserved natural communities on lands in the Reserve System for which the Permittees are responsible. State and federal lands in the Reserve System will be managed by the relevant state and federal agencies consistent with the MSHCP. CVCC will enter into MOUs with the state and federal agencies to ensure this management. Finally, CVCC will use its best efforts to enter into MOUs with non-profit conservation organization which own land within the Reserve System to ensure management of those lands consistent with the MSHCP. During the first 75 years of the Plan, a total of $221,252,000 is budgeted for the Management Program. Funding thereafter, in perpetuity, will be provided from the Endowment Fund established to fund the Monitoring Program, the Management Program, and Adaptive Management. See Section 5.14 for details on funding for the Management Program. Section 8 describes the Plan's provisions for Adaptive Management. During the first 75 years of the Plan, a total of $14,903,000 is budgeted for Adaptive Management. Funding thereafter, in perpetuity, will be provided from the Endowment Fund. See Section 5.14 for details on funding for Adaptive Management and Section 8.2.4.2 for details on what constitutes Adaptive Management.

- *Avoidance, Minimization, and Mitigation Measures, including Land Use Adjacency Guidelines*. The Conservation Areas in Section 4.3 list specific Required Measures to avoid, minimize, and mitigate Take in the Conservation Areas, including avoiding activities during certain periods, restricting Development activities near nest sites, installing wildlife underpasses in conjunction with road improvement projects, and taking measures to maintain fluvial sand transport. Section 4.4 provides additional information on required avoidance, minimization, and mitigation measures. Section 4.5 describes Land Use Adjacency Guidelines designed to further avoid, minimize, and mitigate Take associated with the edge effects of Development in or adjacent to Conservation Areas by minimizing unauthorized entry into the Reserve System, and avoiding the introduction of exotic species, intrusive lighting, harmful runoff, and excessive noise levels.

- *Assure adequate funding and procedures to deal with Unforeseen Circumstances*. Procedures to deal with Unforeseen Circumstances are described in Section 6.8.

- *The taking will not appreciably reduce the likelihood of survival and recovery of the species in the wild.* The Conservation Areas have been designed to ensure that the Reserve System can conserve the highest quality Habitat for the Covered Species, as well as protect the Essential Ecological Processes necessary to maintain Habitat quality and maintain connectivity among large blocks of Habitat. The Reserve System has been designed to support viable populations of the Covered Species or, in the case of species which may not have viable populations in just the Plan Area, to conserve the best Habitat available for the species in the Plan Area and support connectivity with populations outside the Plan Area. The Plan focuses Development in areas of lesser quality Habitat, typically where Habitat fragmentation and edge effects are already impacting Habitat quality. Additionally, adequate funding will be provided for management of the lands in the Reserve System for which the Permittees are responsible. For these reasons, the Take will not appreciably reduce the likelihood of survival and recovery of the species in the wild. The species accounts in Section 9 of the Plan provide an in depth analysis of the Plan's impacts on and benefits to the Covered Species.

Under the Plan and Permits, approximately 152,600 acres could potentially be lost to Development during the 75 year term of the Permits. This figure reflects all the vacant, private land outside the Conservation Areas plus the maximum Development that could occur in the Conservation Areas. In actuality, the acreage is expected to be substantially less for several reasons. One, since 1994, the rate of Development in the Plan Area has averaged approximately 1,370 acres per year. Projected over the 75-year term of the Permits, this would result in approximately 102,750 acres being Developed. Two, much of the vacant land both within and outside of Conservation Areas is severely constrained due to restrictions on Development on slopes, lack of access, and flood plain designations. Three, acquisition and conservation through other means may exceed the minimum acreage objective in the Conservation Areas. This would reduce the level of Take that occurs in the Conservation Areas.

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4.0 Establishment of the MSHCP Reserve System

The Conservation Plan includes the establishment of an MSHCP Reserve System, setting Conservation Goals and Objectives to ensure the Conservation of the Covered Species and conserved natural communities in the MSHCP Reserve System, provisions for management of the MSHCP Reserve System, and a Management and Monitoring Program. This section describes the establishment of the MSHCP Reserve System and the Conservation Objectives that will protect the Plan's Covered Species and conserved natural communities. The MSHCP Reserve System will be established from lands within 21 Conservation Areas. Because some Take Authorization is provided under the Plan for Development in Conservation Areas, the actual MSHCP Reserve System will be somewhat smaller than the total acres in the Conservation Areas. When assembled, the Reserve System will provide for the Conservation of the Covered Species in the Plan Area. The Conservation Areas are further described in terms of Core Habitat, Other Conserved Habitat, the conserved natural communities, Essential Ecological Processes, and Biological Corridors and Linkages. The description of the Conservation Areas also includes lands already developed and the amount of land that could be developed under the Permits. The subsection on each Conservation Area describes in detail the measures that will be implemented by the Permittees to achieve the identified Conservation Objectives.

The discussion of multiple Conservation Areas is not intended to imply that these areas exist in isolation from one another. The division is based on a combination of ecological and jurisdictional factors. Discussion of multiple Conservation Areas also facilitates the presentation of acreages regarding species' Habitat and natural community Conservation. Figure 4-1 depicts the location of the Conservation Areas. More detailed maps are found in the descriptions of the individual Conservation Areas. Figure 4-2 shows the Existing Conservation Lands within the MSHCP Reserve System.

Additional benefits of assembling the MSHCP Reserve System include maintaining viewsheds and natural areas that provide relief from urban areas, protecting cultural resources, providing trails opportunities, and avoiding significant flooding impacts.

For each Conservation Area, Conservation Objectives and Required Measures are articulated for conserving Core Habitat for Covered Species, Essential Ecological Processes necessary to maintain Habitat viability, Biological Corridors and Linkages as needed, and the less common conserved natural communities. Core Habitat has not been delineated for all species. Where it has not been delineated, Conservation Objectives are stated for either acres of Habitat or known occurrences. Specific Conservation Objectives for Other Conserved Habitat are generally not delineated because Other Conserved Habitat overlaps with and will be conserved in conjunction with attaining Conservation Objectives such as conserving Essential Ecological Process areas, Biological Corridors, Linkages, or Core Habitat for other Covered Species. An analysis of the Conservation achieved for Other Conserved Habitat through other Conservation Objectives is included in Section 4.1 of Appendix I. Specific Conservation Objectives are also not articulated for the more broadly distributed conserved natural communities because sufficient amounts of these communities in an appropriate configuration

are conserved in conjunction with attaining Conservation Objectives for Core Habitat for Covered Species, Essential Ecological Processes, Biological Corridors and Linkages. This analysis is also found in Section 4.1 of Appendix I. Attainment of the Conservation Objectives in each Conservation Area will result in the establishment of the MSHCP Reserve System.

The MSHCP Reserve System consists of the following components, as described in Sections 4.1 and 4.2:

- Existing Conservation Lands, managed by local, state, or federal agencies, or non-profit conservation organizations.
- Complementary Conservation lands
- Additional Conservation Lands

The MSHCP Reserve System will be assembled as shown in Table 4-1. The table shows acreage as of 1996, at the time the Planning Agreement was signed, and as of November 2006, the most recent data available. Conservation Objectives, Take Authorization, and Permittee mitigation obligations are based on the 1996 acreages. The November 2006 acreages show what Conservation occurred between 1996 and November 2006, the most recent date for which data is available.

Table 4-1: MSHCP Reserve System Assembly (in acres)

1996	2006	Lands
458,800	484,600	Existing federal lands in MSHCP Reserve System[1]
32,700	44,600	Existing state lands in MSHCP Reserve System
900	19,100	Existing non-profit organization lands in MSHCP Reserve System[2]
4,000	8,800	Existing Local Permittee Conservation lands in the MSHCP Reserve System
496,400	***557,100***	***SUBTOTAL***
69,290	29,990	Acres of Complementary Conservation
39,850	21,390	Acres to be acquired by state and federal agencies
7,700~~7,500~~	7,700~~7,500~~	Additional Local Permittee acres for which there will be cooperation to conserve
93,100	88,900	Acres to be acquired or otherwise conserved by the Local Permittees
10,800	10,800	Non-Permittee public and quasi-public lands
7,800	7,800	Fluvial sand transport area where the Conservation Objective is met through non-acquisition. Development consistent with Conservation Objectives is allowed.[3]
228,540~~228,340~~	***166,580~~166,380~~***	***SUBTOTAL - COMPLEMENTARY CONSERVATION AND ADDITIONAL CONSERVATION LANDS***
22,660	22,420	Potential Development within Conservation Areas from Table 5-1.
747,600~~747,400~~	***746,100~~745,900~~***[4]	***TOTAL – CONSERVATION AREAS***

[1] The acreage includes lands purchased by non-profit organizations and donated to federal agencies.
[2] The acreage includes lands owned by non-profit organizations but acquired with State grant funds or local funds.
[3] These acres are in the Cabazon, Long Canyon, and West Deception Canyon Conservation Areas.
4 Revisions in the overall Conservation Area acreage from 1996 to 2006 reflect changes in boundaries due to Like Exchanges, modifications in Response to Comments, and a higher resolution analysis of the Conservation Area

boundaries. These revisions do not change the obligations of the Permittees to Conserve the acreages described in the 1996 column.

Section 4 focuses on the establishment and operation of the MSHCP Reserve System through description of the Conservation Objectives, Reserve Assembly, and the measures that will be implemented to achieve the Conservation Area and Covered Species Goals and Objectives. Section 4.1 provides an overview of the Existing Conservation Lands and how existing management constraints were used to determine their contribution to meeting the Conservation Objectives of the Conservation Areas. Section 4.2 describes MSHCP Reserve System Assembly. This is followed in Section 4.3 by an in-depth description of the 21 Conservation Areas from which the MSHCP Reserve System will be assembled. This section includes a description of Conservation Objectives and Required Measures to avoid, minimize, and mitigate Take. Section 4.4 provides additional description of avoidance, minimization, and mitigation measures for Covered Activities. Section 4.5 describes guidelines for land uses within or adjacent to the MSHCP Reserve System. These guidelines are another form of avoidance, minimization, and mitigation measures. Section 4.6 summarizes Conservation and Take or Habitat loss levels for the Covered Species (Take for animal species) and conserved natural communities within the Plan Area.

Implementation of the Plan must ensure that the Conservation Objectives delineated for each Conservation Area are achieved and that the Required Measures are carried out. Implementation relies on cooperation among all the signatories to the IA, including local, state, and federal agencies. Assembly of the MSHCP Reserve System is a component of Plan implementation.

4.1 Existing Conservation Lands within Conservation Areas

The Conservation Areas contained approximately 496,400 acres of Existing Conservation Lands in 1996 at the time of the signing of the Planning Agreement. Since then, approximately 59,600 acres have been acquired in the Conservation Areas by federal, state, and local agencies, and non-profit organizations. (See Section 4.2 in Appendix I for information on acquisitions since the Planning Agreement.) As of November 2006, there were approximately 557,100 acres of Existing Conservation Lands in the Conservation Areas composed of approximately 529,200 acres of state and federal lands, 8,800 acres of local lands, and approximately 19,100 acres of non-profit organization lands. These are lands in public or private ownership that are managed for Conservation and/or open space values, and which contribute to the Conservation of the Covered Species and the conserved natural communities included in the Plan. These lands are expected to be maintained in their current natural state. Tables 4-2 and 4-3 in Sections 4.1.1 and 4.1.2 show the ownership of these lands. These lands have been assigned one of three Conservation Levels, as explained in Section 2.

On Conservation Level 1 land, Development is precluded in Wilderness Areas except to the extent that federal agencies must provide reasonable access across public lands to private inholdings within wilderness. Notwithstanding this, virtually no Habitat loss is anticipated. The

Plan anticipates only minimal Habitat loss on Conservation Level 2 lands, in conjunction with trails and trailheads identified in Section 7.4, or as necessitated by an Adaptive Management action. Section 7 of the Plan addresses Covered Activities including Operation and Maintenance Activities (O&M) for any existing Permittee facilities that may occur on Existing Conservation Lands. New Development on federal Existing Conservation Lands would be subject to a Section 7 consultation as applicable pursuant to FESA. New Development on state Existing Conservation Lands would be subject to appropriate permitting processes with ~~CDFG~~CDFW. New Development on Local Permittee or Private Conservation Land, except as specifically authorized in Section 7 of this Plan, would be permitted only through a Plan amendment and must be consistent with the Conservation Objectives of the relevant Conservation Area.

On Conservation Level 3 land, the Plan anticipates that Habitat loss will not occur on more than 1% of lands managed by each entity, and that any Development will be consistent with the Conservation Objectives for the relevant Conservation Area. The BLM 2002 CDCA Plan Amendment for the Coachella Valley specifically commits BLM to conserving at least 99% of vegetation community types on the lands it administers in the MSHCP Reserve System. In the portion of the MSHCP Area where the Northern and Eastern Colorado (NECO) Plan applies to federal land, new surface disturbance is cumulatively limited to one percent of the federal portion of each Desert Wildlife Management Area. New Development on federal Existing Conservation Lands would be subject to a Section 7 consultation as applicable. New Development on state Existing Conservation Lands, except as specifically authorized in Section 7 of this Plan, would be subject to appropriate permitting processes with ~~CDFG~~CDFW. New Development on Local Permittee and Private Conservation Land, except as specifically authorized in Section 7 of this Plan, may be permitted only through a Plan amendment and must be consistent with the Conservation Objectives of the relevant Conservation Area.

The Existing Conservation Lands include the Coachella Valley Fringe-toed Lizard Preserve system established pursuant to the Coachella Valley Fringe-toed Lizard Habitat Conservation Plan (CVFTL HCP), approved in 1986. Three preserves were established: Coachella Valley (Thousand Palms), Whitewater Floodplain, and Willow Hole/Edom Hill. As described in Section 16.2 of the IA, the lands acquired under the CVFTL HCP will be subsumed into and managed as part of the MSHCP Reserve System. The CVFTL Incidental Take Permit will be relinquished per 50 CFR 13.26 and 50 CFR 17.22(a)(7). The CVFTL is a Covered Species under the MSHCP.

4.1.1 Federal and State Existing Conservation Lands

Federal lands within the MSHCP Reserve System that will contribute to the Conservation of the Covered Species include lands administered by BLM, BOR, NPS, USFWS, and USFS. State lands within the MSHCP Reserve System that will contribute to the Conservation of the Covered Species include lands administered by ~~CDFG~~CDFW, State Parks, CVMC, and UC. The federal and state Existing Conservation Lands are summarized in Table 4-2, and the lands managed by the federal and state agencies as of November 2006 are briefly described following the table. The difference in acreage between 1996 and 2006 reflects acquisitions during that period. Acquisitions may include purchases as well as lands donated to the agency. Additional information concerning the lands described below is found in Section 8.2.3. While the federal

and state Existing Conservation Lands are a component of the MSHCP Reserve System and add value to the lands to be conserved by the Permittees, their Conservation does not constitute mitigation for impacts of the Covered Activities. Conversely, Take Authorization and mitigation and minimization of impacts from the Covered Activities are not dependent on the Conservation of the federal and state Existing Conservation Lands.

Table 4-2: State and Federal Existing Conservation Lands[1]

Agency	*Acres (1996)*	*Acres (November 2006)*	*Conservation Area*
BLM	260,300	277,100	Santa Rosa and San Jacinto Mountains; Mecca Hills/Orocopia Mountains; Upper Mission Creek/Big Morongo Canyon; Dos Palmas; Whitewater Canyon; Willow Hole; Edom Hill; Thousand Palms; Indio Hills/Joshua Tree National Park Linkage
BOR	600	600	Dos Palmas
NPS	138,000	146,000	Joshua Tree National Park
USFWS	3,600	3,600	Thousand Palms
USFS	56,400	57,300	Santa Rosa and San Jacinto Mountains; Cabazon; Stubbe and Cottonwood Canyons; Upper Mission Creek/Big Morongo Canyon; Whitewater Canyon
~~CDFG~~CDFW	22,300	27,700	Santa Rosa and San Jacinto Mountains; Dos Palmas; Thousand Palms; Indio Hills/Joshua Tree National Park Linkage
Caltrans	0	500	Dos Palmas
State Lands Commission	500	700	Joshua Tree National Park
State Parks	3,400	6,800	Santa Rosa and San Jacinto Mountains; Indio Hills Palms; Indio Hills/Joshua Tree National Park Linkage
CVMC	200	2,600	Snow Creek/Windy Point; Willow Hole; Thousand Palms; Santa Rosa and San Jacinto Mountains
UC	6,300	6,300	Santa Rosa and San Jacinto Mountains
TOTAL	***491,500***	***529,200***	

[1] Acreage is rounded to nearest 100 acres.

Bureau of Land Management

The management of BLM lands in the MSHCP Reserve System is consistent with the Conservation Goals and Conservation Objectives of the Plan. These areas, totaling approximately 277,100 acres, are BLM portions of the Santa Rosa and San Jacinto Mountains National Monument, the Santa Rosa Wilderness (which also lies within the National Monument), the Mecca Hills Wilderness, the Orocopia Mountains Wilderness, the San Gorgonio Wilderness, the Big Morongo Canyon Preserve/ACEC, portions of the Chuckwalla Desert Wildlife Management Area/ACEC (some portions lie outside the Plan Area), portions of the Dos Palmas Preserve/ACEC, the Whitewater Canyon ACEC, the Willow Hole-Edom Hill Preserve/ACEC, and portions of the Thousand Palms CVFTL Preserve. The BLM also manages land in the MSHCP Reserve System that is not included in any of the foregoing management units. Pursuant to BLM's 2002 CDCAPA for the Coachella Valley, BLM commits to conserving at least 99% of vegetation community types on lands it administers within the MSHCP Reserve System. CVCC

will use its best efforts to enter into a Memorandum of Understanding (MOU) with BLM to ensure monitoring and management consistent with the MSHCP prior to issuance of the Permits and no later than 3 years after the issuance of the Permits. This MOU will address cooperative efforts to control OHV trespass on Reserve System lands and will encourage cooperative agreements to enforce third-party noncompliance with the requirements of the Plan. BLM has the responsibility to address OHV trespass across BLM lands within the Plan Area through implementation of the CDCA Plan Amendment and any associated Section 7 consultations, consistent with the Terms and Conditions of any associated Biological Opinions and re-initiation of consultation on previous BLM actions when necessary.

Bureau of Reclamation

BOR administers approximately 600 acres of land adjacent to the Coachella Canal in the Dos Palmas Conservation Area. The Permits will not provide Take Authorization for activities on this land.

National Park Service

NPS manages approximately 146,000 acres within Joshua Tree National Park that are in the MSHCP Reserve System. NPS management of these areas will ensure that the biological resource values on these lands are managed in a manner consistent with the MSHCP. NPS has three relevant plans that guide management of these areas: the Joshua Tree National Park General Management Plan, the Land Protection Plan for Joshua Tree National Park, and the Backcountry and Wilderness Management Plan. CVCC will use its best efforts to enter into an MOU with NPS to ensure monitoring and management consistent with the MSHCP prior to issuance of the Permits and no later than 3 years after Permit issuance.

U.S. Fish and Wildlife Service

USFWS manages approximately 3,600 acres in the Coachella Valley National Wildlife Refuge, which is the USFWS portion of the CVFTL Preserve. USFWS will monitor and manage these lands consistent with the Conservation Goals and Conservation Objectives of the Plan.

U.S. Forest Service

The approximately 57,300 acres of USFS lands within the MSHCP Reserve System include portions of the San Jacinto Wilderness, portions of the San Gorgonio Wilderness Management Area, portions of the Santa Rosa Wilderness, and some non-Wilderness portions of the San Bernardino National Forest. USFS management objectives for these lands are compatible with the Conservation Goals and Conservation Objectives of the Plan. The approved 2004 Land and Resource Management Plan provides specific standards and guidelines for the protection of Peninsular bighorn sheep and riparian birds. CVCC will use its best efforts to enter into an MOU with USFS to ensure monitoring and management consistent with the MSHCP prior to issuance of the Permits and no later than 3 years after Permit issuance.

California Department of Fish and ~~Game~~Wildlife

CDFW~~G~~ manages approximately 27,700 acres of land within the MSHCP Reserve System. This includes the Carrizo Canyon Ecological Reserve, Hidden Palms Ecological Reserve, Sky Valley Ecological Reserve, Magnesia Springs Ecological Reserve, Oasis Springs Ecological Reserve, and the Santa Rosa Mountains State Wildlife Area. In addition, CDFW~~G~~ manages some lands in the CVFTL Preserve as an Ecological Reserve. CDFW~~G~~ will monitor and manage these lands consistent with the Conservation Goals and Conservation Objectives of the Plan.

California Transportation Department (Caltrans)

Caltrans manages approximately 500 acres in the Dos Palmas Conservation Area.

State Lands Commission

The State Lands Commission administers more than 4,800 acres in the Plan Area. All but 700 acres are managed for revenue generating purposes. By special agreement with NPS, State Lands Commission manages 700 acres in Joshua Tree National Park for conservation purposes. The remaining 4,100 acres are not considered conserved. The State Lands Commission is not a Permittee and receives no Take Authorization through the MSHCP.

State Parks

The mission of State Parks is to provide for the health, inspiration, and education of the people of California by helping to preserve the state's extraordinary biological diversity, protecting its most valued natural and cultural resources, and creating opportunities for high-quality outdoor recreation. State Parks lands totaling approximately 6,800 acres within the MSHCP Reserve System include portions of Mt. San Jacinto Wilderness State Park and the Indio Hills Palms unit of the State Parks system. The Wilderness designation of the former provides management that is consistent with the Conservation Goals and Conservation Objectives of the Plan. The latter is currently managed per an MOU as part of the CVFTL Preserve. This preserve will be incorporated into the MSHCP Reserve System and management of State Parks' lands will be consistent with the Conservation Area and Covered Species Goals and Objectives of the Plan. State Parks is a Permittee and will sign the IA. Management and monitoring of approximately 6,800 acres within the Conservation Areas consistent with the MSHCP is part of State Parks' obligation as a Permittee.

Coachella Valley Mountains Conservancy

CVMC acquires mountainous lands surrounding the Coachella Valley and natural community conservation lands within the Coachella Valley to hold in perpetual open space and to provide for the protection of wildlife resources on, the public's enjoyment of, and the enhancement of their recreational and educational experiences on those lands in a manner consistent with the protection of the lands and the resource values thereon. CVMC buys land directly and makes local assistance grants to other entities to acquire land for CVMC's purposes. CVMC owns approximately 2,600 acres of land or a conservation easement interest in land in the

Snow Creek/Windy Point Conservation Area, the Willow Hole Conservation Area, the Thousand Palms Conservation Area, and the Santa Rosa and San Jacinto Mountains Conservation Area. CVMC manages these lands to protect their biological resource values pursuant to Public Resources Code Section 33501. CVMC will monitor and manage these lands consistent with the Conservation Area and Covered Species Goals and Objectives of the Plan as part of its obligation as a Permittee. CVMC will sign the IA.

Regents of the University of California

UC owns and manages land totaling approximately 6,300 acres in two areas of the MSHCP Reserve System as part of its Natural Reserve System. The two areas are Deep Canyon Desert Research Center and Oasis de los Osos, both of which are located in the Santa Rosa and San Jacinto Mountains Conservation Area. The mission of the Natural Reserve System is to protect the biological resources of its sites while providing for teaching and research opportunities. Management of these lands is consistent with the Conservation Goals and Conservation Objectives of the Plan. CVCC will use its best efforts to enter into an MOU with Regents to ensure monitoring and management consistent with the MSHCP prior to issuance of the Permits and no later than 3 years after Permit issuance.

4.1.2 Local Permittee Existing Conservation Lands, Including CVFTL HCP Lands

As part of their mitigation obligation under the Plan, the Local Permittees will commit to manage and protect approximately 8,800 acres of Existing Conservation Lands as part of the MSHCP Reserve System, and consistent with the Conservation Area and Covered Species Goals and Objectives of the Plan. This includes the Covered Species Conservation Goals and Objectives in Section 9. The Local Permittee Existing Conservation Lands are summarized in Table 4-3. Local Permittee lands in the MSHCP Reserve System that are currently conserved and which will be managed for Plan purposes include lands owned by the Cities and County Parks. Prior to relinquishment of the CVFTL Permit, CVCC will conserve the parcels through a recorded Legal Instrument acceptable to the Wildlife Agencies. CVCC may obtain conservation easements on or fee title to the lands owned by the Cities and County Parks. CVCC will enter into MOUs with these jurisdictions assuring management of these lands consistent with the MSHCP.

Also included in the Local Permittee Existing Conservation Lands are lands owned by the Center for Natural Lands Management, which were acquired with local mitigation fees pursuant to the CVFTL HCP, and lands owned by CVWD and managed pursuant to the CVFTL HCP. The CVFTL HCP required establishment of three preserves for the Conservation of the CVFTL and its Habitat. These are the Coachella Valley Preserve in the Thousand Palms area, the Willow Hole/Edom Hill Preserve near the west end of the Indio Hills, and the Whitewater Floodplain Preserve east of Indian Avenue in the Whitewater River area. These lands are displayed in Figure 6-2 in Section 6.6.1.3 of the Plan. These preserves consist of BLM, ~~CDFG~~CDFW, USFWS, State Parks, CVMC, CVWD, TNC, and CNLM lands. Table 6-1 shows the ownership in the three reserves. Of the land in the reserves, approximately 1,700 acres in the

Whitewater Floodplain Reserve is CVWD land, and approximately 500 acres was acquired with local CVFTL mitigation fees. These lands will be included in the MSHCP Reserve System.

In conjunction with Plan approval and Permit issuance, the CVFTL Incidental Take Permit will be relinquished per 50 CFR 13.26 and 50 CFR 17.22(a)(7). A new Incidental Take Permit will be issued pursuant to the MSHCP. Prior to relinquishment of the CVFTL Permit, CVCC shall conserve these lands through a recorded Legal Instrument acceptable to the Wildlife Agencies. CVCC may obtain conservation easements on or fee title to these mitigation lands. (See Section 6.6.1.3 of the Plan and Section 16.2 of the IA for additional details.)

Table 4-3: Local Permittee Existing Conservation Lands[1]

Permittee	*Acres (1996)*	*Acres (November 2006)*	*Land Designation*	*Conservation Area*
City of Cathedral City	0	100	Deed Restricted	Edom Hill
City of Indian Wells	600	600	Leased to Living Desert	Santa Rosa and San Jacinto Mountains
City of La Quinta	0	100	Deed Restricted	Santa Rosa and San Jacinto Mountains
City of Palm Desert	0	1,000	Deed Restricted	Santa Rosa and San Jacinto Mountains
City of Palm Springs	1,800	2,100	Deed Restricted	Santa Rosa and San Jacinto Mountains
City of Rancho Mirage	0	1,000	Conservation Easement	Santa Rosa and San Jacinto Mountains
CVWD	1,200	1,700	Restricted pursuant to CVFTL HCP	Whitewater Floodplain
County Parks	400	400	Regional Open Space	Upper Mission Creek/Big Morongo Canyon; Santa Rosa and San Jacinto Mountains
CVAG	0	1,300	Transportation mitigation	Willow Hole; West Deception; Indio Hills/Joshua Tree Linkage
Center for Natural Lands Management	0	500	Acquired with CVFTL local mitigation fees pursuant to the CVFTL HCP	Thousand Palms
TOTAL	***4,000***	***8,800***		

[1] Acreage is rounded to the nearest 100 acres.

4.1.3 Non-Profit Organization Conservation Lands

Various non-profit conservation organizations own land in the MSHCP Reserve System, which they acquired for Conservation purposes. CVCC will use its best efforts to enter into an MOU regarding cooperative management with non-profit conservation organizations within three years of Permit issuance to ensure the permanent Conservation by the execution of a Legal Instrument and management of the lands they own pursuant to the Plan, including providing

access to the property for biological monitoring and management purposes. The text of the model MOU is included in Section 4.3 of Appendix I.

Table 4-4 shows non-profit conservation organization Existing Conservation Lands.

Table 4-4: Non-Profit Organization Existing Conservation Lands[1]

Non-profit Organization	*Acres (1996)*	*Acres (November 2006)*	*Conservation Area*
American Land Conservancy	0	500	Santa Rosa and San Jacinto Mountains
Center for Natural Lands Management	0	800	Dos Palmas
Center for Natural Lands Management (CVFTL Preserve)	0	1,100	Thousand Palms; Willow Hole; Edom Hill
Friends of the Desert Mountains	0	12,400	Snow Creek/Windy Point; Stubbe and Cottonwood Canyons; Whitewater Canyon; Willow Hole; Thousand Palms; Indio Hills Palms; Indio Hills/Joshua Tree National Park Linkage; Santa Rosa and San Jacinto Mountains
The Living Desert	0	600	Santa Rosa and San Jacinto Mountains
The Nature Conservancy	900	900	Thousand Palms; Dos Palmas
Wildlands Conservancy	0	2,800	Joshua Tree National Park; Upper Mission Creek/Big Morongo Canyon; Santa Rosa and San Jacinto Mountains
NON-PROFIT ORGANIZATION TOTAL	***900***	***19,100***	

[1] Acreage is rounded to the nearest 100 acres.

4.2 MSHCP Reserve System Assembly

4.2.1 Complementary Conservation

Several acquisition efforts for Conservation purposes are ongoing. These acquisition programs have broader rationales than the MSHCP program and are independent of the MSHCP effort, though they may be coordinated with it. They complement implementation of the MSHCP, but the acquisition is not a Permittee obligation for purposes of the authorization of Take. In the case of public agencies, the goal of these acquisition programs is to consolidate public ownership of lands within Joshua Tree National Park, the Santa Rosa and San Jacinto Mountains National Monument, and the Mecca Hills and Orocopia Mountains Wilderness areas. Other Complementary Conservation includes acquisitions by non-profit organizations and possibly Tribal acquisition of land for Conservation purposes outside reservation boundaries. Between 1996 and November 2006, Complementary Conservation has accounted for the conservation of approximately 36,900 acres in the Conservation Areas. Table 4-5 shows where

this Complementary Conservation has occurred, as well as where future Complementary Conservation is projected to occur.

During the term of the Permits, approximately 29,990 acres of additional Complementary Conservation is projected to occur in the Conservation Areas after November 2006. Based on past performance, this is a reasonable estimate of the acquisitions that might be accomplished through these programs over the life of the Permits. For purposes of projecting acquisition costs for the Plan, it has been assumed that future Complementary Conservation will occur in Joshua Tree National Park, the Santa Rosa and San Jacinto Mountains National Monument, and the Mecca Hills and Orocopia Mountains Wilderness areas. Figure 4-3 shows the location of these projected future Complementary Conservation areas. Acquisitions by non-profit organizations or Tribes may also occur in the Conservation Areas. Any such acquisitions will be considered as part of the Complementary Conservation acres projected under the Plan, as long as the Conservation is not for mitigation for projects or other HCPs. CVCC shall note in its Annual Report to the Wildlife Agencies how much land, if any, non-profit organizations and the Tribes have acquired in the Conservation Areas.

If, during the course of Plan implementation, Complementary Conservation is not occurring as anticipated, the Parties will meet and confer regarding impacts to meeting Conservation Objectives.

Table 4-5: Complementary Conservation[1]

Conservation Area	***Complementary Conservation since 1996***	***Projected Complementary Conservation***
Desert Tortoise and Linkage	600	0
Dos Palmas	800	0
Edom Hill	200	0
Indio Hills/JTNP Linkage	700	0
Indio Hills Palms	1,000	0
Joshua Tree National Park[2]	9,300	11,900
Mecca Hills/Orocopia Mountains[3]	1,000	6,900
Santa Rosa and San Jacinto Mountains[4]	17,000	10,700
Snow Creek/Windy Point[5]	1,000	490
Upper Mission Creek/Big Morongo Canyon	4,200	0
West Deception Canyon	500	0
Willow Hole	100	0
Whitewater Canyon	500	0
TOTAL[6]	***36,900***	***29,990***

[1] Complementary Conservation is represented in acreage rounded to the nearest 100 acres.
[2] Future Complementary Conservation consists of National Park inholding acquisitions by NPS.
[3] Future Complementary Conservation consists of Wilderness inholding acquisitions by BLM.
[4] Future Complementary Conservation consists of National Monument inholding acquisitions by BLM and USFS.
[5] Future Complementary Conservation consists of Wilderness inholding acquisitions by BLM.
[6] Total Complementary Conservation includes some lands that were purchased by Private Conservation agencies and transferred to Federal Ownership.

4.2.1.1 Tribal Land outside the Reservation

Between 1996 and 2003, the Agua Caliente Band of Cahuilla Indians purchased approximately 3,800 acres of land outside the Indian Reservation and within the Santa Rosa and San Jacinto Mountains Conservation Area. This land is the subject of a proposed land exchange between the Agua Caliente Band and the Bureau of Land Management. It is not known at this time how much of the 3,800 acres may ultimately be included in the exchange. The purpose of the proposed land exchange is to consolidate tribal land inside the external boundaries of the reservation, and for BLM to consolidate its land within the Santa Rosa and San Jacinto Mountains National Monument. BLM would obtain some or all of the 3,800 acres of tribal lands outside the reservation. Upon completion of the land exchange, the CVCC will coordinate with the Agua Caliente Band of Cahuilla Indians regarding the preparation of a Minor Amendment without Wildlife Agency concurrence to adjust land ownership and conservation acreages in this Conservation Area.

4.2.2 Additional Conservation Lands

A minimum of 129,690 acres in the Conservation Areas will be conserved as Additional Conservation Lands after November 2006, to be acquired or otherwise conserved through state and federal acquisitions, Permittee contributions, and the Conservation of public and quasi-public lands.

4.2.2.1 The Role of Federal and State Governments in Assembly of the Reserve System

Sensitive species and their Habitats are public resources; the benefits of protecting these resources accrue broadly to the citizens of the state and the nation. The federal and state governments have acknowledged their role in Habitat Conservation and agree to assist in creating an MSHCP Reserve System that reduces or avoids the need to list additional species and contributes to the recovery of Covered Species. Between 1996 and November 2006, the state and federal governments have acquired or funded the acquisition of 37,700 acres in the Conservation Areas (in addition to Complementary Conservation). Through the MSHCP and its IA, the federal and state governments have agreed to partner with the Permittees in assembling, managing, and monitoring the MSHCP Reserve System. The federal and state governments will undertake the following actions:

- Acquire 21,390 acres of privately owned lands in the Conservation Areas after November 2006, as a contribution to Plan implementation.
- Manage certain federal and state lands in the MSHCP Reserve System.
- Participate in the Monitoring and Adaptive Management Program for the MSHCP Reserve System.

Biological value, cost, vulnerability to Development, and proximity to existing state and federal lands will be considered in determining which lands are acquired. State and federal

potential funding sources and programs for land acquisition are described in Section 5 of the Plan.

4.2.2.2 Permittees' Obligation in Assembly of the MSHCP Reserve System

As of 2006, the Permittees have an obligation to conserve approximately 115,340 ~~115,140~~ acres in the Conservation Areas through:

- Conservation of 7,700~~7,500~~ acres of currently non-conserved Local Permittee-owned lands. [See Section 4.2.2.2.1.]
- Conservation of 88,900 acres of Additional Conservation Lands by the Local Permittees and Caltrans through acquisition or other means, such as planning tools and land use regulation and the acquisition of 640 acres by State Parks, of which 100 acres can be developed for State Park facilities. [See Section 4.2.2.2.2.]
- Management of 18,200 acres of Local and State Permittee Existing Conservation Lands consistent with the MSHCP. [See Section 4.2.2.2.3.]

In addition, the Permittees will maintain the fluvial sand transport Essential Ecological Process in the Cabazon, Long Canyon, and West Deception Canyon Conservation Areas as described in Section 4.2.2.2.4.

4.2.2.2.1 Conservation of Non-Conserved Permittee Owned Lands in Conservation Areas

In addition to lands they have previously committed to conservation, the Local Permittees will cooperate with CVCC to conserve currently non-conserved Local Permittee lands shown in Table 4-6 as part of the Permittees' contribution of Additional Conservation Lands to Plan implementation. Figure 4-4 depicts the location of these lands. Some parcels contain public facilities that are Covered Activities under the Plan as identified in Section 7.3. These parcels will be conserved to the extent consistent with the Covered Activities. CVCC shall conserve the 7,700~~7,500~~ acres through a recorded Legal Instrument. CVCC shall also enter into an agreement or MOU providing for management consistent with the MSHCP. Within three years of Permit issuance, CVCC will, in this manner, ensure the Conservation of the Cities, Riverside County, County Flood Control, County Parks, and County Waste lands within the Conservation Areas. The CVWD, ~~and~~ IID, and MSWD lands totaling about 6,900~~6,700~~ acres will be conserved incrementally over time as CVWD, ~~and~~ IID, and MSWD mitigate Covered Activities, through a recorded Legal Instrument acceptable to the Wildlife Agencies. The Legal Instrument may include conveying fee title or conservation easements on these lands to CVCC. If before Year 50 of Plan implementation, either CVWD, ~~or~~ IID, or MSWD still owns land in the Conservation Areas that has not been conserved by any of the foregoing methods, CVWD, ~~and/or~~ IID, and/or MSWD shall cooperate with CVCC in the conservation of these lands through acquisition by CVCC or other means.

4.2.2.2.2 Conservation of Additional Conservation Lands by Permittees through Acquisition or Other Means

One of the Permittees' mitigation obligations is to conserve 88,900 acres through acquisition or other means after November 2006.

Table 4-6: Non-Conserved Permittee Owned Lands

Local Permittee	*Acres*[1]	*Conservation Area*
City of La Quinta	100	Santa Rosa and San Jacinto Mountains
City of Palm Springs	100	Santa Rosa and San Jacinto Mountains
City of Desert Hot Springs	100	Upper Mission Creek/Big Morongo Canyon
Coachella Valley Water District (CVWD)	5,800	Whitewater Floodplain; CV Stormwater Channel & Delta; Santa Rosa/San Jacinto Mountains
Imperial Irrigation District	900	CV Stormwater Channel & Delta; Desert Tortoise & Linkage
Mission Springs Water District	100	Upper Mission Creek/Big Morongo Canyon; Willow Hole
Riverside County; County Flood Control; County Parks; County Waste	600	Cabazon; Stubbe & Cottonwood Canyons; Willow Hole; Edom Hill; Upper Mission Creek/Big Morongo Canyon; Mission Creek/Morongo Wash; Desert Tortoise & Linkage; CV Stormwater Channel & Delta; Santa Rosa and San Jacinto Mountains;
TOTAL	***7,700~~7,500~~***	

[1] Acreage is rounded to the nearest 100 acres.

Acquisition priorities will be set by CVCC and will focus on areas with the greatest biological sensitivity and greatest risk of Development. CVCC will adjust priorities as needed to maintain Rough Step, which is described in Section 6.5, and respond to changing Development patterns. CVCC will seek to maintain a strategic cash reserve or line of credit with willing Local Permittees for high priority acquisitions.

In addition to acquisition, land in the MSHCP Reserve System may be conserved through dedication, deed restriction, or granting a conservation easement in conjunction with Development approvals and other conservation incentives used by the Permittees. A Permittee could, for example, use planning tools such as transfer of Development rights or cluster development to ensure that a Development in a Conservation Area is compatible with the Conservation Objectives and that a portion of the property is committed to Conservation. Jurisdictions may identify or develop additional incentives in exchange for Conservation commitments. For Plan purposes, it is assumed that a limited amount of land, not anticipated to exceed approximately 1,700 acres, may be conserved through planning tools and land use regulation. Because of the uncertainty of this, however, the Plan assumes for funding projection purposes that acquisition will be the method used to conserve land. If a Permittee approves Development in a Conservation Area, the jurisdiction will be responsible for reporting to CVCC the acreage approved for Development and the acreage of any land committed to Conservation in conjunction with the approval. (See Section 6.6.1.1 for a discussion of how Development proposals in a Conservation Area will be reviewed.)

Habitat Conservation through planning tools and land use regulation shall be ensured, prior to issuance of a grading permit, by fee title transfer, granting a conservation easement to CVCC or other approved entity, or recordation of a deed restriction. Regardless of the means by which Habitat Conservation occurs, rights of access for monitoring and management of the lands by CVCC, the Wildlife Agencies, or their designees shall be provided. The 88,900 acres of Permittee mitigation lands to be acquired or otherwise conserved will be protected by the CVCC with a Legal Instrument that guarantees conservation in perpetuity. Acquisitions that occurred prior to Permit issuance will be protected by a Legal Instrument within five years of Permit issuance; acquisitions that occur after Permit issuance shall be protected by a Legal Instrument within five years of acquisition. Such instruments may be removed from a parcel with Wildlife Agencies' concurrence if it is necessary to accomplish an exchange of lands that results in higher quality Conservation. A conservation easement shall be substantially in the form of the Model Conservation Easement included in the Final IA as Exhibit H.

The undeveloped portions of parcels in Conservation Areas on which Development is approved by a Permittee shall count toward meeting the MSHCP's Conservation Objectives only when the undeveloped portion of the parcel is legally described and permanently protected through an appropriate Legal Instrument, and provision is made for the land to be monitored and managed pursuant to the MSHCP's Monitoring Program and Management Program. Review of individual Development projects will occur in accordance with the Implementation Manual.

4.2.2.2.3 Management of Permittee Existing Conservation Land Consistent with the Plan

As previously described in Sections 4.1.1 and 4.1.2, certain Permittee-owned lands in the Conservation Areas will be managed by the Permittees consistent with the Conservation Area and Covered Species Goals and Objectives of the Plan as part of the Permittees' mitigation obligation. These lands consist of 6,800 acres of State Parks' land, 2,600 acres of CVMC land, and 8,800 acres of Local Permittee land as of November 2006.

4.2.2.2.4 Conservation of Fluvial Sand Transport Process within Conservation Areas

Also as part of their mitigation obligations, the Local Permittees will protect the fluvial sand transport Essential Ecological Process in the Cabazon, Long Canyon, and West Deception Canyon Conservation Areas to ensure no net reduction in fluvial sand transport in these areas. Figure 4-5 depicts these areas. The Permittees will require that natural flows onto parcels in the fluvial sand transport areas shall be conveyed offsite in the natural pre-disturbance direction of flow. This ensures that Development on the property shall not impede water-borne sand transport across the parcel in its natural direction of flow. In addition, water-borne sediments and floodwaters shall not be artificially retained onsite. Concentration of flows and increase in flow velocity offsite shall be minimized to avoid downstream erosion and scour. Alternatively, a flood control structure for the area that is designed to ensure no net reduction of sediment transport from the sand source area to the sand deposition area where aeolian sand transport processes are active may be used to achieve the Conservation Objective of fluvial sand transport. Construction of such flood control structures, unless identified as Covered Activities in Section 7.3, will require a Minor Amendment to the Plan with Wildlife Agencies' concurrence, as set forth in Section 6.12.3 of the Plan. Sections 4.3.1, 4.3.10, and 4.3.13 provide additional information on

the protection of fluvial sand transport processes in the Cabazon, Long Canyon, and West Deception Canyon Conservation Areas. The fluvial sand transport processes occur on a total of 7,800 acres in these three Conservation Areas. While there is Habitat (but not Core Habitat) for some of the Covered Species in these areas, it is already fragmented and subject to significant edge effects by existing Development. As a result, there are no Conservation Objectives for Habitat in the areas consisting of the 7,800 acres. The only Conservation Objective for these areas is to maintain fluvial sand transport as described above. Development consistent with ensuring no net loss of fluvial sand transport may occur in these areas, and such Development is a Covered Activity under the Plan and Permits.

4.2.2.3 Public and Quasi-Public Land in the Conservation Areas

Approximately 10,800 acres within the Conservation Areas (identified in the County of Riverside Assessor's parcel database and utilities databases) belong to public and quasi-public entities that are not Permittees. The Plan assumes that should a non-Permittee seek Take Authorization through the Participating Special Entity provisions of the Plan, Conservation would occur in conjunction with such Take Authorization such that 10,800 acres would ultimately be conserved or remain undeveloped, enabling the Conservation Area and Covered Species Goals and Objectives of the Plan to be achieved.

4.3 Conservation Areas

The Plan will result in the establishment and management of the MSHCP Reserve System from land within the Conservation Areas. The Conservation Goals of the MSHCP Reserve System are:

1. Represent native ecosystem types or natural communities across their natural range of variation in a system of conserved areas.
2. Maintain or restore self-sustaining populations or metapopulations of the species included in the Plan to ensure permanent Conservation so that Take Authorization can be obtained for currently Listed Species (animal species) and Non-listed Species can be covered in case they are listed in the future.
3. Sustain ecological and evolutionary processes necessary to maintain the functionality of the conserved natural communities and Habitats for the species included in the Plan.
4. Maximize connectivity among populations and avoid Habitat fragmentation within Conservation Areas to conserve biological diversity, ecological balance, and connected populations of Covered Species.
5. Minimize adverse impacts from OHV use, illegal dumping, edge effects, exotic species, and other disturbances in accordance with the Management and Monitoring Programs.
6. Manage the Conservation Areas adaptively to be responsive to short-term and long-term environmental change and new science.

The MSHCP Reserve System will be assembled from the Conservation Areas as described in Section 4.2. Avoidance, minimization, and mitigation measures as described in Section 4.4, and Land Use Adjacency Guidelines as described in Section 4.5 will minimize the impacts of Development in the Conservation Areas and adjacent to the Reserve System. The Monitoring Program, Management Program, and Adaptive Management, as described in Section 8.0, will ensure that Conservation Area and Covered Species Goals and Objectives continue to be met in perpetuity in the MSHCP Reserve System. The following section on each Conservation Area describes measures required in that specific Conservation Area to ensure that Conservation Objectives are met. The Conservation Objectives delineate the acres that need to be conserved as of 1996, when the Planning Agreement was signed. These acreages are in addition to Existing Conservation Lands in the Conservation Areas. Table 5-1 in Section 5.1.1 shows the acres in each Conservation Area that have been conserved since 1996.

For each Conservation Area, Conservation Objectives are articulated for conserving Core Habitat for Covered Species, Essential Ecological Processes necessary to maintain Habitat viability, Biological Corridors and Linkages as needed, and the less common conserved natural communities. Core Habitat has not been delineated for all species. Where it has not been delineated, Conservation Objectives are stated for either acres of Habitat or known occurrences. Specific Conservation Objectives for Other Conserved Habitat are generally not delineated because Other Conserved Habitat overlaps with and will be conserved in conjunction with attaining Conservation Objectives such as conserving Essential Ecological Process areas, Biological Corridors, Linkages, or Core Habitat for other Covered Species. An analysis of the Conservation achieved for Other Conserved Habitat through other Conservation Objectives is included in Section 4.1 of Appendix I. Specific Conservation Objectives are also not articulated for the more broadly distributed conserved natural communities because sufficient amounts of these communities in an appropriate configuration are conserved in conjunction with attaining Conservation Objectives for Core Habitat for Covered Species, Essential Ecological Processes, Biological Corridors and Linkages. This analysis is also found in Section 4.1 of Appendix I. Attainment of the Conservation Objectives in each Conservation Area will result in the establishment of the MSHCP Reserve System. It is anticipated that as Additional Conservation Lands are acquired in each Conservation Area, it may be appropriate to transfer acreage Conservation Goals associated with Conservation Objectives for both specific conserved natural communities and Covered Species between Conservation Areas. Section 6.12.2 of this document addresses this situation.

Table 4-7 summarizes the acres of various general plan land use designations on private, non-conserved lands in the Conservation Areas to provide a general overview of the existing land use designations.

Table 4-7: Land Use Designations for Non-conserved Lands in Conservation Areas

Land Use Designation	*Acres of Non- Conserved Lands*	*% of Non-Conserved Lands by Land Use Designation*
General Plan Designated as Open Space[1]	190,485	91.6%
General Plan Designated as Residential, allowing more than 1 unit per 10 acres[2]	12,612	6.1%
General Plan Designated as Commercial, Industrial, Business Park[3]	1,021	0.5%
General Plan Designated as Agriculture	2,954	1.4%
Other General Plan Designations[4]	843	0.4%
TOTALS	**207,915**	**100%**

[1] General plan designated as open space generally indicates that the maximum land use intensity on the property is 1 unit per 10 acres. In the case of the Palm Springs General Plan designation "Desert", the minimum lot size ranges from 5 acres to 20 acres. This designation is considered "open space" in this table because of the additional requirement that 90% of the lot be left in open space.

[2] General plan Residential designations include all densities from Very Low to High, which encompass rural to urban residential land uses. Associated golf course lands are included.

[3] These general plan designations include all types of commercial, business, industrial, and manufacturing land uses. Wind energy areas are also included.

[4] "Other" general plan designations include Park, Specialized Park, Utility Substation, Public Use, Public Facilities, and School.

4.3.1 Cabazon Conservation Area

Location and Description. The Cabazon Conservation Area consists of the San Gorgonio River and several tributaries in the westernmost part of the Plan Area, and portions of the San Jacinto Mountains and the San Bernardino Mountains, which function as a sand source area. Portions of this Conservation Area are within the Morongo Indian Reservation, which is not a part of the Plan. This Conservation Area is depicted in Figure 4-6a. To the east is the Snow Creek/Windy Point Conservation Area. The Cabazon Conservation Area contains a total of approximately 12,470 acres.

Core Habitat. The Conservation Area does not provide Core Habitat for any of the Covered Species in the Plan Area; however, it does contain Essential Habitat for Peninsular bighorn sheep.

Other Conserved Habitat. The Conservation Area contains Other Conserved Habitat for Coachella Valley milkvetch, Coachella Valley Jerusalem cricket, desert tortoise, burrowing owl, gray vireo, least Bell's vireo, Le Conte's thrasher, southwestern willow flycatcher, summer tanager, yellow-breasted chat, yellow warbler, Coachella Valley round-tailed ground squirrel, Peninsular bighorn sheep, and Palm Springs pocket mouse. Most of the Habitat for the Coachella Valley milkvetch, Coachella Valley Jerusalem cricket, Coachella Valley round-tailed ground squirrel, and Palm Springs pocket mouse is in the floodplain area of the San Gorgonio River. Because of the extent of edge effects from existing Development and fragmentation in this area, the Conservation Objectives for this area do not include protecting the Habitat for these species except incidental to conserving the Biological Corridor in the Fornat Wash area. The riparian species' Habitat will be conserved. Table 4-8 shows the Covered Species occurring in this area. Figure 4-6b shows Essential Peninsular bighorn sheep Habitat in this Conservation Area.

Table 4-8: Species Habitat – Cabazon Conservation Area
(All acreages are based on 1996 pre-Planning Agreement information.)

Species	*Total Acres of Habitat in the Conservation Area*	*Existing Conservation Lands*	*Acres of Habitat Not Currently Conserved*	*Habitat Designation*	*Acres of Core Habitat*
CV milkvetch	987	24	1 (962) [1]	Other Cons. Habitat	0
CV Jerusalem cricket	356	0	(356) [1]	Other Cons. Habitat	0
Desert tortoise	3,216	42	527 (2,647) [1]	Other Cons. Habitat	0
Gray vireo	26	0	(26) [1]	Other Cons. Habitat	0
Le Conte's thrasher	4,083	42	(4,041) [1]	Other Cons. Habitat	0
Least Bell's vireo [2]	100	78	22	Breeding	N/A
Southwestern willow flycatcher	87 / 13[3]	78 / 0[3]	9 / 13[3]	Breeding/ Migratory	N/A
Summer tanager	87 / 13[3]	78 / 0[3]	9 / 13[3]	Breeding/ Migratory	N/A
Yellow-breasted chat	87 / 13[3]	78 / 0[3]	9 / 13[3]	Breeding/ Migratory	N/A
Yellow warbler	87 / 13[3]	78 / 0[3]	9 / 13[3]	Breeding/ Migratory	N/A
CV round-tailed ground squirrel	934	24	(910) [1]	Other Cons. Habitat	0
Palm Springs pocket mouse	934	24	(910) [1]	Other Cons. Habitat	0
Peninsular bighorn sheep – RZ1	264	0	92 (172) [1]	Essential [4]	264

[1] Numbers within parentheses are acres of Habitat in fluvial sand transport areas where the only Conservation Objective is to maintain fluvial sand transport. Habitat conservation is not an objective.
[2] Least Bell's vireo breeding acres includes mesquite; not included in other riparian species acreages.
[3] The number preceding the slash is the acreage of breeding Habitat; the number following the slash is the acreage of Habitat used in migration.
[4] Essential Habitat as described in the Recovery Plan for Peninsular bighorn sheep is the same as Core Habitat for purposes of this Plan.

Natural Communities. Table 4-9 shows the conserved natural communities occurring in this Conservation Area: mesquite hummocks, southern arroyo willow riparian forest, southern sycamore-alder riparian woodland, interior live oak chaparral, chamise chaparral, Sonoran creosote bush scrub, and semi-desert chaparral. All of the southern arroyo willow riparian forest within this Conservation Area occurs within Existing Conservation Lands. The Sonoran creosote bush scrub associated with the fluvial sand transport area is not proposed for conservation

because of the extent of edge effects from existing Development and fragmentation in this area. Figure 4-6c shows the conserved natural communities in this Conservation Area.

Table 4-9: Conserved[1] Natural Communities - Cabazon Conservation Area
(All acreages are based on 1996 pre-Planning Agreement information.)

Natural Community	*Total Acres in the Conservation Area*	*Existing Conservation Lands*	*Acres Not Currently Conserved*
Mesquite hummocks	13	0	13
Sonoran creosote bush scrub	3,027	42	347 (2,638)[2]
Chamise chaparral	188	0	182 (6)[2]
Semi-desert chaparral	26	0	(26)[2]
Interior live oak chaparral	4,691	4,562	129
Southern arroyo willow riparian forest	78	78	0
Southern sycamore-alder riparian woodland	9	0	9

[1] Only natural communities to be conserved under the Plan are shown. Natural communities that are not included as described in Section 3.2.2 are not shown.
[2] Numbers within parentheses are acres of Habitat in fluvial sand transport areas. The Conservation Objective for these acres is to maintain fluvial sand transport. Habitat conservation is not an objective.

Essential Ecological Processes. The primary importance of the Conservation Area is that the San Gorgonio River and various tributaries function as a fluvial sand transport system for the Snow Creek/Windy Point Conservation Area and the Whitewater Floodplain Conservation Area. The portions of the San Bernardino Mountains and the San Jacinto Mountains included in this area are sand sources for this fluvial sand transport system. Figure 4-6d shows the Essential Ecological Process areas in this Conservation Area. The Western Riverside County MSHCP has determined that fluvial sand transport along the San Gorgonio River west of the Cabazon Conservation Area and functionality of the San Gorgonio River as a Biological Corridor are maintained as a result of public ownership along the river and flood control regulations.

Biological Corridors and Linkages. The San Gorgonio River and associated tributaries provide value as a Biological Corridor between the San Bernardino Mountains and the San Jacinto Mountains. The area on either side of the Fornat Wash culvert under I-10 is included in the Conservation Area to serve as a Biological Corridor. Within one mile of the culvert, on both the north and south sides of I-10, this corridor area borders on the Morongo Indian Reservation, which is not included in the Plan, and the Plan cannot control what might occur on the reservation and how it might impact this corridor. Figure 4-6d shows the Biological Corridors and Linkages in this Conservation Area.

Conservation Objectives. The Conservation Objectives for this Conservation Area are:

1. In total, 2,340 acres of the Cabazon Conservation Area shall be conserved. (This may be less than the sum of acres indicated in the following objectives because there can be overlap among areas covered by the objectives. For example, Core Habitat for two or more species may overlap, or Core Habitat and an Essential Ecological Process area may overlap. The individual acreage figures will be used in compliance monitoring.)
2. Conserve at least 1,629 acres of the sand source areas.
3. Conserve at least 12 acres of mesquite hummocks natural community and 9 acres of southern sycamore-alder riparian woodland natural community, which provide Habitat for riparian birds and other Covered Species.
4. Conserve at least 83 acres of Essential Habitat for the Peninsular bighorn sheep.
5. Maintain the current capacity for fluvial (water-borne) sand transport along 4,496 acres of the San Gorgonio River and its tributaries.
6. Maintain functional Biological Corridors under I-10 by conserving at least 631 acres in the Fornat Wash Biological Corridor to maintain ecosystem function for Covered Species. Aside from the freeway culvert, which is an unavoidably narrow segment, the Biological Corridor shall be one mile wide, except where Existing Uses or Indian reservation lands not subject to the Plan preclude this width, to minimize edge effects. It should also be noted that portions of the corridor cross Indian reservation land, which is not a part of the Plan and over which the Plan exerts no control.
7. Coordinate with the Western Riverside County MSHCP Regional Conservation Authority to ensure that fluvial sand transport along the San Gorgonio River west of the Cabazon Conservation Area and functionality of the San Gorgonio River as a Biological Corridor are maintained.

Ownership and General Plan Land Use Designations. Table 4-10 shows the public versus private ownership within this Conservation Area.

Table 4-10: Land Ownership - Cabazon Conservation Area
(rounded to nearest 10 acres)

Ownership[1]	***Acres***
Existing Conservation Lands:	*5,910*
BLM	40
USFS	5,870
Lands Not Currently Conserved:	*6,560*
County	30
County Flood Control	10
Private	6,200
Public, Quasi-public entities	320
TOTAL	**12,470**

[1] Based on 1996 pre-Planning Agreement land ownership information

In this Conservation Area, the Essential Ecological Process of fluvial sand transport is to be maintained on 4,496 acres through flood control guidelines and land use regulation only. Of the remaining area in this Conservation Area, 47% of the land is currently in public or non-profit conservation organization ownership. Current conservation ranges from Level 1 to Level 3.

Table 4-11 identifies the existing general plan designation on currently non-conserved lands within the Conservation Area. Table 4-11, shows that 100% of the private land in the Conservation Area is under the jurisdiction of Riverside County. Figure 4-6e shows the Existing Conservation Lands and general plan land use designations on Level 4 lands for the area.

Table 4-11: General Plan Land Use Designations[1] (Non-conserved lands only)[2] Cabazon Conservation Area

General Plan Designation (Map symbol) - Riverside County	*% of Private Non-conserved Land in Conservation Area[2]*	*Building Intensity Range*
Rural Mountainous (RM)	94%	1 unit per 10 acres
Freeway (FWY)	2%	N/A
Very Low Density Residential[3] (VLDR)	---	0-2 units per acre
Low Density Residential (LDR)	4%	2-5 units per acre
Medium Density Residential[3] (MDR)	---	5-8 units per acre
Light Industrial[2] (LI)	---	Industrial and related uses
TOTAL	**100%**	

[1] Based on 2003 general plan designations and 2003 parcel data.
[2] General Plan designations are shown only for lands outside the Fluvial Sand Transport areas.
[3] Statistically insignificant (less than 1%)

Required Measures for the Conservation Area. Table 4-12 shows how many acres of Existing Conservation Lands are in this Conservation Area and how many acres of Additional Conservation Lands will need to be acquired or otherwise conserved through acquisition or other means. The following measures will be imposed to achieve the Conservation Objectives in this Conservation Area.

1. Conservation of the identified fluvial sand transport process areas will be achieved through application of the general plan land use designations and policies. In the fluvial sand transport areas, the Permittees will require that natural flows onto a parcel on which Development is proposed shall be conveyed offsite in the natural pre-disturbance direction of flow, and will require that Development on the property shall not impede water-borne sand transport across the parcel in its natural direction of flow. In addition, water-borne sediments and floodwaters shall not be artificially retained onsite. Concentration of flows and increase in flow velocity offsite shall be minimized to the maximum extent Feasible to avoid downstream erosion and scour. Alternatively, a flood control structure for the area that is designed to ensure no reduction in sediment transport from the sand source area to the sand deposition area where aeolian sand transport processes are active may be used to achieve the Conservation Objective of fluvial sand transport.

2. The culvert conveying Fornat Wash under I-10 shall be maintained by Caltrans at no less than its current size, with a soft-bottom, to maintain current levels of sand transport and wildlife movement under I-10.

3. Outside of the fluvial sand transport Essential Ecological Process area, the Permittees shall comply with applicable avoidance, minimization, and mitigation measures described in Section 4.4 and the Land Use Adjacency Guidelines as described in Section 4.5.

4. New Development in Essential bighorn sheep Habitat shall adhere to the following criteria, in accordance with the guidelines in the Implementation Manual:

    a. Development shall be clustered in one area of a site as close as possible to existing Development.
    b. Development on alluvial fans shall be sited at the lowest possible elevation on the site and shall avoid the mouth of any canyon.
    c. Development shall be sited a minimum of a quarter (0.25) mile from known bighorn sheep water sources identified on a reference map on file with CVCC (see Figure 4-26f), except where topographic features shield the view of the water source and access to it from proposed Development or trails, thereby minimizing potential impacts to the Peninsular bighorn sheep's ability to access water.
    d. Development shall be conditioned to prohibit the construction of trails in Essential bighorn sheep Habitat unless approved through a Minor Amendment with Wildlife Agency concurrence.
    e. Development shall not preclude Habitat connectivity or movement. Determination of whether Habitat connectivity or movement is precluded shall be made by the Lead Agency for the Development based on factual data provided by the RMOC, RMUC, Wildlife Agencies, or other source.
    f. Development shall comply with Land Use Adjacency Guidelines as described in Section 4.5.

5. Within one year of Permit issuance, CVCC and the applicable Local Permittee will coordinate with the Western Riverside County MSHCP Regional Conservation Authority to ensure that fluvial sand transport along the San Gorgonio River west of the Cabazon Conservation Area and functionality of the San Gorgonio River as a Biological Corridor are maintained.

Table 4-12: Conservation and Take Authorization for Cabazon Conservation Area
(All acreages are based on 1996 pre-Planning Agreement information.)

Conservation Objective	*Total Acres in Conservation Area*	*Existing Conservation Lands*	*Acres of Disturbance Authorized*	*Remaining Acres to be Conserved*
Conserve Essential Habitat for Peninsular bighorn sheep	264	0	(181) [1]	83
Conserve mesquite hummocks	13	0	1	12[2]
Conserve southern sycamore-alder riparian woodland	9	0	(1)[2]	9
Conserve sand source areas	7,683	5,873	181	1,629
Conserve fluvial sand transport areas	4,538	42	N/A	N/A[3]
Conserve Fornat Wash Biological Corridor	641	0	10	631

[1] There are 264 acres of Essential bighorn sheep Habitat in the Conservation Area; 181 acres are within a fluvial sand transport area where there is no Conservation Objective other than maintaining fluvial sand transport.
[2] Disturbance of no more than one acre may occur, but it would be replaced to ensure that the no net loss occurs and the Conservation Objective is achieved.
[3] Conservation of the identified fluvial sand transport process areas will be achieved through application of the general plan land use designations and policies, not through acquisition.

4.3.2 Stubbe and Cottonwood Canyons Conservation Area

Location and Description. The Stubbe and Cottonwood Canyons Conservation Area encompasses the area north of I-10 and west of Whitewater Canyon, including Stubbe Canyon and Cottonwood Canyon and portions of their alluvial fans down to I-10. This Conservation Area is depicted in Figure 4-7a. To the south is the Snow Creek/Windy Point Conservation Area. To the east and northeast is the Whitewater Canyon Conservation Area. To the west and northwest is the Cabazon Conservation Area and portions of the Morongo Indian Reservation, which is not part of the Plan. The Stubbe and Cottonwood Canyons Conservation Area contains a total of approximately 9,840 acres.

Core Habitat. The desert tortoise population in this Conservation Area centers on the mesas to the west of the Whitewater River. The desert tortoise population in this Conservation Area is potentially the most dense tortoise population within the Plan Area. A possible corridor exists connecting this area with tortoise Habitat in Joshua Tree National Park. Figure 4-7b depicts the Core Habitat, selected Other Conserved Habitat, and recorded burrowing owl locations.

Other Conserved Habitat. Stubbe Canyon and Cottonwood Canyon contain suitable migration and breeding Habitat for least Bell's vireo, southwestern willow flycatcher, summer tanager, yellow-breasted chat, and yellow warbler. Given the scarcity of riparian Habitat in the desert, all riparian Habitat is considered important for these species, and is likely to contribute to the Conservation of these species in their respective ranges. There is also Other Conserved Habitat for Coachella Valley milkvetch, Coachella Valley Jerusalem cricket, desert tortoise, gray vireo, Le Conte's thrasher, burrowing owl, Coachella Valley round-tailed ground squirrel, and Palm Springs pocket mouse. Table 4-13 shows the Covered Species occurring in this area.

Table 4-13: Species Habitat – Stubbe and Cottonwood Canyons Conservation Area
(All acreages are based on 1996 pre-Planning Agreement information.)

Species	*Total Acres of Habitat in the Conservation Area*	*Existing Conservation Lands*	*Acres of Habitat Not Currently Conserved*	*Habitat Designation*	*Acres of Core Habitat*
CV milkvetch	232	84	148	Other Cons. Habitat	0
CV Jerusalem cricket	12	8	4	Other Cons. Habitat	0
Desert tortoise	5,735 / 44	3,206 / 37	2,529 / 7	Core / Other Cons. Habitat	5,735
Gray vireo	9	9	0	Other Cons. Habitat	0
Le Conte's thrasher	1,265	31	1,234	Other Cons. Habitat	0
Least Bell's vireo	266 / 289	241 / 34	25 / 255	Breeding / Migratory	N/A
Southwestern willow flycatcher	266 / 289	241 / 34	25 / 255	Breeding / Migratory	N/A
Summer tanager	266 / 289	241 / 34	25 / 255	Breeding / Migratory	N/A
Yellow-breasted chat	266 / 289	241 / 34	25 / 255	Breeding / Migratory	N/A
Yellow warbler	266 / 289	241 / 34	25 / 255	Breeding / Migratory	N/A
CV round-tailed ground squirrel	421	21	400	Other Cons. Habitat	0
Palm Springs pocket mouse	1,210	26	1,184	Other Cons. Habitat	0

Natural Communities. Table 4-14 shows the conserved natural communities occurring in this area: Sonoran creosote bush scrub, Sonoran mixed woody and succulent scrub, Sonoran cottonwood-willow riparian forest, desert dry wash woodland, semi-desert chaparral, interior live oak chaparral, and chamise chaparral. Figure 4-7c depicts the conserved natural communities in this Conservation Area.

Table 4-14: Conserved[1] Natural Communities – Stubbe and Cottonwood Canyons Conservation Area
(All acreages are based on 1996 pre-Planning Agreement information.)

Natural Community	*Total Acres in the Conservation Area*	*Existing Conservation Lands*	*Acres Not Currently Conserved*
Sonoran creosote bush scrub	1,562	273	1,289
Sonoran mixed woody & succulent scrub	1,703	1,037	666
Chamise Chaparral	1,983	1,813	170
Semi-desert Chaparral	9	9	0
Interior live oak chaparral	1,220	1,220	0
Sonoran cottonwood-willow riparian forest	267	242	25
Desert dry wash woodland	289	34	255

[1] Only natural communities to be conserved under the Plan are shown. Natural communities that are not included as described in Section 3.2.2 are not shown.

Essential Ecological Processes. The portions of the San Bernardino Mountains included in this area are a sand source for blowsand Habitat areas in the Snow Creek/Windy Point Conservation Area and Whitewater Floodplain Conservation Area. Stubbe Canyon Wash provides fluvial sand transport from the San Bernardino Mountains to the San Gorgonio River in the western portion of the Snow Creek/Windy Point Conservation Area. Figure 4-7d depicts the Essential Ecological Process areas in this Conservation Area.

Biological Corridors and Linkages. This area provides a Biological Corridor and Linkage between the Peninsular Range (San Jacinto and Santa Rosa Mountains) and the San Bernardino Mountains portion of the Transverse Range. The significance of this corridor is noted in *Missing Linkages: Restoring Connectivity to the California Landscape* (California Wilderness Coalition 2001). The Biological Corridor, which utilizes two culverts under I-10, connects the San Bernardino Mountains to the San Jacinto Mountains through the Snow Creek/Windy Point Conservation Area. Predators and large mammals, including coyotes, bobcats, mountain lions, and foxes, may use this Biological Corridor and Linkage. This connectivity would facilitate genetic flow and demographic dispersal among these species and help maintain predator-prey relationships. This corridor may be used by at least three of the Covered Species: desert tortoise, Palm Springs pocket mouse, and Coachella Valley round-tailed ground squirrel. Figure 4-7d depicts the Biological Corridors and Linkages in this Conservation Area. See Section 4.5.1 in Appendix I for details about the Stubbe Canyon Wash corridor.

Conservation Objectives. The Conservation Objectives for this Conservation Area are:

1. In total, 2,430 acres of the Stubbe and Cottonwood Canyons Conservation Area shall be conserved. (This may be less than the sum of acres indicated in the following objectives because there can be overlap among areas covered by the objectives. For example, Core Habitat for two or more species may overlap, or Core Habitat and an Essential Ecological Process area may overlap. The individual acreage figures will be used in compliance monitoring.)
2. Conserve at least 2,276 acres of Core Habitat for desert tortoise, allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused disturbance, and edge effects to Core Habitat by conserving contiguous Habitat and effective Linkages between patches of Core Habitat. Protect individual tortoises within the area when allowed Development does occur.
3. Conserve at least 1,111 acres of Other Conserved Habitat for Le Conte's thrasher. Conserve Le Conte's thrasher nesting sites as described in Section 4.4 for avoidance, minimization, and mitigation measures.
4. Conserve at least 1,241 acres of the sand source area in the San Bernardino Mountains to maintain the natural erosion processes that provide sediment for the blowsand ecosystem.
5. Conserve at least 1,129 acres in the fluvial (water-borne) sand transport area. Maintain the current capacity for fluvial sand transport in Stubbe Canyon Wash.
6. Conserve occupied burrowing owl burrows as described in Section 4.4 for burrowing owl avoidance, minimization, and mitigation measures.
7. Conserve at least 25 acres of Sonoran cottonwood-willow riparian forest and at least 229 acres of desert dry wash woodland natural communities, which provide Habitat for

riparian birds and other Covered Species. For the remaining acreage of the Sonoran cottonwood-willow riparian forest natural community where disturbance is authorized by the Plan, ensure no net loss.

8. Maintain functional Biological Corridors under I-10 by conserving at least 1,058 acres in the Stubbe Canyon Wash Biological Corridor north of the freeway to maintain potential Habitat connectivity for desert tortoise, Coachella Valley round-tailed ground squirrel, and Palm Springs pocket mouse, and a wildlife movement corridor to maintain ecosystem function for Covered Species. Aside from the freeway culverts and any Existing Use areas, which are unavoidably narrow segments, the Biological Corridor shall expand to one mile wide to minimize edge effects.

Ownership and General Plan Land Use Designations. Table 4-15 shows the public versus private land ownership in this Conservation Area.

Table 4-15: Land Ownership - Stubbe and Cottonwood Canyons Conservation Area
(rounded to nearest 10 acres)

Ownership[1]	***Acres***
Existing Conservation Lands:	*7,140*
BLM	5,220
USFS	1,920
Lands Not Currently Conserved:	*2,700*
County Flood Control	100
Private	2,420
Public, Quasi-Public entities	180
TOTAL	**9,840**

[1] Based on 1996 pre-Planning Agreement land ownership information

As seen in Table 4-15, 73% of the land within this Conservation Area is currently in public or nonprofit conservation organization ownership. Current conservation status ranges from Level 1 to Level 3. Conservation management will be improved where needed through management prescriptions to be adopted by the relevant agency as Feasible.

As seen in Table 4-16, 100% of the private land in the Conservation Area is under the jurisdiction of Riverside County. The major general plan designations are Open Space Rural, which restricts land use to a maximum of 1 unit per 20 acres, and Rural Mountainous, which restricts land use to a maximum of 1 unit per 10 acres. Much of the area is within the 100-year floodplain of Stubbe Canyon wash.

Table 4-16: General Plan Land Use Designations[1] (Non-conserved lands only) Stubbe and Cottonwood Canyons Conservation Area

General Plan Designation/Map symbol - Riverside County	*% of Private Non-conserved Land in Conservation Area*	*Building Intensity Range*
Open Space Rural (OS-RUR)	94%	1 unit per 20 acres
Rural Mountainous (RM)	6%	1 unit per 10 acres
Medium Density Residential[2] (MDR)	--	5-8 units per acre
TOTAL	**100%**	

[1] Based on 2003 general plan designations and 2003 parcel data
[2] Statistically insignificant (less than 1%)

Figure 4-7e shows the Existing Conservation Lands and general plan land use designations on Level 4 lands for the area.

Required Measures for the Conservation Area. Table 4-17 shows how many acres of Existing Conservation Lands are in this Conservation Area and how many acres of Additional Conservation Lands will need to be conserved through acquisition or other means. The following measures will be imposed to achieve the Conservation Objectives in this Conservation Area.

1. Existing culverts under I-10 at West Stubbe and East Stubbe will be maintained by Caltrans at no less than their current size, with soft-bottoms, to maintain current levels of sand transport and wildlife movement under I-10.

2. A Conservation to Development ratio of 9:1 shall be maintained within the east half of Section 6, T3S R3E to maintain sand transport and the functionality of the Biological Corridor. Here and in other Conservation Areas as applicable, a Conservation to Development ratio is used in specific areas where even limited Development could impede attainment of a Conservation Objective. The ratio ensures that the Conservation Objective will be attained by requiring that for every acre of Development allowed in the specified area, 9 acres of Conservation will occur. The Local Permittee(s) shall incorporate feasible design, orientation, or other criteria in the Implementation Manual. These criteria would not apply to single-family homes, emergency response activities, or any non-commercial accessory uses and structures including but not limited to second units on an existing legal lot. If it appears that the ratio may not be met, the appropriate Local Permittees will meet with the Wildlife Agencies and identify additional means that will be implemented to maintain the functionality of the Biological Corridor, including an accelerated acquisition program and/or Development standards to restrict fencing that would impede wildlife movement. (See Figure 4-7f.)

3. The Permittees shall comply with applicable avoidance, minimization, and mitigation measures described in Section 4.4 and the Land Use Adjacency Guidelines as described in Section 4.5.

Table 4-17: Conservation and Take Authorization for Stubbe and Cottonwood Canyons Conservation Area
(All acreages are based on 1996 pre-Planning Agreement information.)

Conservation Objective	*Total Acres in Conservation Area*	*Existing Conservation Lands*	*Acres of Disturbance Authorized*	*Remaining Acres to be Conserved*
Conserve Core Habitat for desert tortoise	5,735	3,206	253	2,276
Conserve Other Conserved Habitat for Le Conte's thrasher	1,265	31	123	1,111
Conserve Sonoran cottonwood-willow riparian forest	267	242	(3) [1]	25
Conserve desert dry wash woodland	289	34	26	229
Conserve sand source areas	8,402	7,023	138	1,241
Conserve fluvial sand transport areas	1,375	121	125	1,129
Conserve Stubbe Canyon Wash Bio. Corridor	1,181	6	117	1,058

[1] Disturbance of no more than three acres may occur, but it would be replaced to ensure that the no net loss occurs and the Conservation Objective is achieved.

4.3.3 Snow Creek/Windy Point Conservation Area

Location and Description. The Snow Creek/Windy Point Conservation Area encompasses the area between the toe-of-slope of the San Jacinto Mountains and Highway 111 or the Santa Fe Pacific railroad (whichever is farther south), and extends westward to the range line separating Range 2 East and Range 3 East, and eastward to Windy Point. This Conservation Area is depicted in Figure 4-8a. This area borders on the west with the Cabazon Conservation Area. To the north are the Stubbe and Cottonwood Canyons Conservation Area and the Highway 111/I-10 Conservation Area. To the south is the Santa Rosa and San Jacinto Mountains Conservation Area. The Snow Creek/Windy Point Conservation Area contains a total of approximately 2,940 acres.

Core Habitat. This area protects a significant blowsand ecosystem at the western edge of the Plan Area. Most of the Coachella Valley floor was once an extensive blowsand ecosystem; estimates from the CVFTL HCP (Nature Conservancy 1985) are that originally some 267 square miles of the Coachella Valley may have been covered with wind-blown sand. Three blowsand areas were set aside in the CVFTL HCP. This Plan adds Snow Creek as an additional blowsand area. It provides Core Habitat for the Coachella Valley milkvetch, Coachella Valley giant sand-treader cricket, Coachella Valley fringe-toed lizard, Coachella Valley Jerusalem cricket, Coachella Valley round-tailed ground squirrel, and Palm Springs pocket mouse. While there is insufficient data regarding the population density of the Coachella Valley Jerusalem cricket in the Plan Area, this area appears to be the center of the species distribution (Greg Ballmer, pers. comm.). This Conservation Area also provides some Essential Habitat for Peninsular bighorn sheep. Figure 4-8b (1-4) depicts the Core Habitat and recorded burrowing owl locations in this Conservation Area.

Other Conserved Habitat. This Conservation Area provides Habitat for the burrowing owl that contributes to the protection of the burrowing owls. While a viable population of this species is not thought to exist within this Conservation Area, the Habitat is likely to contribute to the Conservation of this species in its range. There has been one documented sighting and at least two anecdotal reports of desert tortoise, and this area may serve as a connection between the desert tortoise population on the north side of I-10 and desert tortoise in the San Jacinto and Santa Rosa Mountains. Peninsular bighorn sheep Habitat extends from the adjacent mountains into the alluvial fan portion of this area. Protection of this Habitat is achieved through attainment of the Conservation Objectives for other Covered Species. There is also Other Conserved Habitat for Coachella Valley milkvetch, Coachella Valley Jerusalem cricket, Palm Springs pocket mouse, Le Conte's thrasher, and gray vireo. The area is also important for neotropical migrants (birds that breed in the U.S. and winter to the south of the U.S.) moving through the San Gorgonio Pass. Some of these, including least Bell's vireo, southwestern willow flycatcher, yellow warbler, yellow-breasted chat, and summer tanager, could nest in the adjacent canyons in the Santa Rosa and San Jacinto Mountains Conservation Area. Table 4-18 shows the Covered Species occurring in this area.

Natural Communities. Table 4-19 shows the conserved natural communities occurring in this area: active desert dunes, ephemeral desert sand fields, stabilized and partially stabilized desert sand fields, Sonoran creosote bush scrub, and semi-desert chaparral. Together with the active desert dunes in the Thousand Palms Conservation Area, the Snow Creek/Windy Point dunes constitute 90% of this natural community in the Plan Area. Figure 4-8c depicts the conserved natural communities in this Conservation Area.

Table 4-18: Species Habitat – Snow Creek/Windy Point Conservation Area
(All acreages are based on 1996 pre-Planning Agreement information.)

Species	*Total Acres in the Conservation Area*	*Existing Conservation Lands*	*Acres of Habitat Not Currently Conserved*	*Habitat Designation*	*Acres of Core Habitat*
CV milkvetch	2,610 / 90	359 / 0	2,251/ 90	Core / Other Cons. Habitat	2,610
CV giant sand-treader cricket	1,374	70	1,304	Core	1,374
CV Jerusalem cricket	1,690 / 283	187 / 0	1,503 / 283	Core / Other Cons. Habitat	1,690
CV fringe-toed lizard	1,374	70	1,304	Core	1,374
Flat-tailed horned lizard – Pred. / Potential	0 / 20	0 / 4	0 / 16	Pred. / Pot.[1] Other Cons. Habitat	0
Desert tortoise	1,559	290	1,269	Other Cons. Habitat	0
Gray vireo	6	1	5	Other Cons. Habitat	0
Le Conte's thrasher	2,788	312	2,476	Other Cons. Habitat	0
CV round-tailed ground squirrel	2,814	360	2,454	Core	2,814
Palm Springs pocket mouse	2,744 / 53	334 / 0	2,410 / 53	Core / Other Cons. Habitat	2,744
Peninsular bighorn sheep[2]	705	53	652	Essential[3]	705

[1] The species distribution model for the flat-tailed horned lizard includes predicted ("pred.") Habitat and also potential (Pot.) Habitat. Predicted Habitat includes areas where presence of this species is known or expected based on recent observations. Potential Habitat includes areas where there are historical observations of this species but no recent observations are recorded. See Section 9.6.3.3 for additional information.

[2] This Peninsular bighorn sheep Habitat is contiguous and continuous with that in the Santa Rosa and San Jacinto Mountains Conservation Area. It is included in this area because it overlaps with Habitat for one or more of the other species listed above.

[3] Essential Habitat as described in the Recovery Plan for Peninsular bighorn sheep is the same as Core Habitat for purposes of this Plan.

Table 4-19: Conserved[1] Natural Communities – Snow Creek/Windy Point Conservation Area
(All acreages are based on 1996 pre-Planning Agreement information.)

Natural Community	*Total Acres in the Conservation Area*	*Existing Conservation Lands*	*Acres Not Currently Conserved*
Active desert dunes	69	0	69
Ephemeral desert sand fields	1,148	16	1,132
Stabilized & partially stabilized desert sand fields	157	54	103
Sonoran creosote bush scrub	1,351	88	1,263
Semi-desert chaparral	6	1	5

[1] Only natural communities to be conserved under the Plan are shown. Natural communities that are not included as described in Section 3.2.2 are not shown.

Essential Ecological Processes. The San Gorgonio River, which flows through this area, provides fluvial sand transport for the blowsand Habitats within this Conservation Area as well as for the Whitewater Floodplain Conservation Area, farther to the east. Aeolian sand transport is also important in this area. Figure 4-8d depicts the Essential Ecological Process areas in this Conservation Area.

Biological Corridors and Linkages. Connections would be maintained between areas south of I-10 (Snow Creek and the adjacent San Jacinto Mountains) and areas north of I-10 (the San Gorgonio Wilderness and Whitewater Canyon ACEC in the San Bernardino Mountains) through two Biological Corridors: Stubbe and Cottonwood Canyons, and the Whitewater River. The corridors would provide sand transport via Stubbe Canyon Wash and the Whitewater River, and retain connectivity to help maintain predator-prey relationships in the Snow Creek area and provide for large mammal movement between the San Jacinto and San Bernardino Mountains. There is the potential for desert tortoise to use the Stubbe Canyon Wash corridor. Figure 4-8d depicts the Biological Corridors and Linkages in this Conservation Area. See Section 4.4.1 in Appendix I for details about the Stubbe Canyon Wash corridor and Section 4.4.2 in Appendix I for details about the San Gorgonio River and Whitewater River corridors.

Conservation Objectives. The Conservation Objectives for this Conservation Area are:

1. In total, 2,340 acres of the Snow Creek/Windy Point Conservation Area shall be conserved. (This may be less than the sum of acres indicated in the following objectives because there can be overlap among areas covered by the objectives. For example, Core Habitat for two or more species may overlap, or Core Habitat and an Essential Ecological Process area may overlap. The individual acreage figures will be used in compliance monitoring.)
2. Conserve Core Habitat and associated Essential Ecological Processes (as set forth below) for Coachella Valley milkvetch, Coachella Valley giant sand-treader cricket, Coachella Valley Jerusalem cricket, Coachella Valley fringe-toed lizard, Coachella Valley round-tailed ground squirrel, and Palm Springs pocket mouse, allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused

disturbance, and edge effects to Core Habitat by conserving contiguous Habitat and effective Linkages between patches of Core Habitat.

a. Conserve at least 816 acres of Core Habitat for the Coachella Valley milkvetch in the City of Palm Springs portion of the area and at least 1,210 acres of Core Habitat in the unincorporated portion of the area.

b. Conserve at least 672 acres of Core Habitat for the Coachella Valley giant sand-treader cricket in the City of Palm Springs portion of the area and at least 501 acres of Core Habitat in the unincorporated portion of the area.

c. Conserve at least 815 acres of Core Habitat for the Coachella Valley Jerusalem cricket in the City of Palm Springs and at least 538 acres in the unincorporated portion of the area.

d. Conserve at least 672 acres of Core Habitat for the Coachella Valley fringe-toed lizard in the City of Palm Springs portion of the area and at least 501 acres of Core Habitat in the unincorporated portion of the area.

e. Conserve at least 838 acres of Core Habitat for the Coachella Valley round-tailed ground squirrel in the City of Palm Springs portion of the area and at least 1,371 acres of Core Habitat in the unincorporated portion of the area.

f. Conserve at least 838 acres of Core Habitat for the Palm Springs pocket mouse in the City of Palm Springs portion of the area and at least 1,331 acres of Core Habitat in the unincorporated portion of the area.

g. Conserve at least 838 acres of the fluvial and aeolian sand transport area in the City of Palm Springs portion of the area and at least 1,482 acres in the unincorporated portion of the area. Maintain the current capacity for fluvial sand transport in the San Gorgonio River floodplain

3. Conserve at least 775 acres of Other Conserved Habitat for Le Conte's thrasher in the City of Palm Springs portion of the area and at least 1,453 acres of Other Conserved Habitat in the unincorporated portion of the area. Conserve Le Conte's thrasher nesting sites as described in Section 4.4 for avoidance, minimization, and mitigation measures.

4. Conserve at least 144 acres of Essential Habitat for the Peninsular bighorn sheep in the City of Palm Springs portion of the area, and at least 443 acres in the unincorporated portion of the area.

5. Conserve individual desert tortoises as described in Section 4.4 for desert tortoise avoidance, minimization, and mitigation measures.

6. Conserve occupied burrowing owl burrows as described in Section 4.4 for burrowing owl avoidance, minimization, and mitigation measures.

7. Conserve at least 62 acres of the active desert dunes and at least 610 acres of the ephemeral desert sand fields in the City of Palm Springs portion of the area, and at least 409 acres of the ephemeral desert sand fields and at least 93 acres of the stabilized and partially stabilized desert sand fields in the unincorporated portion of the area to provide for the conservation of these natural communities. As these conserved natural communities are all part of the Core Habitat areas identified in Conservation Objective 2 for this area, attainment of that objective will also achieve this objective.

8. Maintain functional Biological Corridors and Linkages under I-10 and Highway 111 by conserving at least 415 acres of identified Biological Corridor in the unincorporated portion of the Conservation Area and at least 247 acres identified Biological Corridor in the City of Palm Springs' portion, such that the functionality of each individual Biological Corridor listed below is not compromised:

   a. Conserve the Stubbe Canyon Wash Biological Corridor south of the I-10 to maintain potential Habitat connectivity for desert tortoise, Coachella Valley round-tailed ground squirrel, and Palm Springs pocket mouse, and to maintain ecosystem function for Covered Species. Aside from the freeway culverts and any Existing Use areas, which are unavoidably narrow segments, the Biological Corridor shall expand to one mile wide to minimize edge effects.

   b. Conserve the Whitewater Floodplain Biological Corridor south of Highway 111 to maintain potential Habitat connectivity for Coachella Valley Jerusalem cricket, Coachella Valley round-tailed ground squirrel, and Palm Springs pocket mouse, and to maintain ecosystem function for Covered Species. Aside from the highway culverts and any Existing Use areas, which are unavoidably narrow segments, the Biological Corridor shall expand to one mile wide to minimize edge effects.

Ownership and General Plan Land Use Designations. As seen in Table 4-20, 12% of the land within this Conservation Area is currently in public or nonprofit conservation organization ownership. Current conservation status on public and Private Conservation Lands ranges from Level 1 to Level 3. Conservation management will be improved where needed through management prescriptions and/or changes in land classification to be adopted by the relevant agency as Feasible. As seen in Table 4-21, private land in the Conservation Area is partially under the jurisdiction of the City of Palm Springs, and partially under Riverside County.

Table 4-20: Land Ownership Snow Creek/ Windy Point Conservation Area
(rounded to the nearest 10 acres)

Ownership[1]	***Acres***
Existing Conservation Lands:	*360*
BLM	360
Lands Not Currently Conserved:	2,580
Public, Quasi-Public entities	60
Private	2,520
TOTAL	**2,940**

[1] Based on 1996 pre-Planning Agreement land ownership information.

Table 4-21: General Plan Land Use Designations[1] (Non-conserved lands only) Snow Creek/Windy Point Conservation Area

General Plan Designation (Map symbol) - Riverside County	***% of Private Non-conserved Land in Conservation Area***	***Building Intensity Range***
Open Space Rural (OS-RUR)	67%	1 unit per 20 acres
Open Space Water (OS-W)	12%	Bodies of water, floodplains, and natural drainage corridors
Rural Desert (RD)	21%	1 unit per 10 acres
TOTAL	**100%**	
General Plan Designation (Map symbol) - City of Palm Springs	***% of Private Non-conserved Land in Conservation Area***	***Building Intensity Range***
Desert (D)	3%	3.5 units per acre on a 5 acre minimum site
Watercourse (W)	97%	Flood control or drainage facilities
TOTAL	**100%**	

[1] Based on 2003 general plan designations and 2003 parcel data.

Figure 4-8e shows the Existing Conservation Lands and general plan land use designations on Level 4 lands for the Conservation Area.

Required Measures for the Conservation Area. Table 4-22 shows how many acres of Existing Conservation Lands are in this Conservation Area and how many acres of Additional Conservation Lands will need to be conserved through acquisition or other means. The following measures will be imposed to achieve the Conservation Objectives in this Conservation Area.

1. The culvert under Highway 111 west of Windy Point and the bridge over the San Gorgonio River at Windy Point will be maintained by Caltrans at no less than their current size, with soft-bottoms, to maintain current levels of sand transport and potential wildlife movement under Highway 111.
2. The Permittees shall comply with applicable avoidance, minimization, and mitigation measures described in Section 4.4 and the Land Use Adjacency Guidelines as described in Section 4.5.
3. New Development in Essential bighorn sheep Habitat shall adhere to the following criteria, in accordance with the guidelines in the Implementation Manual:
   a. Development shall be clustered in one area of a site as close as possible to existing Development.
   b. Development on alluvial fans shall be sited at the lowest possible elevation on the site and shall avoid the mouth of any canyon.
   c. Development shall be sited a minimum of a quarter (0.25) mile from known bighorn sheep water sources identified on a reference map on file with CVCC (see Figure 4-26f), except where topographic features shield the view of the water source and

access to it from proposed Development or trails, thereby minimizing potential impacts to the Peninsular bighorn sheep's ability to access water.

d. Development shall be conditioned to prohibit the construction of trails in Essential bighorn sheep Habitat unless approved through a Minor Amendment with Wildlife Agency concurrence.

e. Development shall not preclude Habitat connectivity or movement. Determination of whether Habitat connectivity or movement is precluded shall be made by the Lead Agency for the Development based on factual data provided by the RMOC, RMUC, Wildlife Agencies, or other source.

f. Development shall comply with Land Use Adjacency Guidelines as described in Section 4.5.

4. For Development proposals on lands zoned for domestic stock animals on parcels within or adjacent to Conservation Areas with bighorn sheep habitat, the Permittees shall either (1) prohibit husbandry of domestic sheep and goats on such parcels or (2) require double fencing separated by a distance consistent with applicable disease transmission standards and as agreed to by the Wildlife Agencies, including an 8-foot outer fence or functional equivalent around all enclosures used to keep domestic sheep and goats or the parcel perimeter adjoining the Conservation Area if the double fence can be tied into features that would preclude bighorn sheep access around the ends of the fence.

5. For Development proposals on lands within or adjacent to Conservation Areas with bighorn sheep habitat, the Local Permittee shall require construction of an 8-foot fence or functional equivalent, or granting of an easement to CVCC for future installation of a barrier separating the Development from adjoining habitat if (i) bighorn sheep are documented to begin foraging or watering on the project site or (ii) unauthorized trails, paths, routes, or ways (trails) are documented to proliferate from the project site into adjoining habitat. To ensure that the fence is an effective barrier, the CVCC shall determine the appropriate location of the fence in consultation with the Local Permittee. If fence construction is deferred and either condition (i) or (ii) is documented by the Wildlife Agencies, the CVCC shall incur the responsibility and cost for fence installation and maintenance on lands to which CVCC has access, unless at the time of project approval the Permittee assigns a legally responsible party to construct and maintain the fence, and requires establishment of a funding instrument for construction and maintenance of the fence. The subject fences shall be constructed within 2 years of documented sheep use or the proliferation of trails, as noted above. The location of this barrier (i.e., an 8-foot fence or functional equivalent) shall be determined by the CVCC based on its ability to obtain permission/access to the necessary lands. If placement of the barrier must occur on other public lands (e.g., BLM, ~~CDFG~~CDFW), CVCC will coordinate with these other agencies as appropriate.

Table 4-22a: Conservation and Take Authorization for Snow Creek/ Windy Point Conservation Area – City of Palm Springs Area

(All acreages are based on 1996 pre-Planning Agreement information.)

Conservation Objective	*Total Acres in Conservation Area*	*Existing Conservation Lands*	*Acres of Disturbance Authorized*	*Remaining Acres to be Conserved*
Conserve Core Habitat for CV milkvetch	910	3	91	816
Conserve Core Habitat for CV giant sand-treader cricket	749	2	75	672
Conserve Core Habitat for CV Jerusalem cricket	908	3	90	815
Conserve Core Habitat for CV fringe-toed lizard	749	2	75	672
Conserve Other Conserved Habitat for Le Conte's thrasher	864	3	86	775
Conserve Core Habitat for CV round-tailed ground squirrel	934	3	93	838
Conserve Core Habitat for Palm Springs pocket mouse	934	3	93	838
Conserve Essential Habitat for Peninsular bighorn sheep	180	20	16	144
Conserve active desert dunes	69	0	7	62
Conserve ephemeral desert sand fields	680	2	68	610
Conserve fluvial and aeolian sand transport	934	3	93	838
Conserve Hwy 111 – WWR Biological Corridor	276	2	27	247

Table 4-22b: Conservation and Take Authorization for Snow Creek/Windy Point Conservation Area – Riverside County Area

(All acreages are based on 1996 pre-Planning Agreement information.)

Conservation Objective	*Total Acres in Conservation Area*	*Existing Conservation Lands*	*Acres of Disturbance Authorized*	*Remaining acres to be conserved*
Conserve Core Habitat for CV milkvetch	1,700	356	134	1,210
Conserve Core Habitat for CV giant sand-treader cricket	625	68	56	501
Conserve Core Habitat for CV Jerusalem cricket	782	184	60	538
Conserve Core Habitat for CV fringe-toed lizard	625	68	55	502

Table 4-22b (cont.)

Conservation Objective	*Total Acres in Conservation Area*	*Existing Conservation Lands*	*Acres of Disturbance Authorized*	*Remaining acres to be conserved*
Conserve Other Conserved Habitat for Le Conte's thrasher	1,924	309	162	1,453
Conserve Core Habitat for CV round-tailed ground squirrel	1,880	357	152	1,371
Conserve Core Habitat for Palm Springs pocket mouse	1,810	331	148	1,331
Conserve Essential Habitat for Peninsular bighorn sheep	525	33	49	443
Conserve ephemeral desert sand fields	468	14	45	409
Conserve stabilized and partially stabilized desert sand fields	157	54	10	93
Conserve fluvial and aeolian sand transport	2,004	357	165	1,482
Conserve Stubbe Canyon Wash & Hwy 111-WWR Biological Corridors	474	13	46	415

4.3.4 Whitewater Canyon Conservation Area

Location and Description. The Whitewater Canyon Conservation Area encompasses the Whitewater River and its watershed north of I-10. This Conservation Area is depicted in Figure 4-9a. To the west and southwest of the Whitewater Canyon Conservation Area is the Stubbe and Cottonwood Canyons Conservation Area. To the east and northeast is the Upper Mission Creek/Big Morongo Canyon Conservation Area. To the south are the Highway 111/I-10 Conservation Area and the Whitewater Floodplain Conservation Area. The Whitewater Canyon Conservation Area contains a total of approximately 14,170 acres.

Core Habitat. This Conservation Area contains the only confirmed historic Habitat for the arroyo toad in the Plan Area. This Conservation Area provides Habitat for the riparian birds covered in the Plan that contributes to the Conservation of these species in their respective ranges. There is also some Habitat for the desert tortoise. The Habitat is considered as part of a larger Core Habitat area for this species, which includes Stubbe and Cottonwood Canyons Conservation Area and the Upper Mission Creek/Big Morongo Canyon Conservation Area. There is also Core Habitat for triple-ribbed milkvetch. Figure 4-9b depicts the Core Habitat and selected Other Conserved Habitat in this Conservation Area.

Other Conserved Habitat. This Conservation Area contains Other Conserved Habitat for the Coachella Valley milkvetch, Little San Bernardino Mountains linanthus, Coachella Valley Jerusalem cricket, desert tortoise, gray vireo, Le Conte's thrasher, Coachella Valley round-tailed ground squirrel, southern yellow bat, and Palm Springs pocket mouse. Substantial potential Habitat for the gray vireo occurs, but it has not been surveyed to determine if the species is present. Table 4-23 shows the Covered Species occurring in this area.

Table 4-23: Species Habitat - Whitewater Canyon Conservation Area
(All acreages are based on 1996 pre-Planning Agreement information.)

Species	*Total Acres of Habitat in the Conservation Area*	*Existing Conservation Lands*	*Acres of Habitat not Currently Conserved*	*Habitat Designation*	*Acres of Core Habitat*
CV milkvetch	202	75	127	Other Cons. Habitat	0
Little San Bernardino Mtns. linanthus	579	192	387	Other Cons. Habitat	0
Triple-ribbed milkvetch	1,295	886	409	Core	1,295
CV Jerusalem cricket	2	1	1	Other Cons. Habitat	0
Arroyo toad	2,082	1,298	784	Core	2,082
Desert tortoise	4,494 / 85	3,290 / 53	1,204 / 32	Core / Other Cons. Habitat	4,494
Gray vireo	4,927	4,739	188	Other Cons. Habitat	0
Le Conte's thrasher	6	0	6	Other Cons. Habitat	0
Least Bell's vireo	167	60	107	Breeding	N/A
SW willow flycatcher	167	60	107	Breeding	N/A
Summer tanager	167	60	107	Breeding	N/A
Yellow-breasted chat	167	60	107	Breeding	N/A
Yellow warbler	167	60	107	Breeding	N/A
CV round-tailed ground squirrel	110	18	92	Other Cons. Habitat	0
Palm Springs pocket mouse	166	30	136	Other Cons. Habitat	0
Southern yellow bat	1	1	0	Other Cons. Habitat	0

Natural Communities. Table 4-24 shows the conserved natural communities occurring in this Conservation Area: Sonoran creosote bush scrub, Sonoran mixed woody and succulent scrub, Sonoran cottonwood-willow riparian forest, desert fan palm oasis woodland, semi-desert chaparral, chamise chaparral, and interior live oak chaparral. Figure 4-9c depicts the conserved natural communities.

Essential Ecological Processes. The Whitewater River is a fluvial sand transport system for the Whitewater Floodplain Preserve Conservation Area. The portions of the San Bernardino Mountains included in this area are a sand source for this fluvial sand transport system. Figure 4-9d depicts the Essential Ecological Process areas.

Table 4-24: Conserved[1] Natural Communities – Whitewater Canyon Conservation Area
(All acreages are based on 1996 pre-Planning Agreement information.)

Natural Community	*Total Acres in the Conservation Area*	*Existing Conservation Lands*	*Acres Not Currently Conserved*
Sonoran creosote bush scrub	2,748	2,431	317
Sonoran mixed woody and succulent scrub	955	327	628
Chamise chaparral	569	407	162
Semi-desert Chaparral	4,927	4,739	188
Interior live oak chaparral	24	24	0
Sonoran cottonwood-willow riparian forest	166	59	107
Desert fan palm oasis woodland	1	1	0

[1] Only natural communities to be conserved under the Plan are shown. Natural communities that are not included as described in Section 3.2.2 are not shown.

Biological Corridors and Linkages. Whitewater Canyon serves as part of a Linkage and Biological Corridor linking the San Bernardino Mountains portion of the Transverse Ranges with the Peninsular Ranges (San Jacinto and Santa Rosa Mountains) through the Snow Creek/Windy Point Conservation Area. The corridor provides for movement under I-10 along the Whitewater River, which crosses under the I-10 freeway beneath a high bridge. See Section 4.5.3 in Appendix I for details about this bridge. Figure 4-9d depicts the Biological Corridor and Linkage.

Conservation Objectives. The Conservation Objectives for this Conservation Area are:

1. In total, 1,440 acres of the Whitewater Canyon Conservation Area shall be conserved. (This may be less than the sum of acres indicated in the following objectives because there can be overlap among areas covered by the objectives. For example, Core Habitat for two or more species may overlap, or Core Habitat and an Essential Ecological Process area may overlap. The individual acreage figures will be used in compliance monitoring.)
2. Conserve at least 1,084 acres of Core Habitat for desert tortoise in the unincorporated portion of the area, allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused disturbance, and edge effects to Core Habitat by conserving contiguous Habitat and effective Linkages between patches of Core Habitat. Protect individual tortoises within the area if allowed Development does occur.
3. Conserve at least 850 acres of the sand source area in the San Bernardino Mountains in the unincorporated portion of the area to maintain the natural erosion processes that provide sediment for the blowsand ecosystem.

4. Conserve at least 435 acres in the fluvial (water-borne) sand transport area in the Riverside County portion of the area. Maintain the current capacity for fluvial sand transport in the Whitewater River.
5. Conserve at least 348 acres of Other Conserved Habitat for the Little San Bernardino Mountains linanthus in the Riverside County portion of the area.
6. Conserve at least 368 acres of Core Habitat for the triple-ribbed milkvetch in the Riverside County portion of the area.
7. Conserve at least 706 acres of modeled Habitat for the arroyo toad in the Riverside County portion of the area.
8. In the Riverside County portion of the area, conserve at least 107 acres of existing Sonoran cottonwood-willow riparian forest natural community, which provides Habitat for riparian birds and other Covered Species. For the remaining acreage of this natural community where disturbance is authorized by the Plan, ensure no net loss.
9. In the Riverside County portion of the area, maintain functional Biological Corridors under I-10 by conserving at least 201 acres in the Whitewater River Biological Corridor north of the freeway to maintain potential Habitat connectivity for desert tortoise, Coachella Valley round-tailed ground squirrel, and Palm Springs pocket mouse, and to maintain ecosystem function for Covered Species. Aside from the freeway bridge and any Existing Use areas, which are unavoidably narrow segments, the Biological Corridor shall expand to one mile wide to minimize edge effects.

Ownership and General Plan Land Use Designations. Table 4-25 shows the public versus private ownership of lands within this Conservation Area.

Table 4-25: Land Ownership
Whitewater Canyon Conservation Area
(rounded to the nearest 10 acres)

Ownership[1]	***Acres***
Existing Conservation Lands:	*12,630*
BLM	10,190
USFS	2,440
Lands Not Currently Conserved:	*1,540*
Private	1,320
Public, Quasi-public entities	220
TOTAL	**14,170**

[1] Based on 1996 pre-Planning Agreement land ownership information.

As seen in Table 4-25, 89% of the land within this Conservation Area is currently in public or nonprofit conservation organization ownership. Current conservation status ranges from Level 1 to Level 3. Conservation management will be improved where needed through management prescriptions to be adopted by the relevant agency as Feasible.

As seen in Table 4-26, private land in the Conservation Area is under the jurisdiction of Riverside County. The major general plan designation is Open Space Rural, which restricts land use to a maximum of 1 unit per 20 acres. The Open Space Water designation does not have a building intensity range; this designation refers to natural bodies of water and natural or artificial drainage corridors. Within this land use designation "Extraction of mineral resources . . . may be permissible provided that flooding hazards are addressed and long term habitat and riparian values are maintained" (Riverside County General Plan 2003). Much of the area is within the 100-year floodplain of the Whitewater River. Access is provided only by Whitewater Canyon Road, a two lane paved road. There is no flood control master plan for the area, and it is highly unlikely that Development could defray the costs of constructing a flood control system that would be needed to support significant Development.

Table 4-26: General Plan Land Use Designations[1]
(Non-conserved lands only)
Whitewater Canyon Conservation Area

General Plan Designation (Map symbol) - Riverside County	***% of Private Non-conserved Land in Conservation Area***	***Building Intensity Range***
Open Space Conservation (OS-C)	9%	Protection of open space – natural hazards and resources
Open Space Rural (OS-RUR)	57%	1 unit per 20 acres
Open Space Water (OS-W)	34%	Bodies of water, floodplains, and natural or artificial drainage corridors
Rural Desert[2] (RD)	---	1 unit per 10 acres
Commercial Retail[2] (CR)	---	Retail and service uses
TOTAL	**100%**	

[1] Based on 2003 general plan designations and 2003 parcel data
[2] Statistically insignificant (less than 1%)

Figure 4-9e shows the Existing Conservation Lands and general plan land use designations on Level 4 lands for the area.

Required Measures for the Conservation Area. Tables 4-27a and 4-27b show how many acres of Existing Conservation Lands are in this Conservation Area and how many acres of the Additional Conservation Lands will need to be conserved through acquisition or other means. The following measures will be imposed to achieve the Conservation Objectives in this Conservation Area.

1. The existing bridge over the Whitewater River on I-10 will be maintained by Caltrans at no less than its current size, with a soft-bottom, to maintain at least current levels of sand transport and potential wildlife movement under I-10.
2. For proposed Development in Little San Bernardino Mountains linanthus modeled Habitat, Development in Essential Ecological Process fluvial sand transport areas shall not obstruct natural watercourses, and the rate of flow and sediment transport shall not be impeded.

3. The Permittees shall comply with applicable avoidance, minimization, and mitigation measures described in Section 4.4 and the Land Use Adjacency Guidelines as described in Section 4.5.

4. Covered Activities in arroyo toad breeding Habitat in the Whitewater Canyon Conservation Area will be conducted outside of the March 1 - June 30 reproductive season unless otherwise authorized through a Minor Amendment to the Plan.

5. Activities and projects involving water diversions in arroyo toad Habitat are not Covered Activities. Take Authorization for Listed Species (animal species) for such activities requires a Minor Amendment with Wildlife Agency concurrence.

Table 4-27a: Conservation and Take Authorization for Whitewater Canyon Conservation Area – City of Desert Hot Springs Area ~~(No Covered Activities)~~

(All acreages are based on 1996 pre-Planning Agreement information.)

Conservation Objective	*Total Acres in Conservation Area*	*Existing Conservation Lands*	*Acres of Disturbance Authorized*	*Remaining Acres to be Conserved*
Conserve Core Habitat for desert tortoise	56	56	0	0
Conserve sand source areas	56	56	0	0

Table 4-27b: Conservation and Take Authorization for Whitewater Canyon Conservation Area – Riverside County Area

(All acreages are based on 1996 pre-Planning Agreement information.)

Conservation Objective	*Total Acres in Conservation Area*	*Existing Conservation Lands*	*Acres of Disturbance Authorized*	*Remaining Acres to be Conserved*
Conserve Core Habitat for arroyo toad	2,082	1,298	78	706
Conserve Core Habitat for desert tortoise	4,438	3,234	120	1,084
Conserve Other Cons. Habitat for Little San Bernardino Mountains. Linanthus	579	192	39	348
Conserve Core Habitat for triple-ribbed milkvetch	1,295	886	41	368
Conserve Sonoran cottonwood-willow riparian forest	166	59	(11) [1]	107
Conserve desert fan palm oasis woodland	1	1	0	0
Conserve sand source areas	12,616	11,672	94	850
Conserve fluvial sand transport areas	1,392	909	48	435
Conserve Biological Corridors	223	0	22	201

[1] Disturbance of no more than 11 acres may occur, but it would be replaced to ensure that the no net loss occurs and the Conservation Objective is achieved.

4.3.5 Highway 111/I-10 Conservation Area

Location and Description. The Highway 111/I-10 Conservation Area encompasses portions of the non-developed and non-Indian owned land between Highway 111 and I-10 west of the Whitewater River. This Conservation Area is depicted in Figure 4-10a. To the north of this Conservation Area is the Whitewater Canyon Conservation Area. To the south is the Snow Creek/Windy Point Conservation Area, and to the east is the Whitewater Floodplain Conservation Area. The Highway 111/I-10 Conservation Area contains a total of approximately 390 acres.

Core Habitat. This area does not provide Core Habitat for any species. There is, however, a probable connection between this Habitat and the Habitat in the Snow Creek/Windy Point Conservation Area via the Biological Corridor described below. This connection provides value to the Other Conserved Habitat in this area.

Other Conserved Habitat. This area contains Other Conserved Habitat for the Coachella Valley milkvetch, triple-ribbed milkvetch, Coachella Valley Jerusalem cricket, desert tortoise, Le Conte's thrasher, Coachella Valley round-tailed ground squirrel, and Palm Springs pocket mouse. While the extent of Habitat in this Conservation Area is not enough to consider it Core Habitat, there is a probable connection between this Habitat and the Habitat in the Snow Creek/Windy Point Conservation Area via the Biological Corridor described below. Thus, the Habitat in the Highway 111/I-10 Conservation Area increases the level of protection for these species. The Highway 111/I-10 Conservation Area may provide a refugium for species in the Snow Creek/Windy Point Conservation Area (in addition to refugia areas within this area) in the event of a major flood event along the San Gorgonio River, or a population source for recolonization of the Snow Creek/Windy Point Conservation Area after a catastrophic event. The Highway 111/I-10 Conservation Area may also provide an area useful to species for adapting to potential future climatic change. The Habitat is similar to some of the Habitat in the Snow Creek/Windy Point Conservation Area; however, what may formerly have been active desert dunes have been partially stabilized as a result of the aeolian sand transport processes having been largely blocked by tamarisk windrows and other barriers established to protect Highway 111 and the railroad track north of the highway. Table 4-28 shows the Covered Species occurring in this area. Figure 4-10b depicts the Other Conserved Habitat and recorded burrowing owl locations.

Table 4-28: Species Habitat - Highway 111/I-10 Conservation Area
(All acreages are based on 1996 pre-Planning Agreement information.)

Species	*Total Acres of Habitat in the Conservation Area*	*Existing Conservation Lands*	*Acres of Habitat Not Currently Conserved*	*Habitat Designation*	*Acres of Core Habitat*
CV milkvetch	372	0	372	Other Cons. Habitat	0

Table 4-28 (cont.)

Species	*Total Acres of Habitat in the Conservation Area*	*Existing Conservation Lands*	*Acres of Habitat Not Currently Conserved*	*Habitat Designation*	*Acres of Core Habitat*
Triple-ribbed milkvetch	5	0	5	Other Cons. Habitat	0
CV Jerusalem cricket	372	0	372	Other Cons. Habitat	0
Desert tortoise	389	0	389	Other Cons. Habitat	0
Le Conte's thrasher	389	0	389	Other Cons. Habitat	0
CV round-tailed ground squirrel	389	0	389	Other Cons. Habitat	0
Palm Springs pocket mouse	389	0	389	Other Cons. Habitat	0

Natural Communities. Table 4-29 shows that this area contains Sonoran creosote bush scrub. Figure 4-10c depicts the natural community.

Table 4-29: Conserved Natural Communities – Highway 111/I-10 Conservation Area

(All acreages are based on 1996 pre-Planning Agreement information.)

Natural Community	*Total Acres in the Conservation Area*	*Existing Conservation Lands*	*Acres Not Currently Conserved*
Sonoran creosote bush scrub	389	0	389

Essential Ecological Processes. This area includes part of the historic sand transport system of the Whitewater River to the Snow Creek/Windy Point Conservation Area.

Biological Corridors and Linkages. This area is adjacent to a Biological Corridor between the San Jacinto Mountains and the San Bernardino Mountains. This corridor also connects the Snow Creek/Windy Point Conservation Area and the Whitewater Canyon Conservation Area. The actual corridor is contained within the Whitewater Floodplain Conservation Area.

Conservation Objectives. The Conservation Objective for this Conservation Area is:

1. Conserve 350 acres in this Conservation Area. This will protect Other Conserved Habitat for the Coachella Valley milkvetch, Coachella Valley Jerusalem cricket, Coachella Valley round-tailed ground squirrel, Palm Springs pocket mouse, and Le Conte's thrasher, allowing evolutionary processes and natural population fluctuations to occur.

Minimize fragmentation, human-caused disturbance, and edge effects to Habitat by conserving contiguous Habitat patches and effective Linkages between them.

Ownership and General Plan Land Use Designations. Table 4-30 shows the public versus private ownership and conservation management levels of lands within this area.

Table 4-30: Land Ownership Highway 111/I-10 Conservation Area
(rounded to nearest 10 acres)

Ownership[1]	*Acres*
Existing Conservation Lands:	*0*
Lands Not Currently Conserved:	*390*
Private	390
TOTAL	**390**

[1] Based on 1996 pre-Planning Agreement land ownership information

As seen in Table 4-30, none of the land within this Conservation Area is currently in public or non-profit conservation organization ownership.

As seen in Table 4-31, private land in the Conservation Area is under the jurisdiction of the City of Palm Springs. The general plan designation is Desert, which is an open space designation restricting land use to a minimum of 1 unit per 5 acres, or to 3 ½ units per acre if Development is clustered and 90% of the site is reserved for an open space use. Access is limited to Tipton Road, a two-lane road adjacent to the area, connecting Highway 111 with I-10. The road receives very limited use as there is no Development in the area served by the road, other than one wind energy facility on private land, and Highway 111 and I-10 provide more convenient routes of travel.

Table 4-31: General Plan Land Use Designations[1]
(Non-conserved lands only)
Highway 111/I-10 Conservation Area

General Plan Designation (Map symbol) - City of Palm Springs	*% of Private Non-conserved Land in Conservation Area*	*Building Intensity Range*
Desert (D)	100%	1 to 3.5 units per acre on 5 acre minimum site
TOTAL	**100%**	

[1] Based on 2003 general plan designations and 2003 parcel data

Figure 4-10d shows the Existing Conservation Lands and general plan land use designations on Level 4 lands for the area.

Required Measures for the Conservation Area. Table 4-32 shows how many acres of Existing Conservation Lands are in this Conservation Area and how many acres of Additional Conservation Lands will need to be acquired or otherwise conserved through acquisition or other

means. The following measures will be imposed to achieve the Conservation Objectives in this Conservation Area.

1. The Permittees shall comply with applicable avoidance, minimization, and mitigation measures described in Section 4.4 and Land Use Adjacency Guidelines as described in Section 4.5.

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Table 4-32: Conservation and Take Authorization for Highway 111/I-10 Conservation Area
(All acreages are based on 1996 pre-Planning Agreement information.)

Conservation Objective	*Total Acres in Conservation Area*	*Existing Conservation Lands*	*Acres of Disturbance Authorized*	*Remaining Acres to be Conserved*
Conserve Other Cons. Habitat for CV milkvetch	372	0	37	335
Conserve Other Cons. Habitat for CV Jerusalem cricket	372	0	37	335
Conserve Other Cons. Habitat for Le Conte's thrasher	389	0	39	350
Conserve Other Cons. Habitat for CV round-tailed ground squirrel	389	0	39	350
Conserve Other Cons. Habitat for Palm Springs pocket mouse	389	0	39	350

4.3.6 Whitewater Floodplain Conservation Area

Location and Description. The Whitewater Floodplain Conservation Area encompasses portions of the Whitewater River floodplain south of I-10 eastward to the existing Whitewater Floodplain Preserve, established by the CVFTL HCP. This Conservation Area is depicted in Figure 4-11a. The Conservation Area includes additional Habitat east and southeast of the existing Preserve on the west and east sides of Gene Autry Trail, south and east of CVWD's groundwater recharge basins, the Garnet Hill area north of the existing preserve, and Biological Corridor and sand transport areas south of I-10 along Mission Creek, and Willow washes, which connect this area to the Willow Hole Conservation Area north of I-10. To the northwest of this Conservation Area is the Whitewater Canyon Conservation Area. To the west is the Highway 111/I-10 Conservation Area. The Whitewater Floodplain Conservation Area connects to the Snow Creek/Windy Point Conservation Area near Windy Point, where the San Gorgonio River joins the Whitewater River. The Whitewater Floodplain Conservation Area contains a total of approximately 7,400 acres.

Core Habitat. This Conservation Area provides Core Habitat for the Coachella Valley milkvetch, Coachella Valley giant sand-treader cricket, Coachella Valley fringe-toed lizard, Coachella Valley round-tailed ground squirrel, and Palm Springs pocket mouse. Figure 4-11b depicts the Core Habitat, Other Conserved Habitat, and burrowing owl locations.

Other Conserved Habitat. While there is modeled Habitat for the Coachella Valley Jerusalem cricket, it has not been found in this area based on limited surveys. The area also provides some Other Conserved Habitat for the Coachella Valley milkvetch, triple-ribbed milkvetch, desert tortoise, flat-tailed horned lizard, burrowing owl, Le Conte's thrasher, Coachella Valley round-tailed ground squirrel, and Palm Springs pocket mouse. Table 4-33 shows the Covered Species occurring in this area.

Table 4-33: Species Habitat – Whitewater Floodplain Conservation Area
(All acreages are based on 1996 pre-Planning Agreement information.)

Species	*Total Acres of Habitat in the Conservation Area*	*Existing Conservation Lands*	*Acres of Habitat Not Currently Conserved*	*Habitat Designation*	*Acres of Core Habitat*
CV milkvetch	5,635 / 77	2,535 / 0	3,100 / 77	Core / Other Cons. Habitat	5,635
Triple-ribbed milkvetch	866	272	594	Other Cons. Habitat	0
CV giant sand-treader cricket	5,617	2,532	3,085	Core	5,617
CV Jerusalem cricket	5,646	2,532	3,114	Other Cons. Habitat	0
CV fringe-toed lizard	5,617	2,532	3,085	Core	5,617
Desert tortoise	1,110	307	803	Other Cons. Habitat	0
Le Conte's thrasher	7,308	2,893	4,415	Other Cons. Habitat	0
Flat-tailed horned lizard	3,369 / 2,120	1,598 / 909	1,771 / 1,211	Pred. / Pot.[1] Other Cons. Habitat	0
CV round-tailed ground squirrel	6,115 / 40	2,655 / 0	3,460 / 40	Core / Other Cons. Habitat	6,115
Palm Springs pocket mouse	6,981 / 19	2,914 / 0	4,067/ 19	Core / Other Cons. Habitat	6,981

[1] The species distribution model for the flat-tailed horned lizard includes predicted ("pred.") Habitat and also potential (Pot.) Habitat. Predicted Habitat includes areas where presence of this species is known or expected based on recent observations. Potential Habitat includes areas where there are historical observations of this species but no recent observations are recorded. See Section 9.6.3.3 for additional information.

Natural Communities. Table 4-34 shows the conserved natural communities occurring in this Conservation Area: active desert sand fields, ephemeral desert sand fields, stabilized and partially stabilized desert sand fields, stabilized shielded desert sand fields, Sonoran creosote bush scrub, and Sonoran mixed woody and succulent scrub. Figure 4-11c depicts the conserved natural communities.

Table 4-34: Conserved[1] Natural Communities – Whitewater Floodplain Conservation Area
(All acreages are based on 1996 pre-Planning Agreement information.)

Natural Community	*Total Acres in the Conservation Area*	*Existing Conservation Lands*	*Acres Not Currently Conserved*
Active desert sand fields	485	1	484
Ephemeral desert sand fields	2,959	1,584	1,375
Stabilized shielded desert sand fields	1,591	806	785
Stabilized & partially stabilized desert sand fields	582	139	443
Sonoran creosote bush scrub	1,556	299	1,257
Sonoran mixed woody & succulent scrub	93	21	72

[1] Only natural communities to be conserved under the Plan are shown. Natural communities that are not included as described in Section 3.2.2 are not shown.

Essential Ecological Processes. The Whitewater River, after it joins the San Gorgonio River, provides fluvial sand transport to the existing Whitewater Floodplain Preserve. The groundwater recharge ponds west of Indian Avenue are in the path of the fluvial flows of the Whitewater River, and their presence has restricted flows to a narrower deposition area, which has affected the extent of suitable Habitat. The recharge ponds trap an unknown amount of sediment when water from the Colorado River Aqueduct, released into the Whitewater River approximately one mile north of I-10, flows down the river channel to the recharge ponds. Figure 4-11d depicts the Essential Ecological Process areas.

Biological Corridors and Linkages. The area along the Whitewater River provides a Linkage and Biological Corridor between the Snow Creek/Windy Point Conservation Area and the Core Habitat portion of the Whitewater Floodplain Conservation Area, as well as with the Whitewater Canyon Conservation Area. The area south of the recharge ponds may also function as a Biological Corridor to the Snow Creek/Windy Point Conservation Area. As two lane roads, Indian Avenue and Gene Autry Trail are not considered complete barriers to movement of the Covered Species. When constructed to full width, these roads will include wildlife underpasses to maintain connectivity. There is also potential connectivity between this area and the Willow Hole Conservation Area where Mission Creek and Willow Wash cross under the freeway. CVWD is in the process of designing a concrete and earth channel on the south side of I-10 to carry flows from Edom Wash and Willow Wash, as well as Salvia Wash from north of I-10 under a proposed railroad bridge to tie into an existing slope protection facility south of the railroad. This project is being designed to enhance sand transport and wildlife movement between the Willow Hole Conservation Area and the Whitewater Floodplain Conservation Area. Figure 4-11d depicts the Biological Corridors and Linkages.

Conservation Objectives. The Conservation Objectives for this Conservation Area are:

1. In total, 4,140 acres of the Whitewater Floodplain Conservation Area shall be conserved. (This may be less than the sum of acres indicated in the following objectives because there can be overlap among areas covered by the objectives. For example, Core Habitat for two or more species may overlap, or Core Habitat and an Essential Ecological Process area may overlap. The individual acreage figures will be used in compliance monitoring.)

2. Conserve Core Habitat and associated ecological processes (as set forth below) for Coachella Valley milkvetch, Coachella Valley giant sand-treader cricket, Coachella Valley fringe-toed lizard, Coachella Valley round-tailed ground squirrel, and Palm Springs pocket mouse, allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused disturbance, and edge effects to Core Habitat by conserving contiguous Habitat and effective Linkages between patches of Core Habitat.

   a. Conserve at least 2,671 acres of Core Habitat for the Coachella Valley milkvetch in the Palm Springs portion of the area, at least 61 acres in the Cathedral City portion of the area, and at least 58 acres in the unincorporated Riverside County portion of the area.

   b. Conserve at least 2,659 acres of Core Habitat for the Coachella Valley giant sand-treader cricket in the Palm Springs portion of the area, at least 61 acres in the Cathedral City portion of the area, and at least 57 acres in the unincorporated Riverside County portion of the area.

   c. Conserve at least 2,659 acres of Core Habitat for the Coachella Valley fringe-toed lizard in the Palm Springs portion of the area, at least 61 acres in the Cathedral City portion of the area, and at least 57 acres in the unincorporated Riverside County portion of the area.

   d. Conserve at least 2,955 acres of Core Habitat for the Coachella Valley round-tailed ground squirrel in the Palm Springs portion of the area, at least 59 acres in the Cathedral City portion of the area, and at least 100 acres in the unincorporated Riverside County portion of the area.

   e. Conserve at least 3,122 acres of Core Habitat for the Palm Springs pocket mouse in the Palm Springs portion of the area, at least 61 acres in the Cathedral City portion of the area, and at least 477 acres in the unincorporated Riverside County portion of the area.

   f. Conserve at least 3,484 acres of the fluvial and aeolian sand transport area in the Palm Springs portion of the area, at least 61 acres in the Cathedral City portion of the area, and at least 481 acres in the unincorporated Riverside County portion of the area. Maintain the current capacity for fluvial sand transport in the Whitewater River floodplain.

3. Conserve occupied burrowing owl burrows as described in Section 4.4 for burrowing owl avoidance, minimization, and mitigation measures.

4. Conserve at least 3,433 acres of Other Conserved Habitat for Le Conte's thrasher in the Palm Springs portion of the area, at least 61 acres in the Cathedral City portion of the

area, and at least 480 acres in the unincorporated Riverside County portion of the area. Conserve Le Conte's thrasher nesting sites as described in Section 4.4 for avoidance, minimization, and mitigation measures.

5. Conserve at least 392 acres of the active desert sand fields in the Palm Springs portion of the area; at least 43 acres of the active desert sand fields in the Cathedral City portion of the area; at least 1,185 acres of the ephemeral desert sand fields in the Palm Springs portion of the area and at least 52 acres in the unincorporated Riverside County portion of the area for the conservation of these natural communities; at least 394 acres of the stabilized and partially stabilized desert sand fields in the Palm Springs portion of the area and at least 4 acres of the stabilized and partially stabilized desert sand fields in the unincorporated Riverside County portion of the area. As these conserved natural communities are all part of the Core Habitat areas identified in Conservation Objective 2 for this area, attainment of that objective will also achieve this objective.

6. Maintain functional Biological Corridors and Linkages by conserving at least 475 acres of identified Biological Corridor in the unincorporated portion of the Conservation Area, at least 809 acres of identified Biological Corridor in the City of Palm Springs' portion, and at least 18 acres of identified Biological Corridor in the City of Cathedral City portion, such that the functionality of each individual Biological Corridor listed below is not compromised:

   a. Conserve the Whitewater River Biological Corridor south of I-10 in the unincorporated area to maintain potential Habitat connectivity for desert tortoise, Coachella Valley round-tailed ground squirrel, and Palm Springs pocket mouse, and to maintain ecosystem function for Covered Species. Aside from the freeway bridge and any Existing Use areas, which are unavoidably narrow segments, the Biological Corridor shall expand to one mile wide to minimize edge effects.

   b. Conserve the Mission Creek Biological Corridor south of the freeway in the Palm Springs portion of the Conservation Area to maintain potential Habitat connectivity for Coachella Valley round-tailed ground squirrel, and Palm Springs pocket mouse, and to maintain ecosystem function for Covered Species. Aside from the freeway culvert and any Existing Use areas, which are unavoidably narrow segments, the Biological Corridor shall expand to one mile wide to minimize edge effects.

   c. Conserve the Willow wash area south of the I-10 in Palm Springs and in Cathedral City to maintain potential Habitat connectivity for Coachella Valley round-tailed ground squirrel, and Palm Springs pocket mouse, and to maintain ecosystem function for Covered Species. Aside from the freeway culverts and any Existing Use areas, which are unavoidably narrow segments, the Biological Corridor shall expand to one mile wide to minimize edge effects.

   d. Maintain the ability of wildlife to cross Indian Avenue and Gene Autry Trail by providing undercrossings for Coachella Valley fringe-toed lizard, flat-tailed horned lizard, Coachella Valley round-tailed ground squirrel, and Palm Springs pocket mouse if these roads are widened to six lanes or more.

Ownership and General Plan Land Use Designations. Table 4-35 shows the public versus private ownership of lands within this Conservation Area.

Table 4-35: Land Ownership Whitewater Floodplain Conservation Area
(rounded to nearest 10 acres)

Ownership[1]	***Acres***
Existing Conservation Lands:	*2,930*
BLM	1,770
CVWD	1,160
Lands Not Currently Conserved:	*4,470*
CVWD	2,040
Private	2,320
Public, Quasi-public entities	110
TOTAL	**7,400**

[1] Based on 1996 pre-Planning Agreement land ownership information.

As seen in Table 4-35, 40% of the land within this Conservation Area is currently in public or nonprofit conservation organization ownership. Current conservation status ranges from Level 1 to Level 3. Conservation management will be improved where needed through management prescriptions to be adopted by the relevant agency as Feasible.

As seen in Table 4-36, private land in the Conservation Area is under the jurisdiction of the City of Palm Springs, Cathedral City, and Riverside County. The main general plan designations are Rural Desert and Open Space Water in the County area, Open Space - Water and Open Space – Other in the City of Cathedral City area, and Conservation, Desert, and Watercourse in the City of Palm Springs area. These are considered open space designations in the respective jurisdictions' general plans. Approximately 2% of the portion of the Conservation Area within the City of Palm Springs, in the Garnet Hill area, has a land use designation of Industrial. There are wind energy facilities in the sediment transport area west of Indian Avenue in this area.

Table 4-36: General Plan Land Use Designations[1] (Non-conserved lands only) Whitewater Floodplain Conservation Area

General Plan Designation (Map symbol)- Riverside County	***% of Private Non-conserved Land in Conservation Area***	***Building Intensity Range***
Open Space Water (OS-W)	9%	Bodies of water, floodplains, and natural or artificial drainage corridors
Rural Desert (RD)	91%	1 unit per 10 acres
TOTAL	**100%**	
General Plan Designation (Map symbol) - City of Palm Springs	***% of Private Non-conserved Land in Conservation Area***	***Building Intensity Range***
Conservation (C)	35%	1 unit per 20 acres
General Plan Designation (Map symbol) - City of Palm Springs	***% of Private Non-conserved Land in Conservation Area***	***Building Intensity Range***
Desert (D)	27%	3.5 units per acre on 5 acre minimum site
Watercourse (W)	36%	Flood control or drainage facilities
Industrial (I)	2%	Various business & industrial uses
TOTAL	**100%**	
General Plan Designation (Map symbol) - City of Cathedral City	***% of Private Non-conserved Land in Conservation Area***	***Building Intensity Range***
Open Space –Water (OS-W)	72%	Bodies of water, floodplains, and natural or artificial drainage corridors
Open Space – Other (OS-O)	28%	Special resource or hazard areas
TOTAL	**100%**	

[1] Based on 2003 general plan designations and 2003 parcel data.

Figure 4-11e shows the Existing Conservation Lands and general plan land use designations on Level 4 lands for the area.

Required Measures for the Conservation Area. Tables 4-37a, 4-37b, and 4-37c show how many acres of Existing Conservation Lands are in this Conservation Area and how many acres of Additional Conservation Lands will need to be acquired or otherwise conserved through acquisition or other means. The following measures will be imposed to achieve the Conservation Objectives in this Conservation Area.

1. The appropriate Local Permittee for the project will ensure that when Gene Autry Trail and Indian Avenue are widened to six lanes, or in 2038-39, whichever comes first, fluvial

and aeolian sand transport capacity is not reduced. Roadway design will facilitate aeolian sand transport. Sand that accumulates upwind of either road will be deposited on the downwind side of the road to address potential impacts to aeolian sand transport. At the same time, the appropriate Local Permittee will also ensure that wildlife underpasses of sufficient size, to be determined in consultation with the Wildlife Agencies, are installed to provide for the movement of Coachella Valley round-tailed ground squirrel, Palm Springs pocket mouse, Coachella Valley fringe-toed lizard, and other species.

2. In the future, the Salvia Road (Micro Place) and Garnet Avenue Extension together may create a frontage road on the south side of I-10 connecting Indian Avenue and Gene Autry Trail. Where the road would cross Mission Creek it must provide for fluvial sand transport along Mission Creek. Additionally, the bridge structure or culvert must provide for the movement of wildlife under the road.

3. CVWD will deposit sand removed from the groundwater recharge basins during maintenance operations in the fluvial and aeolian sand transport area on available Reserve Lands in a manner that downwind habitat would receive appreciable inputs of aeolian sand from the deposits, as determined in consultation with the RMOC. It is understood that CVWD has a sediment relocation experiment underway and that the results of the experiment will be considered when they are available.

4. The Permittees shall comply with applicable avoidance, minimization, and mitigation measures described in Section 4.4 and the Land Use Adjacency Guidelines as described in Section 4.5.

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Table 4-37a: Conservation and Take Authorization for Whitewater Floodplain Conservation Area – City of Palm Springs Area

(All acreages are based on 1996 pre-Planning Agreement information.)

Conservation Objective	*Total Acres in Conservation Area*	*Existing Conservation Lands*	*Acres of Disturbance Authorized*	*Remaining Acres to be Conserved*
Conserve Core Habitat for CV milkvetch	5,432	2,464	297	2,671
Conserve Core Habitat for CV giant sand-treader cricket	5,418	2,464	295	2,659
Conserve Core Habitat for CV fringe-toed lizard	5,418	2,464	295	2,659
Conserve Other Cons. Habitat for Le Conte's thrasher	6,495	2,681	381	3,433
Conserve Core Habitat for CV round-tailed ground squirrel	5,825	2,542	328	2,955
Conserve Core Habitat for Palm Springs pocket mouse	6,173	2,704	347	3,122
Conserve active desert sand fields	436	0	44	392
Conserve ephemeral desert sand fields	2,873	1,556	132	1,185
Conserve stabilized & partially stabilized desert sand fields	577	139	44	394
Conserve fluvial & aeolian sand transport	6,590	2,719	387	3,484
Conserve Biological Corridors[1]	1,183	284	90	809

[1] Includes Whitewater River at Interstate 10, Mission Creek, and Willow Wash Biological Corridors

Table 4-37b: Conservation and Take Authorization for Whitewater Floodplain Conservation Area – City of Cathedral City Area

(All acreages are based on 1996 pre-Planning Agreement information.)

Conservation Objective	*Total Acres in Conservation Area*	*Existing Conservation Lands*	*Acres of Disturbance Authorized*	*Remaining Acres to be Conserved*
Conserve Core Habitat for CV milkvetch	107	39	7	61
Conserve Core Habitat for CV giant sand-treader cricket	107	39	7	61
Conserve Core Habitat for CV fringe-toed lizard	107	39	7	61
Conserve Other Cons. Habitat for Le Conte's thrasher	107	39	7	61
Conserve Core Habitat for CV round-tailed ground squirrel	105	39	7	59
Conserve Core Habitat for Palm Springs pocket mouse	107	39	7	61
Conserve active desert sand fields	49	1	5	43
Conserve fluvial & aeolian sand transport	107	39	7	61
Conserve Biological Corridors[1]	28	8	2	18

[1] Includes Willow Wash Biological Corridor

Table 4-37c: Conservation and Take Authorization for Whitewater Floodplain Conservation Area – Riverside County Area
(All acreages are based on 1996 pre-Planning Agreement information.)

Conservation Objective	*Total Acres in Conservation Area*	*Existing Conservation Lands*	*Acres of Disturbance Authorized*	*Remaining Acres to be Conserved*
Conserve Core Habitat for CV milkvetch	96	32	6	58
Conserve Core Habitat for CV giant sand-treader cricket	92	29	6	57
Conserve Core Habitat for CV fringe-toed lizard	92	29	6	57
Conserve Other Cons. Habitat for Le Conte's thrasher	706	173	53	480
Conserve Core Habitat for CV round-tailed ground squirrel	185	74	11	100
Conserve Core Habitat for Palm Springs pocket mouse	701	171	53	477
Conserve ephemeral desert sand fields	86	28	6	52
Conserve stabilized & partially stabilized desert sand fields	5	0	1	4
Conserve fluvial & aeolian sand transport	707	173	53	481
Conserve Biological Corridors[1]	701	173	53	475

[1] Includes Whitewater River at Interstate 10, Mission Creek, and Willow Wash Biological Corridors.

4.3.7 Upper Mission Creek/Big Morongo Canyon Conservation Area

Location and Description. The Upper Mission Creek/Big Morongo Canyon Conservation Area encompasses the Mission Creek and Big Morongo Canyon watersheds and the portions of the Mission Creek flood control channel and Morongo Wash within the City of Desert Hot Springs. Portions of the Mission Creek flood control channel and Morongo Wash south of Desert Hot Springs are included in the Willow Hole Conservation Area. This Conservation Area is depicted in Figure 4-12a. The Upper Mission Creek/Big Morongo Canyon Conservation Area is bounded on the west by the Whitewater Canyon Conservation Area, on the north by portions of the San Gorgonio Wilderness and Morongo Canyon ACEC in San Bernardino County, and on the east by the Joshua Tree National Park Conservation Area. The Upper Mission Creek/Big Morongo Canyon Conservation Area contains a total of approximately

29,440 acres. ~~As a result of a decision by~~In 2013 the City of Desert Hot Springs and Mission Springs Water District became Permittees as a result of a Major Amendment. ~~not to participate in the Plan, p~~Private lands within the city limits of Desert Hot Springs are now~~t~~ included in the Upper Mission Creek/Big Morongo Canyon Conservation Area, ~~with the exception of~~including those lands necessary to provide for flood control as well as associated habitat conservation along Morongo Wash. Within the Conservation Area, the Morongo Wash ~~a~~ Special Provisions Area has been ~~incorporated~~subsumed into the Conservation Area. However, a minimum 1,200 foot wide Morongo Wash Flood Control Corridor will be maintained. The Riverside County Flood Control and Water Conservation District is developing a~~The~~ West Desert Hot Springs Master Drainage Plan (MDP)~~ is currently being prepared~~. ~~, with a recommended alternative which would utilize levees along Morongo Wash following the Conservation Area boundaries.~~ This Master Drainage Plan ~~delineated to~~will address a potential Morongo Wash flood control facility and its associated mitigation. The proposed MDP will be required to be consistent with the CVMSHCP and will require a minor amendment. The Conservation Area along Morongo Wash includes ~~, as well as~~ conservation ~~for~~ of a wildlife habitat corridor and additional habitat necessary to accomplish the Conservation Goals and Objectives of the Plan.

West of Highway 62, private lands within the city limits and the land use authority of Desert Hot Springs, ~~are not within the land use authority of any Permittee under the Plan; as such, they~~ are now~~t~~ included in the Upper Mission Creek/Big Morongo Canyon Conservation Area. Figure 4-12a depicts the ~~ex~~inclusion of these private lands. These lands have important biological value as Core Habitat for desert tortoise. Portions of the lands also have important biological value as Other Conserved Habitat for Le Conte's thrasher and Palm Springs pocket mouse. ~~The lands could be conserved as a result of regulatory actions by other agencies and/or would likely be suitable mitigation lands for these species if such mitigation is needed by other entities.~~

Core Habitat. On the east side of Highway 62 in this Conservation Area is the largest Habitat area in the Plan Area for Little San Bernardino Mountains linanthus. Mission Creek east of the highway, and both Dry Morongo Wash and Big Morongo Wash, which form meandering braided channels in this area, all contain linanthus Habitat. Additional Habitat for the linanthus occurs where these two washes meet to become the Morongo Wash area. Significant Core Habitat for the triple-ribbed milkvetch occurs in this area. There is also Core Habitat for the Palm Springs pocket mouse in this area, on both sides of Highway 62 and connected where the highway bridges Mission Creek. The population of desert tortoise is considered to be connected with a larger viable population stretching southwest into the Whitewater Canyon Conservation Area and eastward through the Little San Bernardino Mountains into the Joshua Tree National Park Conservation Area. Figure 4-12b depicts the Core Habitat, selected Other Conserved Habitat, and recorded burrowing owl locations.

Other Conserved Habitat. The riparian areas along Mission Creek contain suitable migration and breeding Habitat for the riparian species covered by the Plan. Given the scarcity of riparian Habitat in the desert, all riparian Habitat is considered important for these species, and is likely to contribute to the Conservation of these species in their respective ranges. There is also potential Habitat for the arroyo toad. Some Other Conserved Habitat for Coachella Valley milkvetch, Coachella Valley Jerusalem cricket, flat-tailed horned lizard, gray vireo, Le Conte's

thrasher, Palm Springs pocket mouse, and Coachella Valley round-tailed ground squirrel also exists in this area. Table 4-38 shows the Covered Species occurring in this area.

Table 4-38: Species Habitat – Upper Mission Creek/ Big Morongo Canyon Conservation Area
(All acreages are based on 1996 pre-Planning Agreement information.)

Species	*Total Acres of Habitat in the Conservation Area*	*Existing Conservation Lands*	*Acres of Habitat Not Currently Conserved*	*Habitat Designation*	*Acres of Core Habitat*
CV milkvetch	~~827~~829	256	~~571~~573	Other Cons. Habitat	0
Little San Bernardino Mtns. linanthus	2,410	168	2,242	Core	2,410
Triple-ribbed milkvetch	819	346	473	Core	819
CV Jerusalem cricket	~~715~~717	154	~~561~~563	Other Cons. Habitat	0
Arroyo toad	3	3	0	Other Cons. Habitat	0
Desert tortoise	~~27,676~~28,447	17,106	~~10,570~~11,341	Core	~~27,676~~28,447
Flat-tailed horned lizard	0 / 96	0 / 0	0 / 96	Pred. / Pot.[1]	0
Gray vireo	14	14	0	Other Cons. Habitat	0
Le Conte's thrasher	~~3,727~~3,898	537	~~3,190~~3,361	Other Cons. Habitat	0
Least Bell's vireo	204 / ~~258~~278	62 / 112	142 / ~~146~~166	Breeding / Migratory	N/A
SW willow flycatcher	204 / ~~258~~278	62 / 112	142 / ~~146~~166	Breeding / Migratory	N/A
Summer tanager	204 / ~~258~~278	62 / 112	142 / ~~146~~166	Breeding / Migratory	N/A
Yellow-breasted chat	204 / ~~258~~278	62 / 112	142 / ~~146~~166	Breeding / Migratory	N/A
Yellow warbler	204 / ~~258~~278	62 / 112	142 / ~~146~~166	Breeding / Migratory	N/A
CV round-tailed ground squirrel	~~2,636~~2,773	160	~~2,476~~2,613	Other Cons. Habitat	0
Palm Springs pocket mouse	~~3,685~~3,806 / ~~353~~392	498 / 85	~~3,187~~3,308 / ~~268~~307	Core / Other Cons. Habitat	~~3,685~~3,806

[1] The species distribution model for the flat-tailed horned lizard includes predicted ("pred.") Habitat and also potential (Pot.) Habitat. Predicted Habitat includes areas where presence of this species is known or expected based on recent observations. Potential Habitat includes areas where there are historical observations of this species but no recent observations are recorded. See Section 9.6.3.3 for additional information.

~~Acreages for the Morongo Wash Special Provisions Area are included in this table.~~

Natural Communities. Table 4-39 shows the conserved natural communities occurring in this area: Sonoran creosote bush scrub, Sonoran mixed woody and succulent scrub, Mojavean mixed woody scrub, Sonoran cottonwood-willow riparian forest, southern sycamore-alder riparian woodland, desert dry wash woodland, and Mojavean pinyon-juniper woodland. Figure 4-12c depicts the conserved natural communities.

Table 4-39: Conserved[1] Natural Communities – Upper Mission Creek/Big Morongo Canyon Conservation Area
(All acreages are based on 1996 pre-Planning Agreement information.)

Natural Community	*Total Acres in the Conservation Area*	*Existing Conservation Lands*	*Acres Not Currently Conserved*
Sonoran creosote bush scrub	~~5,296~~5,369	4,370	~~926~~999
Sonoran mixed woody & succulent scrub	~~6,912~~[2]7,527	2,306	~~4,606~~5,221
Mojave mixed woody scrub	15,771	10,711	5,060
Sonoran cottonwood-willow riparian forest	100	16	84
Southern sycamore-alder riparian woodland	104	~~91~~46	~~13~~58
Desert dry wash woodland	~~260~~280	112	~~148~~168
Mojavean pinyon-juniper woodland	13	13	0

[1] Only natural communities to be conserved under the Plan are shown. Natural communities that are not included as described in Section 3.2.2 are not shown.

~~[2] Acreages for the Morongo Wash Special Provisions Area are included in this table.~~

Essential Ecological Processes. This Conservation Area includes sand source and the upper part of the fluvial sand transport system that provides blowsand to the Willow Hole Preserve, and, to some extent, to the Whitewater Floodplain Preserve. Figure 4-12d depicts the Essential Ecological Process areas. Mission Creek and Morongo Wash, fed by Dry Morongo Canyon, Big Morongo Canyon, and Little Morongo Canyon, convey sediment from the San Bernardino and Little San Bernardino Mountains during storm events. The sediments are deposited in a broad area below the San Andreas Fault, where blowsand Habitat is formed and where strong winds carry the sediment eastward to the existing Willow Hole Preserve, which is described more fully in the section on the Willow Hole Conservation Area. Mission Creek is channelized between approximately Pierson Boulevard and Dillon Road. According to County Flood Control, the present channel does not have the capacity to convey sufficient flows to meet Federal Emergency Management Act (FEMA) requirements to eliminate the need for flood insurance in the 100 year floodplain area. At some point in the future, County Flood Control will need to widen the channel to protect significant Development.

Biological Corridors and Linkages. Within the area, two bridges on Highway 62 span Mission Creek and provide movement corridors under the highway. See Section 4.5.4 in Appendix I for details about these bridges. The area east of Morongo Wash, typically along the sandy eastern bank, provides Habitat connectivity for the Palm Springs pocket mouse between the Upper Mission Creek/Big Morongo Canyon Conservation Area and the Willow Hole Conservation Area. For the Morongo Wash area to function as a Biological Corridor between two Core Habitat areas for the Palm Springs pocket mouse, continuous Habitat must exist along the corridor so that, over time, genetic material will be transmitted between the two Core Habitat

populations through the resident population in the Habitat connectivity area. It is assumed that Pierson Avenue, Two Bunch Palms Road, and Dillon Road (in the Willow Hole Conservation Area) do not currently constitute complete barriers to movement of pocket mice, although some mortality may occur when individuals attempt to cross the roads. It is also assumed that existing edge effects, including predation from domestic pets or feral animals, and Habitat degradation from OHV trespass, dumping, introduction of exotic plants, etc., are not sufficient to fragment the corridor. Additional edge effects in the future must be anticipated as Development continues in the area outside the Conservation Area. Figure 4-12d depicts the Biological Corridors and Linkages.

Conservation Objectives. The Conservation Objectives for this Conservation Area are:

1. In total, 10,810 acres of the Upper Mission Creek/Big Morongo Canyon Conservation Area shall be conserved. (This may be less than the sum of acres indicated in the following objectives because there can be overlap among areas covered by the objectives. For example, Core Habitat for two or more species may overlap, or Core Habitat and an Essential Ecological Process area may overlap. The individual acreage figures will be used in compliance monitoring.) ~~If through means not under the control of the Permittees this Conservation Objective cannot be achieved within the Desert Hot Springs or Riverside County portions of the Conservation Area, the acreage not conserved per this Conservation Objective shall be conserved in or adjacent to this Conservation Area or the Willow Hole, Whitewater Canyon, Desert Tortoise Linkage, Stubbe and Cottonwood Canyons, Indio Hills/Joshua Tree National Park Linkage, Joshua Tree National Park, Mecca Hills/Orocopia Mountains, or Snow Creek/Windy Point Conservation Areas as described below for the individual species. The Wildlife Agencies shall review impacts and conservation pursuant to the requirements above annually during the Rough Step review. If, as described below, the maximum impacts are exceeded or the minimum required conservation is not occurring, coverage for Palm Springs pocket mouse and/or Little San Bernardino Mountains linanthus shall automatically terminate and the CVCC and Permittees will be given written notice acknowledging the termination of coverage for the above-referenced species 30 days prior to coverage terminating~~.

2. Conserve Core Habitat and associated Essential Ecological Processes (as set forth below) for Little San Bernardino Mountains linanthus, triple-ribbed milkvetch, desert tortoise, and Palm Springs pocket mouse, allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused disturbance, and edge effects to Core Habitat by conserving contiguous Habitat and effective Linkages between patches of Core Habitat.

   a. Conserve at least 967 acres of Core Habitat for the Little San Bernardino Mountains linanthus in the Desert Hot Springs portion of the area ~~(including at least 891 acres in the Special Provisions Area)~~, and at least ~~1,100~~1,052 acres in the Riverside County portion ~~(including at least 65 acres in the Special Provisions Area)~~, including the hydrologic processes upon which the plant depends. ~~If, through means not under the control of the Permittees, this Conservation Objective cannot be achieved, for every acre less than 967 acres conserved in the Desert Hot Springs portion of the area (within the current Desert Hot Springs City limits), and for every acre less than 1,100 acres conserved in the Riverside County portion of the area, 2 acres of suitable habitat shall be conserved adjacent to or within this Conservation Area, Willow Hole~~

~~Conservation Area, or Whitewater Canyon Conservation Area. These acquisitions shall occur, at a minimum, incrementally with disturbance, so as to occur within 2 years of whenever the acres not conserved shown in Table 4-42a or acres of disturbance authorized in Table 4-42c are exceeded, at the same ratio (2:1 for losses beyond those anticipated in the tables). These substitute acquisitions within Conservation Areas pursuant to the requirements above would be beyond the minimum Conservation Objectives identified in the Plan. Proposed acquisitions shall be subject to Wildlife Agencies' review and approval.~~

b. Conserve at least 426 acres of Core Habitat for the triple-ribbed milkvetch in the Riverside County portion of the area.

c. Conserve at least ~~1,429~~2,271 acres of Core Habitat for desert tortoise in the Desert Hot Springs portion of the area ~~(including at least 1,324 acres in the Special Provisions Area)~~ and at least ~~7,984~~7,936 acres in the Riverside County portion ~~(including at least 192 acres in the Special Provisions Area)~~. Protect individual tortoises within the area when allowed Development does occur. ~~If, through means not under the control of the Permittees, this Conservation Objective cannot be achieved, for every acre less than 1,429 acres conserved in the Desert Hot Springs portion of the area, and for every acre less than 7,984 acres conserved in the Riverside County portion of the area, 2 acres of suitable habitat shall be conserved adjacent to or within this Conservation Area, the Desert Tortoise Linkage, Stubbe and Cottonwood Canyons, Whitewater Canyon, Indio Hills/Joshua Tree National Park Linkage, Joshua Tree National Park, or Mecca Hills/Orocopia Mountains Conservation Areas. These acquisitions shall occur incrementally with disturbance, so as to occur within 2 years of whenever the acres not conserved shown in Table 4-42a or the acres of disturbance authorized in Table 4-42c are exceeded, at the same 2:1 ratio. These substitute acquisitions within Conservation Areas pursuant to the requirements above would be beyond the minimum Conservation Objectives identified in the Plan. Proposed acquisitions shall be subject to Wildlife Agencies' review and approval~~.

d. Conserve at least ~~1,403~~1,865 acres of Core Habitat for the Palm Springs pocket mouse in the Desert Hot Springs portion of the area ~~(including at least 1,324 acres in the Special Provisions Area)~~, at least 22 acres of Other Conserved Habitat for the Palm Springs pocket mouse in the Palm Springs portion of the area and at least ~~1,363~~1,112 acres of Core Habitat in the Riverside County portion ~~(including at least 203 acres in the Special Provisions Area)~~. Maintain potential Habitat connectivity between Core Habitat in the Upper Mission Creek/Big Morongo Canyon Conservation Area and the Willow Hole Conservation Area. Minimize fragmentation and human-disturbance of, and edge effects to, the Habitat connectivity area along Morongo Wash from any Development allowed within the Conservation Area. ~~If, through means not under the control of the Permittees, this Conservation Objective cannot be achieved, for every acre less than 1,403 acres conserved in the Desert Hot Springs portion of the area, and for every acre less than 1,363 acres conserved in the Riverside County portion of the area, then 2 acres of suitable habitat shall be conserved adjacent to or within this Conservation Area or in the Willow Hole or Snow Creek/Windy Point Conservation Areas. These acquisitions shall occur incrementally with disturbance, so as to occur within 2 years of whenever the acres~~

~~not conserved shown in Table 4-42a or acres of disturbance authorized in Table 4-42c are exceeded, at the same 2:1 ratio. These substitute acquisitions within Conservation Areas pursuant to the requirements above would be beyond the minimum Conservation Objectives identified in the Plan. Conservation within or adjacent to the Snow Creek/Windy Point Conservation Area shall make up no more than 40 percent of the offsetting acreage. Proposed acquisitions shall be subject to Wildlife Agencies' review and approval.~~

e. Conserve at least 14~~6~~ acres of the sand source areas in the Desert Hot Springs portion of the area and at least 6,488 acres in the Riverside County portion subject to natural erosion processes.

f. Conserve at least 1,949~~1,399~~ acres of the fluvial sand transport areas in the Desert Hot Springs portion of the area ~~(including at least 1,319 acres in the Special Provisions Area)~~, at least 22 acres in the Palm Springs portion, and at least 1,259 ~~1,509~~ acres in the Riverside County portion. Maintain the current capacity for fluvial sand transport in Mission Creek and Morongo Wash.

3. Conserve at least 1,931~~1,409~~ acres of Other Conserved Habitat for Le Conte's thrasher in the Desert Hot Springs portion of the area ~~(including at least 1,326 acres in the Special Provisions Area)~~, at least 22 acres in the Palm Springs portion, and at least 1,072~~1,323~~ ~~072~~ acres in the Riverside County portion of the area ~~(including at least 203 acres in the Special Provisions Area)~~. Conserve Le Conte's thrasher nesting sites as described in Section 4.4 for avoidance, minimization, and mitigation measures. ~~If, through means not under the control of the Permittees, this Conservation Objective cannot be achieved, for every acre less than 1,409 acres conserved in the Desert Hot Springs portion of the area, and for every acre less than 1,323 acres conserved in the Riverside County portion of the area, 2 acres of suitable habitat shall be conserved adjacent to or within this Conservation Area or within other appropriate Conservation Areas described in Table 9-23 of the Plan. These acquisitions shall occur incrementally with disturbance, so as to occur within 2 years of whenever the acres not conserved shown in Table 4-42a or acres of disturbance authorized in Table 4-42c are exceeded, at the same 2:1 ratio. These substitute acquisitions within Conservation Areas pursuant to the requirements above would be beyond the minimum Conservation Objectives identified in the Plan. Proposed acquisitions shall be subject to Wildlife Agencies' review and approval.~~

4. Conserve at least 90~~49~~ acres of Coachella Valley Jerusalem cricket Habitat in the Desert Hot Springs portion of the area, and at least 419~~460~~ acres of Coachella Valley Jerusalem cricket Habitat in the Riverside County portion of the area ~~(including at least 41 acres in the Special Provisions Area)~~.

5. Conserve occupied burrowing owl burrows as described in Section 4.4 for burrowing owl avoidance, minimization, and mitigation measures.

6. Conserve at least 76 acres of Sonoran cottonwood-willow riparian forest and at least 58~~52~~ acres of Southern sycamore-alder riparian woodland in the Riverside County portion of the area; and at least 76~~58~~ acres of desert dry wash woodland natural communities in the Desert Hot Springs portion ~~(including at least 57 acres in the Special Provisions Area)~~, and at least 76 acres in the Riverside County portion, which provide Habitat for riparian birds and other Covered Species. For the remaining acreage of these

conserved natural communities where disturbance is authorized by the Plan, ensure no net loss. ~~If, through means not under the control of the Permittees, this Conservation Objective cannot be achieved, for every acre less than 58 acres conserved in the Desert Hot Springs portion of the area, and for every acre less than 76 acres in the Riverside County portion of the area, 2 acres of suitable habitat shall be conserved adjacent to or within this Conservation Area or within other appropriate Conservation Areas described in Table 10-26 of the Plan. These acquisitions shall occur incrementally with disturbance, so as to occur within 2 years of whenever the acres not conserved shown in Table 4-42a or the acres of disturbance authorized in Table 4-42c are exceeded, at the same 2:1 ratio. These substitute acquisitions within Conservation Areas pursuant to the requirements above would be beyond the minimum Conservation Objectives identified in the Plan. Proposed acquisitions shall be subject to Wildlife Agencies' review and approval.~~

7. Maintain the two bridges on Highway 62 over Mission Creek so as not to affect the existing sediment transport and Biological Corridor. Maintain functional Biological Corridors under Highway 62 by conserving at least ~~66~~88 acres in the Desert Hot Springs portion and at least 688~~715~~ acres in the Riverside County portion to maintain potential Habitat connectivity for desert tortoise and Palm Springs pocket mouse, and to maintain ecosystem function for Covered Species. Aside from the highway bridges and any Existing Use areas, which are unavoidably narrow segments, the Biological Corridor shall expand to one mile wide to minimize edge effects.

8. Maintain the fluvial sand transport along the existing Mission Creek Channel.

Ownership and General Plan Land Use Designations. Table 4-40 shows the public versus private ownership of land within this Conservation Area.

As seen in Table 4-40, approximately 60% of the land in this Conservation Area is currently in public or nonprofit conservation organization ownership. Current Conservation ranges from Level 1 to Level 3. Conservation management will be improved where needed through management prescriptions to be adopted by the relevant agency as Feasible.

As seen in Table 4-41, the Conservation Area is partially under the jurisdiction of Riverside County and partially under the jurisdiction of the cities of Desert Hot Springs ~~(which is not a Permittee)~~ and Palm Springs. The general plan designations that restrict land use to 1 unit per 10 acres or to even more restrictive uses apply to approximately 74% of the private non-conservation land in the Conservation Area.

Table 4-40: Land Ownership Upper Mission Creek/ Big Morongo Canyon Conservation Area[1]
(rounded to the nearest 10 acres)

Ownership[2]	***Acres***
Existing Conservation Lands:	*17,710*
BLM	17,530
County Parks	180
Lands Not Currently Conserved:	*11,730*
County Flood Control	190

Private	10,490
Public, Quasi-public entities	1,050
TOTAL	**29,440**

[1] Based on 1996 pre-Planning Agreement land ownership information.
[2] ~~Acreages for the Morongo Wash Special Provisions Area are included in this table.~~

Table 4-41: General Plan Land Use Designations[1] (Non-conserved lands only) Upper Mission Creek/ Big Morongo Canyon Conservation Area

General Plan Designation (Map symbol) - Riverside County	***% of Private Non-conserved Land in Conservation Area***	***Building Intensity Range***
Open Space Rural (OS-RUR)	69%	1 unit per 20 acres
Open Space Water (OS-W)	6%	Bodies of water, floodplains, and natural or artificial drainage corridors
Rural Desert (RD)	20%	1 unit per 10 acres
Rural Mountainous (RM)	1%	1 unit per 10 acres
Rural Residential (RR)	4%	1 unit per 5 acres
Commercial Retail[2] (CR)	---	Retail and service uses
TOTAL	**100%**	
General Plan Designation (Map symbol) - City of Desert Hot Springs	***% of Private Non-conserved Land in Conservation Area***	***Building Intensity Range***
Open Space Flood Ways (OS/FW)	6%	Floodways
Open Space Parks (OS/PP)	6%	Public parks
Open Space Mountain Reserve (OS/MR)	28%	1 unit per 10 acres
Residential Estates – 10 (R-E)	7%	1 unit per 10 acres
Energy-related Industrial (I-E)	5%	Energy producing facilities
Medium Density Residential (R-M)	7%	0 - 8 units per acre
Low density residential (R-L)	7%	0 – 5 units per acre
Low Density Residential, Specific Plan required (R-L/SP)	34%	0 – 5 units per acre
TOTAL	**100%**	
Watercourse (W)	67%	Flood control or drainage facilities
Energy/Industrial (I)	33%	Various business & industrial uses
Freeway[2]	--	
TOTAL	**100%**	

[1] Based on 2003 general plan designations and 2003 parcel data.
[2] Statistically insignificant (less than 1%).

Figure 4-12e shows the Existing Conservation Lands and general plan land use designations on Level 4 lands for the area. ~~Figure 4-12f shows the Morongo Wash Special Provisions Area within the Conservation Area.~~

Required Measures for the Conservation Area. Tables 4-42a, 4-42b, and 4-42c show how many acres of Existing Conservation Lands are in this Conservation Area and how many acres of Additional Conservation Lands will need to be conserved through acquisition or other means for each jurisdiction. ~~Tables 4-42d and 4-42e show how many acres will need to be conserved within the Morongo Wash Special Provisions Area. These Special Provisions Area acreages are included in Tables 4-42a and 4-42c.~~ The following measures will be imposed to achieve the Conservation Objectives in this Conservation Area.

1. For the widening of Mission Lakes Boulevard, Indian Avenue, Pierson Boulevard, Hacienda Avenue, Two Bunch Palms Road, and Cholla Drive to four or more lanes in the Conservation Area, the appropriate Local Permittee will ensure that the fluvial sand transport capacity of Mission Creek and Morongo Wash are maintained and that adequately sized culverts or wildlife undercrossings are provided for desert tortoise and Palm Springs pocket mouse in their respective Habitats. Widening projects will undergo the Joint Project Review Process set forth in Section 6.6.1.1 to determine the dimensions of the culverts or undercrossings based on site specific conditions and best available science.

2. Any improvements to Highway 62 by Caltrans will not reduce the size, openness, and existing natural character of the bridges over Mission Creek so as not to impede fluvial sand transport and wildlife movement.

3. For proposed Development in Little San Bernardino Mountains linanthus modeled Habitat, Development in Essential Ecological Process fluvial sand transport areas shall not obstruct natural watercourses, and the rate of flow and sediment transport shall not be impeded.

4. The Permittees shall comply with applicable avoidance, minimization, and mitigation measures described in Section 4.4 and the Land Use Adjacency Guidelines as described in Section 4.5.

5. ~~A Special Provisions Area~~The Morongo Wash Flood Control Corridor within the Upper Mission Creek/Big Morongo Canyon Conservation Area (depicted on Figure 4-12a~~f~~) shall be subject to the following requirements:

a. Loss of functional connectivity for Palm Springs pocket mouse between Core Habitat in this Conservation Area and the Willow Hole Conservation Area shall be defined by a cumulative narrowing of Palm Springs pocket mouse habitat (defined below) to less than 600 feet wide for a length along Big Morongo Wash/Morongo Wash (Indian Avenue to Varner Avenue) of more than 2,000 feet, or any single narrowing or constriction of Palm Springs pocket mouse habitat to less than 300 feet wide for a length along Morongo Wash of more than 200 feet. ~~The loss of this connectivity function would be offset through acquisition of an additional 1,400 acres of high function habitat for Palm Springs pocket mouse (beyond that required elsewhere herein) within or adjacent to the Willow Hole, Upper Mission Creek/Big Morongo Canyon, Long Canyon, and/or Snow Creek/Windy Point Conservation Areas. This acquisition shall occur within 5 years of functional loss of connectivity, as defined. Acquisitions within Conservation Areas shall be beyond the minimum Conservation Objectives (e.g., conservation acres to be acquired) of the Plan. Mitigation pursuant to the requirements above within/adjacent to the Snow Creek/Windy Point Conservation Area shall make up no more than 40 percent~~

~~of the necessary offsetting acreage. Acquisitions shall be subject to Wildlife Agencies' review and approval.~~

b. ~~The Special Provisions Area will include a minimum 1,200-foot suitable habitat corridor, plus 300 acres of refugia outside the suitable habitat corridor, configured to be equivalent to about 25 acres of refugia every 0.25 mile. No individual refugium shall be less than 15 acres nor shall any refugia be more than 0.5 mile apart.~~

~~c.~~ Section 7.3.1 lists further requirements of a proposed Morongo Wash flood control facility within the ~~Special Provisions Area~~Morongo Wash Flood Control Corridor.

Table 4-42a: Conservation and Take Authorization for Upper Mission Creek/Big Morongo Canyon Conservation Area – City of Desert Hot Springs Area ~~(No Covered Activities)~~

(All acreages are based on 1996 pre-Planning Agreement information.)

Conservation Objective	*Total Acres in Conservation Area*[1]	*Existing Conservation Lands*	*Acres of Disturbance Authorized~~Acres Not Conserved~~*[2]	*~~Total~~ Remaining Acres to be Conserved*
Conserve Core Habitat for Little San Bernardino Mtns. linanthus	1,073~~1,020~~	0	~~53~~107	~~967~~966
Conserve Other Cons. Habitat for CV Jerusalem cricket	~~49~~100	0	~~0~~10	~~49~~90
Conserve Core Habitat for desert tortoise	~~3,554~~4,378	1,855	~~270~~252	~~1,429~~2,271
Conserve Other Cons. Habitat for Le Conte's thrasher	~~1,832~~2,281	135	~~288~~215	~~1,409~~1,931
Conserve Core Habitat for Palm Springs pocket mouse	~~1,748~~2,147	75	~~270~~207	~~1,403~~1,865
Conserve desert dry wash woodland	~~135~~155	71	~~6~~8	~~58~~76
Conserve sand source Areas	~~343~~494	337	~~0~~16	~~6~~141
Conserve fluvial sand transport areas	~~1,869~~2,350	184	~~286~~217	~~1,399~~1,949
Conserve Hwy 62 Biological Corridor	~~73~~98	0	~~7~~10	~~66~~88

~~[1]Acreages for the Morongo Wash Special Provisions Area are included in this table. See Table 4-42d for the total and conservation acreages for the Desert Hot Springs portion of the Special Provisions Area.~~
~~[2]The City of Desert Hot Springs has no Covered Activities because it is not a Permittee to the Plan.~~

Table 4-42b: Conservation and Take Authorization for Upper Mission Creek/Big Morongo Canyon Conservation Area – City of Palm Springs Area

(All acreages are based on 1996 pre-Planning Agreement information.)

Conservation Objective	***Total Acres in Conservation Area***	***Existing Conservation Lands***	***Acres of Disturbance Authorized***	***Remaining Acres to be Conserved***
Conserve Other Cons. Habitat for Le Conte's thrasher	24	0	2	22
Conserve Other Cons. Habitat for Palm Springs pocket mouse	24	0	2	22
Conserve fluvial sand transport	24	0	2	22

Table 4-42c: Conservation and Take Authorization for Upper Mission Creek/Big Morongo Canyon Conservation Area – Riverside County Area

(All acreages are based on 1996 pre-Planning Agreement information.)

Conservation Objective	***Total Acres in Conservation Area[2]***	***Existing Conservation Lands***	***Acres of Disturbance Authorized***	***Remaining Acres to be Conserved***
Conserve Core Habitat for Little San Bernardino Mtns. Linanthus	~~1,390~~1,337	168	~~122~~117	~~1,100~~1,052
Conserve Core Habitat for triple-ribbed milkvetch	819	346	47	426
Conserve Other Cons. Habitat for CV Jerusalem cricket	~~666~~620	154	~~52~~47	~~460~~419
Conserve Core Habitat for desert tortoise	~~24,122~~24,069	15,251	~~887~~882	~~7,984~~7,936
Conserve Other Cons. Habitat for Le Conte's thrasher	~~1,871~~1,593	402	~~146~~119	~~1,323~~1,072
Conserve Core Habitat for Palm Springs pocket mouse	~~1,937~~1,659	423	~~151~~124	~~1,363~~1,112
Conserve Sonoran cottonwood-willow riparian forest	100	16	(8)[1]	76
Conserve southern sycamore-alder riparian woodland	104	46	6[1]	52

Conservation Objective	*Total Acres in Conservation Area*[2]	*Existing Conservation Lands*	*Acres of Disturbance Authorized*	*Remaining Acres to be Conserved*
Conserve desert dry wash woodland	125	41	8	76
Conserve sand source areas	19,789	12,580	721	6,488
Conserve fluvial sand transport areas	~~2,279~~2,001	602	~~168~~140	~~1,509~~1,259
Conserve Hwy. 62 Biological Corridor	~~907~~877	113	~~79~~76	~~715~~688

[1] Disturbance of no more than eight acres may occur, but it would be replaced to ensure that the no net loss occurs and the Conservation Objective is achieved.

~~[2] Acreages for the Morongo Wash Special Provisions Area are included in this table. See Table 4-42e for the total and conservation acreages for the Riverside County portion of the Special Provisions Area.~~

~~*Table 4-42d: Species Habitat – Morongo Wash Special Provisions Area – City of Desert Hot Springs Area*~~

~~*Species*~~	~~*Total Acres in Special Provisions Area*~~	~~*Existing Conserv-ation Lands*~~	~~*Acres Not Conserved*[1]~~	~~*Total Acres to be Conserved*~~	~~*Habitat Designation*~~
~~Little San Bernardino Mtns. linanthus~~	~~944~~	~~0~~	~~53~~	~~891~~	~~Core~~
~~CV Jerusalem cricket~~	~~49~~	~~0~~	~~0~~	~~49~~	~~Other Cons. Habitat~~
~~Desert tortoise~~	~~1,594~~	~~0~~	~~270~~	~~1,324~~	~~Core~~
~~Le Conte's thrasher~~	~~1,614~~	~~0~~	~~288~~	~~1,326~~	~~Other Cons. Habitat~~
~~Palm Springs pocket mouse~~	~~1,594~~	~~0~~	~~270~~	~~1,324~~	~~Core Habitat~~
~~Desert dry wash woodland~~	~~63~~	~~0~~	~~6~~	~~57~~	~~N/A~~
~~Sand transport area~~	~~1,605~~	~~0~~	~~286~~	~~1,319~~	~~N/A~~
~~Highway 62 biological corridor~~	~~73~~	~~0~~	~~7~~	~~66~~	~~N/A~~

~~[1] The City of Desert Hot Springs has no Covered Activities because it is not a Permittee to the Plan.~~

~~Table 4-42e: Species Habitat – Morongo Wash Special Provisions Area – Riverside County Area~~

~~Species~~	~~Acres in Special Provisions Area~~	~~Existing Conserv-ation Lands~~	~~Acres of Disturbance Authorized~~	~~Remaining Acres to be Conserved~~	~~Habitat Designation~~
~~Little San Bernardino Mtns. linanthus~~	~~72~~	~~0~~	~~7~~	~~65~~	~~Core~~
~~CV Jerusalem cricket~~	~~46~~	~~0~~	~~5~~	~~41~~	~~Other Cons. Habitat~~
~~Desert tortoise~~	~~213~~	~~0~~	~~21~~	~~192~~	~~Core~~
~~Le Conte's thrasher~~	~~225~~	~~0~~	~~22~~	~~203~~	~~Other Cons. Habitat~~
~~Palm Springs pocket mouse~~	~~225~~	~~0~~	~~22~~	~~203~~	~~Core Habitat~~

4.3.8 Willow Hole Conservation Area

Location and Description. The Willow Hole Conservation Area includes the portions of the Mission Creek flood control channel and Morongo Wash~~ south of the City of Desert Hot Springs~~; the Mission Creek and Morongo Wash sand depositional areas and aeolian sand transport areas, generally from Mission Creek on the west to Flattop Mountain on the east; and blowsand Habitat areas along the San Andreas Fault and at Stebbins' Dune south of Varner and west of Date Palm. The Conservation Area also includes the existing Willow Hole Preserve. This Conservation Area is depicted in Figure 4-13a. This area is bounded in part on the north by the Upper Mission Creek/Big Morongo Canyon Conservation Area and the Long Canyon Conservation Area. It is bounded on the east by the Edom Hill Conservation Area. To the south it is connected by culverts under I-10 to the Whitewater Floodplain Conservation Area. The Willow Hole Conservation Area contains a total of approximately 5,600 acres.

Core Habitat. This Conservation Area contains Core Habitat for the Coachella Valley milkvetch, Coachella Valley fringe-toed lizard, the Coachella Valley round-tailed ground squirrel, and Palm Springs pocket mouse. For the fringe-toed lizard, the long-term viability of the population in this area requires a movement corridor between the Willow Hole area north of Varner Road and the Stebbins' dune area south of Varner Road. This Core Habitat area is a climatically moderate area between the wetter, cooler western portion of the Plan Area and the hotter, drier central and eastern portions. Figure 4-13b depicts the Core Habitat, selected Other Conserved Habitat, and recorded burrowing owl locations.

Other Conserved Habitat. This Conservation Area contains suitable migration and breeding Habitat for the riparian species covered by the Plan. Given the scarcity of riparian Habitat in the desert, all riparian Habitat is considered important for these species and is likely to contribute to the Conservation of these species in their respective ranges. This area provides some Other Conserved Habitat for Coachella Valley milkvetch, desert tortoise, Coachella Valley fringe-toed lizard, Coachella Valley giant sand-treader cricket, Coachella Valley Jerusalem cricket, flat-tailed horned lizard, crissal thrasher, Le Conte's thrasher, Coachella Valley round-tailed ground squirrel, Palm Springs pocket mouse, and southern yellow bat. There are four known location records for burrowing owl. There is also some Other Conserved Habitat for the Little San Bernardino Mountains linanthus. Table 4-43 shows the Covered Species occurring in this area.

Table 4-43: Species Habitat - Willow Hole Conservation Area
(All acreages are based on 1996 pre-Planning Agreement information.)

Species	*Total Acres of Habitat in the Conservation Area*	*Existing Conservation Lands*	*Acres of Habitat Not Currently Conserved*	*Habitat Designation*	*Acres of Core Habitat*
CV milkvetch	3,166 / 168	351 / 37	2,815 / 131	Core / Other Cons. Habitat	3,166
Little San Bernardino Mtns. Linanthus	200	3	197	Other Cons. Habitat	0
CV giant sand-treader cricket	1,754	157	1,597	Other Cons. Habitat	0
CV Jerusalem cricket	2,632	245	2,387	Other Cons. Habitat	0
Desert tortoise	36	0	36	Other Cons. Habitat	0
CV fringe-toed lizard	897 / 857	157 / 0	740 / 857	Core / Other Cons. Habitat	897
Flat-tailed horned lizard	880 / 842	126 / 5	754 / 837	Pred. / Pot. [1] Other Cons. Habitat	0
Crissal thrasher	294	16	278	Other Cons. Habitat	0
Le Conte's thrasher	5,396	749	4,647	Other Cons. Habitat	0
Least Bell's vireo	126 / 169	17 / 0	109 / 169	Breeding / Migratory	N/A
SW willow flycatcher	1 / 294	1 / 16	0 / 278	Breeding / Migratory	N/A
Summer tanager	1 / 294	1 / 16	0 / 278	Breeding / Migratory	N/A
Yellow-breasted chat	1 / 294	1 / 16	0 / 278	Breeding / Migratory	N/A
Yellow warbler	1 / 294	1 / 16	0 / 278	Breeding / Migratory	N/A

Species	*Total Acres of Habitat in the Conservation Area*	*Existing Conservation Lands*	*Acres of Habitat Not Currently Conserved*	*Habitat Designation*	*Acres of Core Habitat*
CV round-tailed ground squirrel	3,146 / 1,518	551 / 11	2,595 / 1,507	Core / Other Cons. Habitat	3,146
Palm Springs pocket mouse	4,610 / 217	564 / 13	4,046 / 204	Core / Other Cons. Habitat	4,610
Southern yellow bat	20	1	19	Other Cons. Habitat	0

[1] The species distribution model for the flat-tailed horned lizard includes predicted ("pred.") Habitat and also potential (Pot.) Habitat. Predicted Habitat includes areas where presence of this species is known or expected based on recent observations. Potential Habitat includes areas where there are historical observations of this species but no recent observations are recorded. See Section 9.6.3.3 for additional information.

Natural Communities. Table 4-44 shows the conserved natural communities occurring in this Conservation Area: stabilized and partially stabilized desert dunes, active desert sand fields, ephemeral desert sand fields, stabilized and partially stabilized desert sand fields, mesquite hummocks, Sonoran creosote bush scrub, Sonoran mixed woody and succulent scrub, desert saltbush scrub, and desert fan palm oasis woodland. For stabilized and partially stabilized desert dunes, this area contains 93% of the occurrence of this natural community in the Plan Area. This area also protects the largest concentration of mesquite hummocks in the Plan Area. Figure 4-13c depicts the conserved natural communities.

Table 4-44: Conserved[1] Natural Communities - Willow Hole Conservation Area
(All acreages are based on 1996 pre-Planning Agreement information.)

Natural Community	*Total Acres in the Conservation Area*	*Existing Conservation Lands*	*Acres Not Currently Conserved*
Stabilized & partially stabilized desert dunes	383	29	354
Active desert sand fields	37	0	37
Ephemeral desert sand fields	1,133	126	1,007
Stabilized & partially stabilized desert sand fields	201	2	199
Mesquite hummocks	125	16	109
Sonoran creosote bush scrub	24	0	24
Sonoran mixed woody & succulent scrub	3,327	575	2,752
Desert saltbush scrub	169	0	169
Desert fan palm oasis woodland	1	1	0

[1] Only natural communities to be conserved under the Plan are shown. Natural communities that are not included as described in Section 3.2.2 are not shown.

Essential Ecological Processes. The report, *-Long-term Sand Supply to Coachella Valley Fringe-toed Lizard (Uma inornata) Habitat in the Northern Coachella Valley, California* (United States Geological Survey, 2002) indicates that the primary sand flow into the Willow Hole and Stebbins' Dune blowsand Habitat areas comes from Mission Creek and Morongo Wash. Additional sand transport into the existing Willow Hole Preserve comes from Long Canyon to the north and an unnamed wash emanating from the Indio Hills to the northeast of Willow Hole. Although sand flow from these sources appears rare, maintaining the process corridor to allow for that sand flow is a critical design feature. During large-scale sand movement events (last known to have occurred in the late 1930s), a substantially greater areal extent and connectivity of aeolian sand Habitat can occur across this Conservation Area. An additional sand flow source, at least historically, was the Whitewater River. This source has been essentially blocked by I-10, the railroad, and the trees planted along these transportation corridors to prevent aeolian sand movement. Groundwater level north of the fault dunes plays an important role in maintaining the mesquite hummocks natural community in this Conservation Area. Figure 4-13d depicts the Essential Ecological Process areas.

Biological Corridors and Linkages. Five 36" culverts under Palm Drive provide a Biological Corridor for Coachella Valley fringe-toed lizard, Coachella Valley round-tailed ground squirrel, and Palm Springs pocket mouse. Future road widening of Mountain View Road and Varner Road could create a barrier to movement of these species absent adequately sized culverts or undercrossings. The Plan seeks to maintain a Linkage between this area and the Thousand Palms Conservation Area, through the Edom Hill Conservation Area; the Upper Mission Creek/Big Morongo Canyon Conservation Area for the Palm Springs pocket mouse; and the Whitewater Floodplain Conservation Area via the Mission Creek culvert under I-10, and the culvert where Willow Wash crosses under I-10. See Section 4.5.5 in Appendix I for details about these culverts. The area east of Morongo Wash, typically along the sandy eastern bank, provides Habitat connectivity for the Palm Springs pocket mouse between the Upper Mission Creek/Big Morongo Canyon Conservation Area and the Willow Hole Conservation Area. For the Morongo Wash area to function as a Biological Corridor between two Core Habitat areas for the Palm Springs pocket mouse, continuous Habitat must exist along the corridor so that, over time, genetic material will be transmitted between the two Core Habitat populations through the resident population in the Habitat connectivity area. It is assumed that Dillon Road and Pierson Avenue and Two Bunch Palms Road (in the Upper Mission Creek/Big Morongo Canyon Conservation Area) do not currently constitute complete barriers to movement of pocket mice, although some mortality may occur when individuals attempt to cross the roads. It is also assumed that existing edge effects, including predation from domestic pets or feral animals, and Habitat degradation from OHV trespass, dumping, introduction of exotic plants, etc., are not sufficient to fragment the corridor. Additional edge effects in the future must be anticipated as Development continues in the area outside the Conservation Area. Figure 4-13d depicts the Biological Corridors and Linkages.

Conservation Objectives. The Conservation Objectives for this Conservation Area are:

1. In total, 4,920 acres of the Willow Hole Conservation Area shall be conserved. (This may be less than the sum of acres indicated in the following objectives because there can be overlap among areas covered by the objectives. For example, Core Habitat for two or

more species may overlap, or Core Habitat and an Essential Ecological Process area may overlap. The individual acreage figures will be used in compliance monitoring.)

2. Conserve Core Habitat and associated ecological processes (as set forth below) for Coachella Valley milkvetch, Coachella Valley fringe-toed lizard, Coachella Valley round-tailed ground squirrel, and Palm Springs pocket mouse, allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused disturbance, and edge effects to Core Habitat by conserving contiguous Habitat patches and effective Linkages between patches of Core Habitat.

   a. Conserve at least 782 acres of Core Habitat for the Coachella Valley milkvetch in the Cathedral City portion of the area, at least 863 acres in the Desert Hot Springs portion of the area, and at least 1,751 acres in the Riverside County portion.

   b. Conserve at least 211 acres of Core Habitat for the Coachella Valley fringe-toed lizard in the Cathedral City portion of the area, at least 3 acres in the Desert Hot Springs portion of the area, and at least 452~~454~~ acres in the Riverside County portion.

   c. Conserve at least 1,256 acres of Core Habitat for the Coachella Valley round-tailed ground squirrel in the Cathedral City portion of the area, at least 3 acres in the Desert Hot Springs portion of the area, and at least 1,078~~1,081~~ acres in the Riverside County portion.

   d. Conserve at least 959 acres of Core Habitat for the Palm Springs pocket mouse in the Cathedral City portion of the area, at least 1,542 acres in the Desert Hot Springs portion of the area, and at least 1,142~~2,684~~ acres in the Riverside County portion of the area. Maintain potential Habitat connectivity between Core Habitat in the Willow Hole Conservation Area and Upper Mission Creek/Big Morongo Canyon Conservation Area. Minimize fragmentation and human-disturbance of, and edge effects to, the Habitat connectivity area along Morongo Wash from any Development allowed within the Conservation Area.

   e. Conserve at least 710 acres of the sand source area in the Cathedral City portion of the area and at least 17 acres in the Riverside County portion to maintain the natural erosion processes that provide sediment for the blowsand ecosystem.

3. Conserve at least 798 acres in the fluvial (water-borne) and aeolian (air-borne) sand transport area in the Cathedral City portion of the area, at least 1,542 acres in the Desert Hot Springs portion of the area, and at least 1,192~~2,734~~ acres in the Riverside County portion. Maintain the current capacity for fluvial sand transport in Mission Creek and Morongo Wash for sand transport to the Willow Hole/Edom Hill Reserve.

4. Conserve at least 1,505~~1,508~~ acres of Other Conserved Habitat for Le Conte's thrasher in the Cathedral City portion of the area, at least 1,499 acres in the Desert Hot Springs portion of the area, and at least 1,178~~2,677~~ acres in the Riverside County portion. Conserve Le Conte's thrasher nesting sites as described in See Section 4.4 avoidance, minimization, and mitigation measures.

5. Conserve at least 71~~98~~ acres of mesquite hummocks natural community in the Riverside County portion of the area, and at least 27 acres in the Desert Hot Springs portion of the area, which provides Habitat for riparian birds and other Covered Species.

6. Conserve at least 194~~319~~ acres of stabilized & partially stabilized desert dunes in the Riverside County portion and at least 125 acres in the Desert Hot Springs portion; at least 33 acres of active desert sand fields in the Cathedral City portion of the area; at least 178 acres of ephemeral desert sand fields in the Cathedral City portion of the area, at least 549 acres in the Desert Hot Springs portion, and at least 179~~728~~ acres in the Riverside County portion; at least 51 acres of stabilized and partially stabilized desert sand fields in the Cathedral City portion of the area, at least 49 acres in the Desert Hot Springs portion, and at least 79~~128~~ acres in the Riverside County portion; and at least 152 acres of desert saltbush scrub in the Riverside County portion of the area to conserve these natural communities.

7. Maintain functional Biological Corridors between this area and the Whitewater Floodplain Conservation Area by maintaining the culverts conveying Mission Creek and Willow Wash under I-10 at no less than their current size and character. Maintain functional Biological Corridors under I-10 by conserving at least 120~~397~~ acres in the Riverside County portion and at least 277 acres in the Desert Hot Springs portion ~~total~~, such that the functionality of each individual Biological Corridor listed below is not compromised:

   a. Conserve the Mission Creek Biological Corridor north of the freeway to maintain potential Habitat connectivity for Coachella Valley round-tailed ground squirrel, and Palm Springs pocket mouse, and to maintain ecosystem function for Covered Species. Aside from the freeway culvert and any Existing Use areas, which are unavoidably narrow segments, the Biological Corridor shall expand to one mile wide to minimize edge effects.

   b. Conserve the Willow Wash area north of the freeway in the City of Desert Hot Springs ~~unincorporated county portion~~ to maintain potential Habitat connectivity for Coachella Valley round-tailed ground squirrel, and Palm Springs pocket mouse, and to maintain ecosystem function for Covered Species. Aside from the freeway culverts and any Existing Use areas, which are unavoidably narrow segments, the Biological Corridor shall expand to one mile wide to minimize edge effects.

8. Maintain the ability of wildlife to cross Mountain View Road, Varner Road, 18th Avenue, and Dillon Road by providing culverts or undercrossings for Coachella Valley fringe-toed lizard, Coachella Valley giant sand-treader cricket, Coachella Valley round-tailed ground squirrel, Palm Springs pocket mouse, and other species if these roads are widened beyond two lanes.

9. Maintain the fluvial sand transport along the existing Mission Creek Channel.

10. Conserve occupied burrowing owl burrows as described in Section 4.4 for burrowing owl avoidance, minimization, and mitigation measures.

Ownership and General Plan Land Use Designations. Table 4-45 shows the public versus private ownership of lands within this Conservation Area.

Table 4-45: Land Ownership Willow Hole Conservation Area
(rounded to nearest 10 acres)

Ownership[1]	*Acres*
Existing Conservation Lands:	*750*
BLM	590
CVMC	160
Lands Not Currently Conserved:	*4,850*
County	10
County Flood Control	90
CVWD	10
Private	4,520
Public, Quasi-public entities	220
TOTAL	**5,600**

[1] Based on 1996 pre-Planning Agreement land ownership information

As seen in Table 4-45, 13% of the land in this Conservation Area is currently in public or nonprofit conservation organization ownership. Current Conservation ranges from Conservation Level 1 to Level 3. Conservation management will be improved where needed through management prescriptions to be adopted by the relevant agency as Feasible.

Table 4-46: General Plan Land Use Designations[1]
(Non-conserved lands only)
Willow Hole Conservation Area

General Plan Designation (Map symbol) - Riverside County	*% of Private Non-conserved Land in Conservation Area*	*Building Intensity Range*
Open Space Water (OS-W)	14%	Bodies of water, floodplains, and natural or artificial drainage corridors
Rural Desert (RD)	68%	1 unit per 10 acres
Rural Residential (RR)	15%	1 unit per 5 acres
Light Industrial (LI)	3%	Industrial and related uses
TOTAL	**100%**	
General Plan Designation (Map symbol) - City of Cathedral City	*% of Private Non-conserved Land in Conservation Area*	*Building Intensity Range*
Open Space Water (OS-W)	8%	Floodways and drainage channels
Open Space – Other (OS-O)	8%	Special resource or hazard areas
Hillside Reserve (HR)	31%	1 unit per 20 acres
Parks and Public Open Space (OS–P)	31%	Public parks and open space lands with important natural resources
Estate Residential (RE)-	21%	0 – 2 units per acre
Industrial (I)	1%	Industrial uses
TOTAL	**100%**	

[1]—Based on 2003 general plan designations and 2003 parcel data. Desert Hot Springs has annexed a portion of this Conservation Area but has retained the Riverside County general plan designations.

As seen in Table 4-46, the Conservation Area is partially under the jurisdiction of the City of Cathedral City, partially under the City of Desert Hot Springs, and partially under Riverside County. Portions of the area are within the 100-year floodplain of Mission Creek, Morongo Wash, or Long Canyon.

Figure 4-13e shows the Existing Conservation Lands and general plan land use designations on Level 4 lands for the area.

Required Measures for the Conservation Areas. Tables 4-47a and 4-47b show how many acres of Existing Conservation Lands are in this Conservation Area and how many acres of Additional Conservation Lands will need to be conserved through acquisition or other means. The following measures will be imposed to achieve the Conservation Objectives in this Conservation Area.

1. At such time as those portions of Little Morongo Road, Mountain View Road, Dillon Road, 18th Avenue, and Varner Road within the Conservation Area are widened to four or more lanes, the appropriate Local Permittee for the project will ensure that culverts or undercrossings of adequate size and design to maintain ecosystem function for Covered Species are constructed under the road. Widening projects will undergo the Joint Project Review Process set forth in Section 6.6.1.1 to determine the dimensions of the culverts or undercrossings based on site specific conditions and best available science.

Figure 4-13g Special Provisions Area

Table 4-47a: Conservation and Take Authorization for Willow Hole Conservation Area – City of Cathedral City Area

(All acreages are based on 1996 pre-Planning Agreement information.)

Conservation Objective	***Total Acres in Conservation Area***	***Existing Conservation Lands***	***Acres of Disturbance Authorized***	***Remaining Acres to be Conserved***
Conserve Core Habitat for CV milkvetch	938	69	87	782
Conserve Core Habitat for CV fringe-toed lizard	264	29	24	211
Conserve Other Cons. Habitat for Le Conte's thrasher	1,799	123	168	1,508
Conserve Core Habitat for CV round-tailed ground squirrel	1,485	89	140	1,256
Conserve Core Habitat for Palm Springs pocket mouse	1,147	81	107	959
Conserve active desert sand fields	37	0	4	33
Conserve ephemeral desert sand fields	227	29	20	178

Table 4-47a (cont.)

Conservation Objective	*Total Acres in Conservation Area*	*Existing Conservation Lands*	*Acres of Disturbance Authorized*	*Remaining Acres to be Conserved*
Conserve stabilized & partially stabilized desert dunes	1	0	0	1
Conserve stabilized & partially stabilized desert sand fields	57	0	6	51
Conserve sand source areas	833	44	79	710
Conserve fluvial & aeolian sand transport areas	966	79	89	798

Table 4-47b: Conservation and Take Authorization for Willow Hole Conservation Area – Riverside County Area

(All acreages are based on 1996 pre-Planning Agreement information.)

Conservation Objective	*Total Acres in Conservation Area*	*Existing Conservation Lands*	*Acres of Disturbance Authorized*[1]	*Remaining Acres to be Conserved*
Conserve Core Habitat for CV milkvetch	~~2,228~~1,269	282	~~195~~99	~~1,751~~888
Conserve Core Habitat for CV fringe-toed lizard	~~633~~630	128	~~51~~50	~~454~~452
Conserve Other Cons. Habitat for Le Conte's thrasher	~~3,601~~1,935	626	~~298~~131	~~2,677~~1,178
Conserve Core Habitat for CV round-tailed ground squirrel	~~1,663~~1,660	462	~~120~~120	~~1,081~~1,078
Conserve Core Habitat for Palm Springs pocket mouse	~~3,465~~1,752	483	~~298~~127	~~2,684~~1,142
Conserve ephemeral desert sand fields	~~906~~296	97	~~81~~20	~~728~~179
Conserve stabilized & partially stabilized desert dunes	~~383~~244	29	~~35~~21	~~319~~194
Conserve stabilized & partially stabilized desert sand fields	~~144~~90	2	~~14~~9	~~128~~79
Conserve mesquite Hummocks	~~125~~95	16	~~118~~[12]	~~98~~71
Conserve desert saltbush Scrub	169	0	17	152
Conserve desert fan palm oasis woodland	1	1	0	0
Conserve sand source Areas	186	167	2	17
Conserve fluvial & aeolian sand transport areas	~~3,500~~1,787	462	~~304~~133	~~2,734~~1,193
Conserve Mission Creek (I-10), Willow Wash Biological Corridors	~~509~~201	68	~~44~~13	~~397~~120

[1] The numbers in this table are calculated based on a change of jurisdictional boundaries. The City and the County are parties to a Memorandum of Understanding which states that they will negotiate the distribution of Authorized Disturbance after completion of the Major Amendment.

[2] Pursuant to the avoidance, minimization, and mitigation measures in Section 4.4, mesquite hummocks will be avoided to the maximum extent Feasible.

Table 4-47c: Conservation and Take Authorization for Willow Hole Conservation Area – City of Desert Hot Springs Area

(All acreages are based on 1996 pre-Planning Agreement information.)

Conservation Objective	*Total Acres in Conservation Area*	*Existing Conservation Lands*	*Acres of Disturbance Authorized*[1]	*Remaining Acres to be Conserved*
Conserve Core Habitat for CV milkvetch	959	0	96	863
Conserve Core Habitat for CV fringe-toed lizard	3	0	0	3
Conserve Other Cons. Habitat for Le Conte's thrasher	1,666	0	167	1,499
Conserve Core Habitat for CV round-tailed ground squirrel	3	0	0	3
Conserve Core Habitat for Palm Springs pocket mouse	1,713	0	171	1,542
Conserve ephemeral desert sand fields	610	0	61	549
Conserve stabilized & partially stabilized desert dunes	139	0	14	125
Conserve stabilized & partially stabilized desert sand fields	54	0	5	49
Conserve mesquite Hummocks	30	0	3[2]	27
Conserve fluvial & aeolian sand transport areas	1,713	0	171	1,542
Conserve Mission Creek (I-10), Willow Wash Biological Corridors	308	0	31	277

[1] The numbers in this table are calculated based on a change of jurisdictional boundaries. The City and the County are parties to a Memorandum of Understanding which states that they will negotiate the distribution of Authorized Disturbance after completion of the Major Amendment.

[2] Pursuant to the avoidance, minimization, and mitigation measures in Section 4.4, mesquite hummocks will be avoided to the maximum extent Feasible.

2. The appropriate Local Permittee shall maintain existing 36" culverts under Palm Drive at no less than their current width to provide for movement of Coachella Valley fringe-toed lizard, Coachella Valley round-tailed ground squirrel, and Palm Springs pocket mouse.

3. Existing culverts under I-10 for Mission Creek, and Willow Wash will be maintained by Caltrans at no less than their current size, with soft-bottoms to maintain the potential for sand transport and biological connectivity.

4. A Conservation to Development ratio of 9:1 shall be maintained within the portion of the north half of Section 24, T3S R4E that is in the Conservation Area to maintain the functionality of the fluvial and aeolian sand transport systems. The Local Permittee(s) shall incorporate feasible design, orientation, or other criteria in the Implementation Manual. These criteria would not apply to single-family homes, emergency response activities, or any non-commercial accessory uses and structures including but not limited

to second units on an existing legal lot. If it appears that the ratio may not be maintained, the appropriate Local Permittee(s) will meet with the Wildlife Agencies and identify additional means that will be implemented to achieve these goals and objectives, including an accelerated acquisition program and/or Development standards to maintain fluvial sand transport. The requirements for Development in floodplains also help ensure that sand transport capacity is maintained. (See Figure 4-13f.)

5. A Conservation to Development ratio of 9:1 shall be maintained within the north half of Section 19, T3S R5E; within the portion of the south half of the northwest quarter of Section 20, T3S R5E that is in the Conservation Area; and within a portion of the northwest quarter of Section 29, T3S R5E; to maintain the functionality of the fluvial and aeolian sand transport systems. The Local Permittee(s) shall incorporate feasible design, orientation, or other criteria in the Implementation Manual. These criteria would not apply to single-family homes, emergency response activities, or any non-commercial accessory uses and structures including but not limited to second units on an existing legal lot. If it appears that the ratio may not be maintained, the appropriate Local Permittee(s) will meet with the Wildlife Agencies and identify additional means that will be implemented to achieve these goals and objectives, including an accelerated acquisition program and/or Development standards to maintain fluvial and aeolian sand transport. The requirements for Development in floodplains also help ensure that sand transport capacity is maintained. (See Figure 4-13f.)

6. A Conservation to Development ratio of 9:1 shall be maintained within the south half of the south half of Section 28, T3S R5E to maintain the functionality of the aeolian sand transport system and the Biological Corridor. The Local Permittee(s) shall incorporate feasible design, orientation, or other criteria in the Implementation Manual. These criteria would not apply to single-family homes, emergency response activities, or any non-commercial accessory uses and structures including but not limited to second units on an existing legal lot. If it appears that the ratio may not be maintained, the appropriate Local Permittee(s) will meet with the Wildlife Agencies and identify additional means that will be implemented to achieve these goals and objectives, including an accelerated acquisition program and/or Development standards to maintain aeolian sand transport capacity and Development standards to restrict fencing that would impede wildlife movement. (See Figure 4-13f.)

7. The Permittees shall comply with applicable avoidance, minimization, and mitigation measures described in Section 4.4 and the Land Use Adjacency Guidelines as described in Section 4.5.

8. For construction of a frontage road north of and parallel to I-10, the appropriate Local Permittee shall ensure that project design provides for fluvial sand transport along Salvia, Edom, and Willow Washes to allow sand to be transported under I-10. Additionally, any future bridge structure over Willow Wash must provide for the movement of the Coachella Valley round-tailed ground squirrel under the road.

9. The appropriate Local Permittee for any Development or flood control structures along Long Canyon Wash south of Varner Road in the Conservation Area will ensure that the project does not impede fluvial and aeolian sand transport along the wash to provide sand to the Stebbins' dune area.

10. For proposed Development in Little San Bernardino Mountains linanthus modeled Habitat, Development in Essential Ecological Process fluvial sand transport areas shall not obstruct natural watercourses, and the rate of flow and sediment transport shall not be impeded.

11. The portion of Section 3, T4S R5E, in the Conservation Area is a Special Provisions area as follows:

    a. Take Authorization is provided for Development in the area depicted in Figure 4-13g. This Take Authorization becomes effective only upon the permanent Conservation of the area depicted in Figure 4-13g for Conservation.
    b. The Local Development Mitigation Fee will not be assessed in the Take Authorization area delineated in Figure 4-13g.
    c. At such time as the Take Authorization becomes effective, the Conservation Objectives for affected species, conserved natural communities, and ecological processes shall be adjusted to reflect the Take Authorization and Conservation in Section 2 provided through this measure. The Take Authorization does not count against the acres of Take/disturbance identified in the Plan prior to the implementation of these Special Provisions.

12. At such time as those portions of Long Canyon Channel within the Willow Hole Conservation Area are built, the appropriate Local Permittee for the project will design the facility to maintain the current sand transport process for the Conservation Area. The appropriate Local Permittee for the project will initiate a Joint Project Review Process set forth in Section 6.6.1.1 to maintain the current sand transport process for the Willow Hole Conservation Area.

4.3.9 Long Canyon Conservation Area

Location and Description. The Long Canyon Conservation Area encompasses the 100-year floodplain for Long Canyon Wash southwards from the termination of the existing Long Canyon flood control channel to the boundary of the existing Willow Hole Preserve at 20th Avenue, and is bounded on the west by Mountain View Road. The Long Canyon Conservation Area contains a total of approximately 810 acres. This Conservation Area is depicted in Figure 4-14a.

Core Habitat. This Conservation Area does not provide Core Habitat for any species.

Other Conserved Habitat. This Conservation Area contains Other Conserved Habitat for Coachella Valley milkvetch, Coachella Valley Jerusalem cricket, desert tortoise, burrowing owl, Le Conte's thrasher, Coachella Valley round-tailed ground squirrel, and Palm Springs pocket mouse. There is also potential habitat for the flat-tailed horned lizard, None of it is considered essential to the Conservation of these species. Table 4-48 shows the Covered Species occurring in this area.

Table 4-48: Species Habitat - Long Canyon Conservation Area
(All acreages are based on 1996 pre-Planning Agreement information.)

Species	*Total Acres of Habitat in the Conservation Area*	*Existing Conservation Lands*	*Acres of Habitat Not Currently Conserved*	*Habitat Designation*	*Acres of Core Habitat*
CV milkvetch	113	2	(111)[1, 2]	Other Cons. Habitat	0
CV Jerusalem cricket	110	0	(110)[1, 2]	Other Cons. Habitat	0
Desert tortoise	506	102	(404)[1, 2]	Other Cons. Habitat	0
Flat-tailed horned lizard	110	0	(110)[1, 2]	Potential Other Cons. Habitat	0
Le Conte's thrasher	712	12	(700)[1, 2]	Other Cons. Habitat	0
CV round-tailed ground squirrel	769	101	(668)[1, 2]	Other Cons. Habitat	0
Palm Springs pocket mouse	788	101	(687)[1, 2]	Other Cons. Habitat	0

[1] All acres within Existing Conservation Lands are located in sand transport areas.
[2] A portion of this species Habitat model occurs within a fluvial sand transport area

Natural Communities. Table 4-49 shows the conserved natural communities occurring in this Conservation Area: Sonoran creosote bush scrub and Sonoran mixed woody and succulent scrub.

Table 4-49: Conserved[1] Natural Communities – Long Canyon Conservation Area
(All acreages are based on 1996 pre-Planning Agreement information.)

Natural Community	*Total Acres in the Conservation Area*	*Existing Conservation Lands*	*Acres Not Currently Conserved*
Sonoran creosote bush scrub	99	90	(9)[2]
Sonoran mixed woody & succulent scrub	689	11	(678)[2]

[1] Only natural communities to be conserved under the Plan are shown. Natural communities that are not included as described in Section 3.2.2 are not shown.
[2] Numbers within parentheses are acres of Habitat in fluvial sand transport areas. The Conservation Objective for these acres is to maintain fluvial sand transport. Habitat conservation is not an objective.

Essential Ecological Processes. The function of this Conservation Area is to provide fluvial sand transport to the Willow Hole Preserve in flood events. Figure 4-14b depicts the Essential Ecological Process areas.

Biological Corridors and Linkages. This area is not a Biological Corridor.

Conservation Objectives. The Conservation Objective for this Conservation Area is:

1. Maintain the fluvial (water-borne) transport of sediment through the Long Canyon floodplain area. Maintain the current capacity for fluvial sand transport in Long Canyon wash.

Ownership and General Plan Land Use Designations. Table 4-50 shows the public versus private ownership of lands within this Conservation Area.

Table 4-50: Land Ownership Long Canyon Conservation Area (rounded to nearest 10)

Ownership[1]	***Acres***
Existing Conservation Lands:	*100*
BLM	100
Lands Not Currently Conserved:	*710*
Private	700
Public, Quasi-public entities	10
TOTAL	**810**

[1] Based on 1996 pre-Planning Agreement land ownership information

As seen in Table 4-50, 12% of the land in this Conservation Area is currently in public or nonprofit conservation organization ownership. Figure 4-14c shows the Existing Conservation Lands and general plan land use designations on Level 4 lands for the area. Table 4-51 shows the general plan designations.

Table 4-51: General Plan Land Use Designations[1] *(Non-conserved lands only) Long Canyon Conservation Area*

General Plan Designation (Map symbol) - Riverside County	***% of Private Non-conserved Land in Conservation Area***	***Building Intensity Range***
Rural Residential (RR)	100%	1 unit per 5 acres
TOTAL	**100%**	**-----**

[1] Based on 2003 general plan designations and 2003 parcel data

Required Measures for the Conservation Area. The following measures will be imposed to achieve the Conservation Objectives in this Conservation Area.

1. Development requirements imposed in floodplains will ensure that sand transport capacity is maintained.

2. If flood control structures are built in the Long Canyon Conservation Area, the appropriate Local Permittee for the project will ensure that such structures maintain the current fluvial sand transport process for the Willow Hole Conservation Area. The proposed flood control structures will undergo the Joint Project Review Process set forth in Section 6.6.1.1 to ensure current fluvial sand transport capacity is maintained.

4.3.10 Edom Hill Conservation Area

Location and Description. The Edom Hill Conservation Area encompasses the portion of the Indio Hills between the existing Willow Hole Preserve and the Thousand Palms Conservation Area. It extends northward from the Indio Hills to encompass an unnamed wash that flows out of the Indio Hills in a southwesterly direction to the existing Willow Hole Preserve. This area is depicted in Figure 4-15a. The Edom Hill Conservation Area contains a total of approximately 4,090 acres.

Core Habitat. This Conservation Area does not provide Core Habitat for any of the Covered Species.

Other Conserved Habitat. The Edom Hill Conservation Area contains patches of Other Conserved Habitat for the Coachella Valley milkvetch, Mecca aster, Coachella Valley giant sand-treader cricket, Coachella Valley Jerusalem cricket, Coachella Valley fringe-toed lizard, flat-tailed horned lizard, Coachella Valley round-tailed ground squirrel, and Palm Springs pocket mouse, but is not Core Habitat for any of these species. These patches of Other Conserved Habitat are important in maintaining connectivity between the Willow Hole Conservation Area and the Thousand Palms Conservation Area. The Edom Hill Conservation Area also provides Habitat for burrowing owl and Le Conte's thrasher. Table 4-52 shows the Covered Species occurring in this area. Figure 4-15b depicts the Other Conserved Habitat.

Table 4-52: Species Habitat - Edom Hill Conservation Area
(All acreages are based on 1996 pre-Planning Agreement information.)

Species	*Total Acres of Habitat in the Conservation Area*	*Existing Conservation Lands*	*Acres of Habitat Not Currently Conserved*	*Habitat Designation*	*Acres of Core Habitat*
CV milkvetch	1,788	298	1,490	Other Cons. Habitat	0
Mecca aster	28	2	26	Other Cons. Habitat	0
CV giant sand-treader cricket	120	58	62	Other Cons. Habitat	0
CV Jerusalem cricket	1,256	219	1,037	Other Cons. Habitat	0
CV fringe-toed lizard	120	58	62	Other Cons. Habitat	0
Flat-tailed horned lizard	0 / 276	0 / 0	0 / 276	Pred. / Pot.[1] Other Cons.	0

Species	*Total Acres of Habitat in the Conservation Area*	*Existing Conservation Lands*	*Acres of Habitat Not Currently Conserved*	*Habitat Designation*	*Acres of Core Habitat*
				Habitat	
Le Conte's thrasher	2,582	299	2,283	Other Cons. Habitat	0
CV round-tailed ground squirrel	1,835	254	1,581	Other Cons. Habitat	0
Palm Springs pocket mouse	1,342	189	1,153	Other Cons. Habitat	0

[1] The species distribution model for the flat-tailed horned lizard includes predicted ("pred.") Habitat and also potential (Pot.) Habitat. Predicted Habitat includes areas where presence of this species is known or expected based on recent observations. Potential Habitat includes areas where there are historical observations of this species but no recent observations are recorded. See Section 9.6.3.3 for additional information.

Natural Communities. Table 4-53 shows the conserved natural communities occurring in this area: active desert sand fields, stabilized and partially stabilized desert sand fields, Sonoran creosote bush scrub, and Sonoran mixed woody and succulent scrub. Figure 4-15c depicts the conserved natural communities.

Table 4-53: Conserved[1] Natural Communities – Edom Hill Conservation Area

(All acreages are based on 1996 pre-Planning Agreement information.)

Natural Community	*Total Acres in the Conservation Area*	*Existing Conservation Lands*	*Acres Not Currently Conserved*
Active desert sand fields	73	32	41
Stabilized & partially stabilized desert sand fields	47	25	22
Sonoran creosote bush scrub	1,379	421	958
Sonoran mixed woody & succulent scrub	2,034	219	1,815

[1] Only natural communities to be conserved under the Plan are shown. Natural communities that are not included as described in Section 3.2.2 are not shown.

Essential Ecological Processes. An unnamed wash emanates from the north side of the Indio Hills in this area and provides sediment transport to portions of the existing Willow Hole Preserve and to Stebbins' Dune during flood events. The Indio Hills are a sand source area for the Willow Hole Preserve. Figure 4-15d depicts the Essential Ecological Process areas.

Biological Corridors and Linkages. This area provides a potential Linkage for Coachella Valley milkvetch, Coachella Valley giant sand-treader cricket, Coachella Valley fringe-toed lizard, Coachella Valley round-tailed ground squirrel, and Palm Springs pocket mouse between the Core Habitat at Willow Hole and the Core Habitat at the Thousand Palms Conservation Area. It also provides a Linkage for species such as coyote, bobcat, and gray fox, which may be important in maintaining predator-prey relationships and overall biodiversity in the Conservation Areas. Figure 4-15d depicts the Biological Corridors and Linkages.

Conservation Objectives. The Conservation Objectives for this Conservation Area are:

1. In total, 3,060 acres of the Edom Hill Conservation Area shall be conserved. (This may be less than the sum of acres indicated in the following objectives because there can be overlap among areas covered by the objectives. For example, Core Habitat for two or more species may overlap, or Core Habitat and an Essential Ecological Process area may overlap. The individual acreage figures will be used in compliance monitoring.)
2. To maintain connectivity, conserve the Other Conserved Habitat patches for the Coachella Valley milkvetch, Coachella Valley giant sand-treader cricket, Coachella Valley fringe-toed lizard, Coachella Valley round-tailed ground squirrel, and Palm Springs pocket mouse between the Thousand Palms Conservation Area and the Willow Hole Conservation Area. Maintain the Other Conserved Habitat patches, allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused disturbance, and edge effects to the Habitat by conserving effective Linkages between patches of Core Habitat.
3. Conserve ecological processes (as set forth below) for the Willow Hole Conservation Area and the Thousand Palms Conservation Area.
    a. Conserve at least 310 acres of the sand source area for the Willow Hole Conservation Area in the Cathedral City portion of the area and at least 1,770 acres in the Riverside County portion to maintain the natural erosion processes that provide sediment for the blowsand ecosystem.
    b. Conserve at least 565 acres in the fluvial sand transport area in the Riverside County portion of the area for the Willow Hole Conservation Area. Maintain the current capacity for fluvial sand transport in the washes emanating from the Indio Hills that carry sand to the Willow Hole Conservation Area.
    c. Conserve that portion of the sand source area for the Thousand Palms Conservation Area in the Riverside County portion of the Conservation Area to maintain the natural erosion processes that provide sediment for the blowsand ecosystem.
4. Conserve occupied burrowing owl burrows as described in Section 4.4 avoidance, minimization, and mitigation measures.
5. Conserve at least 310 acres of Other Conserved Habitat for Le Conte's thrasher in the Cathedral City portion of the area and at least 1,745 acres in the Riverside County portion. Conserve individual Le Conte's thrasher nesting sites as described in Section 4.4 avoidance, minimization, and mitigation measures.
6. Conserve at least 3 acres of the stabilized and partially stabilized desert sand fields, and at least 37 acres of active desert sand fields in the Riverside County portion of the area to ensure the conservation of these conserved natural communities.

Ownership and General Plan Land Use Designations. Table 4-54 shows the public versus private ownership of lands within this Conservation Area.

Table 4-54: Land Ownership Edom Hill Conservation Area
(rounded to nearest 10 acres)

Ownership[1]	***Acres***
Existing Conservation Lands:	*700*
BLM	700
Lands Not Currently Conserved:	*3,390*
Private	3,380
Riverside County	10
TOTAL	**4,090**

[1]Based on 1996 pre-Planning Agreement land ownership information

As seen in Table 4-54, 17% of the land in this Conservation Area is currently in public or nonprofit conservation organization ownership. Current Conservation ranges from Level 1 to Level 3. Conservation management will be improved where needed through management prescriptions to be adopted by the relevant agency as Feasible. Figure 4-15e shows the Existing Conservation Lands and general plan land use designations on Level 4 lands for the area.

Table 4-55: General Plan Land Use Designations[1] *(Non-conserved lands only) Edom Hill Conservation Area*

General Plan Designation (Map symbol) - Riverside County	***% of Private Non-conserved Land in Conservation Area***	***Building Intensity Range***
Open Space Rural (OS-RUR)	32%	1 unit per 20 acres
Rural Desert (RD)	42%	1 unit per 10 acres
Rural Mountainous (RM)	1%	1 unit per 10 acres
Rural Residential (RR)	4%	1 unit per 5 acres
Public Facilities (PF)	21%	Landfills, airports, utilities, etc.
TOTAL	**100%**	
General Plan Designation (Map symbol) - City of Cathedral City[1]	***% of Private Non-conserved Land in Conservation Area***	***Building Intensity Range***
Hillside Reserve (HR)	21%	1 unit per 20 acres
Industrial (I)	71%	Industrial uses
Parks and Public Open Space (OS–P)	8%	Public parks and open space lands with important natural resources
TOTAL	**100%**	

[1]Based on 2003 general plan designations and 2003 parcel data

Required Measures for the Conservation Area. Tables 4-56a and 4-56b show how many acres of Existing Conservation Lands are in this Conservation Area and how many acres of Additional Conservation Lands will need to be conserved through acquisition or other means. The following measures will be imposed to achieve the Conservation Objectives in this Conservation Area.

1. In its activities on the Edom Hill Landfill well parcel, County Waste will not significantly reduce fluvial sand transport along the wash that crosses the parcel and will not fence the property in a manner that prevents wildlife movement across the parcel.
2. The Permittees shall comply with applicable avoidance, minimization, and mitigation measures described in Section 4.4 and the Land Use Adjacency Guidelines as described in Section 4.5.

Table 4-56a: Conservation and Take Authorization for Edom Hill Conservation Area - City of Cathedral City Area
(All acreages are based on 1996 pre-Planning Agreement information.)

Conservation Objective	*Total Acres in Conservation Area*	*Existing Conservation Lands*	*Acres of Disturbance Authorized*	*Remaining Acres to be Conserved*
Conserve Other Cons. Habitat for CV milkvetch	151	0	15	136
Conserve Other Cons. Habitat for Le Conte's thrasher	344	0	34	310
Conserve Other Cons. Habitat for CV round-tailed ground squirrel	134	0	13	121
Conserve Other Cons. Habitat for Palm Springs pocket mouse	114	0	11	103
Conserve sand source areas	345	0	35	310

Table 4-56b: Conservation and Take Authorization for Edom Hill Conservation Area – Riverside County Area
(All acreages are based on 1996 pre-Planning Agreement information.)

Conservation Objective	*Total Acres in Conservation Area*	*Existing Conservation Lands*	*Acres of Disturbance Authorized*	*Remaining Acres to be Conserved*
Conserve Other Cons. Habitat for CV milkvetch	1,637	298	134	1,205
Conserve Other Cons. Habitat for CV giant sand-treader cricket	103	58	5	40
Conserve Other Cons. Habitat for CV fringe-toed lizard	103	58	5	40
Conserve Other Cons. Habitat for Le Conte's thrasher	2,238	299	194	1,745
Conserve Other Cons. Habitat for CV round-tailed ground squirrel	1,701	254	145	1,302
Conserve Other Cons. Habitat for Palm Springs pocket mouse	1,228	189	104	935
Conserve active desert sand fields	73	32	4	37
Conserve stabilized & partially stabilized desert sand fields	29	25	1	3
Conserve sand source areas	2,665	698	197	1,770
Conserve fluvial sand transport areas	628	0	63	565

4.3.11 Thousand Palms Conservation Area

Location and Description. The Thousand Palms Conservation Area includes the existing CVFTL Preserve and the sand source/transport area to the west of it, emanating from the Indio Hills. All of the sand source/transport Essential Ecological Process area that has not been blocked by existing Development is included. The proposed Whitewater River Flood Control Project would further define the Essential Ecological Process area by constructing a system of levees along the western and southern boundaries of the Essential Ecological Process area. Several hundred acres immediately east of the existing preserve, below Pushawalla Canyon, are also included in this Conservation Area as additional Habitat for some of the species found on the preserve. This Conservation Area constitutes the largest unfragmented Habitat area on the Coachella Valley floor. It also represents the hot-dry end of the gradient of Habitat conditions found in the Coachella Valley. This Conservation Area is depicted in Figure 4-16a. The Thousand Palms Conservation Area contains a total of approximately 25,900 acres.

Core Habitat. This Conservation Area provides Core Habitat for the Coachella Valley milkvetch, Coachella Valley giant sand-treader cricket (eastern most viable populations for both these species), Coachella Valley fringe-toed lizard, flat-tailed horned lizard, Coachella Valley round-tailed ground squirrel, and Palm Springs pocket mouse. This area contains Mecca aster Core Habitat, which in conjunction with contiguous Habitat in the Indio Hills Palms Conservation Area is presumed to be suitable for a self-sustaining population. Figure 4-16b depicts the Core Habitat, selected Other Conserved Habitat, and recorded burrowing owl locations.

Other Conserved Habitat. Le Conte's thrashers and burrowing owls occur in this Conservation Area. While a viable population for either of these species is not thought to exist within this Conservation Area, the Habitat is likely to contribute to the Conservation of these species in their respective ranges. There is also Other Conserved Habitat for the Coachella Valley Jerusalem cricket, Coachella Valley fringe-toed lizard, Coachella Valley giant sand-treader cricket, Coachella Valley milk vetch, Coachella Valley round-tailed ground squirrel, flat-tailed horned lizard, and Palm Springs pocket mouse. The mesquite hummocks, desert dry wash woodland, and desert fan palm oasis woodland areas contain suitable migration and breeding Habitat for the riparian bird species covered by the Plan. Given the scarcity of riparian Habitat in the desert, all riparian Habitat is considered important for these species, and is likely to contribute to the Conservation of these species in their respective ranges The desert fan palm oasis woodlands provide the largest amount of natural Habitat for the southern yellow bat in the Plan Area. The existing preserve contains a refugium for the desert pupfish. This area also contains potential Habitat for crissal thrasher. Table 4-57 shows the Covered Species occurring in this area.

Table 4-57: Species Habitat - Thousand Palms Conservation Area
(All acreages are based on 1996 pre-Planning Agreement information.)

Species	*Total Acres of Habitat in the Conservation Area*	*Acres of Existing Conservation Lands*	*Acres of Habitat Not Currently Conserved*	*Habitat Designation*	*Acres of Core Habitat*
CV milkvetch	4,403 / 682	3,291 / 305	1,112 / 377	Core / Other Cons. Habitat	4,403
Mecca aster	11,745	8,772	2,973	Core	11,745
CV giant sand-treader cricket	3,962 / 3	3,035 / 2	927 / 1	Core / Other Cons. Habitat	3,962
CV Jerusalem cricket	197	51	146	Other Cons. Habitat	0
Desert pupfish	($15m^2$)	($15m^2$)	0	Refugium	0
CV fringe-toed lizard	3,962 / 3	3,035 / 2	927 / 1	Core / Other Cons. Habitat	3,962
Flat-tailed horned lizard	4,148 / 0	3,174 / 0	974 / 0	Pred. / Pot.[1] Core Habitat	4,148
Flat-tailed horned lizard	98 / 81	61 / 21	37 / 60	Pred. / Pot. Other Cons. Habitat	0
Crissal thrasher	58	58	0	Other Cons. Habitat	0
Le Conte's thrasher	11,058	6,627	4,431	Other Cons. Habitat	0
Least Bell's vireo	198 / 748	198 / 710	0 / 38	Breeding / Migratory	N/A
SW flycatcher	141 / 805	141 / 767	0 / 38	Breeding / Migratory	N/A
Summer tanager	141 / 805	141 / 767	0 / 38	Breeding / Migratory	N/A
Yellow-breasted chat	141 / 805	141 / 767	0 / 38	Breeding / Migratory	N/A
Yellow warbler	141 / 805	141 / 767	0 / 38	Breeding / Migratory	N/A
CV round-tailed ground squirrel	8,513 / 532	5,071 / 275	3,442 / 257	Core / Other Cons. Habitat	8,513
Palm Springs pocket mouse	11,707 / 425	7,601 / 277	4,106 / 148	Core / Other Cons. Habitat	11,707
Southern yellow bat	137	137	0	Other Cons. Habitat	0

[1] The species distribution model for the flat-tailed horned lizard includes predicted ("pred.") Habitat and also potential (Pot.) Habitat. Predicted Habitat includes areas where presence of this species is known or expected based on recent observations. Potential Habitat includes areas where there are historical observations of this species but no recent observations are recorded. See Section 9.6.3.3 for additional information.

Natural Communities. As shown in Table 4-58, conserved natural communities present are active desert dunes, active desert sand fields, mesquite hummocks, Sonoran creosote bush scrub, Sonoran mixed woody and succulent scrub, Sonoran cottonwood-willow riparian forest, desert dry wash woodland, and desert fan palm oasis woodland. Figure 4-16c depicts the conserved natural communities.

Table 4-58: Conserved[1] Natural Communities – Thousand Palms Conservation Area

(All acreages are based on 1996 pre-Planning Agreement information.)

Natural Community	*Total Acres in the Conservation Area*	*Existing Conservation Lands*	*Acres Not Currently Conserved*
Active desert Dunes	421	405	16
Active desert sand Fields	3,543	2,632	911
Mesquite Hummocks	58	58	0
Sonoran creosote bush scrub	14,754	10,791	3,963
Sonoran mixed woody and succulent scrub	5,515	1,973	3,542
Sonoran cottonwood-willow riparian forest	4	4	0
Desert dry wash woodland	748	710	38
Desert fan palm oasis woodland	137	137	0

[1] Only natural communities to be conserved under the Plan are shown. Natural communities that are not included as described in Section 3.2.2 are not shown.

Essential Ecological Processes. This Conservation Area contains the Indio Hills sand source and sand transport system west and northwest of the existing CVFTL Preserve. Sand originating in the Little San Bernardino Mountains and Joshua Tree National Park is also delivered through Thousand Palms Canyon and other unnamed canyons to the west. A portion of Thousand Palms Canyon is within this area. The remaining portions of this system are conserved in the West Deception Canyon and Indio Hills/Joshua Tree National Park Linkage Conservation Areas. Figure 4-16d depicts the Essential Ecological Processes.

Biological Corridors and Linkages. This Conservation Area is linked to the Willow Hole Conservation Area to the west through the Edom Hill Conservation Area, to the East Indio Hills Conservation Area to the east through the Indio Hills Palms Conservation Area, and to Joshua Tree National Park to the north through the Indio Hills/Joshua Tree National Park Linkage Conservation Area. Bobcats, kit foxes, and other species occurring in the Indio Hills depend on that National Park connection. Desert bighorn sheep are also known to cross from the National Park into the Indio Hills, possibly for access to water. Figure 4-16d depicts the Biological Corridors and Linkages.

Conservation Objectives. The Conservation Objectives for this Conservation Area are:

1. In total, 8,040 additional acres of the Thousand Palms Conservation Area shall be conserved. (This may be less than the sum of acres indicated in the following objectives because there can be overlap among areas covered by the objectives. For example, Core Habitat for two or more species may overlap, or Core Habitat and an Essential Ecological Process area may overlap. The individual acreage figures will be used in compliance monitoring.)
2. Conserve Core Habitat and associated ecological processes (as set forth below) for Coachella Valley milkvetch, Mecca aster, Coachella Valley giant sand-treader cricket, Coachella Valley fringe-toed lizard, flat-tailed horned lizard, Coachella Valley round-tailed ground squirrel, and Palm Springs pocket mouse, allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused disturbance, and edge effects to Core Habitat by conserving contiguous Habitat patches and effective Linkages between patches of Core Habitat. This will also help maintain connectivity with Habitat at Willow Hole through the Edom Hill Conservation Area.
    a. Conserve at least 985 acres of Core Habitat for the Coachella Valley milkvetch.
    b. Conserve at least 2,676 acres of Core Habitat for the Mecca aster.
    c. Conserve at least 818 acres of Core Habitat for the Coachella Valley giant sand-treader cricket.
    d. Conserve at least 818 acres of Core Habitat for the Coachella Valley fringe-toed lizard.
    e. Conserve at least 860 acres of Core Habitat for the flat-tailed horned lizard. Conserve individual flat-tailed horned lizards as described in Section 4.4 avoidance, minimization, and mitigation measures.
    f. Conserve at least 3,082 acres of Core Habitat for the Coachella Valley round-tailed ground squirrel.
    g. Conserve at least 3,679 acres of Core Habitat for the Palm Springs pocket mouse.
    h. Conserve at least 3,712 acres of the sand source area to maintain the natural erosion processes that provide sediment for the blowsand ecosystem. This also maintains Linkages for wildlife to the Edom Hill Conservation Area.
    i. Conserve at least 4,206 acres in the fluvial and aeolian sand transport area to maintain the sand transport system. Maintain the current capacity for fluvial sand transport in the washes emanating from the Indio Hills that provide sand for the Thousand Palms Conservation Area. This also maintains Linkages for wildlife to the Edom Hill Conservation Area.
3. Conserve occupied burrowing owl burrows as described in Section 4.4 burrowing owl avoidance, minimization, and mitigation measures.
4. Conserve the refugia locations for the desert pupfish in accordance with the Desert Pupfish Recovery Plan.

5. Conserve at least 3,972 acres of Other Conserved Habitat for Le Conte's thrasher. Conserve Le Conte's thrasher nesting sites as described in Section 4.4 avoidance, minimization, and mitigation measures.
6. Conserve at least 34 acres of the desert dry wash woodland natural community, which provides Habitat for riparian birds and other Covered Species. For the remaining acreage of this natural community where disturbance is authorized by the Plan, ensure no net loss.
7. Conserve at least 14 acres of active desert dunes and at least 804 acres of active desert sand fields to provide for the Conservation of these conserved natural communities. This goal will be attained through attaining Goal 2 for the species that inhabit these conserved natural communities.
8. Maintain the hydrologic groundwater regime necessary to maintain the pupfish refugium and the mesquite hummocks, Sonoran cottonwood-willow riparian woodland, desert dry wash woodland, and desert fan palm oasis woodland natural communities in this Conservation Area.
9. Maintain the ability of wildlife to cross Ramon Road, Washington Street, and Thousand Palms Canyon Road by providing undercrossings for Coachella Valley fringe-toed lizard, flat-tailed horned lizard, Coachella Valley round-tailed ground squirrel, and Palm Springs pocket mouse if these roads are widened. These undercrossings should also provide for seed dispersal.

Ownership and General Plan Land Use Designations. Table 4-59 shows the public and private ownership within this Conservation Area.

Table 4-59: Land Ownership
Thousand Palms Conservation Area
(rounded to nearest 10 acres)

Ownership[1]	***Acres***
Existing Conservation Lands:	*16,810*
BLM	10,600
~~CDFG~~CDFW	700
State Parks	1,010
TNC	880
USFWS	3,620
Lands Not Currently Conserved:	*9,090*
CVWD	150
IID	0
Private	8,700
Public, Quasi-public entities	240
TOTAL	**25,900**

[1] Based on 1996 pre-Planning Agreement land ownership information

As seen in Table 4-59, 65% of the land in this Conservation Area is currently in public or nonprofit conservation organization ownership. Current conservation ranges from Level 1 to Level 3. Conservation management will be improved where needed through management

prescriptions to be adopted by the relevant agency as Feasible. Figure 4-16e shows the Existing Conservation Lands and general plan land use designations on Level 4 lands for the area.

Table 4-60: General Plan Land Use Designations[1] (Non-conserved lands only) Thousand Palms Conservation Area

General Plan Designation (Map symbol) - Riverside County	*% of Private Non-conserved Land in Conservation Area*	*Building Intensity Range*
Open Space Recreation (OS-R)	1%	Active and passive recreational uses
Open Space Rural (OS-RUR)	63%	1 unit per 20 acres
Rural Residential (RR)	30%	1 unit per 5 acres
Very Low Density Residential (VLDR)	3%	0-2 units per acre
Low Density Residential[2] (LDR)	---	2-5 units per acre
Medium Density Residential[2] (MDR)	---	5-8 units per acre
Light Industrial (LI)	3%	Industrial and related uses
Public Facilities[2] (PF)	---	Landfills, airports, utilities, etc.
TOTAL	**100%**	

[1] Based on 2003 general plan designations and 2003 parcel data
[2] Statistically insignificant (less than 1%)

Required Measures for the Conservation Area. Table 4-61 shows how many acres of Existing Conservation Lands are in this Conservation Area and how many acres of Additional Conservation Lands will need to be conserved through acquisition or other means. The following measures will be imposed to achieve the Conservation Objectives in this Conservation Area.

1. The planned Whitewater Flood Control Project in this area consists of a series of levees to provide flood protection for the Thousand Palms community and I-10 areas. A Section 7 consultation has been completed on this project and a No Jeopardy determination made through the Biological Opinion. The approved project's levees would define the southern edge of this Conservation Area. Final project design has not been completed, so the precise alignment has not been determined. The final alignment may cause a minor adjustment of the Conservation Area boundary such that the levees will not be in the Conservation Area, but will define the edge of the area. The project includes the protection of a 550 acre floodway within the Conservation Area. The levee system will help direct fluvial-borne sand into the depositional area where aeolian sand transport processes will sort and transport sand downwind. O&M of the levees will be in conformance with an O&M Manual to be developed with the U.S. Army Corps of Engineers in consultation with the Wildlife Agencies. Take associated with operation and maintenance by CVWD can be authorized pursuant to a Minor Amendment with Wildlife Agency concurrence.

2. If Ramon Road, Washington Street, and Thousand Palms Canyon Road are widened to four lanes or more, the County will install wildlife undercrossings for Coachella Valley fringe-toed lizard, flat-tailed horned lizard, Coachella Valley round-tailed ground squirrel, Palm Springs pocket mouse, and other species. Widening projects will undergo

the Joint Project Review Process set forth in Section 6.6.1.1 to determine the dimensions of the culverts or undercrossings based on site-specific conditions and best available science.

3. Special Site Planning Standards apply in those portions of Sections 7 and 8, T4S R6E, located in the Conservation Area and with a Rural Residential general plan land use designation as of June 2004. It is estimated that the implementation of the standards would conserve over 80% of the vacant parcels as of June 2004. The standards are described below.

   Site Planning Standard 1: Development on the property shall not impede water-borne sand transport across the parcel in its natural direction of flow. A drainage plan for the site shall be required and demonstrate that natural flows onto the parcel shall be conveyed offsite in the natural pre-disturbance direction of flow. Water-borne sediments shall not be artificially retained onsite.

   Site Planning Standard 2: Development shall be limited to 50% of the parcel for parcels smaller than 4 acres in size. Development shall be limited to 2 acres on parcels 4 acres or larger in size. The portion of each parcel that is not Developed shall be permanently conserved as natural open space through conveyance of fee title or conservation easement, or through deed restriction prior to issuance of any grading permit. The owner will be compensated by CVCC for the fair market value of the portion of the parcel required to be conserved. The Local Permittee(s) shall incorporate feasible design, orientation, or other criteria in the Implementation Manual. The portion of the site to be conserved shall be determined consistent with attainment of Site Planning Standard 1 and the maximization of aeolian sand transport relative to adjacent parcels to the extent Feasible. This portion of the property shall not be fenced.

   Site Planning Standard 3: Onsite driveways shall be at grade, without gutters, curbs, berms, or other elevated areas that may impede or divert the passage of water-borne or wind-borne sand.

4. CVCC shall continue the acquisition of vacant parcels in those portions of Sections 7 and 8, T4S R6E, located in the Conservation Area at market value from willing sellers as a high priority so long as vacant parcels remain. CVCC shall maintain $500,000 available at all times for acquisitions in Sections 7 and 8 until all vacant land has been acquired or Developed consistent with the Conservation Objectives and required measures.

5. CVCC and the County shall develop and implement a land exchange program within Sections 7 and 8, T4S R6E, which will maximize attainment of the Conservation Objectives by encouraging Development to occur in the least sensitive portions of the sections or outside the Conservation Area. CVCC and the County shall consult with the Wildlife Agencies and ISAs to determine the least sensitive portions of the area and the highest priority parcels for Conservation. As appropriate, the land exchange program will include incentives to encourage landowners to exchange parcels with high priority for Conservation for parcels in the least sensitive portions of the sections or outside the Conservation Area.

6. A Conservation to Development ratio of 9:1 shall be maintained within Section 21, T4S R6E, south of Ramon Road to maintain the functionality of the fluvial and aeolian sand transport systems. The Local Permittee(s) shall incorporate feasible design, orientation,

or other criteria in the Implementation Manual. These criteria would not apply to single-family homes, emergency response activities, or any non-commercial accessory uses and structures including but not limited to second units on an existing legal lot. If it appears that the ratio may not be maintained, the appropriate Local Permittee(s) will meet with the Wildlife Agencies and identify additional means that will be implemented to achieve these objectives, including an accelerated acquisition program and/or Development standards to maintain fluvial and aeolian sand transport. The requirements for Development in floodplains also help ensure that sand transport capacity is maintained. See Figure 4-16f.

7. The alignment for Rio Del Sol from approximately Vista Chino to 20th Avenue in this Conservation Area identified in the Circulation Element of the Riverside County General Plan could create significant Habitat fragmentation, impact fluvial sand transport, and disrupt a Biological Corridor. Therefore, construction of Rio Del Sol through the Conservation Area from approximately Vista Chino to 20th Avenue would require a Major Amendment to the Plan.

8. The alignment for 22nd Avenue from Rio Del Sol to Sky Ridge in this Conservation Area identified in the Circulation Element of the Riverside County General Plan could create significant Habitat fragmentation, impact fluvial sand transport, and disrupt a Linkage between Conservation Areas. Therefore, construction of 22nd Avenue through the Conservation Area from Rio Del Sol to Sky Ridge would require a Major Amendment to the Plan.

9. If an extension of Chase School Road is constructed in the future, Riverside County will realign the proposed extension of Chase School Road, also known as Chocktaw Rd. and Vista del Pajaro, to an alignment outside the Conservation Area.

10. The Permittees shall comply with applicable avoidance, minimization, and mitigation measures described in Section 4.4 and the Land Use Adjacency Guidelines as described in Section 4.5.

11. If the Monitoring Program for the Conservation Area indicates that bird predation of Coachella Valley fringe-toed lizards or flat-tailed horned lizards is a problem because of the use of IID overhead power lines and poles, IID will consult with the Reserve Unit Management Committee to identify appropriate Adaptive Management measures for it to implement.

12. The refugia populations of the desert pupfish will be maintained in accordance with the Desert Pupfish Recovery Plan.

Table 4-61: Conservation and Take Authorization for Thousand Palms Conservation Area
(All acreages are based on 1996 pre-Planning Agreement information.)

Conservation Objective	*Total Acres in Conservation Area*	*Acres of Existing Conservation Lands*	*Acres of Disturbance Authorized*	*Remaining Acres to be Conserved*
Conserve Core Habitat for CV milkvetch	4,403	3,291	111	1,001
Conserve Core Habitat for Mecca aster	11,745	8,772	297	2,676
Conserve Core Habitat for CV giant sand-treader cricket	3,962	3,035	93	834
Conserve refugia locations for desert pupfish	($15m^2$)	($15m^2$)	N/A	0
Conserve Core Habitat for CV fringe-toed lizard	3,962	3,035	93	834
Conserve Core Habitat for flat-tailed horned lizard (predicted)	4,148	3,174	97	877
Conserve Other Cons. Habitat for Le Conte's thrasher	11,058	6,627	552[1]	3,879
Conserve Core Habitat for CV round-tailed ground squirrel	8,513	5,071	468[1]	2,974
Conserve Core Habitat for Palm Springs pocket mouse	11,707	7,601	518[1]	3,588
Conserve active desert dunes	421	405	2	14
Conserve active desert sand fields	3,543	2,632	91	820
Conserve mesquite hummocks	58	58	0	0
Conserve Sonoran cottonwood - willow riparian forest	4	4	0	0
Conserve desert dry wash woodland	748	710	4	34
Conserve desert fan palm oasis woodland	137	137	0	0
Conserve sand source areas	13,056	8,932	412	3,712
Conserve fluvial & aeolian sand transport areas	12,550	7,877	573[1]	4,100
Conserve Linkages	25,607	16,808	983[1]	7,816

[1] Of this Authorized Take, 147 acres can be used only in Section 8, T4S R6E.

4.3.12 West Deception Canyon Conservation Area

Location and Description. The West Deception Canyon Conservation Area, north of the Indio Hills, encompasses the drainage area for West Deception Canyon, which transports sediment from the Little San Bernardino Mountains to Thousand Palms Canyon, and thereby to the existing CVFTL Preserve. While this Conservation Area is contiguous to the Indio Hills/Joshua Tree National Park Linkage Conservation Area, it is ecologically significant for sediment transport, but not as a Biological Corridor or for Habitat. Because of this difference in

function, the West Deception Canyon Conservation Area can be conserved with different implementation mechanisms, and is, therefore, delineated as a separate Conservation Area. There are existing rural residential Development and a mobile-home park in this area. This Conservation Area is depicted in Figure 4-17a. The West Deception Canyon Conservation Area contains a total of approximately 4,150 acres.

Core Habitat. This Conservation Area does not provide Core Habitat for any Covered Species.

Other Conserved Habitat. This Conservation Area contains some Other Conserved Habitat for Coachella Valley milkvetch, desert tortoise, Le Conte's thrasher, Coachella Valley round-tailed ground squirrel, and Palm Springs pocket mouse. Table 4-62 shows the Covered Species occurring in this area. The Other Conserved Habitat will be conserved only incidental to maintaining the fluvial sand transport system, which is the primary purpose of this Conservation Area.

Table 4-62: Species Habitat – West Deception Canyon Conservation Area

(All acreages are based on 1996 pre-Planning Agreement information.)

Species	*Total Acres of Habitat in the Conservation Area*	*Existing Conservation Lands*	*Acres of Habitat Not Currently Conserved*	*Habitat Designation*	*Acres of Core Habitat*
CV milkvetch	115	15	56 (44)[1]	Other Cons. Habitat	0
Desert tortoise	2,028	132	1,181 (715)[1]	Other Cons. Habitat	0
Le Conte's thrasher	1,393	0	(1,393)[1]	Other Cons. Habitat	0
CV round-tailed ground squirrel	1,533	10	(1,523)[1]	Other Cons. Habitat	0
Palm Springs pocket mouse	2,818	10	1 (2,807)[1]	Other Cons. Habitat	0

[1] Acres in parentheses are within the fluvial sand transport area. The only Conservation Objective in this area is to maintain fluvial sand transport. Habitat conservation is not an objective.

Natural Communities. Table 4-63 shows that the conserved natural communities occurring in this Conservation Area are Sonoran creosote bush scrub and Mojave mixed woody scrub.

Table 4-63: Conserved[1] Natural Communities – West Deception Canyon Conservation Area
(All acreages are based on 1996 pre-Planning Agreement information.)

Natural Community	*Total acres in the Conservation Area*	*Existing Conservation Lands*	*Acres Not Currently Conserved*
Sonoran creosote bush scrub	1,467	0	26 (1,441)[2]
Mojave mixed woody scrub	1,397	132	1,155 (110)[2]

[1] Only natural communities to be conserved under the Plan are shown. Natural communities that are not included as described in Section 3.2.2 are not shown.

[2] Numbers within parentheses are acres of Habitat in fluvial sand transport areas. The Conservation Objective for these acres is to maintain fluvial sand transport. Habitat conservation is not an objective.

Essential Ecological Processes. The primary function of this Conservation Area is fluvial sand transport from the Little San Bernardino Mountains to Thousand Palms Canyon and the existing CVFTL Preserve. The area also contains some sand source area in the Little San Bernardino Mountains. Figure 4-17b depicts the Essential Ecological Process areas.

Biological Corridors and Linkages. The West Deception Canyon Conservation Area could provide some incidental wildlife movement opportunities between the Indio Hills and the Little San Bernardino Mountains; however, because major corridors will be conserved in the Indio Hills/Joshua Tree National Park Linkage Conservation Area to the east, the West Deception Canyon Conservation Area, which contains existing rural residential Development, is not proposed to be maintained as a Biological Corridor.

Conservation Objectives. The Conservation Objectives for this Conservation Area are:

1. Conserve at least 1,063 acres of the sand source area to maintain the natural erosion processes that provide sediment for the blowsand ecosystem.

2. Maintain the current capacity for fluvial sand transport in the West Deception Canyon fluvial sand transport system.

Ownership and General Plan Land Use Designations. Table 4-64 shows the public versus private ownership of lands within this Conservation Area.

Table 4-64: Land Ownership – West Deception Canyon Conservation Area (rounded to nearest 10 acres)

Ownership[1]	*Acres*
Existing Conservation Lands:	*130*
BLM	130
Lands Not Currently Conserved:	*4,020*
Private	3,890
Public, Quasi-public entities	130
TOTAL	**4,150**

[1] Based on 1996 pre-Planning Agreement land ownership information.

Table 4-65: General Plan Land Use Designations[1] *(Non-conserved lands only) West Deception Canyon Conservation Area*

General Plan Designation (Map symbol) - Riverside County	*% of Private Non-conserved Land in Conservation Area*	*Building Intensity Range*
Rural Residential (RR)	100%	1 unit per 5 acres
TOTAL	**100%**	

[1] Based on 2003 general plan designations and 2003 parcel data.

As seen in Table 4-64, 3% of the land in this Conservation Area is currently in public or nonprofit conservation organization ownership. Current conservation ranges from Level 1 to Level 3. Conservation management will be improved where needed through management prescriptions to be adopted by the relevant agency as Feasible. Figure 4-17c shows the Existing Conservation Lands and general plan land use designations on Level 4 lands for the area.

Required Measures for the Conservation Area. Table 4-66 shows how many acres of Existing Conservation Lands are in this Conservation Area and how many acres of Additional Conservation Lands will need to be conserved through acquisition or other means. The following measures will be imposed to achieve the Conservation Objectives in this Conservation Area.

1. Development requirements imposed in floodplains will ensure that sand transport capacity is maintained.
2. If flood control structures are built in the West Deception Canyon Conservation Area, the appropriate Local Permittee for the project will ensure that such structures avoid adverse impacts to the sand transport process for the Thousand Palms Conservation Area. A Major Plan Amendment will be required for such flood control structures, unless such a flood control structure is determined to be beneficial to the sand transport process. In that instance, a Minor Amendment to the Plan can be approved with Wildlife Agency concurrence.

Table 4-66: Conservation and Take Authorization for West Deception Canyon Conservation Area
(All acreages are based on 1996 pre-Planning Agreement information.)

Conservation Objective	*Total Acres in Conservation Area*	*Existing Conservation Lands*	*Acres of Disturbance Authorized*	*Remaining Acres to be Conserved*
Conserve sand source areas	1,302	121	118	1,063

4.3.13 Indio Hills/Joshua Tree National Park Linkage Conservation Area

Location and Description. The Indio Hills/Joshua Tree National Park Linkage Conservation Area stretches from East Deception Canyon (adjacent to West Deception Canyon) to the eastern limits of the watershed for Fan Hill Canyon. All of this is watershed for Thousand Palms Canyon. The area also includes the upper Pushawalla Canyon area as a secondary Biological Corridor. The area is bounded on the north by the Joshua Tree National Park Conservation Area and on the south by the Thousand Palms Conservation Area. This Conservation Area is depicted in Figure 4-18a. The Indio Hills/Joshua Tree National Park Linkage Conservation Area contains a total of approximately 13,410 acres.

Core Habitat. This Conservation Area provides Core Habitat for the desert tortoise in conjunction with the Joshua Tree National Park Conservation Area and the Desert Tortoise and Linkage Conservation Area. Figure 4-18b depicts the Core Habitat and selected Other Conserved Habitat.

Other Conserved Habitat. This Conservation Area contains Other Conserved Habitat for Coachella Valley milkvetch, Mecca aster, Le Conte's thrasher, Coachella Valley round-tailed ground squirrel, and Palm Springs pocket mouse, but the Habitat within the area is not regarded as large enough by itself to maintain a viable population of any of these species. Contiguity with other Conservation Areas, however, increases the value of the Habitat in this area for these species. Table 4-67 shows the Covered Species occurring in this area.

Table 4-67: Species Habitat - Indio Hills/ Joshua Tree National Park Linkage Conservation Area
(All acreages are based on 1996 pre-Planning Agreement information.)

Species	*Total Acres of Habitat in the Conservation Area*	*Existing Conservation Lands*	*Acres of Habitat Not Currently Conserved*	*Habitat Designation*	*Acres of Core Habitat*
CV milkvetch	17	10	7	Other Cons. Habitat	0
Mecca aster	166	4	162	Other Cons. Habitat	0
Desert tortoise[1]	10,308	1,714	8,594	Core	10,308
Le Conte's thrasher	6,396	333	6,063	Other Cons. Habitat	0
CV round-tailed ground squirrel	165	0	165	Other Cons. Habitat	0
Palm Springs pocket mouse	7,059	445	6,614	Other Cons. Habitat	0

[1] This is Core Habitat for the desert tortoise in conjunction with the contiguous Habitat in Joshua Tree National Park.

Natural Communities. Table 4-68 shows that the conserved natural communities occurring in this Conservation Area are Sonoran creosote bush scrub and Mojave mixed woody scrub. Figure 4-18c depicts the conserved natural communities.

Table 4-68: Conserved[1] Natural Communities – Indio Hills/Joshua Tree National Park Linkage Conservation Area
(All acreages are based on 1996 pre-Planning Agreement information.)

Natural Community	*Total Acres in the Conservation Area*	*Existing Conservation Land*	*Acres Not Currently Conserved*
Sonoran creosote bush scrub	8,374	499	7,875
Mojave mixed woody scrub	4,380	1,219	3,161

[1] Only natural communities to be conserved under the Plan are shown. Natural communities that are not included as described in Section 3.2.2 are not shown.

Essential Ecological Processes. This area functions as a sand source and fluvial sand transport area for the existing CVFTL Preserve. This area is also part of the groundwater basin that provides water to the oases on the preserve. Figure 4-18d depicts the Essential Ecological Process areas.

Biological Corridors and Linkages. This Conservation Area provides a Biological Corridor between the Indio Hills and the Little San Bernardino Mountains, including Joshua Tree National Park. This area is also a contact zone between the Palm Springs pocket mouse (*Perognathus longimembris bangsi*) and another subspecies, *Perognathus longimembris longimembris,* or little pocket mouse, found to the north. The Indio Hills/Joshua Tree National Park Linkage Conservation Area also includes a separate Biological Corridor centered on Pushawalla Canyon and helps protect the watershed for this canyon. The Linkage between the

Indio Hills and the National Park also contributes to biological diversity in the Indio Hills. The gradient between the lower CVFTL Preserve (near sea level) to the high portions of the National Park (5,000') constitutes one of the few remaining areas within this portion of the Coachella Valley where an unimpeded elevation transect such as this exists. As climate changes over time, the availability of this area may be vital for species to adjust to climate-induced shifts in Habitat. This area is also linked to the Desert Tortoise and Linkage Conservation Area to the east, and provides connectivity with desert tortoise populations in that area. It may also provide connectivity for the Palm Springs pocket mouse population in that area. It also provides a Linkage for species such as coyote, bobcat, and gray fox, which are important in maintaining predator-prey relationships and overall biodiversity in the Conservation Areas. Figure 4-18d depicts the Biological Corridors and Linkages in this Conservation Area.

Conservation Objectives. The Conservation Objectives for this Conservation Area are:

1. In total, 10,530 acres of the Indio Hills/Joshua Tree National Park Linkage Conservation Area shall be conserved. (This may be less than the sum of acres indicated in the following objectives because there can be overlap among areas covered by the objectives. For example, Core Habitat for two or more species may overlap, or Core Habitat and an Essential Ecological Process area may overlap. The individual acreage figures will be used in compliance monitoring.)
2. Conserve ecological processes for the Thousand Palms Conservation Area that occur in the Indio Hills/Joshua Tree National Park Linkage Conservation Area and Core Habitat for the desert tortoise as set forth below:
    a. Conserve at least 7,735 acres of Core Habitat for desert tortoise, allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused disturbance, and edge effects to Core Habitat by conserving contiguous Habitat and effective Linkages between patches of Core Habitat. Protect individual tortoises within the area when allowed Development does occur.
    b. Conserve at least 4,135 acres of the sand source area to maintain the natural erosion processes that provide sediment for the blowsand ecosystem.
    c. Conserve at least 6,132 acres in the fluvial sand transport area. Maintain the current capacity for fluvial sand transport in the washes emanating from the Little San Bernardino Mountains that flow into Thousand Palms Canyon.
3. Maintain functional Biological Corridors and Linkages as set forth below.
    a. Conserve at least 10,267 acres in the Indio Hills/Joshua Tree National Park Biological Corridor to maintain Habitat connectivity and ecosystem function between the Thousand Palms Conservation Area and the Joshua Tree National Park Conservation Area for Covered Species. The corridor shall be wide enough to minimize edge effects.
4. Conserve at least 5,457 acres of Other Conserved Habitat for Le Conte's thrasher. Conserve Le Conte's thrasher nesting sites as described in Section 4.4 avoidance, minimization, and mitigation measures.

5. Maintain the ability of wildlife to cross Dillon Road by providing undercrossings to maintain ecosystem function for Covered Species, if this road is widened.

Ownership and General Plan Land Use Designations. Table 4-69 shows the public versus private ownership of lands within this Conservation Area.

Table 4-69: Land Ownership Indio Hills/ Joshua Tree National Park Linkage Conservation Area
(rounded to nearest 10 acres)

Ownership[1]	*Acres*
Existing Conservation Lands:	*1,720*
BLM	1,720
Lands Not Currently Conserved:	*11,690*
CVWD[2]	0
Private	10,780
Public, Quasi-public entities	910
TOTAL	**13,410**

[1] Based on 1996 pre-Planning Agreement land ownership information
[2] CVWD owns approximately 1.1 acres in this Conservation Area.

Table 4-70: General Plan Land Use Designations[1] *(Non-conserved lands only) Indio Hills/ Joshua Tree National Park Linkage Conservation Area*

General Plan Designation (Map symbol) - Riverside County	*% of Private Non-conserved Land in Conservation Area*	*Building Intensity Range*
Open Space Conservation (OS-C)	5%	Protection of open space – natural hazards and resources
Open Space Rural (OS-RUR)	87%	1 unit per 20 acres
Rural Desert (RD)	1%	1 unit per 10 acres
Rural Residential (RR)	7%	1 unit per 5 acres
TOTAL	**100%**	

[1] Based on 2003 general plan designations and 2003 parcel data.

As seen in Table 4-69, approximately 13% of the land in this Conservation Area is currently in public or nonprofit conservation organization ownership. Current conservation ranges from Level 1 to Level 3. Conservation management will be improved where needed through management prescriptions to be adopted by the relevant agency as Feasible. Figure 4-18e shows the Existing Conservation Lands and general plan land use designations on Level 4 lands for the area.

Required Measures for the Conservation Area. Table 4-71 shows how many acres of Existing Conservation Lands are in this Conservation Area and how many acres of Additional Conservation Lands will need to be conserved through acquisition or other means. The following measures will be imposed to achieve the Conservation Objectives in this Conservation Area.

1. If Dillon Road is widened to four or more lanes, the Appropriate Local Permittee for the project will ensure that adequately sized culverts or wildlife undercrossings are installed to maintain fluvial sand transport and provide for wildlife movement for Covered Species. Widening projects will undergo the Joint Project Review Process set forth in Section 6.6.1.1 to determine the dimensions of the culverts or undercrossings based on site specific conditions and best available science.
2. A Conservation to Development ratio of 9:1 shall be maintained within Section 30, T3S R7E to maintain the functionality of the fluvial sand transport systems. The Local Permittee(s) shall incorporate feasible design, orientation, or other criteria in the Implementation Manual. These criteria would not apply to single-family homes, emergency response activities, or any non-commercial accessory uses and structures including but not limited to second units on an existing legal lot. If it appears that the ratio may not be maintained, the appropriate Local Permittee(s) will meet with the Wildlife Agencies and identify additional means that will be implemented to achieve these goals and objectives, including an accelerated acquisition program and/or Development standards to maintain fluvial sand transport. The requirements for Development in floodplains also help ensure that sand transport capacity is maintained (See Figure 4-18f).
3. The Permittees shall comply with applicable avoidance, minimization, and mitigation measures described in Section 4.4 and the Land Use Adjacency Guidelines as described in Section 4.5.

Table 4-71: Conservation and Take Authorization for Indio Hills/Joshua Tree National Park Linkage Conservation Area
(All acreages are based on 1996 pre-Planning Agreement information.)

Conservation Objective	*Total Acres in Conservation Area*	*Existing Conservation Lands*	*Acres of Disturbance Authorized*	*Remaining Acres to be Conserved*
Conserve Core Habitat for desert tortoise	10,308	1,714	859	7,735
Conserve Other Cons. Habitat for Le Conte's thrasher	6,396	333	606	5,457
Conserve sand source areas	5,823	1,228	460	4,135
Conserve fluvial sand transport areas	7,304	491	681	6,132
Conserve Indio Hills/JTNP Biological Corridor	13,127	1,719	1,141	10,267

4.3.14 Indio Hills Palms Conservation Area

Location and Description. The Indio Hills Palms Conservation Area includes the portion of the Indio Hills to the east of the existing CVFTL Preserve that provides Habitat for the Mecca aster, a disjunct population from that in the Mecca Hills, and includes the desert fan palm

oases and mesquite hummock areas along the base of the Indio Hills, associated with the San Andreas Fault. This Conservation Area is depicted in Figure 4-19a. It is bounded on the west and northwest by the Thousand Palms Conservation Area and on the south and southeast by the East Indio Hills Conservation Area. The Indio Hills Palms Conservation Area contains a total of approximately 6,230 acres.

Core Habitat. In conjunction with contiguous Habitat on the Thousand Palms Conservation Area, this Conservation Area provides Core Habitat for the Mecca aster. Figure 4-19b depicts the Core Habitat and selected Other Conserved Habitat.

Other Conserved Habitat. This Conservation Area contains Other Conserved Habitat for crissal thrasher, Le Conte's thrasher, Coachella Valley round-tailed ground squirrel, Palm Springs pocket mouse, and southern yellow bat. The area contains suitable migration and breeding Habitat for the riparian species covered by the Plan. Given the scarcity of riparian Habitat in the desert, all riparian Habitat is considered important for these species, and is likely to contribute to the Conservation of these species in their respective ranges. Table 4-72 shows the Covered Species occurring in this area.

Table 4-72: Species Habitat – Indio Hills Palms Conservation Area
(All acreages are based on 1996 pre-Planning Agreement information.)

Species	*Total Acres of Habitat in the Conservation Area*	*Existing Conservation Lands*	*Acres of Habitat Not Currently Conserved*	*Habitat Designation*	*Acres of Core Habitat*
Mecca aster[1]	6,091	3,546	2,545	Core	6,091
Crissal thrasher	3	1	2	Other Cons. Habitat	0
Le Conte's thrasher	106	98	8	Other Cons. Habitat	0
Least Bell's vireo	97 / 79	47 / 42	50 / 37	Breeding / Migratory	N/A
SW willow flycatcher	93 / 83	46 / 43	47 / 40	Breeding / Migratory	N/A
Summer tanager	93 / 83	46 / 43	47 / 40	Breeding / Migratory	N/A
Yellow-breasted chat	93 / 83	46 / 43	47 / 40	Breeding / Migratory	N/A
Yellow warbler	93 / 83	46 / 43	47 / 40	Breeding / Migratory	N/A
CV round-tailed ground squirrel	145	59	86	Other Cons. Habitat	0
Palm Springs pocket mouse	458	264	194	Other Cons. Habitat	0
Southern yellow bat	93	46	47	Other Cons. Habitat	0

[1] An MOU with the City of Indio provides for a Like Exchange for Indio Water Authority that could result in removal of up to 20 acres of Mecca Aster habitat.

Natural Communities. Table 4-73 shows that the conserved natural communities occurring in this area are mesquite hummocks, Sonoran creosote bush scrub, Sonoran mixed

woody and succulent scrub, desert dry wash woodland, and desert fan palm oasis woodland. Figure 4-19c depicts the conserved natural communities.

Table 4-73: Conserved[1] Natural Communities – Indio Hills Palms Conservation Area
(All acreages are based on 1996 pre-Planning Agreement information.)

Natural Community	*Total Acres in the Conservation Area[2]*	*Existing Conservation Land*	*Acres Not Currently Conserved*
Mesquite Hummocks	3	1	2
Sonoran creosote bush scrub	5,718	3,246	2,472
Sonoran mixed woody & succulent scrub	216	210	6
Desert dry wash Woodland	79	42	37
Desert fan palm oasis woodland	93	46	47

[1] Only natural communities to be conserved under the Plan are shown. Natural communities that are not included as described in Section 3.2.2 are not shown.
[2] An MOU with the City of Indio provides for a Like Exchange for Indio Water Authority that could result in removal of up to 20 acres of land from this Conservation Area.

Essential Ecological Processes. The Indio Hills are part of the watershed for the desert fan palm oasis woodlands. These oases are also dependent on groundwater brought to or near the surface by the San Andreas Fault.

Biological Corridors and Linkages. This Conservation Area is linked to Joshua Tree National Park through the Indio Hills/Joshua Tree National Park Linkage Conservation Area. Figure 4-19d depicts the Biological Corridors and Linkages. This area provides potential Habitat connectivity between the Thousand Palms Conservation Area and the East Indio Hills Conservation Area.

Conservation Objectives. The Conservation Objectives for this Conservation Area are:

1. In total, 2,290 acres of the Indio Hills Palms Conservation Area shall be conserved. (This may be less than the sum of acres indicated in the following objectives because there can be overlap among areas covered by the objectives. For example, Core Habitat for two or more species may overlap, or Core Habitat and an Essential Ecological Process area may overlap. The individual acreage figures will be used in compliance monitoring.)
2. Conserve at least 2,290 acres of Core Habitat for Mecca aster, allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused disturbance, and edge effects to Core Habitat by conserving contiguous Habitat patches and effective linkages between patches of Core Habitat.

3. Conserve at least 7 acres of Other Conserved Habitat for Le Conte's thrasher. Conserve Le Conte's thrasher nesting sites as described in Section 4.4 avoidance, minimization, and mitigation measures.
4. Conserve at least 33 acres of desert dry wash woodland natural community, which provides Habitat for riparian birds and other Covered Species.
5. Conserve at least 1 acre of the mesquite hummocks natural community, which provides Habitat for riparian birds and other Covered Species.
6. Conserve at least 42 acres of desert fan palm oasis woodland natural community, which provides Habitat for southern yellow bat.

Ownership and General Plan Land Use Designations. Table 4-74 shows the public versus private ownership of lands within this Conservation Area.

Table 4-74: Land Ownership Indio Hills Palms Conservation Area
(rounded to the nearest 10 acres)

Ownership[1]	*Acres*
Existing Conservation Lands:	*3,660*
BLM	2,470
State Parks	1,190
Lands Not Currently Conserved:	*2,570*
Private[2]	2,570
TOTAL	**6,230**

[1] Based on 1996 pre-Planning Agreement land ownership information.
[2] An MOU with the City of Indio provides for a Like Exchange for Indio Water Authority that could result in removal of up to 20 acres of private land from this Conservation Area.

Table 4-75: General Plan Land Use Designations[1]
(Non-conserved lands only) Indio Hills Palms Conservation Area

General Plan Designation (Map symbol) - Riverside County	*% of Private Non-conserved Land in Conservation Area*	*Building Intensity Range*
Open Space Rural (OS-RUR)	79%	1 unit per 20 acres
Open Space Minerals (OS-MIN)	21%	Minerals extraction and processing facilities
TOTAL	**100%**	

[1] Based on 2003 general plan designations and 2003 parcel data

As seen in Table 4-74, approximately 59% of the land in this Conservation Area is currently in public or nonprofit conservation organization ownership. Current conservation ranges from Level 1 to Level 3. Conservation management will be improved where needed through management prescriptions to be adopted by the relevant agency as Feasible. Figure 4-19e shows the Existing Conservation Lands and general plan land use designations on Level 4 lands for the area.

Required Measures for the Conservation Area. Table 4-76 shows how many acres of Existing Conservation Lands are in this Conservation Area and how many acres of Additional Conservation Lands will need to be conserved through acquisition or other means. The following measures will be imposed to achieve the Conservation Objectives in this Conservation Area.

1. The Permittees shall comply with applicable avoidance, minimization, and mitigation measures described in Section 4.4 and the Land Use Adjacency Guidelines as described in Section 4.5.

2. All otherwise lawful activities undertaken by Granite Construction Company, or its successor, in the area belonging to Granite Construction in Sections 34 and 35, T4S, R7E, and Section 2, T5S R7E, including currently permitted activities and any subsequently permitted mining activities, implementation of approved mining reclamation plans, and future development activities outside the area depicted in Figure 4-20f in Section 4.3.15 are Covered Activities subject to the following Special Provisions:

   (1) Upon cessation of mining activities and implementation of approved mining reclamation plans, the area depicted in Figure 4-20f shall be permanently conserved and added to the Reserve System through conveyance of fee title or a conservation easement to the CVCC, or through other means acceptable to the Wildlife Agencies. The area depicted lies between the west section line of Section 33, T4S R7E and a parallel line 1,320 feet to the east of that line. The purpose of conserving this area is to provide habitat connectivity for the Palm Springs pocket mouse and other species that may use this area.

   (2) Granite Construction Company, or its successor, shall coordinate implementation of its approved mining reclamation plan(s) with CVCC and the appropriate RMUC to achieve the optimum Habitat restoration for the area to be conserved depicted in Figure 4-20f consistent with the approved mining reclamation plan(s).

   [Note: a portion of the Granite Construction Company land is in this Conservation Area and a portion is in East Indio Hills Conservation Area. The map is shown only in Section 4.3.15.]

Table 4-76: Conservation and Take Authorization for Indio Hills Palms Conservation Area
(All acreages are based on 1996 pre-Planning Agreement information.)

Conservation Objective	*Total Acres in Conservation Area*	*Existing Conservation Lands*	*Acres of Disturbance Authorized*	*Remaining Acres to be Conserved*
Conserve Core Habitat for Mecca aster[1]	6,091	3,546	255	2,290
Conserve Other Cons. Habitat for Le Conte's thrasher	106	98	1	7
Conserve mesquite hummocks	3	1	1	1
Conserve desert dry wash woodland	79	42	4	33
Conserve desert fan palm oasis woodland	93	46	5	42

[1] An MOU with the City of Indio provides for a Like Exchange for Indio Water Authority that could result in removal of up to 20 acres of Mecca aster habitat.

4.3.15 East Indio Hills Conservation Area

Location and Description. The East Indio Hills Conservation Area includes the portion of the Indio Hills east of the Indio Hills Palms Conservation Area and the alluvial fan area between toe of slope on the south side of the hills and the flood control berm north of the Coachella Canal. This area is depicted in Figure 4-20a. This area is bounded on the northwest by the Indio Hills Palms Conservation Area. The portion of this Conservation Area east of Dillon Road is also in the Northern and Eastern Colorado Desert (NECO) Plan Area. The East Indio Hills Conservation Area contains a total of approximately 4,060 acres.

Core Habitat. In conjunction with contiguous Habitat on the Thousand Palms Conservation Area and Core Habitat on the Indio Hills Palms Conservation Area, this Conservation Area provides Core Habitat for the Mecca aster. Figure 4-20b depicts the Core Habitat and selected Other Conserved Habitat.

Other Conserved Habitat. This Conservation Area contains Other Conserved Habitat for Coachella Valley giant sand-treader cricket, Coachella Valley fringe-toed lizard, desert tortoise, flat-tailed horned lizard, crissal thrasher, Le Conte's thrasher, Coachella Valley round-tailed ground squirrel, and Palm Springs pocket mouse that is valuable for these species to the extent connectivity can be maintained with populations on the Thousand Palms Conservation Area. The area contains suitable migration and breeding Habitat for the riparian bird species covered by the Plan. Given the scarcity of riparian Habitat in the desert, all riparian Habitat is considered important for these species, and is likely to contribute to the Conservation of these species in their respective ranges. Table 4-77 shows the Covered Species occurring in this area.

Table 4-77: Species Habitat - East Indio Hills Conservation Area
(All acreages are based on 1996 pre-Planning Agreement information.)

Species	*Total Acres of Habitat in the Conservation Area*	*Existing Conservation Lands*	*Acres of Habitat Not Currently Conserved*	*Habitat Designation*	*Acres of Core Habitat*
Mecca aster	1,594	433	1,161	Core	1,594
CV giant sand-treader cricket	824	123	701	Other Cons. Habitat	0
CV fringe-toed lizard	824	123	701	Other Cons. Habitat	0
Desert tortoise	397	0	397	Other Cons. Habitat	0
Flat-tailed horned lizard	645	67	578	Predicted Other Cons. Habitat	0
Crissal thrasher	47	0	47	Other Cons. Habitat	0
Le Conte's thrasher	2,142	571	1,571	Other Cons. Habitat	0
Least Bell's vireo	39 / 8	0 / 0	39 / 8	Breeding / Migratory	N/A
SW willow flycatcher	47	0	47	Migratory	N/A
Summer tanager	47	0	47	Migratory	N/A
Yellow-breasted chat	47	0	47	Migratory	N/A
Yellow warbler	47	0	47	Migratory	N/A
CV round-tailed ground squirrel	1,476	360	1,116	Other Cons. Habitat	0
Palm Springs pocket mouse	1,651	480	1,171	Other Cons. Habitat	0

Natural Communities. Table 4-78 shows that the conserved natural communities occurring in this area are active desert dunes, stabilized shielded desert sand fields, stabilized and partially stabilized desert sand fields, mesquite hummocks, Sonoran creosote bush scrub, Sonoran mixed woody and succulent scrub, and desert saltbush scrub. Figure 4-20c depicts the conserved natural communities.

Table 4-78: Conserved[1] Natural Communities East Indio Hills Conservation Area

(All acreages are based on 1996 pre-Planning Agreement information.)

Natural Community	*Total Acres in the Conservation Area*	*Existing Conservation Land*	*Acres Not Currently Conserved*
Active desert dunes	5	0	5
Stabilized shielded desert sand fields	515	120	395
Stabilized & partially stabilized desert sand fields	331	3	328
Mesquite hummocks	43	0	43
Sonoran creosote bush scrub	2,882	874	2,008
Desert saltbush scrub	8	0	8
Sonoran mixed woody & succulent scrub	63	0	63

[1] Only natural communities to be conserved under the Plan are shown. Natural communities that are not included as described in Section 3.2.2 are not shown.

Essential Ecological Processes. The Indio Hills are part of the watershed for the mesquite hummocks.

Biological Corridors and Linkages. This area has potential Habitat connectivity with the Thousand Palms Conservation Area through the Indio Hills Palms Conservation Area. (See Figures 4-19d and 4-20e.)

Conservation Objectives. The Conservation Objectives for this Conservation Area are:

1. In total, 2,790 acres of the East Indio Hills Conservation Area shall be conserved. (This may be less than the sum of acres indicated in the following objectives because there can be overlap among areas covered by the objectives. For example, Core Habitat for two or more species may overlap, or Core Habitat and an Essential Ecological Process area may overlap. The individual acreage figures will be used in compliance monitoring.)
2. Conserve Habitat, as set forth below, for Mecca aster, flat-tailed horned lizard, Coachella Valley round-tailed ground squirrel, and Palm Springs pocket mouse, allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused disturbance, and edge effects by conserving contiguous Habitat patches and effective Linkages.
    a. Conserve at least 1,045 acres of Other Conserved Habitat for the Mecca aster in the Riverside County portion of the area.
    b. Conserve at least 415 acres of Other Conserved Habitat for the flat-tailed horned lizard in the Riverside County portion of the area, at least 5 acres in the City of

Coachella portion, and at least 100 acres in the City of Indio portion. Conservation of species Habitat in the City of Indio is subject to the conditions in measure 1 of the Required Measures for the Conservation Area section below.

c. Conserve at least 1,253 acres of Other Conserved Habitat for Le Conte's thrasher in the Riverside County portion of the area, at least 56 acres in the City of Coachella portion, and at least 105 acres in the City of Indio portion. Conserve Le Conte's thrasher nesting sites in the area as described in Section 4.4 for avoidance, minimization, and mitigation measures. Conservation of species Habitat in the City of Indio is subject to the conditions in measure 1 of the Required Measures for the Conservation Area section below.

d. Conserve at least 896 acres of Other Conserved Habitat for the Coachella Valley round-tailed ground squirrel in the Riverside County portion of the area, at least 5 acres in the City of Coachella portion, and at least 103 acres in the City of Indio portion. Conservation of species Habitat in the City of Indio is subject to the conditions in measure 1 of the Required Measures for the Conservation Area section below.

e. Conserve at least 944 acres of Other Conserved Habitat for the Palm Springs pocket mouse in the Riverside County portion of the area, at least 7 acres in the City of Coachella portion, and at least 103 acres in the City of Indio portion. Conservation of species Habitat in the City of Indio is subject to the conditions in measure 1 of the Required Measures for the Conservation Area section below.

3. Conserve at least 4 acres of active desert dunes in the Riverside County portion; at least 295 acres of stabilized and partially stabilized desert sand fields in the Riverside County portion of the area; at least 100 acres of stabilized shielded desert sand fields in the City of Indio portion of the area and at least 256 acres in the Riverside County portion; at least 2 acres of mesquite hummocks in the City of Indio portion of the area and at least 39 acres in the Riverside County portion; and at least 7 acres of desert saltbush scrub in the Riverside County portion of the area to conserve these natural communities. Conservation of natural communities in the City of Indio is subject to the conditions in measure 1 of the Required Measures for the Conservation Area section below.

4. Consistent with the research program described in Section 8.4.1.2, restore 80 acres of mesquite hummocks if 80% of the mesquite hummocks natural community in the south half of Section 17, T5S, R8E, is not conserved under the Plan. If the 80% is conserved, the Conservation Objective shall be to restore 40 acres of mesquite hummocks.

Note that the preceding Conservation Objectives as they pertain to the 120 acres within the City of Indio are subject to revision without a Plan Amendment if the area identified in Required Measure 1 cannot be conserved.

Ownership and General Plan Land Use Designations. Table 4-79 shows the public versus private ownership of lands within this Conservation Area.

Table 4-79 shows that approximately 25% of the land within this area is under existing public or private conservation management. Current conservation ranges from Level 1 to Level

3. Figure 4-20d shows the Existing Conservation Lands and general plan land use designations on Level 4 lands for the area.

Table 4-79: Land Ownership East Indio Hills Conservation Area (rounded to nearest 10 acres)

Ownership[1]	***Acres***
Existing Conservation Lands:	*1,030*
BLM	1,030
Lands Not Currently Conserved:	*3,030*
CVWD	620
Private	2,360
Public, Quasi-public entities	50
TOTAL	**4,060**

[1] Based on 1996 pre-Planning Agreement land ownership information

Table 4-80: General Plan Land Use Designations[1] *(Non-conserved lands only) East Indio Hills Conservation Area*

General Plan Designation (Map symbol) - Riverside County	***% of Private Non-conserved Land in Conservation Area***	***Building Intensity Range***
Open Space Conservation (OS-C)	2%	Protection of open space – natural hazards and resources
Open Space Rural (OS-RUR)	46%	1 unit per 20 acres
Open Space Water (OS-W)	37%	Bodies of water, floodplains, and natural or artificial drainage corridors
Estate Density Residential (EDR)	9%	1 unit per 10 acres
Open Space Recreation (OS-R)	6%	Active and passive recreational uses
TOTAL	**100%**	
General Plan Designation (Map symbol) - City of Indio	***% of Private Non-conserved Land in Conservation Area***	***Building Intensity Range***
Open Space (OS)	3%	1 unit per 20 acres
Residential Low (RL)	69%	Up to 5 units per acre
Public (P)	28%	Public facilities
TOTAL	**100%**	

[1] Based on 2003 general plan designations and 2003 parcel data.

Required Measures for the Conservation Area. Tables 4-81a, 4-81b, and 4-81c show how many acres of Existing Conservation Lands are in this Conservation Area and how many acres of Additional Conservation Lands will need to be conserved through acquisition or other means in each jurisdiction. The following measures will be imposed to achieve the Conservation Objectives in this Conservation Area.

1. Parcels north of the Coachella Canal in Sections 2 and 11, T5S R7E may be acquired from a willing seller. It is recognized that acquisition could occur through purchase of a fee simple or conservation easement interest, land exchange, dedication of land in exchange for density transfer, or dedication of land in exchange for the waiver of mitigation fees, up to the fair market value of the dedicated land, related to the Development of other land owned by the same person or entity in the City of Indio. Efforts to acquire any of these parcels for conservation purposes shall not be cause to impede an application to obtain Development entitlements consistent with the General Plan in effect at the time the Development is proposed and any entitlements so approved are a Covered Activity under the Plan.

2. In conjunction with its WRP recharge facility, CVWD will remove tamarisk from the site. In addition, if a study undertaken by the CVCC demonstrates the feasibility of mesquite restoration, CVWD will restore and enhance mesquite and Coachella Valley round-tailed ground squirrel Habitat on site pursuant to Required Measure 2 in Section 4.3.20. The process for evaluating the potential for mesquite hummock restoration and enhancement is described in Section 8.4.1.2. Within two years of Plan approval, a plan detailing the location, water requirements, and monitoring and management responsibilities, including funding, shall be provided to the Wildlife Agencies for review and approval. The Habitat will be established within three years of approval of this Plan by the Wildlife Agencies.

3. In addition to the CVWD requirement in Required Measure 2, CVCC will undertake additional mesquite hummocks restoration in this Conservation Area to ensure a total of 40 acres of mesquite Habitat is created. If 80% of the mesquite hummocks natural community in the south half of Section 17, T5S, R8E, is not conserved under the Plan, CVCC shall ensure the establishment of an additional 40 acres (80 acres total) of mesquite hummocks in this Conservation Area if Feasible. To the extent Feasible, the acreage to be established by CVCC will be sited on the CVWD land where CVWD establishes its required mesquite habitat. To the extent that the CVWD site does not accommodate the CVCC-required acres of mesquite hummocks restoration, CVCC will seek to establish the remaining requirement elsewhere in this Conservation Area. If establishment of the full acreage is not Feasible in this Conservation Area, establishment of acreage needed to reach the required total will occur in other appropriate Conservation Areas proximate to Coachella Valley round-tailed ground squirrel habitat.

4. The Permittees shall comply with applicable avoidance, minimization, and mitigation measures described in Section 4.4 and the Land Use Adjacency Guidelines as described in Section 4.5.

5. In order to be a Covered Activity under the Plan, any project in the south half of Section 17, T5S, R8E must provide for the permanent conservation of 80% of the mesquite natural community in an unfragmented manner in the above-described area. Take Authorization for Listed Species (animal species) would require a Minor Amendment with Wildlife Agency concurrence.

6. All otherwise lawful activities undertaken by Granite Construction Company, or its successor, in the area belonging to Granite Construction in Sections 34 and 35, T4S, R7E, and Section 2, T5S R7E, including currently permitted activities and any subsequently permitted mining activities, implementation of approved mining reclamation plans, and

future development activities outside the area depicted in Figure 4-20f are Covered Activities subject to the following Special Provisions:

(1) Upon cessation of mining activities and implementation of approved mining reclamation plans, the area depicted in Figure 4-20f shall be permanently conserved and added to the Reserve System through conveyance of fee title or a conservation easement to the CVCC, or through other means acceptable to the Wildlife Agencies. The area depicted lies between the west section line of Section 33, T4S R7E and a parallel line 1,320 feet to the east of that line. The purpose of conserving this area is to provide habitat connectivity for the Palm Springs pocket mouse and other species that may use this area.

(2) Granite Construction Company, or its successor, shall coordinate implementation of its approved mining reclamation plan(s) with CVCC and the appropriate RMUC to achieve the optimum Habitat restoration for the area to be conserved depicted in Figure 4-20f consistent with the approved mining reclamation plan(s).

[Note: a portion of the Granite Construction Company land is in this Conservation Area and a portion is in Indio Hills Palms Conservation Area. The map is shown only in Section 4.3.15.]

7. When the County issues discretionary approvals for the Adams Ranch project in Section 29, T4S R7E, it will ensure that the area within the transmission line corridor is conserved as permanent open space to maintain Habitat connectivity. This area is depicted in Figure 4-20e. If a new or amended specific plan is processed through the City of Indio after an annexation, the following language shall apply:

> *The Fiesta de Vida Specific Plan is a Covered Activity provided that the City requires and the landowner implements a functional biological corridor designed for small mammal movement between the East Indio Hills and Thousand Palms Conservation Areas. The biological corridor shall include the following components: (a) either the existing native plant community and/or mesquite hummocks restoration shall be maintained along the entire length and width of the utility corridor except where transportation access or golf course facilities cross the right-of-way; (b) wildlife undercrossings approved by the Wildlife Agencies shall be installed within the utility corridor along roadway crossings; and (c) mesquite hummocks creation consistent with the MSHCP, shall be interspersed throughout the golf course design and, if acceptable to the Bureau of Reclamation, in the Bureau of Reclamation floodway linking habitat to the east, as auxiliary connections.*

Table 4-81a: Conservation and Take Authorization for East Indio Hills Conservation Area - City of Coachella Area

(All acreages are based on 1996 pre-Planning Agreement information.)

Conservation Objective	*Total Acres in Conservation Area*	*Existing Conservation Lands*	*Acres of Disturbance Authorized*	*Remaining Acres to be Conserved*
Conserve Other Cons. Habitat for flat-tailed horned lizard (predicted)	6	0	1	5
Conserve Other Cons. Habitat for Le Conte's thrasher	62	0	6	56
Conserve Other Cons. Habitat for CV round-tailed ground squirrel	6	0	1	5
Conserve Other Cons. Habitat for Palm Springs pocket mouse	8	0	1	7

Table 4-81b: Conservation and Take Authorization for East Indio Hills Conservation Area - City of Indio Area

(All acreages are based on 1996 pre-Planning Agreement information.)

Conservation Objective[1]	*Total Acres in Conservation Area*	*Existing Conservation Lands*	*Acres of Disturbance Authorized*	*Remaining Acres to be Conserved*
Conserve Other Cons. Habitat for flat-tailed horned lizard (predicted)	114	3	11	100[1]
Conserve Other Cons. Habitat for Le Conte's thrasher	120	3	12	105[1]
Conserve Other Cons. Habitat for CV round-tailed ground squirrel	117	3	11	103[1]
Conserve Other Cons. Habitat for Palm Springs pocket mouse	117	3	11	103[1]
Conserve stabilized shielded desert sand fields	114	3	11	100[1]
Conserve mesquite hummocks	2	0	0	2

[1] Conservation of this Habitat is subject to the conditions in measure 1 of the Required Measures for the Conservation Area section.

Table 4-81c: Conservation and Take Authorization for East Indio Hills Conservation Area – Riverside County Area
(All acreages are based on 1996 pre-Planning Agreement information.)

Conservation Objective	*Total Acres in Conservation Area*	*Existing Conservation Lands*	*Acres of Disturbance Authorized*	*Remaining Acres to be Conserved*
Conserve Core Habitat for Mecca aster	1,594	433	116	1,045
Conserve Other Cons. Habitat for flat-tailed horned lizard (predicted)	525	64	46	415
Conserve Other Cons. Habitat for Le Conte's thrasher	1,960	568	139	1,253
Conserve Other Cons. Habitat for CV round-tailed ground squirrel	1,353	357	100	896
Conserve Other Cons. Habitat for Palm Springs pocket mouse	1,526	477	105	944
Conserve active desert dunes	5	0	1	4
Conserve stabilized and partially stabilized desert sand fields	331	3	33	295
Conserve stabilized shielded desert sand fields	401	117	28	256
Conserve mesquite hummocks	43	0	4	39
Conserve desert saltbush scrub	8	0	1	7

4.3.16 Joshua Tree National Park Conservation Area

Location and Description. The Joshua Tree National Park Conservation Area encompasses those parts of Joshua Tree National Park in the Plan Area that provide Habitat for the desert tortoise, the riparian bird species, southern yellow bat, and potential Habitat for the gray vireo. This includes most of the National Park land in the Plan Area. A portion of this Conservation Area is also in the Northern and Eastern Colorado Desert (NECO) Plan Area. This Conservation Area is depicted in Figure 4-21a. The Joshua Tree National Park Conservation Area contains a total of approximately 161,290 acres.

Core Habitat. This Conservation Area provides Core Habitat for the desert tortoise. A portion of the Habitat in Joshua Tree National Park has been designated as Critical Habitat for the desert tortoise. Figure 4-21b depicts the Core Habitat and selected Other Conserved Habitat.

Other Conserved Habitat. This Conservation Area contains suitable migration and breeding Habitat for the riparian species covered by the Plan. Given the scarcity of riparian Habitat in the desert, all riparian Habitat is considered important for these species, and is likely

to contribute to the Conservation of these species in their respective ranges. This Conservation Area provides Other Conserved Habitat for the southern yellow bat. There is also potential Habitat for the gray vireo and Other Conserved Habitat for Coachella Valley milkvetch, desert tortoise, Le Conte's thrasher, Coachella Valley round-tailed ground squirrel and Palm Springs pocket mouse. Table 4-82 shows the Covered Species occurring in this area.

Table 4-82: Species Habitat – Joshua Tree National Park Conservation Area
(All acreages are based on 1996 pre-Planning Agreement information.)

Species	*Total Acres of Habitat in the Conservation Area*	*Existing Conservation Lands*	*Acres of Habitat Not Currently Conserved*	*Habitat Designation*	*Acres of Core Habitat*
CV milkvetch	4	0	4	Other Cons. Habitat	0
Desert tortoise	127,161 / 4	110,086 / 4	17,075 / 0	Core / Other Cons. Habitat	127,161
Gray vireo	30,653	29,311	1,342	Other Cons. Habitat	0
Le Conte's thrasher	4,330	4,083	247	Other Cons. Habitat	0
Least Bell's vireo	5 / 2,195	5 / 2,063	0 / 132	Breeding / Migratory	N/A
Southwestern willow flycatcher	5 / 2,195	5 / 2,063	0 / 132	Breeding / Migratory	N/A
Summer tanager	5 / 2,195	5 / 2,063	0 / 132	Breeding / Migratory	N/A
Yellow-breasted chat	5 / 2,195	5 / 2,063	0 / 132	Breeding / Migratory	N/A
Yellow warbler	5 / 2,195	5 / 2,063	0 / 132	Breeding / Migratory	N/A
CV round-tailed ground squirrel	2	0	2	Other Cons. Habitat	0
Palm Springs pocket mouse	35	0	35	Other Cons. Habitat	0
Southern yellow bat	5	5	0	Other Cons. Habitat	0

Natural Communities. Table 4-83 shows that the conserved natural communities occurring in this area are Sonoran creosote bush scrub, Mojave mixed woody scrub, desert dry wash woodland, desert fan palm oasis woodland, and Mojavean pinyon and juniper woodland. Figure 4-21c depicts the conserved natural communities.

Table 4-83: Conserved[1] Natural Communities – Joshua Tree National Park Conservation Area
(All acreages are based on 1996 pre-Planning Agreement information.)

Natural Community	*Total Acres in the Conservation Area*	*Existing Conservation Land*	*Acres Not Currently Conserved*
Sonoran creosote bush scrub	70,498	62,891	7,607
Mojave mixed woody scrub	57,099	49,104	7,995
Desert dry wash woodland	2,195	2,063	132
Desert fan palm oasis woodland	5	5	0
Mojavean pinyon- juniper woodland	30,653	29,311	1,342

[1] Only natural communities to be conserved under the Plan are shown. Natural communities that are not included as described in Section 3.2.2 are not shown.

Essential Ecological Processes. Portions of this Conservation Area are also sand source and sand transport areas for the existing CVFTL Preserve. Figure 4-21d depicts the Essential Ecological Process areas.

Biological Corridors and Linkages. Joshua Tree National Park is linked to the Thousand Palms Conservation Area through the Indio Hills/Joshua Tree National Park Linkage Conservation Area. This connection contributes to protecting biodiversity in the Plan Area.

Conservation Objectives. The Conservation Objectives for this Conservation Area are:

1. In total, 35,600 acres of the Joshua Tree National Park Conservation Area shall be conserved. (This may be less than the sum of acres indicated in the following objectives because there can be overlap among areas covered by the objectives. For example, Core Habitat for two or more species may overlap, or Core Habitat and an Essential Ecological Process area may overlap. The individual acreage figures will be used in compliance monitoring.)
2. Conserve Core Habitat for desert tortoise, potential Habitat for gray vireo, and ecological processes for the Joshua Tree National Park Conservation Area (as set forth below), allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused disturbance, and edge effects to Core Habitat by conserving contiguous Habitat patches and effective Linkages between patches of Core Habitat.
    a. Conserve at least 15,367 acres of Core Habitat for desert tortoise. Protect individual tortoises within the area when allowed Development does occur.
    b. Conserve at least 1,208 acres of Other Conserved Habitat for the gray vireo.
    c. Conserve at least 222 acres of Other Conserved Habitat for Le Conte's thrasher. Conserve Le Conte's thrasher nesting sites as described in Section 4.4 avoidance, minimization, and mitigation measures.

d. Maintain the current capacity for fluvial sand transport in the washes emanating from the Little San Bernardino Mountains that provide sand for the Thousand Palms Conservation Area.

3. Conserve at least 7,195 acres of the Mojave mixed woody scrub and at least 1,208 acres of the Mojavean pinyon and juniper woodland natural communities

4. Conserve at least 119 acres of the desert dry wash woodland natural community, which provides Habitat for riparian birds and other Covered Species.

Ownership and General Plan Land Use Designations. Table 4-84 shows the public versus private ownership of lands within this Conservation Area.

Table 4-84: Land Ownership
Joshua Tree National Park Conservation Area
(rounded to nearest 10 acres)

Ownership[1]	***Acres***
Existing Conservation Lands:	*138,560*
BLM	40
NPS	138,000
State Lands Commission	520
Lands Not Currently Conserved:	*22,730*
CVWD	560
Public, Quasi-public entities	1,180
Private	20,990
TOTAL	**161,290**

[1] Based on 1996 pre-Planning Agreement land ownership information

Table 4-85: General Plan Land Use Designations[1]
(Non-conserved lands only)
Joshua Tree National Park Conservation Area

General Plan Designation (Map symbol) - Riverside County	***% of Private Non-conserved Land in Conservation Area***	***Building Intensity Range***
Open Space Rural (OS-RUR)	100%	1 unit per 20 acres
TOTAL	**100%**	

[1] Based on 2003 general plan designations and 2003 parcel data

As seen in Table 4-84, approximately 77% of the land in this Conservation Area is currently in public or nonprofit conservation organization ownership. Current conservation ranges from Level 1 to Level 3. Conservation management will be improved where needed through management prescriptions to be adopted by the relevant agency as Feasible. Figure 4-21e shows the Existing Conservation Lands and general plan land use designations on Level 4 lands for the Conservation Area.

Required Measures for the Conservation Area. Table 4-86 shows how many acres of Existing Conservation Lands are in this Conservation Area and how many acres of Additional Conservation Lands will need to be conserved through acquisition or other means. The following measures will be imposed to achieve the Conservation Objectives in this Conservation Area.

1. The Permittees shall comply with applicable avoidance, minimization, and mitigation measures described in Section 4.4 and the Land Use Adjacency Guidelines as described in Section 4.5.

Table 4-86: Conservation and Take Authorization for Joshua Tree National Park Conservation Area

(All acreages are based on 1996 pre-Planning Agreement information.)

Conservation Objective	*Total Acres in Conservation Area*	*Existing Conservation Lands*	*Acres of Disturbance Authorized*	*Remaining Acres to be Conserved*
Conserve Core Habitat for desert tortoise	127,161	110,086	1,708	15,367
Conserve Other Cons. Habitat for gray vireo	30,653	29,311	134	1,208
Conserve Other Cons. Habitat Le Conte's thrasher	4,330	4,083	25	222
Conserve Mojave mixed woody scrub	57,099	49,104	800	7,195
Conserve desert dry wash woodland	2,195	2,063	13	119
Conserve desert fan palm oasis woodland	5	5	0	0
Conserve Mojavean pinyon-juniper woodland	30,653	29,311	134	1,208

4.3.17 Desert Tortoise and Linkage Conservation Area

Location and Description. The Desert Tortoise and Linkage Conservation Area encompasses most of the land between the Mecca Hills and Orocopia Mountains Wildernesses and Joshua Tree National Park in the eastern portion of the Plan Area. I-10 bisects this area. This area is depicted in Figure 4-22a. The Desert Tortoise and Linkage Conservation Area contains a total of approximately 89,900 acres.

Core Habitat. The Desert Tortoise and Linkage Conservation Area contains Core Habitat for the desert tortoise. For the Mecca aster and Orocopia sage, the Habitat is contiguous with that in the Mecca Hills/Orocopia Mountains Conservation Area and is functionally part of that Core Habitat. Figure 4-22b depicts the Core Habitat and selected Other Conserved Habitat.

Other Conserved Habitat. This area contains Other Conserved Habitat for Le Conte's thrasher, desert tortoise, Coachella Valley round-tailed ground squirrel, and the Palm Springs pocket mouse. While a viable population of Le Conte's thrasher is not thought to exist within this Conservation Area, the Habitat is likely to contribute to the conservation of this species in its

range. The area contains suitable migration Habitat for the riparian bird species covered by the Plan. Given the scarcity of riparian Habitat in the desert, all riparian Habitat is considered important for these species, and is likely to contribute to the Conservation of these species in their respective ranges. Table 4-87 shows the Covered Species occurring in this area.

Table 4-87: Species Habitat – Desert Tortoise and Linkage Conservation Area

(All acreages are based on 1996 pre-Planning Agreement information.)

Species	*Total Acres of Habitat in the Conservation Area*	*Existing Conservation Lands*	*Acres of Habitat Not Currently Conserved*	*Habitat Designation*	*Acres of Core Habitat*
Mecca aster	4,731	2,670	2,061	Core	4,731
Orocopia sage	779	337	442	Core	779
Desert tortoise	89,178 / 4	38,903 / 0	50,275 / 4	Core / Other Cons. Habitat	89,178
Le Conte's thrasher	49,414	20,982	28,432	Other Cons. Habitat	0
Least Bell's vireo	13,564	5,920	7,644	Migratory	N/A
SW willow flycatcher	13,564	5,920	7,644	Migratory	N/A
Summer tanager	13,564	5,920	7,644	Migratory	N/A
Yellow-breasted chat	13,564	5,920	7,644	Migratory	N/A
Yellow warbler	13,564	5,920	7,644	Migratory	N/A
CV round-tailed ground squirrel	43	1	42	Other Cons. Habitat	0
Palm Springs pocket mouse	2,122	436	1,686	Other Cons. Habitat	0

Natural Communities. Table 4-88 shows that the conserved natural communities occurring in this area are Sonoran creosote bush scrub, Sonoran mixed woody and succulent scrub, Mojave mixed woody scrub, and desert dry wash woodland. Figure 4-22c depicts the conserved natural communities.

Table 4-88: Conserved[1] Natural Communities – Desert Tortoise and Linkage Conservation Area
(All acreages are based on 1996 pre-Planning Agreement information.)

Natural Community	*Total Acres in the Conservation Area*	*Existing Conservation Land*	*Acres Not Currently Conserved*
Sonoran creosote bush scrub	58,229	25,895	32,334
Sonoran mixed woody & succulent scrub	129	0	129
Mojave mixed woody scrub	17,264	7,090	10,174
Desert dry wash woodland	13,564	5,920	7,644

[1] Only natural communities to be conserved under the Plan are shown. Natural communities that are not included as described in Section 3.2.2 are not shown.

Essential Ecological Processes. Hydrological processes in this area maintain desert dry wash woodland and desert fan palm oasis woodland.

Biological Corridors and Linkages. This area provides Biological Corridors focused on large I-10 underpasses, linking the Mecca Hills and Orocopia Mountains Wildernesses with Joshua Tree National Park. North of I-10 and west of Thermal Canyon, this Conservation Area also includes the lower slopes of the Little San Bernardino Mountains and their associated canyon mouths and alluvial fans to provide a Linkage to the central part of the Plan Area. Desert tortoise and Palm Springs pocket mouse, which has scattered Habitat in this area, may use this corridor. Coyotes, bobcats, and other mammals may also use the Biological Corridors in this area. Figure 4-22d depicts the Biological Corridors and Linkages. See Section 4.5.6 in Appendix I for details about the culverts under I-10 in these Biological Corridors.

Conservation Objectives. The Conservation Objectives for this Conservation Area are:

1. In total, 46,350 acres of the Desert Tortoise Linkage Conservation Area shall be conserved. (This may be less than the sum of acres indicated in the following objectives because there can be overlap among areas covered by the objectives. For example, Core Habitat for two or more species may overlap, or Core Habitat and an Essential Ecological Process area may overlap. The individual acreage figures will be used in compliance monitoring.)
2. Conserve Core Habitat as set forth below for desert tortoise, allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused disturbance, and edge effects to Core Habitat by conserving contiguous Habitat and effective Linkages between patches of Core Habitat. In addition, conserve Habitat for the Mecca aster and Orocopia sage, for which this area provides Core Habitat in conjunction with that in the Mecca Hills/Orocopia Mountains Conservation Area.
    a. Conserve at least 44,977 acres of Core Habitat for the desert tortoise in the Riverside County portion of the area, and at least 270 acres in the City of Coachella portion.

Protect individual tortoises within the area when allowed Development does occur. Priority will be given to conserving Core Habitat in the Desert Wildlife Management Area for desert tortoise delineated in the NECO Plan.

b. Conserve at least 1,855 acres of Core Habitat for the Mecca aster in the Riverside County portion of the Conservation Area.

c. Conserve at least 398 acres of Core Habitat for the Orocopia sage in the Riverside County portion of the Conservation Area.

3. Conserve at least 25,319 acres of Other Conserved Habitat for Le Conte's thrasher in the Riverside County portion of the area, and at least 270 acres in the City of Coachella portion. Conserve Le Conte's thrasher nesting sites as described in Section 4.4 avoidance, minimization, and mitigation measures.

4. Conserve at least 6,771 acres of the desert dry wash woodland natural community in the Riverside County portion of the area, and at least 109 acres in the City of Coachella portion. Maintain the current capacity for flows in the washes that maintain desert dry wash woodland. This natural community provides Habitat for riparian birds and other Covered Species.

5. Conserve at least 14,143 acres, such that the functionality of each individual Biological Corridor listed below is not compromised, to maintain Linkages between the Joshua Tree National Park Conservation Area and the Mecca Hills/Orocopia Mountains Conservation Area and Biological Corridors under I-10 for desert tortoise, and to maintain ecosystem function for Covered Species.

   a. Conserve Corridor 1, centered on Thermal Canyon.

   b. Conserve Corridor 2 centered on the E. Cactus City Wash and Hazy Gulch culverts.

   c. Conserve Corridor 3 centered on the Happy Gulch culvert.

   d. Conserve Corridor 4 centered on the Desperation Arroyo culvert.

   e. Conserve Corridor 5 centered on the Desperation Arroyo, West Buried Mountain Wash, Buried Mountain Wash, Resurrection Wash, West Saddle Gulch, Saddle Gulch, West Cotton Gulch, Cotton Gulch, East Cotton Gulch, and Paul Gulch culverts.

   Aside from the freeway bridges and culverts and any Existing Use areas, which are unavoidably narrow segments, the Biological Corridors shall expand to one mile wide to minimize edge effects.

6. Maintain the bridges on I-10 and the culverts under I-10 associated with the aforementioned corridors so as not to affect the existing hydrological regime and Biological Corridors.

Ownership and General Plan Land Use designations. Table 4-89 shows the public versus private ownership of lands within this Conservation Area.

Table 4-89: Land Ownership Desert Tortoise and Linkage Conservation Area (rounded to nearest 10 acres)

Ownership[1]	*Acres*
Existing Conservation Lands:	*38,720*
BLM	38,640
CVMC	80
Lands Not Currently Conserved:	*51,180*
CVWD	80
IID	80
Private	44,150
Public, Quasi-public entities	4,770
Riverside County	10
State Lands Commission	2,090
TOTAL	**89,900**

[1] Based on 1996 pre-Planning Agreement land ownership information

Table 4-90: General Plan Land Use Designations[1] *(Non-conserved lands only) Desert Tortoise and Linkage Conservation Area*

General Plan Designation (Map symbol) - Riverside County	*% of Private Non-conserved Land in Conservation Area*	*Building Intensity Range*
Open Space Rural (OS-RUR)	99%	1 unit per 20 acres
Freeway[2] (FWY)	---	
Open Space Minerals[2] (OS-MIN)	---	Minerals extraction and processing facilities
Rural Desert[2] (RD)	---	1 unit per 10 acres
TOTAL	**100%**	
General Plan Designation (Map symbol) - City of Coachella	*% of Private Non-conserved Land in Conservation Area*	*Building Intensity Range*
Low Density Residential (LDR)	100%	0-6 units per acre
TOTAL	**100%**	

[1] Based on 2003 general plan designations and 2003 parcel data.
[2] Statistically insignificant (less than 1%).

As seen in Table 4-89, approximately 43% of the land in this Conservation Area is currently in public or nonprofit conservation organization ownership. Current conservation ranges from Level 1 to Level 3. Conservation management will be improved where needed through management prescriptions to be adopted by the relevant agency as Feasible. Figure 4-22e shows the Existing Conservation Lands and general plan land use designations on Level 4 lands for the area.

Required Measures for the Conservation Area. Tables 4-91a and 4-91b show how many acres of Existing Conservation Lands are in this Conservation Area and how many acres of Additional Conservation Lands will need to be conserved through acquisition or other means.

The following measures will be imposed to achieve the Conservation Objectives in this Conservation Area.

1. The existing bridges on, and culverts under, I-10 listed below, and indicated on Figure 4-22d will be maintained by Caltrans at no less than their current size, with soft-bottoms for the culverts, to maintain hydrological process and Biological Corridor functions for desert tortoise and other species.
   a. Corridor 1 centered on Thermal Canyon
   b. Corridor 2 centered on the E. Cactus City Wash and Hazy Gulch culverts.
   c. Corridor 3 centered on the Happy Gulch culvert.
   d. Corridor 4 centered on the Desperation Arroyo culvert.
   e. Corridor 5 centered on the Desperation Arroyo, West Buried Mountain Wash, Buried Mountain Wash, Resurrection Wash, West Saddle Gulch, Saddle Gulch, West Cotton Gulch, Cotton Gulch, East Cotton Gulch, and Paul Gulch culverts.
2. The Permittees shall comply with applicable avoidance, minimization, and mitigation measures described in Section 4.4 and the Land Use Adjacency Guidelines as described in Section 4.5.

Table 4-91a: Conservation and Take Authorization for Desert Tortoise and Linkage Conservation Area – City of Coachella Area
(All acreages are based on 1996 pre-Planning Agreement information.)

Conservation Objective	*Total Acres in Conservation Area*	*Existing Conservation Lands*	*Acres of Disturbance Authorized*	*Remaining Acres to be Conserved*
Conserve Core Habitat for desert tortoise	300	0	30	270
Conserve Other Cons. Habitat for Le Conte's thrasher	300	0	30	270
Conserve desert dry wash Woodland	121	0	12	109

Table 4-91b: Conservation and Take Authorization for Desert Tortoise and Linkage Conservation Area – Riverside County Area
(All acreages are based on 1996 pre-Planning Agreement information.)

Conservation Objective	*Total Acres in Conservation Area*	*Existing Conservation Lands*	*Acres of Disturbance Authorized*	*Remaining Acres to be Conserved*
Conserve Core Habitat for Mecca aster	4,731	2,670	206	1,855
Conserve Core Habitat for Orocopia sage	779	337	44	398
Conserve Core Habitat for desert tortoise	88,878	38,903	4,998	44,977
Conserve Other Cons. Habitat for Le Conte's thrasher	49,114	20,982	2,813	25,319
Conserve desert dry wash woodland	13,443	5,920	752	6,771
Conserve Biological Corridors [1]	26,122	10,407	1,572	14,143

[1] Includes Thermal Canyon Biological Corridor #1 and Biological Corridors #2, #3, and #4

4.3.18 Mecca Hills/Orocopia Mountains Conservation Area

Location and Description. The Mecca Hills/Orocopia Mountains Conservation Area consists predominantly of the Mecca Hills Wilderness and the Orocopia Mountains Wilderness. The area also includes non-Wilderness lands south of the Wilderness areas, to the west as part of a Biological Corridor along Thermal Canyon Wash, and to the east to the Plan Area boundary. A portion of the Chuckwalla Bench ACEC also occurs in this area. This Conservation Area is depicted in Figure 4-23a. The Mecca Hills/Orocopia Mountains Conservation Area contains a total of approximately 112,780 acres.

Core Habitat. This Conservation Area contains Core Habitat for the Mecca aster and Orocopia sage. The desert tortoise Habitat in this area, a portion of which has been designated Critical Habitat for the species, is contiguous with the Habitat in the Desert Tortoise and Linkage Conservation Area. These areas together constitute Core Habitat for the species. Figure 4-23b depicts the Core Habitat and selected Other Conserved Habitat.

Other Conserved Habitat. The Conservation Area contains suitable migration and breeding Habitat for the riparian bird species covered by the Plan. Given the scarcity of riparian Habitat in the desert, all riparian Habitat is considered important for these species, and is likely to contribute to the Conservation of these species in their respective ranges. There is Other Conserved Habitat for Mecca aster, Le Conte's thrasher, Coachella Valley round-tailed ground squirrel, Palm Springs pocket mouse, and southern yellow bat. For the pocket mouse this area probably contains contact zones between the Palm Springs pocket mouse subspecies and other subspecies to the north and east. Table 4-92 shows the Covered Species occurring in this area.

Table 4-92: Species Habitat – Mecca Hills/ Orocopia Mountains Conservation Area

(All acreages are based on 1996 pre-Planning Agreement information.)

Species	*Total Acres of Habitat in the Conservation Area*	*Existing Conservation Lands*	*Acres of Habitat Not Currently Conserved*	*Habitat Designation*	*Acres of Core Habitat*
Mecca aster	31,655 / 17	27,009 / 0	4,646 / 17	Core / Other Cons. Habitat	31,655
Orocopia sage	66,180	48,150	18,030	Core	66,180
Desert tortoise[1]	112,575	86,334	26,241	Core	112,575
Le Conte's thrasher	17,467	10,949	6,518	Other Cons. Habitat	0
Least Bell's vireo	1 / 9,435	1 / 6,241	0 / 3,194	Breeding / Migratory	N/A
SW willow flycatcher	1 / 9,435	1 / 6,241	0 / 3,194	Breeding / Migratory	N/A
Summer tanager	1 / 9,435	1 / 6,241	0 / 3,194	Breeding / Migratory	N/A
Yellow-breasted chat	1 / 9,435	1 / 6,241	0 / 3,194	Breeding / Migratory	N/A
Yellow warbler	1 / 9,435	1 / 6,241	0 / 3,194	Breeding / Migratory	N/A
CV round-tailed ground squirrel	240	232	8	Other Cons. Habitat	0
Palm Springs pocket mouse	1,946	462	1,484	Other Cons. Habitat	0
Southern yellow bat	1	1	0	Other Cons. Habitat	0

[1] Acreage shown is in conjunction with the Desert Tortoise and Linkage Conservation Area.

Natural Communities. Table 4-93 shows that the conserved natural communities occurring in this area are Sonoran creosote bush scrub, desert dry wash woodland, and desert fan palm oasis woodland. Figure 4-23c depicts the conserved natural communities.

Table 4-93: Conserved[1] Natural Communities – Mecca Hills/Orocopia Mountains Conservation Area

(All acreages are based on 1996 pre-Planning Agreement information.)

Natural Community	*Total Acres in the Conservation Area*	*Existing Conservation Lands*	*Acres Not Currently Conserved*
Sonoran creosote bush scrub	103,456	80,320	23,136
Desert dry wash woodland	9,317	6,138	3,179
Desert fan palm oasis woodland	1	1	0

[1] Only natural communities to be conserved under the Plan are shown. Natural communities that are not included as described in Section 3.2.2 are not shown.

Essential Ecological Processes. Hydrological processes in this area maintain desert dry wash woodland and desert fan palm oasis woodland.

Biological Corridors and Linkages. This area provides a Linkage between Dos Palmas Conservation Area to the south and the Desert Tortoise and Linkage Conservation Area and Joshua Tree National Park to the north. This area also links the Plan Area with protected BLM lands to the east in the Chuckwalla Bench ACEC. Figure 4-23d depicts the Biological Corridors and Linkages.

Conservation Objectives. The Conservation Objectives for this Conservation Area are:

1. In total, 23,670 acres of the Mecca Hills/Orocopia Mountains Conservation Area shall be conserved. (This may be less than the sum of acres indicated in the following objectives because there can be overlap among areas covered by the objectives. For example, Core Habitat for two or more species may overlap, or Core Habitat and an Essential Ecological Process area may overlap. The individual acreage figures will be used in compliance monitoring.)
2. Conserve Core Habitat for Mecca aster, Orocopia sage, and desert tortoise (as set forth below), allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused disturbance, and edge effects to Core Habitat by conserving contiguous Habitat patches and effective Linkages between patches of Core Habitat.
    a. Conserve at least 4,181 acres of Core Habitat for the Mecca aster.
    b. Conserve at least 16,227 acres of Core Habitat for the Orocopia sage.
    c. Conserve at least 23,617 acres of Core Habitat for the desert tortoise. Protect individual tortoises within the area when allowed Development does occur.
3. Conserve at least 5,866 acres of Other Conserved Habitat for Le Conte's thrasher. Conserve Le Conte's thrasher nesting sites as described in Section 4.4 avoidance, minimization, and mitigation measures.
4. Conserve at least 2,861 acres of the desert dry wash woodland natural community, which provides Habitat for the riparian birds and other Covered Species.

Ownership and General Plan Land Use Designations. Table 4-94 shows the public versus private ownership of lands within this Conservation Area.

As seen in Table 4-94, approximately 77% of the land in this Conservation Area is currently in public ownership. Current conservation ranges from Level 1 to Level 3. Conservation management will be improved where needed through management prescriptions to be adopted by the relevant agency as Feasible. Figure 4-23e shows the Existing Conservation Lands and general plan land use designations on Level 4 lands for the area.

Table 4-94: Land Ownership Mecca Hills/ Orocopia Mountains Conservation Area
(rounded to nearest 10 acres)

Ownership[1]	***Acres***
Existing Conservation Lands:	*86,460*
BLM	86,460
Lands Not Currently Conserved:	*26,320*
CVWD	20
Private	23,980
State Lands Commission	2,320
TOTAL	**112,780**

[1] Based on 1996 pre-Planning Agreement land ownership information

Table 4-95: General Plan Land Use Designations[1] *(Non-conserved lands only) Mecca Hills/ Orocopia Mountains Conservation Area*

General Plan Designation (Map symbol) - Riverside County	***% of Private Non-conserved Land in Conservation Area***	***Building Intensity Range***
Open Space Rural (OS-RUR)	98%	1 unit per 20 acres
Open Space Minerals (OS-MIN)	2%	Minerals extraction and processing facilities
TOTAL	**100%**	

[1] Based on 2003 general plan designations and 2003 parcel data

Required Measures for the Conservation Area. Table 4-96 shows how many acres of Existing Conservation Lands are in this Conservation Area and how many acres of Additional Conservation Lands will need to be acquired or otherwise conserved through acquisition or other means. The following measure will be imposed to achieve the Conservation Objectives in this Conservation Area.

1. The Permittees shall comply with applicable avoidance, minimization, and mitigation measures described in Section 4.4 and the Land Use Adjacency Guidelines as described in Section 4.5.

Table 4-96: Conservation and Take Authorization for Mecca Hills/Orocopia Mountains Conservation Area
(All acreages are based on 1996 pre-Planning Agreement information.)

Conservation Objective	***Total Acres in Conservation Area***	***Existing Conservation Lands***	***Acres of Disturbance Authorized***	***Remaining Acres to be Conserved***
Conserve Core Habitat for Mecca aster	31,655	27,009	465	4,181
Conserve Core Habitat for Orocopia sage	66,180	48,150	1,803	16,227
Conserve Core Habitat for desert tortoise	112,575	86,334	2,624	23,617
Conserve Other Cons. Habitat for Le Conte's thrasher	17,467	10,949	652	5,866
Conserve desert dry wash woodland	9,317	6,138	318	2,861
Conserve desert fan palm oasis woodland	1	1	0	0

4.3.19 Dos Palmas Conservation Area

Location and Description. The Dos Palmas Conservation Area lies south of the Mecca Hills and Orocopia Mountains Conservation Area, on the south side of the Coachella Canal, and east of the Salton Sea. The Dos Palmas Conservation Area consists of the existing Dos Palmas ACEC, the existing Oasis Springs Ecological Reserve, and a portion of the existing Salton Sea State Recreation Area. To these existing areas, the Conservation Area adds lands to the east of the ACEC to conserve all the Habitat to the Plan Area boundary with the Chocolate Mountains Aerial Gunnery Range. The Conservation Area also adds lands to the south to connect the ACEC with the adjacent potential Habitat in Imperial County, and to the north to improve the connectivity with the Mecca Hills/Orocopia Mountains Conservation Area. This Conservation Area is depicted in Figure 4-24a. The Dos Palmas Conservation Area contains a total of approximately 25,380 acres.

Core Habitat. This Conservation Area contains Core Habitat for desert pupfish (both natural Habitat in Salt Creek and three refugia populations), and crissal thrasher. Figure 4-24b depicts the Core Habitat and selected Other Conserved Habitat.

Other Conserved Habitat. The Conservation Area also protects one of the two known Habitat areas in the Plan Area for Yuma clapper rail and California black rail. The Conservation Area also provides Other Conserved Habitat for Orocopia sage, desert tortoise, flat-tailed horned lizard, Le Conte's thrasher, Coachella Valley round-tailed ground squirrel, Palm Springs pocket mouse, and southern yellow bat. The flat-tailed horned lizard Habitat connects with additional Habitat for this species to the south in Imperial County. The Conservation Area contains suitable migration and breeding Habitat for the riparian species covered by the Plan. Given the scarcity of riparian Habitat in the desert, all riparian Habitat is considered important for these species, and is likely to contribute to the Conservation of these species in their respective ranges. Table 4-97 shows the species occurring in this Conservation Area.

Table 4-97: Species Habitat - Dos Palmas Conservation Area
(All acreages are based on 1996 pre-Planning Agreement information.)

Species	*Total Acres of Habitat in the Conservation Area*	*Existing Conservation Lands*	*Acres of Habitat Not Currently Conserved*	*Habitat Designation*	*Acres of Core Habitat*
Orocopia sage	4,022	2,177	1,845	Other Cons. Habitat	0
Desert Pupfish[1]	($30m^2$)	($30m^2$)	0	Core	($30m^2$)
Desert tortoise	334	317	17	Other Cons. Habitat	0
Flat-tailed horned lizard	5,537	1,503	4,034	Pred. Other Cons. Habitat	0
California black rail	597	226	371	Other Cons. Habitat	0
Crissal thrasher	536	155	381	Core	536

Table 4-97 (cont.)

Species	*Total Acres of Habitat in the Conservation Area*	*Existing Conservation Lands*	*Acres of Habitat Not Currently Conserved*	*Habitat Designation*	*Acres of Core Habitat*
Le Conte's thrasher	14,882	7,450	7,432	Other Cons. Habitat	0
Least Bell's vireo	182 / 10,129	98 / 3,716	84 / 6,413	Breeding / Migratory	N/A
Southwestern willow flycatcher	125 / 10,184	69 / 3,745	56 / 6,439	Breeding / Migratory	N/A
Summer tanager	125 / 10,184	69 / 3,745	56 / 6,439	Breeding / Migratory	N/A
Yellow-breasted chat	404 / 9,908	212 / 3,602	192 / 6,306	Breeding / Migratory	N/A
Yellow warbler	125 / 10,184	69 / 3,745	56 / 6,439	Breeding / Migratory	N/A
Yuma clapper rail	682	267	415	Other Cons. Habitat	0
CV round-tailed ground squirrel	4,490	2,631	1,859	Other Cons. Habitat	0
Palm Springs pocket mouse	8,147	4,617	3,530	Other Cons. Habitat	0
Southern yellow bat	125	69	56	Other Cons. Habitat	0

[1] The acreage refers to the non-refugia population.

Natural Communities. Table 4-98 shows that the conserved natural communities occurring in this Conservation Area are mesquite hummocks, Sonoran creosote bush scrub, desert sink scrub, cismontane alkali marsh, desert dry wash woodland, desert fan palm oasis woodland, arrowweed scrub, and mesquite bosque. This Conservation Area includes 100% of the arrowweed scrub, 62% of the desert sink scrub, 100% of the cismontane alkali marsh, and 100% of the mesquite bosque in the Plan Area. This Conservation Area affords important Habitat restoration opportunities because of the prevalence of tamarisk. Figure 4-24c depicts the conserved natural communities.

Table 4-98: Conserved[1] Natural Communities – Dos Palmas Conservation Area

(All acreages are based on 1996 pre-Planning Agreement information.)

Natural Community	*Total Acres in the Conservation Area*	*Existing Conservation Lands*	*Acres Not Currently Conserved*
Mesquite hummocks	55	29	26
Sonoran creosote bush scrub	12,177	5,939	6,238
Desert sink scrub	7,195	2,327	4,868

Table 4-98 (cont.)

Natural Community	*Total Acres in the Conservation Area*	*Existing Conservation Lands*	*Acres Not Currently Conserved*
Arrowweed scrub	277	143	134
Cismontane alkali marsh	321	93	228
Mesquite bosque	482	127	355
Desert dry wash woodland	1,856	1,027	829
Desert fan palm oasis woodland	125	69	56

[1] Only natural communities to be conserved under the Plan are shown. Natural communities that are not included as described in Section 3.2.2 are not shown.

Essential Ecological Processes. The ecological processes for this area have been somewhat impacted by the Coachella Canal, which has blocked some of the natural drainage patterns from the Orocopia Mountains. The drainage for Salt Creek, however, is largely intact. Leakage from the canal has also created some wetlands areas. For water conservation purposes, the canal is being lined to prevent leakage.

Biological Corridors and Linkages. While the Coachella Canal has disrupted connectivity with the Orocopia Mountains to the north to some extent, there are sufficient "siphon" areas where the canal runs underground, providing areas where wildlife may freely move from one side of the canal to the other.

Conservation Objectives. The Conservation Objectives for this Conservation Area are:

1. In total, 12,870 acres of the Dos Palmas Conservation Area shall be conserved. (This may be less than the sum of acres indicated in the following objectives because there can be overlap among areas covered by the objectives. For example, Core Habitat for two or more species may overlap, or Core Habitat and an Essential Ecological Process area may overlap. The individual acreage figures will be used in compliance monitoring.)
2. Conserve Core Habitat for crissal thrasher; and Habitat for the California black rail and Yuma clapper rail as set forth below, allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused disturbance, and edge effects to Core Habitat by conserving contiguous Habitat patches and effective Linkages between patches of Core Habitat.
   a. Conserve at least 343 acres of Core Habitat for the crissal thrasher.
   b. Conserve at least 334 acres of Other Conserved Habitat for the California black rail.
   c. Conserve at least 374 acres of Other Conserved Habitat for the Yuma clapper rail.
3. Conserve at least 6,689 acres of Other Conserved Habitat for Le Conte's thrasher. Conserve Le Conte's thrasher nesting sites as described in Section 4.4 avoidance, minimization, and mitigation measures.

4. Conserve at least 3,631 acres of Other Conserved Habitat for the flat-tailed horned lizard.
5. Conserve all known locations for the desert pupfish. Conserve newly found locations of this species in the area.
6. Maintain the refugium populations of the desert pupfish in accordance with the Desert Pupfish Recovery Plan.
7. Conserve at least 23 acres of the mesquite hummocks, at least 205 acres of the cismontane alkali marsh, at least 746 acres of the desert dry wash woodland, at least 134 acres of the arrowweed scrub, and at least 320 acres of the mesquite bosque natural communities, which provide Habitat for the riparian birds and other Covered Species. Where disturbance is authorized for cismontane alkali marsh and arrowweed scrub, ensure no net loss.
8. Conserve at least 50 acres of the desert fan palm oasis woodland for the conservation of the southern yellow bat.
9. Conserve at least 4,381 acres of the desert sink scrub natural community.
10. Remove tamarisk to improve Habitat values.

Ownership and General Plan Land Use Designations. Table 4-99 shows the public versus private ownership of lands within this Conservation Area.

Table 4-99: Land Ownership
Dos Palmas Conservation Area
(rounded to nearest 10 acres)

Ownership[1]	***Acres***
Existing Conservation Lands:	*11,070*
BLM	9,800
Bureau of Reclamation	620
~~CDFG~~CDFW	490
State Parks	160
Lands Not Currently Conserved:	*14,310*
Private	13,360
Public, Quasi-public entities	60
State Lands Commission	890
TOTAL	**25,380**

[1]Based on 1996 pre-Planning Agreement land ownership information

Table 4-100: General Plan Land Use Designations[1] (Non-conserved lands only) Dos Palmas Conservation Area

General Plan Designation (Map symbol) - Riverside County	*% of Private Non-conserved Land in Conservation Area*	*Building Intensity Range*
Open Space Rural (OS-RUR)	99%	1 unit per 20 acres
Open Space Water (OS-W)	1%	bodies of water, floodplains, and natural or artificial drainage corridors
TOTAL	**100%**	

[1] Based on 2003 general plan designations and 2003 parcel data

As seen in Table 4-99, approximately 44% of the land in this Conservation Area was in public or non-profit conservation organization ownership in 1996. Conservation management will be improved where needed through management prescriptions to be adopted by the relevant agency as Feasible. Figure 4-24d shows the Existing Conservation Lands and general plan land use designations on Level 4 lands for the Conservation Area.

Required Measures for the Conservation Area. Table 4-101 shows how many acres of Existing Conservation Lands are in this Conservation Area and how many acres of Additional Conservation Lands will need to be acquired or otherwise conserved through acquisition or other means. The following measures will be imposed to achieve the Conservation Objectives in this Conservation Area.

1. The refugia populations of the desert pupfish on ~~CDFG~~CDFW lands will be maintained in accordance with the Desert Pupfish Recovery Plan.
2. The Yuma clapper rail and the California black rail are Fully Protected Species. As long as the Yuma clapper rail and the California black rail are Fully Protected Species, surveys for the rails will be required in cismontane alkali marsh before any activity that would impact the Habitat. If rails are found, the Habitat must be avoided or measures approved by the Wildlife Agencies taken to ensure that no Take of an individual occurs, other than for projects where Fish and Game Code Section 2081.7 is applicable. If legislation removes Fully Protected status for the rails, the establishment of the permanent Habitat for the rails pursuant to Required Measure 1 in Section 4.3.20 will be adequate mitigation for the loss of Habitat for CVWD Covered Activities. For other authorized Take, establishment of new Habitat at a 2:1 ratio will be undertaken by the entity impacting the species to achieve a no net loss of wetlands Habitat in the MSHCP Reserve System.
3. For Highway 111 bridge widening over Salt Creek, prior to construction Caltrans will conduct surveys to determine if Yuma clapper rails or California black rails are present. If present, no activities will occur that would result in Take under CESA. If legislation removes the rails from the list of Fully Protected Species, activities could occur only outside of the breeding season if rails are present.
4. For Highway 111 bridge widening over Salt Creek, Caltrans will limit working in the wetted portions of the stream. When working in the wetted portions of the stream, Caltrans will place 1/8" or smaller mesh block seines 50 meters upstream and downstream of the work area. Any pupfish found will be removed from the area utilizing

the best method available and placed outside of the blocked section. Once pupfish have been removed, work may occur in the area. The block seines will be checked a minimum of two times a day to assure that they are intact. If any method of egress is observed, work will stop and a survey will be done to determine if a significant number of pupfish have entered the work area. If this occurs, pupfish will again be removed prior to commencing work. Alternatively methods of avoidance may be proposed by Caltrans prior to the construction activity. Changes to this avoidance and minimization measure may occur with concurrence of the Wildlife Agencies.

5. Develop and implement a tamarisk removal and Habitat restoration program as part of the Management Program.

6. Where non-native fish populations are established in pupfish habitat, the RMUC shall develop and submit for review and approval by the Wildlife Agencies an interim plan within 6 months of Permit issuance that includes measures to control the non-native fish species in these areas present in the ponds at Dos Palmas and/or the surface waters of the Salt Creek watershed consistent with Section 9.4.1.2.

7. The Permittees shall comply with applicable avoidance, minimization, and mitigation measures described in Section 4.4 and the Land Use Adjacency Guidelines as described in Section 4.5.

Table 4-101: Conservation and Take Authorization for Dos Palmas Conservation Area

(All acreages are based on 1996 pre-Planning Agreement information.)

Conservation Objective	*Total Acres in Conservation Area*	*Existing Conservation Lands*	*Acres of Disturbance Authorized*	*Remaining Acres to be Conserved*
Conserve Other Cons. Habitat for flat-tailed horned lizard (predicted)	5,537	1,503	403	3,631
Conserve Core Habitat for crissal thrasher	536	155	38	343
Conserve Other Cons. Habitat for California black rail	597	226	37	334
Conserve Other Cons. Habitat for Le Conte's thrasher	14,882	7,450	743	6,689
Conserve Other Cons. Habitat for Yuma clapper rail	682	267	42	374

Table 4-101 (cont.)

Conservation Objective	*Total Acres in Conservation Area*	*Existing Conservation Lands*	*Acres of Disturbance Authorized*	*Remaining Acres to be Conserved*
Conserve known occurrences for the desert pupfish [1]	($30m^2$)	($30m^2$)	N/A	0
Conserve mesquite hummocks	55	29	3[2]	23
Conserve cismontane alkali marsh	321	93	(23)[3]	205
Conserve desert dry wash woodland	1,856	1,027	83	746
Conserve desert fan palm oasis woodland	125	69	6	50
Conserve arrowweed scrub	277	143	(13)[4]	121
Conserve mesquite bosque	482	127	36[2]	320
Conserve desert sink scrub	7,195	2,327	487	4,381

[1] Non-refugia desert pupfish Habitat occurs in a very limited area of much less than 1 acre; this describes an estimate of the Habitat area of 30 square meters.

[2] Pursuant to the avoidance, minimization, and mitigation measures in Section 4.4, mesquite hummocks and mesquite bosque will be avoided to the maximum extent Feasible.

[3] Disturbance of no more than 23 acres may occur, but it would be replaced to ensure that the no net loss occurs and the Conservation Objective is achieved.

[4] Disturbance of no more than 13 acres may occur, but it would be replaced to ensure that the no net loss occurs and the Conservation Objective is achieved.

4.3.20 Coachella Valley Stormwater Channel and Delta Conservation Area

Location and Description. The Coachella Valley Stormwater Channel and Delta Conservation Area includes the Coachella Valley Stormwater Channel from Monroe Avenue to the Salton Sea, those agricultural drains emptying into the Salton Sea which contain desert pupfish Habitat (see list below), and areas in the Whitewater River delta area and along the west edge of the Sea that contain sensitive natural communities. This Conservation Area is depicted in Figure 4-25a. Note that Indian reservation land within this Conservation Area is not subject to this Plan. The Coachella Valley Stormwater Channel and Delta Conservation Area contains a total of approximately 4,390 acres.

Core Habitat. This Conservation Area contains Core Habitat for the desert pupfish and the crissal thrasher. Figure 4-25b depicts Core Habitat, selected Other Conserved Habitat, and known occurrences of the burrowing owl.

Other Conserved Habitat. The Conservation Area also protects one of the two known Habitat areas in the Plan Area for Yuma clapper rail and California black rail. The area contains suitable migration and breeding Habitat for the riparian species covered by the Plan. Given the

scarcity of riparian Habitat in the desert, all riparian Habitat is considered important for these species, and is likely to contribute to the Conservation of these species in their respective ranges. The Conservation Area also provides Other Conserved Habitat for Le Conte's thrasher Coachella Valley round-tailed ground squirrel, and Palm Springs pocket mouse. Table 4-102 shows the Covered Species occurring in this area. The Conservation Area also provides suitable burrowing owl Habitat.

Table 4-102: Species Habitat – Coachella Valley Stormwater Channel and Delta Conservation Area

(All acreages are based on 1996 pre-Planning Agreement information.)

Species	*Total Acres of Habitat in the Conservation Area*	*Existing Conservation Lands*	*Acres of Habitat Not Currently Conserved*	*Habitat Designation*	*Acres of Core Habitat*
Desert pupfish	25	0	25	Core	25
California black rail	62	4	58	Other Cons. Habitat	0
Crissal thrasher	896	28	868	Core	896
Le Conte's thrasher	784	0	784	Other Cons. Habitat	0
Least Bell's vireo	82 / 1,983	0 / 214	82 / 1,769	Breeding / Migratory	N/A
Southwestern willow flycatcher	8 / 2,047	0 / 214	8 / 1,833	Breeding / Migratory	N/A
Summer tanager	8 / 2,047	0 / 214	8 / 1,833	Breeding / Migratory	N/A
Yellow-breasted chat	8 / 2,047	0 / 214	8 / 1,833	Breeding / Migratory	N/A
Yellow warbler	8 / 2,047	0 / 214	8 / 1,833	Breeding / Migratory	N/A
Yuma clapper rail	62	4	58	Other Cons. Habitat	0
CV round-tailed ground squirrel	211	20	191	Other Cons. Habitat	0
Palm Springs pocket mouse	172	20	152	Other Cons. Habitat	0

Natural Communities. Table 4-103 shows that the conserved natural communities occurring in this Conservation Area are mesquite hummocks, desert saltbush scrub, desert sink scrub, Sonoran cottonwood-willow riparian forest, and coastal and valley freshwater marsh. Figure 4-25c depicts the conserved natural communities.

Table 4-103: Conserved[1] Natural Communities – Coachella Valley Stormwater Channel and Delta Conservation Area
(All acreages are based on 1996 pre-Planning Agreement information.)

Natural Community	*Total Acres in the Conservation Area*	*Existing Conservation Lands*	*Acres Not Currently Conserved*
Mesquite hummocks	74	0	74
Desert saltbush Scrub	713	0	713
Desert sink Scrub	1,206	209	997
Coastal & valley freshwater marsh	61	4	57
Sonoran cottonwood-willow riparian forest	8	0	8

[1] Only natural communities to be conserved under the Plan are shown. Natural communities that are not included as described in Section 3.2.2 are not shown.

Essential Ecological Processes. The riparian and aquatic Habitat in this Conservation Area is sustained largely by agricultural runoff, the discharge of treated water into the Whitewater Stormwater Channel, and runoff from infrequent storm events. Maintenance of the flood control channel and the agricultural drains periodically modifies the Habitat.

Biological Corridors and Linkages. This area does not function as a Biological Corridor.

Conservation Objectives. The Conservation Objectives for this Conservation Area are:

1. In total, 3,870 acres of the Coachella Valley Stormwater Channel and Delta Conservation Area shall be conserved. (This may be less than the sum of acres indicated in the following objectives because there can be overlap among areas covered by the objectives. For example, Core Habitat for two or more species may overlap, or Core Habitat and an Essential Ecological Process area may overlap. The individual acreage figures will be used in compliance monitoring.)
2. Conserve at least 781 acres of Core Habitat for crissal thrasher, allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused disturbance, and edge effects to Core Habitat by conserving contiguous Habitat patches and effective Linkages between patches of Core Habitat.
3. Conserve at least 706 acres of Other Conserved Habitat for Le Conte's thrasher.
4. Establish 66 acres of permanent Habitat for California black rail and Yuma clapper rail in this area to replace the Habitat that is periodically altered by flood control and drain maintenance activities.

5. Establish permanent riparian Habitat including at least 44 acres of Sonoran cotton-wood-willow riparian forest in this area to replace the Habitat that is periodically altered by flood control maintenance activities.
6. Restore and enhance wetlands Habitat as Feasible.
7. Conserve occupied burrowing owl burrows as described in Section 4.4 burrowing owl avoidance, minimization, and mitigation measures.
8. Establish 25 acres of permanent replacement Habitat for pupfish and maintain a desert pupfish population in the agricultural drains.
9. Conserve at least 67 acres of mesquite hummocks, at least 713 acres of the desert saltbush scrub, at least 1,026 acres of desert sink scrub, and at least 51 acres of coastal and valley freshwater marsh natural communities, which provide Habitat for riparian birds and other Covered Species. For the remaining acreage of the coastal and valley freshwater marsh natural community where disturbance is authorized by the Plan, ensure no net loss.
10. Remove tamarisk to improve Habitat values.

Ownership and General Plan Land Use Designations. Table 4-104 shows the public versus private ownership of lands within this Conservation Area.

Table 4-104: Land Ownership
Coachella Valley Stormwater Channel
and Delta Conservation Area
(rounded to nearest 10 acres)

Ownership[1]	***Acres***
Existing Conservation Lands:	*240*
BLM	240
Lands Not Currently Conserved:	*4,150*
CVWD	530
IID	830
Private	2,760
Public, Quasi-public entities	10
Riverside County	20
TOTAL	**4,390**

[1] Based on 1996 pre-Planning Agreement land ownership information

Table 4-105: General Plan Land Use Designations[1] (Non-conserved lands only) Coachella Valley Stormwater Channel and Delta Conservation Area

General Plan Designation (Map symbol) - Riverside County	*% of Private Non-conserved Land in Conservation Area*	*Building Intensity Range*
Open Space Water (OS-W)	62%	Bodies of water, floodplains, and natural or artificial drainage corridors
Very Low Density Residential (VLDR)	1%	0 - 2 units per acre
Commercial Tourist (CT)	1%	Hotels, golf courses, recreation facilities
Rural Residential (RR)	7%	1 unit per 5 acres
Public Facilities[2] (PF)	---	Landfills, airports, utilities, etc.
Open Space Recreation (OS-R)	3%	Active and passive recreational uses
Medium Density Residential (MDR)	2%	5 – 8 units per acre
Agriculture (AG)	15%	Agricultural production
Business Park (BP)	9%	Business uses
TOTAL	**100%**	

[1] Based on 2003 general plan designations and 2003 parcel data
[2] Statistically insignificant (less than 1%)

As seen in Table 4-104, 5% of the land in this Conservation Area is currently in public ownership. Current conservation ranges from Level 1 to Level 3. Conservation management will be improved where needed through management prescriptions to be adopted by the relevant agency as Feasible. Figure 4-25d shows the existing conservation lands and general plan land use designations on Level 4 lands for the Conservation Area.

Required Measures for the Conservation Area. Table 4-106 shows how many acres of Existing Conservation Lands are in this Conservation Area and how many acres of Additional Conservation Lands will need to be acquired or otherwise conserved through acquisition or other means. The following measures will be imposed to achieve the Conservation Objectives in this Conservation Area.

1. CVWD will establish 66 acres of permanent Habitat for the California black rail and Yuma clapper rail in this Conservation Area to replace the 41 acres of Habitat in the Coachella Valley Stormwater Channel and the 25 acres of Habitat in the drains that is periodically altered by flood control and drain maintenance activities. CVWD will ensure that the water used to support the managed marsh Habitat is irrigation water from the Lower Colorado River (LCR) or is other water with the same selenium concentration as water from the LCR or that meets an EPA selenium standard for protection of aquatic life that has received a No Jeopardy determination from USFWS, whichever is greatest. Within two years of Permit issuance, a plan detailing the location, water supply, and monitoring and management responsibilities, including funding, shall be prepared by CVWD and submitted to the Wildlife Agencies for review and approval. The Habitat will be established within three years of approval by the Wildlife Agencies of this plan to establish the Habitat. As part of its Water Management Plan, CVWD will conduct

monitoring of selenium concentrations in the drains and the Coachella Valley Stormwater Channel.

2. The Yuma clapper rail and the California black rail are Fully Protected Species. Surveys will be required in potential Habitat for the rails before any activity that would impact the Habitat. If rails are found, the Habitat must be avoided or measures approved by the Wildlife Agencies taken to ensure that no Take of an individual occurs, other than for projects where Fish and Game Code Section 2081.7 is applicable. If legislation removes Fully Protected status for the rails, the establishment of permanent Habitat for the rails will be adequate mitigation for the loss of Habitat.

3. CVWD will establish permanent riparian Habitat including at least 44 acres of Sonoran cottonwood-willow riparian forest in this Conservation Area to replace the Habitat that is periodically altered by flood control maintenance activities. The 44 acres address impacts to 37 acres of Sonoran cottonwood-willow riparian forest and 46 acres (at a 1:7 ratio) of primarily tamarisk scrub interspersed with occasional cottonwoods and willows. This Habitat will provide for the conservation of this natural community and the riparian birds covered by the Plan. Within two years of Permit issuance, a plan detailing the location, water supply, and monitoring and management responsibilities, including funding, shall be prepared by CVWD and submitted to the Wildlife Agencies for review and approval. The Habitat will be established within three years of approval by the Wildlife Agencies of this plan to establish the Habitat.

4. CVWD will enhance and manage Coachella Valley round-tailed ground squirrel Habitat on land it owns in the East Indio Hills Conservation Area to mitigate and minimize impacts to this species from CVWD's operation and management activities in the Coachella Valley Stormwater Channel and Delta Conservation Area. (See Section 4.3.15 for additional details).

5. CVWD will establish at least 25 acres of managed replacement Habitat for desert pupfish, on a 1:1 ratio at a site or sites to be determined with concurrence from the Wildlife Agencies. A plan detailing the 25-acre habitat restoration requirement for desert pupfish mitigation shall be reviewed and approved by the Wildlife Agencies. The pond will use irrigation water from the LCR or other water with the same or better water quality as water from the LCR. For selenium concentrations the water can either be water from the LCR, or water that meets an EPA selenium standard for protection of aquatic life that has received a No Jeopardy determination from USFWS, whichever is greatest. It is estimated that approximately 325 acre-ft/yr of water would be required to maintain 25 acres of replacement Habitat, replacing evaporation and maintaining appropriate flow-through rate. Ongoing maintenance and adjustments will be required, including vegetation control and dike and bank maintenance, to achieve desired Habitat characteristics. This Habitat will replace the 25 acres of Habitat that is periodically altered by maintenance activities in drains and flood control channels that contain pupfish Habitat. CVWD will also develop a study to evaluate the potential effect of routine drain maintenance on pupfish occupying the drains to determine the feasibility of modifying maintenance practices to avoid or minimize potential Take. The study will include methods of surveying for pupfish, effects of the direction in which drains are cleaned (upstream or downstream), the manner in which the drains are cleaned (one side at a time or both sides at a time), and the timing of sediment and vegetation removal. The study proposal will be prepared and submitted to the Wildlife Agencies within two years of

Permit issuance. The study will be initiated in the field season immediately following approval by the Wildlife Agencies. If the findings indicate that modification of the maintenance practices would significantly minimize impacts to pupfish, CVWD will modify its maintenance practices. As part of its Water Management Plan, CVWD will conduct monitoring of selenium concentrations in the drains and the Coachella Valley Stormwater Channel.

6. The Permittees shall comply with applicable avoidance, minimization, and mitigation measures described in Section 4.4 and the Land Use Adjacency Guidelines as described in Section 4.5.

7. Develop and implement a tamarisk removal and Habitat restoration program as part of the Management Program.

Table 4-106: Conservation and Take Authorization for Coachella Valley Stormwater Channel and Delta Conservation Area

(All acreages are based on 1996 pre-Planning Agreement information.)

Conservation Objective	*Total Acres in Conservation Area*	*Existing Conservation Lands*	*Acres of Take Authorized*	*Remaining Acres to be Conserved*
Conserve Core Habitat for desert pupfish	25	0	N/A	25[1]
Conserve Other Cons. Habitat for California black rail	62	4	6	52
Conserve Core Habitat for crissal thrasher	896	28	87	781
Conserve Other Cons. Habitat for Le Conte's thrasher	784	0	78	706
Conserve Other Cons. Habitat for Yuma clapper rail	62	4	6	52
Conserve mesquite hummocks	74	0	7[2]	67
Conserve desert saltbush scrub	792	0	79	713
Conserve desert sink scrub	1,349	209	114	1,026
Conserve coastal & valley freshwater marsh	61	4	(6)[3]	51

[1] See required measure #5 above for explanation of Conservation Objective.
[2] Pursuant to the avoidance, minimization, and mitigation measures in Section 4.4, mesquite hummocks will be avoided to the maximum extent Feasible.
[3] Disturbance of no more than 6 acres may occur, but it would be replaced to ensure that the no net loss occurs and the Conservation Objective is achieved.

4.3.21 Santa Rosa and San Jacinto Mountains Conservation Area

Location and Description. The Santa Rosa and San Jacinto Mountains Conservation Area encompasses virtually all of the desert slopes of the Santa Rosa and San Jacinto Mountains below the upper elevation limit of Peninsular bighorn sheep Habitat, as well as much of the higher elevation areas of the Santa Rosa Mountains where there is known and potential Habitat for the gray vireo. This Conservation Area is depicted in Figure 4-26a. Indian reservation lands in the mountains are not subject to this Plan. The Agua Caliente Band of Cahuilla Indians is preparing a Tribal MSHCP on its reservation land, and efforts are being made to coordinate the Tribal MSHCP with the Coachella Valley MSHCP/NCCP. This Conservation Area is linked to the south with Anza Borrego Desert State Park and to the west with San Bernardino National Forest areas and Mt. San Jacinto State Park. To the north, this Conservation Area is contiguous with the Snow Creek/Windy Point Conservation Area, which includes two Biological Corridors to the San Bernardino Mountains. The Santa Rosa and San Jacinto Mountains Conservation Area contains a total of approximately 211,070 acres.

Core Habitat. This Conservation Area provides Essential Habitat for the Peninsular bighorn sheep. Figure 4-26b depicts Essential Habitat, selected Other Conserved Habitat, and recorded burrowing owl locations.

Other Conserved Habitat. This Conservation Area contains nearly 70,000 acres of potential Habitat for the gray vireo; however, it is not known how much of this Habitat is occupied. Low-density desert tortoise Habitat is also spread throughout the mountains, but it is not known whether the population density is such that this Conservation Area can be considered Core Habitat for the tortoise. The Conservation Area contains suitable migration and breeding Habitat for the riparian species covered by the Plan. Given the scarcity of riparian Habitat in the desert, all riparian Habitat is considered important for these species, and is likely to contribute to the Conservation of these species in their respective ranges. The desert fan palm oasis woodlands also provide nearly 1,000 acres of Habitat for the southern yellow bat. There is one known occurrence of triple-ribbed milkvetch in the Santa Rosa Mountains. This occurrence appears to be disjunct with the other known occurrences in the Plan Area. The Conservation Area also contains a small amount of Habitat for Coachella Valley milkvetch, Coachella Valley giant sand-treader cricket, Coachella Valley Jerusalem cricket, Coachella Valley fringe-toed lizard, flat-tailed horned lizard, burrowing owl, Le Conte’s thrasher, Coachella Valley round-tailed ground squirrel, and Palm Springs pocket mouse. This Conservation Area also contributes to the Plan Area's biodiversity and provides Habitat for an array of predators that may also use adjoining areas such as the Snow Creek/Windy Point Conservation Area. Table 4-107 shows the Covered Species occurring in this area.

Table 4-107: Species Habitat – Santa Rosa and San Jacinto Mountains Conservation Area

(All acreages are based on 1996 pre-Planning Agreement information.)

Species	*Total Acres of Habitat in the Conservation Area*	*Existing Conservation Lands*	*Acres of Habitat Not Currently Conserved*	*Habitat Designation*	*Acres of Core Habitat*
CV milkvetch[1]	292	65	227	Other Cons. Habitat	0
Triple-ribbed milkvetch[2]	<1	0	<1	Other Cons. Habitat	0
CV giant sand-treader cricket[1]	122	22	100	Other Cons. Habitat	0
CV Jerusalem cricket[1]	199	32	167	Other Cons. Habitat	0
CV fringe-toed lizard[1]	122	22	100	Other Cons. Habitat	0
Desert tortoise	125,694	83,976	41,718	Other Cons. Habitat	0
Flat-tailed horned lizard	61 / 15	45 / 1	16 / 14	Pred. / Pot.[3] Other Cons. Habitat	0
Gray vireo	67,401	54,276	13,125	Other Cons. Habitat	0
Le Conte's thrasher	11,093	3,284	7,809	Other Cons. Habitat	0
Least Bell's vireo	1,579 / 3,958	822 / 2,157	757 / 1,801	Breeding/ Migratory	N/A
Southwestern willow flycatcher	1,574 / 3,963	822 / 2,157	752 / 1,806	Breeding/ Migratory	N/A
Summer tanager	1,574 / 3,963	822 / 2,157	752 / 1,806	Breeding/ Migratory	N/A
Yellow-breasted chat	1,574 / 3,963	822 / 2,157	752 / 1,806	Breeding/ Migratory	N/A
Yellow warbler	1,574 / 3,963	822 / 2,157	752 / 1,806	Breeding/ Migratory	N/A
CV round-tailed ground squirrel[1]	1,328	543	785	Other Cons. Habitat	0
Palm Springs pocket mouse[1]	5,565	1,869	3,696	Other Cons. Habitat	0
Peninsular bighorn sheep	168,935	135,577	33,358	Essential Habitat	N/A
Southern yellow bat	934	400	534	Other Cons. Habitat	0

[1] This Habitat is contiguous with Habitat in the Snow Creek/Windy Point Conservation Area and is effectively part of that Core Habitat.

[2] There is one known occurrence for this species in Agua Alta Canyon within this Conservation Area.

[3] The species distribution model for the flat-tailed horned lizard includes predicted ("pred.") Habitat and also potential (Pot.) Habitat. Predicted Habitat includes areas where presence of this species is known or expected based on recent observations. Potential Habitat includes areas where there are historical observations of this species but no recent observations are recorded. See Section 9.6.3.3 for additional information.

Natural Communities. Table 4-108 shows that the conserved natural communities occurring in this Conservation Area are principally Sonoran creosote bush scrub, Sonoran mixed woody and succulent scrub, southern arroyo willow riparian forest, Sonoran cottonwood-willow riparian forest, southern sycamore-alder riparian woodland, desert dry wash woodland, desert fan palm oasis woodland, mesquite hummocks, semi-desert chaparral, red shank chaparral, interior live oak chaparral, and peninsular juniper woodland and scrub. There are also incidental occurrences of active desert dunes, ephemeral desert sand fields, stabilized and partially stabilized desert sand fields, and stabilized shielded desert sand fields. This Conservation Area includes 68% of the Sonoran mixed woody and succulent scrub in the Plan Area, 83% of the southern sycamore-alder riparian woodland in the Plan Area, 71% of the desert fan palm oasis woodland in the Plan Area, 99% of the red shank chaparral in the Plan Area, and 99% of the peninsular juniper woodland and scrub in the Plan Area. Figure 4-26c depicts the conserved natural communities.

Table 4-108: Conserved[1] Natural Communities – Santa Rosa and San Jacinto Mountains Conservation Area
(All acreages are based on 1996 pre-Planning Agreement information.)

Natural Community	*Total Acres in the Conservation Area*	*Existing Conservation Lands*	*Acres Not Currently Conserved*
Active desert dunes	57	0	57
Ephemeral desert sand fields	38	22	16
Stabilized & partially stabilized desert sand fields	20	0	20
Stabilized shielded desert sand fields	7	0	7
Mesquite hummocks	5	0	5
Sonoran creosote bush scrub	44,230	23,243	20,987
Sonoran mixed woody & succulent scrub	89,999	65,893	24,106
Peninsular juniper woodland & scrub	37,229	30,382	6,847
Redshank chaparral	12,514	9,987	2,527
Semi-desert chaparral	17,602	14,654	2,948
Interior live oak chaparral	2,738	1,954	784
Southern arroyo willow riparian forest	32	17	15
Sonoran cottonwood-willow riparian forest	58	0	58
Southern sycamore-alder riparian woodland	548	407	141
Desert dry wash woodland	3,958	2,157	1,801
Desert fan palm oasis woodland	934	400	534

[1] Only natural communities to be conserved under the Plan are shown. Natural communities that are not included as described in Section 3.2.2 are not shown.

Essential Ecological Processes. The desert dry wash woodland, desert fan palm oasis woodland, and riparian Habitats in this Conservation Area are maintained by hydrological processes such as flooding, groundwater from springs, and the availability of perennial water. Protection of these hydrological processes is achieved through the Conservation Objectives for this area. Portions of the San Jacinto Mountains above Snow Creek and westward are sand source for the blowsand ecosystems in the Snow Creek/Windy Point Conservation Area.

Biological Corridors. No specific areas have been delineated as Biological Corridors. Within the Conservation Area, Peninsular bighorn sheep move between ewe group areas, but these movement areas are not specifically defined, except as indicated in Required Measure 5, and are considered part of Peninsular bighorn sheep Habitat in this Plan.

Conservation Objectives. The Conservation Objectives for this Conservation Area are:

1. In total, 55,890 acres of Santa Rosa and San Jacinto Mountains Conservation Area shall be conserved. (This may be less than the sum of acres indicated in the following objectives because there can be overlap among areas covered by the objectives. For example, Core Habitat for two or more species may overlap, or Core Habitat and an Essential Ecological Process area may overlap. The individual acreage figures will be used in compliance monitoring.)
2. As of June 2003, conserve at least 19,205 acres of Essential Habitat for Peninsular bighorn sheep in the Riverside County portion of the Conservation Area, at least 97 acres in the City of Cathedral City portion, at least 1,158 acres in the City of Indian Wells portion, at least 2,545 acres in the City of La Quinta portion, at least 130 acres in the City of Palm Desert portion, at least 7,211 acres in the City of Palm Springs portion, and at least 450 acres in the City of Rancho Mirage portion. Ensure that any Development allowed does not fragment Core Habitat, and that edge effects from such Development are minimized.
3. As of June 2003, conserve at least 7,930 acres of known and potential gray vireo Habitat in the unincorporated portion of the Conservation Area, and at least 3,883 acres in the City of Palm Springs portion. Minimize fragmentation, human-caused disturbance, and edge effects to Core Habitat by conserving contiguous Habitat patches and effective Linkages between them.
4. As of June 2003, conserve at least 5,508 acres of Other Conserved Habitat for Le Conte's thrasher in the unincorporated portion of this Conservation Area, at least 11 acres in the City of Cathedral City portion, at least 206 acres in the City of Indian Wells portion, at least 387 acres in the City of La Quinta portion, at least 33 acres in the City of Palm Desert portion, at least 560 acres in the City of Palm Springs portion, and at least 17 acres in the City of Rancho Mirage portion.
5. As of June 2003, conserve at least 23,856 acres of Other Conserved Habitat for desert tortoise in the unincorporated portion of this Conservation Area, at least 95 acres in the City of Cathedral City portion, at least 999 acres in the City of Indian Wells portion, at least 1,409 acres in the City of La Quinta portion, at least 436 acres in the City of Palm Desert portion, at least 8,856 acres in the City of Palm Springs portion, and at least 1,326 acres in the City of Rancho Mirage portion.

6. Conserve occupied burrowing owl burrows as described in Section 4.4 burrowing owl avoidance, minimization, and mitigation measures.

7. As of June 2003, conserve at least 15 acres of southern arroyo willow riparian forest in the unincorporated portion of the Conservation Area; for the remaining acreage of this natural community where disturbance is authorized by the Plan, ensure no net loss. Conserve at least 117 acres of southern sycamore-alder riparian woodland in the unincorporated portion of the Conservation Area and at least 24 acres of southern sycamore-alder riparian woodland in the City of Palm Springs portion of this Conservation Area; for the remaining acreage of this natural community where disturbance is authorized by the Plan, ensure no net loss. Conserve at least 58 acres of Sonoran cottonwood-willow riparian forest in the City of Palm Springs portion of the Conservation Area; for the remaining acreage of this natural community where disturbance is authorized by the Plan, ensure no net loss. Conserve at least 1,244 acres of the desert dry wash woodland natural community in the unincorporated portion of the Conservation Area, at least 18 acres in the City of Cathedral City portion, at least 66 acres in the City of Indian Wells portion, at least 76 acres in the City of La Quinta portion, at least 29 acres in the City of Palm Desert portion, at least 36 acres in the City of Palm Springs portion, and at least 9 acres in the City of Rancho Mirage portion.

8. As of June 2003, conserve at least 404 acres of the known desert fan palm oasis woodland natural community, which provides Habitat for the southern yellow bat, in the unincorporated portion of the Conservation Area; and at least 76 acres in the City of Palm Springs portion.

9. As of June 2003, conserve at least 2,093 acres of semi-desert chaparral in the unincorporated portion of the Conservation Area and at least 571 acres in the City of Palm Springs portion. Conserve at least 2,274 acres of red shank chaparral in the unincorporated portion of the Conservation Area. Conserve at least 2,899 acres of peninsular juniper woodland and scrub natural community in the unincorporated portion of this Conservation Area and at least 3,177 acres in the City of Palm Springs portion. Attainment of Goal 2 will also achieve this goal.

Ownership and General Plan Land Use Designations. Table 4-109 shows the public versus private ownership of lands within this Conservation Area.

Table 4-109: Land Ownership
Santa Rosa and San Jacinto Mountains Conservation Area
(rounded to nearest 10 acres)

Ownership[1]	***Acres***
Existing Conservation Lands:	*151,210*
BLM	73,900
~~CDFG~~CDFW	20,700
State Parks	1,000
City of Indian Wells	630
City of Palm Springs	2,100
County Parks	230

Table 4-109 (cont.)

Ownership[1]	***Acres***
CVMC	100
University of California	6,330
USFS	46,220
Lands Not Currently Conserved:	*59,860*
County Flood Control	30
CVWD	1,930
Public, Quasi-public Entities	710
Private	57,190
TOTAL	**211,070**

[1] Based on 1996 pre-Planning Agreement land ownership information

Table 4-110: General Plan Land Use Designations[1] *(Non-conserved lands only) Santa Rosa and San Jacinto Mountains Conservation Area*

General Plan Designation (Map symbol) - Riverside County	***% of Private Non-conserved Land in Conservation Area***	***Building Intensity Range***
Open Space Rural (OS-RUR)	78%	1 unit per 20 acres
Open Space Water[2] (OS-W)	---	Bodies of water, floodplains, and natural or artificial drainage corridors
Rural Desert (RD)	1%	1 unit per 10 acres
Rural Mountainous (RM)	3%	1 unit per 10 acres
Rural Residential (RR)	8%	1 unit per 5 acres
Very Low Density Residential (VLDR)	1%	0-2 units per acre
Very Low Density Residential, Rural Community (VLDR-RC)	6%	0-2 units per acre
Agriculture (AG)	2%	Agricultural production
Public Facilities[2] (PF)	---	Landfills, airports, utilities, other civic use
Medium Density Residential (MDR)	1%	5-8 units per acre
TOTAL	**100%**	
General Plan Designation (Map symbol) - City of Cathedral City	***% of Private Non-conserved Land in Conservation Area***	***Building Intensity Range***
Open Space Watercourse[2] (OS-W)	---	Floodways and drainage channels
Open Space – Private (OS-PV)	42%	Golf courses, etc.
Hillside Reserve (HR)	57%	1 unit per 20 acres
TOTAL	**100%**	
General Plan Designation – City of Indian Wells	***% of Private Non-conserved Land in Conservation Area***	***Building Intensity Range***
Natural Preserve	9%	Residential, 1 unit per 40 acres maximum
Open Space	84%	Publicly-owned open space lands
Watercourse	7%	Areas subject to flood hazards
Very Low Density Residential[2]	---	1-3 units per acre
TOTAL	**100%**	

Table 4-110 (cont.)		
General Plan Designation (Map symbol) - City of La Quinta	***% of Private Non-conserved Land in Conservation Area***	***Building Intensity Range***
Open Space (OS)	76%	Public or quasi-public land on hillsides
Park (P)	2%	Municipal and regional park facilities
Golf Course Open Space (G)	3%	Golf course
Low Density (LDR)	16%	1-4 units per acre
Watercourse/Flood Control (W)	3%	
TOTAL	**100%**	
General Plan Designation (Map symbol) – City of Palm Desert	***% of Private Non-conserved Land in Conservation Area***	***Building Intensity Range***
Open Space	78%	
Hillside Planned Residential	15%	1-2 units per acre
Low Density Residential	2%	3-5 units per acre
Medium Density Residential	4%	5-7 units per acre
Regional Commercial[2]	---	Commercial uses
TOTAL	**100%**	
General Plan Designation (Map symbol) - City of Palm Springs	***% of Private Non-conserved Land in Conservation Area***	***Building Intensity Range***
Conservation (C)	43%	1 unit per 20 acres
Desert (D)	2%	3.5 units per acre on 5 acre minimum site
Watercourse (W)	1%	Flood control or drainage facilities
Residential L1 (Palm Hills I SP)	9%	Residential
Residential L2[2]	---	Residential
Residential L4[2]	---	Residential
Palm Hills II SP	12%	Specific Plan required
Palm Hills III SP	32%	Specific Plan required
Parks and Recreation	---	Park and recreation facilities
TOTAL	**100%**	
General Plan Designation - City of Rancho Mirage	***% of Private Non-conserved Land in Conservation Area***	***Building Intensity Range***
Open Space - Floodway	7%	Floodways and drainage channels
Private Open Space	7%	Golf courses and other facilities within planned residential Developments
Hillside Reserve	80%	1 unit per 640 acres
Low Density Residential	6%	0-2 units per acre
TOTAL	**100%**	

[1] Based on 2003 general plan designations and 2003 parcel data
[2] Statistically insignificant (less than 1%)

As seen in Table 4-109, 72% of the land in this Conservation Area is currently in public or nonprofit conservation organization ownership. Current conservation ranges from Level 1 to Level 3. Conservation management will be improved where needed through management prescriptions to be adopted by the relevant agency as Feasible.

Figures 4-26d(1) through 4-26d(4) show the Existing Conservation Lands and general plan land use designations on Level 4 lands for the Conservation Area, according to recovery region or zone.

Required Measures for the Conservation Area. Table 4-111 shows how many acres of Existing Conservation Lands are in this Conservation Area and how many acres of Additional Conservation Lands will need to be conserved through acquisition or other means. The following measures will be imposed to achieve the Conservation Goals and Objectives in this Conservation Area. This includes the Covered Species Conservation Goals and Objectives in Section 9.

1. Figures 4-26e(1) through 4-26e(4) depict Plan provisions for Habitat loss for the Peninsular bighorn sheep. Each figure depicts one recovery region as identified in the Recovery Plan for Bighorn Sheep in the Peninsular Ranges, California (USFWS 2000). Each recovery region is associated with the range of one of the four ewe groups in the Plan Area. New Development shall adhere to the following criteria, in accordance with the guidelines in the Implementation Manual:

   a. Development shall be clustered in one area of a site as close as possible to existing Development.

   b. Development on alluvial fans shall be sited at the lowest possible elevation on the site and shall avoid the mouth of any canyon.

   c. Development shall be sited a minimum of a quarter (0.25) mile from known bighorn sheep water sources identified on a reference map on file with CVCC (see Figure 4-26f), except where topographic features shield the view of the water source and access to it from proposed development or trails, thereby minimizing potential impacts to the Peninsular bighorn sheep's ability to access water.

   d. Development shall be conditioned to prohibit the construction of unauthorized trails in essential bighorn sheep Habitat unless approved through a Minor Amendment with Wildlife Agency concurrence.

   e. Development shall not preclude Habitat connectivity or movement. Determination of whether Habitat connectivity or movement is precluded shall be made by the Lead Agency for the Development based on factual data provided by the RMOC, RMUC, Wildlife Agencies, or other source.

   f. Development shall comply with Land Use Adjacency Guidelines as described in Section 4.5.

   Five types of areas are designated on the maps. These areas are depicted on Figures 4-26e(1) through 4-26e(4):

   (1) Areas within which a maximum of 10% of the private land under the jurisdiction of a Local Permittee may be developed in accordance with the general plan land use designation in effect at the time of MSHCP Plan approval.

   (2) Areas where special provisions apply. These are described in #2 below.

(3) Areas where the Habitat Evaluation and Acquisition Negotiation Strategy (HANS) will be used to meet the Conservation Objectives. Additional information is provided in #3 below.

(4) Areas where a Major Amendment is required to provide Authorization for Acres of Disturbance of Habitat. Additional information is provided in #4 below.

(5) Areas where Authorization for Acres of Disturbance of Habitat is provided for Covered Activities described in Section 7.3 on CVWD and County Flood Control land.

2. Special provisions apply in the areas shown in the figures indicated below:

a. In Figure 4-26e(1), in the special provisions area west of Chino Canyon along Highway 111, the area below toe of slope on a parcel can be developed if the area above toe of slope is permanently conserved through conveyance of a conservation easement or fee title to the CVCC or other appropriate conservation entity. This reflects the greater Conservation value of the area above toe-of-slope, and the edge effects of Highway 111 on the Habitat below toe-of-slope.

b. In Figure 4-26e(1), in the special provisions area in Chino Canyon that apply to an approximately 506 acre parcel in Section 7, T4S R4E, one single-family residence and ancillary structures may be built within a Development envelope not to exceed 2.5 acres, plus an additional maximum of 2.5 acres for an access road and minor improvements within a larger area of 40 acres to be retained by the project proponent, the balance of which shall have a conservation easement recorded on it to ensure its permanent conservation. Additionally, the balance of the approximately 506-acre parcel shall also be permanently conserved through an appropriate mechanism, which may include sale to a conservation entity or recordation of a conservation easement.

c. In the special provisions area south of Highway 111 in the Palm Hills area, the following measures shall apply if a Permit is obtained through the MSHCP rather than a Section 7 consultation:

(1) Development or land disturbance will be limited to the area indicated in Figure 4-26e(2)A. Specific design features that apply are:

(a) Grading details will provide for berming of Fairway 7 to restrict view of golfers from the south.

(b) Fairway #6 will be graded in a manner that the tee is lowered to elevation 805’ and the green is lowered to elevation 785’. The southerly edge of golf improvement will include berming to minimize visibility from the south.

(c) Fairway # 8 will be graded in a manner that the Tee area is bermed on the south to avoid or minimize visibility from the south.

(d) The golf cart path between Hole #6 and Tee #7 will be relocated to the rear of the knoll and will follow the north side of Fairway #7.

(e) Prior to initiation of grading, a sheep exclusion fence shall be installed around the perimeter of the project site. The developer shall submit for review and approval by the Wildlife Agencies final plans for the sheep exclusion fence, including a description and illustration of fence design, fence location, and means of removing sheep from the project site if necessary. A gate/barrier system to preclude unauthorized access into Peninsular bighorn sheep Habitat shall also be installed. The final plans shall be reviewed and approved by the City of Palm Springs and the Wildlife Agencies prior to issuance of any grading permit for the project. If, after further consultation, it is determined that a fence is not necessary or could be deferred to a later time or event, this measure may be accordingly modified. If a fence is not required, no tall shrubs or dense cover shall be allowed within 50 yards of the southern boundary of the project to avoid providing approach and hiding cover for Peninsular bighorn sheep predators.

(f) All exterior lighting shall be low intensity and hooded to direct light away from natural open space areas, and there shall be no perimeter lighting of the golf course, except where required for human safety.

(g) All natural open space within the area depicted in Figure 4-26e(2)A shall be conserved through dedication, deed restriction, or other permanent conservation to be conveyed to the CVCC or other appropriate entity in perpetuity, on or before the approval of the first grading permit.

(h) Dedication of Habitat within the Palm Hills Land Corp. ownership shall be required to offset the direct loss of Peninsular bighorn sheep Essential Habitat on the property and the contribution to cumulative loss of Peninsular bighorn sheep Habitat in the project area. The developer shall dedicate 1,233 (411 acres x 3 = 1,233 acres) of comparable or better quality Habitat within the Palm Hills Land Corp. ownership that is located in the north Santa Rosa ewe group Recovery Region (SR-N74). This acreage shall be in addition to the contiguous open space on the parcel south of the perimeter fence. The location of this Habitat shall be approved by the City of Palm Springs, in consultation with CVCC. The replacement Habitat shall be deeded to the CVCC or other appropriate conservation entity in perpetuity before the approval of the first grading permit. This land dedication shall be provided *in lieu* of any fees that otherwise may be assessed as mitigation for the project.

(i) The project proponent shall cooperate with CVCC to facilitate acquisition of additional private lands within the north Santa Rosa ewe group Recovery Region (SR-N74).

(j) The developer shall contribute an amount to the Endowment Fund for Monitoring and Management maintained by CVCC sufficient to fund the special monitoring management needs of the portion of the Conservation Area that may be affected by the Development.

(k) The developer will install new linkage trails to replace existing trails that are no longer available for public use within the property. The following links are provided to approximate the existing level of trail access on site in substantial conformance with Figure 4-26e(2)A:

- Links between the project access road and the Araby Trail along the northern project boundary; a safe passageway for pedestrians and bicyclists alongside the road will be provided from East Palm Canyon Drive to the link trail.,
- Link between the Clara Burgess Trail and the Wildhorse and Araby trails along the southern and western property boundaries.

(l) An easement shall be granted along the north side of the property east of the road that provides access from East Palm Canyon Drive. This easement will accommodate future construction of a perimeter trail linking the proposed Cathedral City Cove perimeter trail with the access road.

(m) The extension of the Dunn Road is not a covered activity.

(n) Access into the incised portion of Eagle Canyon shall be controlled during project construction, except that required to protect, enhance and maintain the desert fan palm oasis woodland. The developer shall retain a qualified desert ecologist to clean-up the palm oases prior to conveyance of the land to CVCC or other appropriate entity. Prior to the clean-up, the ecologist will confer with the Wildlife Agencies regarding the work to be undertaken.

d. In Figures 4-26e(2) and 4-26e(3), in the special provisions area along Highway 74, Riverside County shall work with landowners to transfer density from the east side of the highway to the west side of the highway to the maximum extent Feasible. Development in the special provisions area west of the highway may exceed the density allowed by the 2003 General Plan land use designation by transferring density from the special provisions area east of the highway. The amount of density transferred shall be the density allowed by the 2003 General Plan for the acreage east of the highway from which density is transferred. To transfer density, land east of the highway must be permanently conserved by conveyance of fee simple interest or a conservation easement to CVCC or its designee or to another conservation organization.

e. The Travertine Specific Plan has initiated a Section 7 consultation with USFWS. If a Permit for specified endangered or threatened species is issued through the Biological Opinion, then no Permit will be provided through the MSHCP for those species. Any provisions listed below for those species will not apply unless incorporated within the Section 7 Biological Opinion. If no

Section 7 Permit is provided, and, in any event, as pertains to non-listed Covered Species, Travertine Specific Plan is a Covered Activity with the following special provisions:

(1) The portion of the Travertine Specific Plan property for which Acres of Disturbance are authorized is outside the Conservation Area, as depicted in Figure 4-26e(3)A.

(2) The remainder of the Travertine Specific Plan property is inside the Conservation Area, as depicted in Figure 4-26e(3)A, and shall be dedicated to Conservation in perpetuity.

(3) Prior to the issuance of grading permits, the project proponent will provide a no-interest $2,000,000 loan to the CVCC or its designee upon mutually agreeable terms to acquire Essential bighorn sheep Habitat in the project area. This provision may be revised or substituted for in a manner of equal or greater benefit to the Plan upon mutual agreement of CVCC, the Wildlife Agencies, and the project proponent.

(4) The project proponent will provide $500,000 for bighorn sheep monitoring and research, with $100,000 due prior to the issuance of grading permits, and an additional $400,000 provided during the succeeding eight years.

f. In Figure 4-26e(3), Development in the designated area in Section 25, Township 7 South, Range 7 East, north of Martinez Canyon, requires mitigation for impacts by providing off site mitigation at a 3:1 ratio in the same Recovery Unit.

g. The Shadowrock Project (City of Palm Springs Planning Area 2) may obtain Take under FESA in one of two ways: (1) through a section 7 consultation with USFWS prior to the issuance of the MSHCP permit, or (2) through the MSHCP. If a Take Permit for endangered and threatened species is issued through the Section 7 Biological Opinion, then no Take will be provided through the MSHCP for those species. If no Section 7 Take is obtained, and, in any event, as pertains to non-listed Covered Species, the Shadowrock Project may be a Covered Activity through the MSHCP by complying with special provisions (1) through (10) below. The Peninsular Bighorn Sheep is a Fully Protected Species under Fish and Game Code Section 4700. Take of this species is prohibited under the California Fish and Game Code. ~~CDFG~~CDFW acknowledges and agrees that if the measures set forth in the MSHCP are fully complied with, the Covered Activities are not likely to result in Take of this Fully Protected Species. Notwithstanding any language to the contrary in this Plan, the City of Palm Springs, Shadowrock Ventures and ~~CDFG~~CDFW have an existing settlement agreement (included in the Final MSHCP as Appendix IV), which is still in existence even after the Plan is approved, and is binding on the parties that executed the settlement agreement. All special provisions (Sections 4.3.21(g) (1-10)) must be implemented in a manner to ensure compliance with the terms and conditions of the settlement agreement among the California Department of Fish and Game, the City of Palm Springs, and Shadowrock Ventures. The settlement agreement cannot be amended

except by an instrument signed by Shadowrock Ventures, the City of Palm Springs, and ~~CDFG~~CDFW. Compliance with the special provisions must be in a manner that is consistent with the Conservation Area Conservation Objectives and Required Measures, and with the Species Conservation Goals and Objectives. Any funds generated through a Section 7 consultation will be managed by USFWS, and funds generated through the Plan will be managed by the CVCC. The City of Palm Springs will be responsible for the implementation of the funding mechanism(s). As a Permittee, the City of Palm Springs is responsible for ensuring implementation of the following special provisions.

(1) A wildlife corridor across Chino Canyon, as depicted in Figure 4-26e(1)A (the exact description of the corridor is on file with the USFWS and the City of Palm Springs), must be conserved as described in "a" through "d". The corridor will include constructed escape terrain to help facilitate PBS movement through the movement corridor. Permanent protection of the movement corridor requires that the following be implemented prior to issuance of grading permits for the Shadowrock project.

   a. That portion of the southwest ¼ of Section 5, Township 4 South, Range 4 East that is within the wildlife movement corridor depicted in Figure 4-26e(1)A must be conserved for PBS conservation in perpetuity through a conservation easement to the CVCC, in a form substantially similar to the Model Conservation Easement attached as Exhibit H, as that form may be amended.

   b. That portion of the southeast ¼ of Section 6, Township 4 South, Range 4 East that is within the wildlife movement corridor depicted in Figure 4-26e(1)A must be conserved for PBS conservation through a conservation easement or other Legal Instrument that is acceptable to the USFWS and the Tribe.

   c. That portion of the northeast ¼ of Section 7, Township 4 South, Range 4 East that is within the wildlife movement corridor depicted in Figure 4-26e(1)A must be conserved for PBS conservation in perpetuity through a conservation easement to the CVCC, in a form substantially similar to the Model Conservation Easement attached as Exhibit H, as that form may be amended.

   d. That portion of the northwest ¼ of Section 8, Township 4 South, Range 4 East that is within the wildlife movement corridor depicted in Figure 4-26e(1)A must be conserved for PBS conservation in perpetuity through a conservation easement to the CVCC, in a form substantially similar to the Model Conservation Easement attached as Exhibit H, as that form may be amended.

   e. If the conservation easements described in "a" through "d" above are not obtained prior to issuance of grading permits, the line demarcating the area within which Take Authorization is provided will revert to the original Reasonable and Prudent Alternative (RPA) line in the January

12, 1998 conference opinion as depicted in Figure 4-26e(1)A. The portion of the Shadowrock project depicted in Figure 4-26e(1)A as outside the RPA line must be conserved for PBS conservation in perpetuity through a conservation easement or other Legal Instrument that is acceptable to the Wildlife Agencies prior to issuance of grading permits.

(2) An easement for the purpose of constructing a wildlife overpass will be obtained by the City of Palm Springs for the possible future construction of an overpass and road through the wildlife movement corridor. Said road will be a public road (for the purpose of obtaining public funds for the construction of a wildlife overpass). Any security gates for the Palm Springs Aerial Tramway facility will be installed outside of the designated corridor.

(3) Prior to issuance of grading permits for the Shadowrock project, all land in Sections 5, 8, and 9 owned by the City of Palm Springs and/or the City of Palm Springs' Parks, Open Space, and Trails (POST) fund as of October 22, 2005, including the land in the Mountain Falls area lease, must be permanently protected for PBS conservation purposes through a conservation easement to the CVCC, in a form substantially similar to the Model Conservation Easement attached as Exhibit H, as that form may be amended, that guarantees conservation in perpetuity and precludes the possibility of constructing golf courses, new trails, or other facilities.

(4) A vegetation management plan for the riparian area in the wildlife movement corridor, depicted in Figure 4-26e(1)A on Shadowrock land and on the land described in (1)c must be developed by the City of Palm Springs and approved by the Wildlife Agencies prior to issuance of grading permits. The small cliff along the edge of the riparian area will be modified to facilitate sheep movement.

(5) Toxic plants such as oleander and nightshade species (Solanaceae family) will be prohibited along the perimeter of the project.

(6) Any artificial water features (e.g. ponds) will be designed to preclude shallow, vegetated edges that provide breeding habitat for *Culicoides* midges, an invertebrate disease vector for bluetongue virus which affects PBS.

(7) The entire Shadowrock development will be fenced to exclude PBS from entering the project site. The fence will be 8' high and should not contain gaps larger than 4 inches, in which PBS may become entangled.

(8) If the project is redesigned, it will incorporate design features to minimize impacts to PBS, such as placing golf holes adjacent to the PBS movement corridor and lining the edge of the golf course with dense vegetation (preferably mesquite or other native vegetation) or earthen berms that will visually screen PBS habitat from human activity associated with the development. Any project redesign must be in compliance with the terms

and conditions of the settlement agreement among the California Department of Fish and Game, the City of Palm Springs, and Shadowrock Ventures, and all conditions of approval required by the City of Palm Springs in the Final EIR for the Shadowrock project in 1993.

(9) Shadowrock, or other responsible party, will host an annual golf tournament fundraiser to provide funding for PBS monitoring, research, and management that may include a corridor effectiveness study, involving GPS collaring of PBS. If Shadowrock is a Covered Activity under the MSHCP, the funds will be provided to the CVCC and would be for a minimum of 10 years and totaling no less than $500,000. If Take Authorization is provided through Section 7, the funds will be provided to USFWS. Additional funds may be needed in the post-10 year period for the activity described in (10) below.

(10) Funding will be obtained from a fund consisting of 1% of the gross proceeds of the sale of all retail goods within the Hotel stores at Shadowrock. This fund will be set aside for PBS management, which may include PBS augmentation. If Shadowrock is a Covered Activity under the MSHCP, the funds will be provided to the CVCC. If Take Authorization is provided through Section 7, the funds will be provided to USFWS.

3. In areas where the HANS process will be used to meet the Conservation Objectives, at least 90% of the private land as of June 2003 within the relevant Recovery Unit and jurisdiction must be conserved. In evaluating whether a portion of a property subject to the HANS process may be Developed, the Local Permittee and the Wildlife Agencies will consider whether the Development would significantly adversely impact the Conservation of the Peninsular bighorn sheep with respect to the Covered Species Conservation Goals and Objectives in Section 9. June 2003 is used because that is the most recent date for which data is available.

4 In Major Amendment areas, the process for Major Amendments described in Section 6.12.3 shall apply.

5. Protection of a Biological Corridor for Peninsular bighorn sheep in Chino Canyon and one in Palm Canyon will be coordinated with the Agua Caliente Tribal HCP to ensure that a functional corridor is maintained.

6. CVWD and County Flood Control will adhere to the avoidance, minimization, and mitigation measures for Peninsular bighorn sheep described in Section 4.4 for the construction, operation, and maintenance of their facilities in this Conservation Area.

7. See Section 7.5 for a discussion of new facilities proposed by CVWD in or adjacent to the Conservation Area that will require a Minor Amendment if specified criteria are met.

8. The Permittees shall comply with applicable avoidance, minimization, and mitigation measures described in Section 4.4 and the Land Use Adjacency Guidelines as described in Section 4.5.

9. Prior to widening East Palm Canyon Drive adjacent to the Santa Rosa and San Jacinto Mountains Conservation Area, Cathedral City will consult with the Wildlife Agencies and the CVCC to obtain appropriate monitoring information to determine if Peninsular bighorn sheep are using the adjacent Habitat. In this event, Cathedral City will install fencing to prevent Peninsular bighorn sheep from straying on to East Palm Canyon Drive.

10. For Development proposals on lands zoned for domestic stock animals on parcels within or adjacent to Conservation Areas with bighorn sheep habitat, the Permittees shall either (1) prohibit husbandry of domestic sheep and goats on such parcels or (2) require double fencing separated by a distance consistent with applicable disease transmission standards and as agreed to by the Wildlife Agencies, including an 8-foot outer fence or functional equivalent around all enclosures used to keep domestic sheep and goats or the parcel perimeter adjoining the Conservation Area if the double fence can be tied into features that would preclude bighorn sheep access around the ends of the fence.

11. For Development proposals on lands within or adjacent to Conservation Areas with bighorn sheep habitat, the Local Permittee shall require construction of an 8-foot fence or functional equivalent, or granting of an easement to CVCC for future installation of a barrier separating the Development from adjoining habitat, if (i) bighorn sheep are documented to begin foraging or watering on the project site, or (ii) unauthorized trails, paths, routes, or ways (trails) are documented to proliferate from the project site into adjoining habitat. To ensure that the fence is an effective barrier, the CVCC shall determine the appropriate location of the fence in consultation with the Local Permittee. If fence construction is deferred and either condition (i) or (ii) is documented by the Wildlife Agencies, the CVCC shall incur the responsibility and cost for fence installation and maintenance on lands to which CVCC has access, unless at the time of project approval the Permittee assigns a legally responsible party to construct and maintain the fence and requires establishment of a funding instrument for construction and maintenance of the fence. The subject fence shall be constructed within 2 years of documented sheep use or the proliferation of trails, as noted above. The location of this barrier (i.e., an 8-foot fence or functional equivalent) shall be determined by CVCC based on its ability to obtain permission/access to the necessary lands. If placement of the barrier must occur on other public lands (e.g., BLM, ~~CDFG~~CDFW), CVCC will coordinate with these other agencies as appropriate.

Table 4-111a: Conservation and Take Authorization for Santa Rosa and San Jacinto Mountains Conservation Area – Riverside County Area

Conservation Objective	*Total Acres in Conservation Area*	*Existing Conservation Lands*	*Acres of Disturbance Authorized*	*Remaining Acres to be Conserved*
Conserve Essential Habitat for Peninsular bighorn sheep - Recovery Zone 1	24,840	16,758	830[1]	7,252
Conserve Essential Habitat for Peninsular bighorn sheep - Recovery Zone 2	14,558	9,642	647[2]	4,269
Conserve Essential Habitat for Peninsular bighorn sheep - Recovery Zone 3	50,972	44,930	683[3]	5,359
Conserve Essential Habitat for Peninsular bighorn sheep - Recovery Zone 4	34,597	32,014	258[4]	2,325
Conserve Other Cons. Habitat for gray vireo	58,985	50,174	881	7,930
Conserve known locations for triple-ribbed milkvetch [5]	< 1	0	< 1	< 1
Conserve Other Cons. Habitat for Le Conte's thrasher	9,123	2,704	911[6]	5,508
Conserve Other Cons. Habitat for desert tortoise	86,875	60,069	2,950[7]	23,856
Conserve southern arroyo willow riparian forest	16	1	(2)[8]	15
Conserve southern sycamore-alder riparian woodland	518	401	(12)[9]	117
Conserve desert dry wash woodland	3,566	2,024	298[10]	1,244
Conserve desert fan palm oasis woodland	716	267	45	404
Conserve semi-desert chaparral	16,869	14,543	233	2,093
Conserve redshank chaparral	12,514	9,987	253	2,274
Conserve peninsular juniper woodland and scrub	29,547	26,230	418[11]	2,899

[1] The acreage shown includes 772 Acres of Disturbance allocated for projects that may be approved in HANS areas, and 58 acres that may be used only in conjunction with the Special Provisions area described in Required Measure 2a.

[2] The acreage shown includes 447 Acres of Disturbance allocated for projects that may be approved in HANS areas, and 200 acres that may be used only in conjunction with the Special Provisions area described in Required Measure 2d.

[3] The acreage shown includes 387 Acres of Disturbance allocated for projects that may be approved in HANS areas, 1 acre that may be used only in conjunction with the 10 percent Take area shown in Figure 4-26e(3), and 295 acres that may be used only in conjunction with the Special Provisions area described in Required Measure 2f.

[4] The acreage shown includes 66 Acres of Disturbance allocated for projects that may be approved in HANS areas, and 201 acres that may be used only in conjunction with the 10 percent Take area shown in Figure 4-26e(4).

[5] There is one known occurrence for this species in Agua Alta Canyon within this Conservation Area. This Conservation Objective would ensure that the location is conserved.

[6] The acreage shown includes 612 Acres of Disturbance allocated for projects that may be approved in HANS areas; 47 acres that may be used only in conjunction with the "special provisions" area described in Required Measure 2a; and 252 acres that may be used only in conjunction with the "special provisions" area described in Required Measure 2f.

[7] The acreage shown includes 2,515 Acres of Disturbance allocated for projects that may be approved in HANS areas; 59 acres that may be used only in conjunction with the "special provisions" area described in Required Measure 2a; 81 acres that may be used only in conjunction with the "special provisions" area described in Required Measure 2d; and 295 acres that may be used only in conjunction with the "special provisions" area described in Required Measure 2f.

[8] Disturbance of no more than 2 acres may occur, but it would be replaced to ensure that the no net loss occurs and the Conservation Objective is achieved.

[9] Disturbance of no more than 12 acres may occur, but it would be replaced to ensure that the no net loss occurs and the Conservation Objective is achieved.

[10] The acreage shown includes 157 Acres of Disturbance allocated for projects that may be approved in HANS areas or in 10 percent "take" areas; and 141 acres that may be used only in conjunction with the "special provisions" area described in Required Measure 2f.

[11] The acreage shown includes 302 Acres of Disturbance allocated for projects that may be approved in HANS areas; and 116 acres that may be used only in conjunction with the "special provisions" area described in Required Measure 2d.

Table 4-111b: Conservation and Take Authorization for Santa Rosa and San Jacinto Mountains Conservation Area – City of Cathedral City Area

Conservation Objective	*Total Acres in Conservation Area*	*Existing Conservation Lands*	*Acres of Disturbance Authorized*	*Remaining Acres to be Conserved*
Conserve Other Cons. Habitat for Le Conte's thrasher	13	1	1	11
Conserve Other Cons. Habitat for desert tortoise	107	1	11	95
Conserve Essential Habitat for Peninsular bighorn sheep – Recovery Zone 2	112	4	11[1]	97
Conserve desert dry wash woodland	20	0	2	18

[1] The acreage shown consists of 11 acres of Acres of Disturbance allocated for projects that may be approved in HANS areas.

Table 4-111c: Conservation and Take Authorization for Santa Rosa and San Jacinto Mountains Conservation Area – City of Indian Wells Area

Conservation Objective	*Total Acres in Conservation Area*	*Existing Conservation Lands*	*Acres of Disturbance Authorized*	*Remaining Acres to be Conserved*
Conserve Other Cons. Habitat for Le Conte's thrasher	419	190	23	206
Conserve Other Cons. Habitat for desert tortoise	4,375	3,265	111	999
Conserve Essential Habitat for Peninsular bighorn sheep – Recovery Zone 3	4,617	3,345	114[1]	1,158
Conserve desert dry wash woodland	128	55	7	66

[1] The acreage shown consists of Acres of Disturbance allocated for projects that may be approved in HANS areas.

Table 4-111d: Conservation and Take Authorization for Santa Rosa and San Jacinto Mountains Conservation Area – City of La Quinta Area

Conservation Objective	*Total Acres in Conservation Area*	*Existing Conservation Lands*	*Acres of Disturbance Authorized*	*Remaining Acres to be Conserved*
Conserve Other Cons. Habitat for Le Conte's thrasher	683	253	43	387
Conserve Other Cons. Habitat for desert tortoise	5,936	4,370	157	1,409
Conserve Essential Habitat for Peninsular bighorn sheep – Recovery Zone 3	6,185	3,481	159[1]	2,545
Conserve desert dry wash woodland	147	63	8	76

[1] This acreage does not include the Take Authorization for the Travertine Special Provisions development area, which is outside the Conservation Area, nor for any other development outside the Conservation Area. Take Authorization for projects outside the Conservation Area is provided by the Permits as described in Section 7.1. The acreage shown consists of 109 Acres of Disturbance Authorized that may be allocated for projects that may be approved in HANS areas, and 5 Acres of Disturbance Authorized that may be allocated for projects subject to the 10 percent take area depicted on Figure 4-26e(3).

Table 4-111e: Conservation and Take Authorization for Santa Rosa and San Jacinto Mountains Conservation Area – City of Palm Desert Area

Conservation Objective	*Total Acres in Conservation Area*	*Existing Conservation Lands*	*Acres of Disturbance Authorized*	*Remaining Acres to be Conserved*
Conserve Other Cons. Habitat for Le Conte's thrasher	43	6	4	33
Conserve Other Cons. Habitat for desert tortoise	581	97	48	436
Conserve Essential Habitat for Peninsular bighorn sheep – Recovery Zone 2	492	420	7[1]	65
Conserve Essential Habitat for Peninsular bighorn sheep – Recovery Zone 3	78	6	7[2]	65
Conserve desert dry wash woodland	38	6	3	29

[1] The acreage shown includes 5 Acres of Disturbance Authorized allocated for projects that may be approved in HANS areas and 2 acres of Take for projects in the 10 percent take area depicted on Figure 4-26e(2).

[2] The acreage shown consists of Acres of Disturbance allocated for projects that may be approved in HANS areas.

Table 4-111f: Conservation and Take Authorization for Santa Rosa and San Jacinto Mountains Conservation Area – City of Palm Springs Area

Conservation Objective	*Total Acres in Conservation Area*	*Existing Conservation Lands*	*Acres of Disturbance Authorized*	*Remaining Acres to be Conserved*
Conserve Other Cons. Habitat for Le Conte's thrasher	793	130	103[1]	560
Conserve Other Cons. Habitat for desert tortoise	22,571	12,398	1,317[2]	8,856
Conserve Essential Habitat for Peninsular bighorn sheep – Recovery Zone 1	9,195	6,458	226[3]	2,511
Conserve Essential Habitat for Peninsular bighorn sheep – Recovery Zone 2	18,426	12,860	866[4]	4,700
Conserve Other Cons. Habitat for gray vireo	8,416	4,102	431	3,883
Conserve southern arroyo willow riparian forest	16	16	0	0

Table 4-111f (cont.)

Conservation Objective	*Total Acres in Conservation Area*	*Existing Conservation Lands*	*Acres of Disturbance Authorized*	*Remaining Acres to be Conserved*
Conserve Sonoran cottonwood-willow riparian forest	58	0	() (0)[5]	58
Conserve southern sycamore-alder riparian woodland	30	6	(2)[6]	24
Conserve desert dry wash woodland	40	0	4	36
Conserve desert fan palm oasis woodland	218	133	9	76
Conserve semi-desert chaparral	733	111	51	571
Conserve peninsular juniper woodland and scrub	7,682	4,152	353	3,177

[1] The acreage shown includes 62 Acres of Disturbance Authorized allocated for projects that may be approved in HANS areas, and 41 acres that may be used only in conjunction with the "special provisions" area described in Required Measure 2a.

[2] The acreage shown includes 768 Acres of Disturbance Authorized allocated for projects that may be approved in HANS areas, 59 acres that may be used only in conjunction with the "special provisions" area described in Required Measure 2a, and 490 acres that may be used only in conjunction with the "special provisions" area described in Required Measure 2c.

[3] The acreage shown includes 129 Acres of Disturbance Authorized allocated for projects that may be approved in HANS areas, 92 acres that may be used only in conjunction with the "special provisions" area described in Required Measure 2a, and 5 acres that may be used only in conjunction with the "special provisions" area described in Required Measure 2b.

[4] The acreage shown includes 362 Acres of Disturbance Authorized allocated for projects that may be approved in HANS areas, and 504 acres that may be used only in conjunction with the "special provisions" area described in Required Measure 2c.

[5] No disturbance is authorized because all 58 acres of this community occurs in an area to be conserved pursuant to the Special Provisions area described in Required Measure 2b.

[6] Disturbance of no more than 2 acres may occur, but it would be replaced to ensure that the no net loss occurs and the Conservation Objective is achieved.

Table 4-111g: Conservation and Take Authorization for Santa Rosa and San Jacinto Mountains Conservation Area – City of Rancho Mirage Area

Conservation Objective	*Total Acres in Conservation Area*	*Existing Conservation Lands*	*Acres of Disturbance Authorized*	*Remaining Acres to be Conserved*
Conserve Other Cons. Habitat for Le Conte's thrasher	19	0	2	17
Conserve Other Cons. Habitat for desert tortoise	5,249	3,776	147	1,326
Conserve Essential Habitat for Peninsular bighorn sheep – Recovery Zone 2	5,262	4,770	42[1]	450
Conserve desert dry wash woodland	19	9	1	9

[1] The acreage shown includes 38 Acres of Disturbance Authorized allocated for projects that may be approved in HANS areas and 4 acres of Take for projects in the 10 percent take area designated on Figure 4-26e(2).

4.4 Required Avoidance, Minimization, and Mitigation Measures

This section describes certain avoidance, minimization, and mitigation requirements for Covered Activities within the Conservation Area, in addition to Conservation Area specific measures described in the Conservation Area subsections in Section 4.3. The measures described in this section do not apply to single-family homes, emergency response activities, and any non-commercial accessory uses and structures including but not limited to second units on an existing legal lot. To assist Permittees with implementation of these measures, CVCC will maintain maps of modeled Habitat and a natural communities map and will provide them to each of the Permittees. CVCC will also maintain a list of Acceptable Biologists who may be used to conduct surveys for specified Covered Species identified in this section. Any Permittee may submit the names of biologists for inclusion in the initial list of Acceptable Biologists. The list shall be updated at least annually. CVCC will develop procedures for individual biologists to submit their name for inclusion on the list. Individuals conducting survey activities for listed endangered or threatened species or species for which a state or federal protocol exists must have the appropriate permit (i.e., in accordance with the federal Endangered Species Act, Section 10(a)(1)(A), or state Endangered Species Act, California Fish and Game Code, Section 2081(a)) to conduct such surveys. Annually, or whenever the list is revised, CVCC shall submit the list to the Wildlife Agencies for review. The Wildlife Agencies shall have thirty (30) days to provide input on the qualifications of any biologists on the list. If the Wildlife Agencies have not responded within thirty days (30) of receipt of the list from CVCC, the biologists on the list shall be deemed acceptable.

In the event that a survey of a parcel is required pursuant to the MSHCP, it will be conducted by an Acceptable Biologist. The survey shall be conducted in the appropriate season, in accordance with established accepted protocols if they exist. Within one (1) year of Permit issuance, the Wildlife Agencies and the MPA, in consultation with CVCC, shall develop survey protocols for those species for which a protocol is required. CVCC will maintain a list of accepted survey protocols. For those species for which protocols do not exist at the time surveys are needed, the Acceptable Biologist shall use a survey protocol generally accepted by biologists familiar with the species. Survey results shall be documented in both mapped and text form and shall be presented for review by the appropriate Permittee and CVCC. Wildlife Agencies' concurrence or acceptance of the surveys and/or the results contained therein is not required by the MSHCP.

Biological Corridors. Specific roads in Conservation Areas, where culverts or undercrossings are required to maintain Biological Corridors, are delineated in the Section 4.3 subsections on individual Conservation Areas.

Burrowing Owl. This measure does not apply to single-family residences and any non-commercial accessory uses and structures including but not limited to second units on an existing legal lot, or to O&M of Covered Activities other than levees, berms, dikes, and similar features that are known to contain burrowing owl burrows. O&M of

roads is not subject to this requirement. For other projects that are subject to CEQA, the Permittees will require burrowing owl surveys in the Conservation Areas using an accepted protocol (as determined by the CVCC in coordination with the Permittees and the Wildlife Agencies). Prior to Development, the construction area and adjacent areas within 500 feet of the Development site, or to the edge of the property if less than 500 feet, will be surveyed by an Acceptable Biologist for burrows that could be used by burrowing owl. If a burrow is located, the biologist will determine if an owl is present in the burrow. If the burrow is determined to be occupied, the burrow will be flagged and a 160-foot buffer during the non-breeding season and a 250-foot buffer during the breeding season, or a buffer to the edge of the property boundary if less than 500 feet, will be established around the burrow. The buffer will be staked and flagged. No Development or O&M activities will be permitted within the buffer until the young are no longer dependent on the burrow.

If the burrow is unoccupied, the burrow will be made inaccessible to owls, and the Covered Activity may proceed. If either a nesting or escape burrow is occupied, owls shall be relocated pursuant to accepted Wildlife Agency protocols. A burrow is assumed occupied if records indicate that, based on surveys conducted following protocol, at least one burrowing owl has been observed occupying a burrow on site during the past three years. If there are no records for the site, surveys must be conducted to determine, prior to construction, if burrowing owls are present. Determination of the appropriate method of relocation, such as eviction/passive relocation or active relocation, shall be based on the specific site conditions (e.g., distance to nearest suitable habitat and presence of burrows within that habitat) in coordination with the Wildlife Agencies. Active relocation and eviction/passive relocation require the preservation and maintenance of suitable burrowing owl habitat determined through coordination with the Wildlife Agencies.

Within one (1) year of Permit issuance, CVCC will cooperate with County Flood Control, CVWD and IID to conduct an inventory of levees, berms, dikes, and similar features in the Plan Area maintained by those Permittees. Burrowing owl burrow locations will be mapped and each of these Permittees will incorporate the information into its O&M practices to avoid impacts to the burrowing owl to the maximum extent Feasible. CVCC in cooperation with County Flood Control, CVWD, and IID will prepare a manual for maintenance staff, educating them about the burrowing owl and appropriate actions to take when owls are encountered to avoid impacts to the maximum extent Feasible. The manual will be submitted to the Wildlife Agencies for review and comment within two (2) years of Permit issuance. In conjunction with the Monitoring Program, the maps of the burrowing owl locations along the above-described levees, berms, dikes, and similar features will be periodically updated.

Covered Riparian Bird Species. This measure does not apply to single-family residences and any non-commercial accessory uses and structures including but not limited to second units on an existing legal lot. Riparian Habitat here refers to the following natural communities: southern arroyo willow riparian forest, Sonoran cottonwood-willow riparian forest, desert fan palm oasis woodland, and southern sycamore-alder riparian woodland in the Cabazon, Stubbe and Cottonwood Canyons,

Whitewater Canyon, Upper Mission Creek/Big Morongo Canyon, Thousand Palms, Indio Hills Palms, Joshua Tree National Park, Mecca Hills and Orocopia Mountains, Dos Palmas, Coachella Valley Stormwater Channel and Delta, and Santa Rosa and San Jacinto Mountains Conservation Areas. Covered Activities, including O&M of facilities and construction of permitted new projects, in riparian Habitat will be conducted to the maximum extent Feasible outside of the March 15 – September 15 nesting season for least Bell's vireo, and the May 1 – September 15 nesting season for southwestern willow flycatcher, summer tanager, yellow warbler, and yellow-breasted chat. If Covered Activities must occur during the nesting season, surveys shall be conducted to determine if any active nests are present. If active nests are identified, the Covered Activity shall not be conducted within 200 feet of an active nest. If surveys conducted during the nesting season document that Covered nesting riparian bird Species are not present, the Covered Activity may proceed.

Crissal Thrasher. This measure does not apply to single-family residences and any non-commercial accessory uses and structures including but not limited to second units on an existing legal lot, or to O&M of Covered Activities. In modeled crissal thrasher Habitat in the Willow Hole, Thousand Palms, Indio Hills Palms, East Indio Hills, Dos Palmas, and Coachella Valley Stormwater Channel and Delta Conservation Areas, surveys will be conducted by an Acceptable Biologist prior to the start of construction activities during the nesting season, January 15 – June 15, to determine if active nest sites for this species occur on the construction site and/or within 500 feet of the construction site, or to the edge of the property boundary if less than 500 feet. If nesting crissal thrashers are found, a 500-foot buffer, or a buffer to the edge of the property boundary if less than 500 feet, will be established around the nest site. The buffer will be staked and flagged. No construction activities will be permitted within the buffer during the breeding season of January 15 – June 15 or until the young have fledged.

Desert tortoise. This measure does not apply to single-family residences and any non-commercial accessory uses and structures, including but not limited to second units on an existing legal lot, or to O&M of Covered Activities for Permittee infrastructure facilities. Within Conservation Areas, the Permittees will require surveys for desert tortoise for Development in modeled desert tortoise Habitat. Prior to Development, an Acceptable Biologist will conduct a presence/absence survey of the Development area and adjacent areas within 200 feet of the Development area, or to the property boundary if less than 200 feet and permission from the adjacent landowner cannot be obtained, for fresh sign of desert tortoise, including live tortoises, tortoise remains, burrows, tracks, scat, or egg shells. The presence/absence survey must be conducted during the window between February 15 and October 31. Presence/absence surveys require 100% coverage of the survey area. If no sign is found, a clearance survey is not required. A presence/absence survey is valid for 90 days or indefinitely if tortoise-proof fencing is installed around the Development site.

If fresh sign is located, the Development area must be fenced with tortoise-proof fencing and a clearance survey conducted during the clearance window. Desert tortoise clearance surveys shall be conducted during the clearance window from February 15 to

June 15 and September 1 to October 31 or in accordance with the most recent Wildlife Agency protocols. Clearance surveys must cover 100% of the Development area. A clearance survey must be conducted during different tortoise activity periods (morning and afternoon). All tortoises encountered will be moved from the Development site to a specified location. Prior to issuance of the Permits, CVCC will either use the *Permit Statement Pertaining to High Temperatures for Handling Desert Tortoises* and *Guidelines for Handling Desert Tortoises During Construction Projects*, revised July 1999, or develop a similar protocol for relocation and monitoring of desert tortoise, to be reviewed and approved by the Wildlife Agencies. Thereafter, the protocol will be revised as needed based on the results of monitoring and other information that becomes available.

For O&M activities in the Conservation Areas, the Permittees shall ensure that personnel conducting such activities are instructed to be alert for the presence of desert tortoise. If a tortoise is spotted, activities adjacent to the tortoise's location will be halted and the tortoise will be allowed to move away from the activity area. If the tortoise is not moving, it will be relocated by an Acceptable Biologist to nearby suitable Habitat and placed in the shade of a shrub. To the maximum extent Feasible, O&M activities will avoid the period from February 15 and October 31.

Utility development protocols have been developed to avoid or minimize potential adverse impacts to the desert tortoise in the Conservation Areas from utility and road right-of-way projects, such as the installation and maintenance of water, sewer, and electric lines and roadway maintenance. The objectives of these protocols are to provide reliable and consistent direction on utility development within the Conservation Areas. Two utility development protocols, inactive and active season, provide specific direction on site preparation and construction phases of utility projects in the Conservation Areas. The protocols include steps to be followed during the desert tortoise active and/or inactive season. The inactive season protocol must be used for utility maintenance or development within the November 1 to February 14 time frame; the active season protocol must be used for utility maintenance or development within the February 15 to October 31 time frame. Deviations from these time frames must be presented to the RMOC.

Inactive Season Protocol. This protocol is applicable to pre-construction and construction phases of utility Covered Activity projects occurring between November 1 and February 14. These protocols apply only to the site preparation and construction phases of projects. The project proponent must follow the eight pre-construction protocol requirements listed below.

1. A person from the entity contracting the construction shall act as the contact person with the representative of the appropriate RMUC. He/she will be responsible for overseeing compliance with the protective stipulations as stated in this protocol.
2. Prior to any construction activity within the Conservation Areas, the contact person will meet with the representative of the appropriate RMUC to review the

plans for the project. The representative of the appropriate RMUC will review alignment, pole spacing, clearing limits, burrow locations, and other specific project plans which have the potential to affect the desert tortoise. He or she may recommend modifications to the contact person to further avoid or minimize potential impacts to desert tortoise.

3. The construction area shall be clearly fenced, marked, or flagged at the outer boundaries to define the limits of construction activities. The construction right-of-way shall normally not exceed 50 feet in width for standard pipeline corridors, access roads and transmission corridors, and shall be minimized to the maximum extent Feasible. Existing access roads shall be used when available, and rights-of-way for new and existing access roads shall not exceed 20 feet in width unless topographic obstacles require greater road width. Other construction areas including well sites, storage tank sites, substation sites, turnarounds, and laydown/staging sites which require larger areas will be determined in the pre-construction phase. All construction workers shall be instructed that their activities shall be confined to locations within the fenced, flagged, or marked areas.

4. An Acceptable Biologist shall conduct pre-construction clearance surveys of all areas potentially disturbed by the proposed project. Any winter burrows discovered in the Conservation Areas during the pre-construction survey shall be avoided or mitigated. The survey shall be submitted to the representative of the appropriate RMUC as part of plan review.

5. All site mitigation criteria shall be determined in the pre-construction phase, including but not limited to seeding, barrier fences, leveling, and laydown/staging areas, and will be reviewed by the representative of the appropriate RMUC prior to implementation.

6. A worker education program shall be implemented prior to the onset of each construction project. All construction employees shall be required to read an educational brochure prepared by the representative of the appropriate RMUC and/or the RMOC and attend a tortoise education class prior to the onset of construction or site entry. The class will describe the sensitive species which may be found in the area, the purpose of the MSHCP Reserve System, and the appropriate measures to take upon discovery of a sensitive species. It will also cover construction techniques to minimize potential adverse impacts.

7. All pre-construction activities which could Take tortoises in any manner (e.g., driving off an established road, clearing vegetation, etc.) shall occur under the supervision of an Acceptable Biologist.

8. If there are unresolvable conflicts between the representative of the appropriate RMUC and the contact person, then the matter will be arbitrated by the RMOC and, if necessary, by CVCC.

The following terms are established to protect the desert tortoise during utility-related construction activities in the Conservation Areas and are to be conducted by an Acceptable Biologist.

- An Acceptable Biologist shall oversee construction activities to ensure compliance with the protective stipulations for the desert tortoise.
- Desert tortoises found above ground inside the project area during construction shall be moved by an Acceptable Biologist out of harm's way and placed in a winter den (at a distance no greater than 250 feet). If a winter den cannot be located, the USFWS or ~~CDFG~~CDFW shall determine appropriate action with respect to the tortoise. Tortoises found above ground shall be turned over to the Acceptable Biologist
- No handling of tortoises will occur when the air temperature at 15 centimeters above ground exceeds 90 degrees Fahrenheit.
- Desert tortoise burrows shall be avoided to the maximum extent Feasible. An Acceptable Biologist shall excavate any burrows which cannot be avoided and will be disturbed by construction. Burrow excavation shall be conducted with the use of hand tools only, unless the Acceptable Biologist determines that the burrow is unoccupied immediately prior to burrow destruction.
- Only burrows within the limits of clearing and surface disturbance shall be excavated. Burrows outside these limits, but at risk from accidental crushing, shall be protected by the placement of deterrent barrier fencing between the burrow and the construction area. Installation and removal of such barrier fencing shall be under the direction and supervision of an Acceptable Biologist.
- For electrical transmission line and road construction projects, only burrows within the right-of-way shall be excavated. Burrows outside the right-of-way, but at risk from accidental crushing, shall be protected by the placement of deterrent barrier fencing between the burrow and the right-of-way. Installation and removal of such barrier fencing shall be under the direction and supervision of an Acceptable Biologist.
- Tortoises in the Conservation Areas are not to be removed from burrows until appropriate action is determined by USFWS or ~~CDFG~~CDFW with respect to the tortoise. The response shall be carried out within 72 hours.
- Blasting is not permissible within 100 feet of an occupied tortoise burrow.

During construction, contractors will comply with the mitigation and minimization measures contained within this protocol. These measures are:

- All trenches, pits, or other excavations shall be inspected for tortoises by an Acceptable Biologist prior to filling.
- All pipes and culverts stored within desert tortoise Habitat shall have both ends capped to prevent entry by desert tortoises. During construction, all open ended pipeline segments that are welded in place shall be capped during periods of

construction inactivity to prevent entry by desert tortoises.

- Topsoil removed during trenching shall be re-spread on the pipeline construction area following compaction of the backfill. The area shall be restored as determined during the environmental review.
- All test pump water will be routed to the nearest wash or natural drainage. The route will be surveyed by an Acceptable Biologist. If tortoises are found in the drainage area the Acceptable Biologist will remove the tortoises.
- Powerlines associated with water development, such as to provide power for pumps, should be buried underground adjacent to the pipe. All above ground structures deemed to be necessary shall be equipped with functional anti-perching devices that would prevent their use by ravens and other predatory birds, and shall adhere to the electrical distribution protocol which follows.
- In order to perform routine O&M of the water systems such as wells, pumps, water lines and storage tanks, etc., employees are to be trained in the area of desert tortoise education. This training will be performed on a regular basis by an Acceptable Biologist for those personnel not previously trained. The training will include at a minimum the following: identification of tortoises, burrows, and other sign; and instructions on installing tortoise barrier fencing. During the course of basic O&M, desert tortoise will be avoided. Untrained employees shall not perform maintenance operations within the reserve.
- All disturbance areas around poles or concrete pads will be reduced to a size just large enough for the construction activity.
- Areas disturbed around poles or construction pads will be restored as determined during the pre-construction process.
- Poles or other above ground structures necessary for electrical distribution development shall be minimized as much as possible. All above ground structures shall be equipped with functional anti-perching devices that would prevent their use by ravens and other predatory birds.
- In order to perform routine O&M of the electrical distribution systems such as transmission lines and poles, substations, etc., employees are to be trained in the area of desert tortoise education. This training will be performed on a regular basis by a qualified biologist for those personnel not previously trained. The training will include at a minimum the following: identification of tortoises, burrows, and other sign; and instructions on installing tortoise barrier fencing. During the course of basic O&M, desert tortoise will be avoided. Untrained employees shall not perform maintenance operations within the non-Take areas.
- All trash and food items shall be promptly contained and removed daily from the project site to reduce the attractiveness of the area to common ravens and other desert tortoise predators.
- Construction activities which occur between dusk and dawn shall be limited to areas which have already been cleared of desert tortoises by the Acceptable Biologist and graded or located in a fenced right-of-way. Construction activities

shall not be permitted between dusk and dawn in areas not previously graded.

Active Season Protocol. This protocol is applicable to pre-construction and construction phases of utility development projects occurring between February 15 and November 1. It is identical to the Inactive Season Protocol with the following additions:

- Work areas shall be inspected for desert tortoises within 24 hours of the onset of construction. To facilitate implementation of this condition, burrow inspection and excavation may begin no more than seven (7) days in advance of construction activities, as long as a final check for desert tortoises is conducted at the time of construction.
- All pre-construction activities which could Take tortoises in any manner (e.g., driving off an established road, clearing vegetation, etc.) shall occur under the overall supervision of an Acceptable Biologist. Any hazards to tortoises created by this activity, such as drill holes, open trenches, pits, other excavations, or any steep-sided depressions, shall be checked three times a day for desert tortoises. These hazards shall be eliminated each day prior to the work crew leaving the site, which may include installing a barrier that will preclude entry by tortoises. Open trenches, pits or other excavations will be backfilled within 72 hours, whenever possible. A 3:1 slope shall be left at the end of every open trench to allow trapped desert tortoises to escape. Trenches not backfilled within 72 hours shall have a barrier installed around them to preclude entry by desert tortoises. All trenches, pits, or other excavations shall be inspected for tortoises by a biological monitor trained and approved by the Acceptable Biologist prior to filling.
- If a desert tortoise is found, the biological monitor shall notify the Acceptable Biologist who will remove the animal as soon as possible.
- Only burrows within the limits of clearing and surface disturbance shall be excavated. Burrows outside these limits, but at risk from accidental crushing, shall be protected by the placement of deterrent barrier fencing between the burrow and the construction area. The barrier fence shall be at least 20 feet long and shall be installed to direct the tortoise leaving the burrow away from the construction area. Installation and removal of such barrier fencing shall be under the direction and supervision of the biological monitor.
- If blasting is necessary for construction, all tortoises shall be removed from burrows within 100 feet of the blast area.

Disposition of Sick, Injured, or Dead Specimens. Upon locating dead, injured, or sick desert tortoises under any utility or road project, initial notification by the contact representative or Acceptable Biologist must be made to the USFWS or ~~CDFG~~CDFW within three (3) working days of its finding. Written notification must be made within five (5) calendar days with the following information: date; time; location of the carcass; photograph of the carcass; and any other pertinent information. Care must be taken in handling sick or injured animals to ensure effective treatment and care. Injured animals shall be taken care of by the Acceptable Biologist or an appropriately trained

veterinarian. Should any treated tortoises survive, USFWS or ~~CDFG~~CDFW should be contacted regarding the final disposition of the animals.

Fluvial Sand Transport. Activities, including O&M of facilities and construction of permitted new projects, in fluvial sand transport areas in the Cabazon, Stubbe and Cottonwood Canyons, Snow Creek/Windy Point, Whitewater Canyon, Whitewater Floodplain, Upper Mission Creek/Big Morongo Canyon, Mission Creek/Morongo Wash, Willow Hole, Long Canyon, Edom Hill, Thousand Palms, West Deception Canyon, and Indio Hills/Joshua Tree National Park Linkage Conservation Areas will be conducted in a manner to maintain the fluvial sand transport capacity of the system.

Le Conte's Thrasher. This measure does not apply to single-family residences and any non-commercial accessory uses and structures including but not limited to second units on an existing legal lot, or to O&M of Covered Activities. In modeled Le Conte's thrasher Habitat in all the Conservation Areas, during the nesting season, January 15 - June 15, prior to the start of construction activities, surveys will be conducted by an Acceptable Biologist on the construction site and within 500 feet of the construction site, or to the property boundary if less than 500 feet. If nesting Le Conte's thrashers are found, a 500 foot buffer, or to the property boundary if less than 500 feet, will be established around the nest site. The buffer will be staked and flagged. No construction will be permitted within the buffer during the breeding season of January 15 - June 15 or until the young have fledged.

Mesquite Hummocks and Mesquite Bosque Natural Communities. This measure does not apply to single-family residences and any non-commercial accessory uses and structures including but not limited to second units on an existing legal lot, or to O&M of Covered Activities. Construction activities in the Cabazon, Willow Hole, Thousand Palms, Indio Hills Palms, East Indio Hills, Dos Palmas, Coachella Valley Stormwater Channel and Delta, and Santa Rosa and San Jacinto Mountains Conservation Areas will avoid mesquite hummocks and mesquite bosque to the maximum extent Feasible.

Peninsular Bighorn Sheep Habitat. Completion of Covered Activities in Peninsular bighorn sheep Habitat in the Cabazon, Snow Creek/Windy Point, and Santa Rosa and San Jacinto Mountains Conservation Areas will be conducted outside of the January 1 - June 30 lambing season unless otherwise authorized through a Minor Amendment to the Plan with concurrence from the Wildlife Agencies. O&M of Covered Activities, including but not limited to refinishing the inside of water storage tanks, shall be scheduled to avoid the lambing season, but may extend into the January 1 – June 30 period if necessary to complete the activity, upon concurrence with the Wildlife Agencies.

For new projects in the above listed Conservation Areas, no toxic or invasive plant species may be used for landscaping. For existing public infrastructure facilities which have landscaping in Peninsular bighorn sheep Habitat in the Cabazon, Snow Creek/Windy Point, and Santa Rosa and San Jacinto Mountains Conservation Areas, the

Permittees who have such facilities will, with respect to those facilities, develop and implement a plan and schedule to remove or prevent access to oleander and any other plants known to be toxic to Peninsular bighorn sheep. The plan and schedule will be prepared within one (1) year of Permit issuance.

Triple-ribbed milkvetch. This measure does not apply to single-family residences and any non-commercial accessory uses and structures including but not limited to second units on an existing legal lot, or to O&M of Covered Activities. It is understood that O&M for infrastructure developed as part of a private development approved in compliance with the MSHCP that is later transferred to a public entity is included as a Covered Activity. For Covered Activities within modeled triple-ribbed milkvetch Habitat in the Whitewater Canyon, Whitewater Floodplain, Upper Mission Creek/Big Morongo Canyon, and Santa Rosa and San Jacinto Mountains Conservation Areas, surveys by an Acceptable Biologist will be required for activities during the growing and flowering period from February 1 - May 15. Any occurrences of the species will be flagged and public infrastructure projects shall avoid impacts to the plants to the maximum extent Feasible. In particular, known occurrences on a map maintained by CVCC shall not be disturbed.

Palm Springs Pocket Mouse. To avoid impacts to the Palm Springs pocket mouse and its habitat in the Upper Mission Creek/Big Morongo Canyon and Willow Hole Conservation Areas, Flood Control-related construction activities will comply with the following avoidance and minimization measures.

- **Clearing**: For construction that would involve disturbance to Palm Springs pocket mouse habitat, activity should be phased to the extent feasible and practicable so that suitable habitat islands are no farther than 300 feet apart at any given time to allow pocket mice to disperse between habitat patches across non-suitable habitat (i.e., unvegetated and/or compacted soils). Prior to project construction, a biological monitor familiar with this species should assist construction crews in planning access routes to avoid impacts to occupied habitat as much as feasible (i.e., placement of preferred routes on project plans and incorporation of methods to avoid as much suitable habitat/soil disturbance as possible). Furthermore, during construction activities, the biological monitor will ensure that connected, naturally vegetated areas with sandy soils and typical native vegetation remain intact to the extent feasible and practicable. Finally, construction that involves clearing of habitat should be avoided during the peak breeding season (approximately March to May), and activity should be limited as much as possible during the rest of the breeding season (January to February and June to August).
- **Revegetation**: Clearing of native vegetation (e.g., creosote, rabbitbrush, burrobush, cheesebush) should be followed by revegetation, including natural reestablishment and other means, resulting in habitat types of equal or superior biological value for Palm Springs pocket mouse.
- **Trapping/Holding**: All trapping activity should be conducted in accordance with accepted protocols and by a qualified biologist who possesses a Memorandum of

Understanding with ~~CDFG~~CDFW for live-trapping of heteromyid species in Southern California.

- **Translocation**: Should translocation between distinct population groups be necessary, as determined through the Adaptive Management and Monitoring Program, activity should be conducted by a qualified biologist who possesses a Memorandum of Understanding with ~~CDFG~~CDFW for live-trapping of heteromyid species in Southern California. Trapping and subsequent translocation activity should be conducted in accordance with accepted protocols. Translocation programs should be coordinated by or conducted by the CVCC and/or RMOC to determine the appropriate trapping, holding, marking, and handling methods and potential translocation sites.

Little San Bernardino Mountains Linanthus. This measure does not apply to single-family residences and any non-commercial accessory uses and structures, including but not limited to second units on an existing legal lot, or to O&M of Covered Activities. To avoid and minimize impacts to this species as much as possible, the following avoidance and minimization effort shall occur:

- **Salvage**: Salvage of top soil and/or seeds should occur prior to ground disturbance in accordance with Section 6.6.1. Salvage should be conducted by or in cooperation with the CVCC.

4.5 Land Use Adjacency Guidelines

The purpose of Land Use Adjacency Guidelines is to avoid or minimize indirect effects from Development adjacent to or within the Conservation Areas. Adjacent means sharing a common boundary with any parcel in a Conservation Area. Such indirect effects are commonly referred to as edge effects, and may include noise, lighting, drainage, intrusion of people, and the introduction of non-native plants and non-native predators such as dogs and cats. Edge effects will also be addressed through reserve management activities such as fencing. The following Land Use Adjacency Guidelines shall be considered by the Permittees in their review of individual public and private Development projects adjacent to or within the Conservation Areas to minimize edge effects, and shall be implemented where applicable.

4.5.1 Drainage

Proposed Development adjacent to or within a Conservation Area shall incorporate plans to ensure that the quantity and quality of runoff discharged to the adjacent Conservation Area is not altered in an adverse way when compared with existing conditions. Stormwater systems shall be designed to prevent the release of

toxins, chemicals, petroleum products, exotic plant materials or other elements that might degrade or harm biological resources or ecosystem processes within the adjacent Conservation Area.

4.5.2 Toxics

Land uses proposed adjacent to or within a Conservation Area that use chemicals or generate bioproducts such as manure that are potentially toxic or may adversely affect wildlife and plant species, Habitat, or water quality shall incorporate measures to ensure that application of such chemicals does not result in any discharge to the adjacent Conservation Area.

4.5.3 Lighting

For proposed Development adjacent to or within a Conservation Area, lighting shall be shielded and directed toward the developed area. Landscape shielding or other appropriate methods shall be incorporated in project designs to minimize the effects of lighting adjacent to or within the adjacent Conservation Area in accordance with the guidelines to be included in the Implementation Manual.

4.5.4 Noise

Proposed Development adjacent to or within a Conservation Area that generates noise in excess of 75 dBA L_{eq} hourly shall incorporate setbacks, berms, or walls, as appropriate, to minimize the effects of noise on the adjacent Conservation Area in accordance with the guidelines to be included in the Implementation Manual.

4.5.5 Invasives

Invasive, non-native plant species shall not be incorporated in the landscape for land uses adjacent to or within a Conservation Area. Landscape treatments within or adjacent to a Conservation Area shall incorporate native plant materials to the maximum extent Feasible; recommended native species are listed in Table 4-112. The plants listed in Table 4-113 shall not be used within or adjacent to a Conservation Area. This list may be amended from time to time through a Minor Amendment with Wildlife Agency Concurrence.

Table 4-112: Coachella Valley Native Plants Recommended for Landscaping[1]

BOTANICAL NAME	COMMON NAME
Trees	
Washingtonia filifera	California Fan Palm
Cercidium floridum	Blue Palo Verde
Chilopsis linearis	Desert Willow
Olneya tesota	Ironwood Tree
Prosopis glandulosa var. torreyana	Honey Mesquite
Shrubs	
Acacia greggii	Cat's Claw Acacia
Ambrosia dumosa	Burro Bush
Atriplex canescens	Four Wing Saltbush
Atriplex lentiformis	Quailbush
Atriplex polycarpa	Cattle Spinach
Baccharis sergiloides	Squaw Water-weed
Bebia juncea	Sweet Bush
Cassia (Senna) covesii	Desert Senna
Condalia parryi	Crucilllo
Crossosoma bigelovii	Crossosoma
Dalea emoryi	Dye Weed
Dalea (Psorothamnus) schottii	Indigo Bush
Datura meteloides	Jimson Weed
Encelia farinosa	Brittle Bush
Ephedra aspera	Mormon Tea
Eriogonum fasciculatum	California Buckwheat
Eriogonum wrightii membranaceum	Wright's Buckwheat
Fagonia laevis	(No Common Name)
Gutierrezia sarothrae	Matchweed
Haplopappus acradenius	Goldenbush
Hibiscus denudatus	Desert Hibiscus
Hoffmannseggia microphylla	Rush Pea
Hymenoclea salsola	Cheesebush
Hyptis emoryi	Desert Lavender
Isomeris arborea	Bladder Pod
Juniperus californica	California Juniper
Krameria grayi	Ratany
Krameria parvifolia	Little-leaved Ratany
Larrea tridentate	Creosote Bush
Lotus rigidus	Desert Rock Pea
Lycium andersonii	Box Thorn
Petalonyx linearis	Long-leaved Sandpaper Plant
Petalonyx thurberi	Sandpaper Plant
Peucephyllum schottii	Pygmy Cedar
Prunus fremontii	Desert Apricot
Rhus ovata	Sugar-bush
Salazaria mexicana	Paper-bag Bush

Table 4-112 (cont.)

BOTANICAL NAME	COMMON NAME
Salvia apiana	White Sage
Salvia eremostachya	Santa Rosa Sage
Salvia vaseyi	Wand Sage
Simmondsia chinensis	Jojoba
Sphaeralcia ambigua	Globemallow (Desert Mallow)
Sphaeralcia ambigua rosacea	Apricot Mallow
Trixis californica	Trixis
Zauschneria californica	California Fuchsia
Groundcovers	
Mirabilis bigelovii	Wishbone Bush (Four O'Clock)
Mirabilis tenuiloba	White Four O'Clock (Thin-lobed)
Vines	
Vitis girdiana	Desert Grape
Accent	
Muhlenbergia rigens	Deer Grass
Herbaceous Perennials[2]	
Adiantum capillus-veneris	Maiden-hair Fern (w)
Carex alma	Sedge (w)
Dalea parryi	Parry Dalea
Eleocharis montevidensis	Spike Rush (w)
Equisetum laevigatum	Horsetail (w)
Juncus bufonis	Toad Rush (w)
Juncus effuses	Juncus (w)
Juncus macrophyllus	Juncus (w)
Juncus mexicanus	Mexican Rush (w)
Juncus xiphioides	Juncus (w)
Notholaena parryi	Parry Cloak Fern
Pallaea mucronata	Bird-foot Fern
Cacti and Succulents	
Agave deserti	Desert Agave
Asclepias albicans	Desert Milkweed (Buggy-whip)
Asclepias subulata	Ajamete
Dudleya arizonica	Live-forever
Dudleya saxosa	Rock Dudleya
Echinocereus engelmannii	Calico Hedgehog Cactus
Ferocactus acanthodes	Barrel Cactus
Fouquieria splendens	Ocotillo
Mamillaria dioica	Nipple Cactus
Mamillaria tetrancistra	Corkseed Cactus
Nolina parryi	Parry Nolina
Opuntia acanthocarpa	Stag-horn or Deer-horn Cholla
Opuntia bigelovii	Teddy Bear or Jumping Cholla
Opuntia basilaris	Beavertail Cactus
Opuntia echinocarpa	Silver or Golden Cholla
Opuntia ramosissima	Pencil Cholla, Darning Needle Cholla

Table 4-112 (cont.)

BOTANICAL NAME	COMMON NAME
Yucca schidigera	Mojave Yucca, Spanish Dagger
Yucca whipplei	Our Lord's Candle

[1] Source: "Coachella Valley Native Plants, Excluding Annuals (0 ft. to approximately 3,000 ft. elevation)." Compiled by Dave Heveron, Garden Collections Manager, and Kirk Anderson, Horticulturist, The Living Desert, May, 2000, for the Coachella Valley Mountains Conservancy.

[2] Common names for herbaceous perennials that are followed by "(w)" indicate a water or riparian species.

Table 4-113: Prohibited Invasive Ornamental Plants[1]

BOTANICAL NAME	COMMON NAME
Acacia spp. (all species except A. greggii)	Acacia (all species except native catclaw acacia)
Arundo donax (✓)	Giant Reed or Arundo Grass
Atriplex semibaccata (✓)	Australian Saltbush
Avena barbata	Slender Wild Oat
Avena fatua	Wild Oat
Brassica tournefortii (✓✓)	African or Saharan Mustard
Bromus madritensis ssp. *rubens (✓)*	Red Brome
Bromus tectorum (✓✓)	Cheat Grass or Downy Brome
Cortaderia jubata [syn.*C. atacamensis*]	Jubata Grass or Andean Pampas Grass
Cortaderia dioica [syn. C. selloana]	Pampas Grass
Descurainia sophia	Tansy Mustard
Eichhornia crassipes	Water Hyacinth
Elaegnus angustifolia	Russian Olive
Foeniculum vulgare	Sweet Fennel
Hirschfeldia incana	Mediterranean or Short-pod Mustard
Lepidium latifolium	Perennial Pepperweed
Lolium multiflorum	Italian Ryegrass
Nerium oleander	Oleander
Nicotiana glauca (✓)	Tree Tobacco
Oenothera berlandieri (#)	Mexican Evening Primrose
Olea europea	European Olive Tree
Parkinsonia aculeata (✓)	Mexican Palo Verde
Pennisetum clandestinum	Kikuyu Grass
Pennisetum setaceum (✓✓)	Fountain Grass
Phoenix canariensis (#)	Canary Island Date Palm
Phoenix dactylifera (#)	Date Palm
Ricinus communis (✓)	Castorbean
Salsola tragus (✓)	Russian Thistle
Schinus molle	Peruvian Pepper Tree or California Pepper
Schinus terebinthifolius	Brazilian Pepper Tree
Schismus arabicus	Mediterranean Grass
Schismus barbatus (✓✓)	Saharan Grass, Abu Mashi
Stipa capensis (✓✓)	No Common Name
Tamarix spp. (all species) (✓✓)	Tamarisk or Salt Cedar
Taeniatherum caput-medusae	Medusa-head

Table 4-113 (cont.)

BOTANICAL NAME	COMMON NAME
Tribulus terrestris	Puncturevine
Vinca major	Periwinkle
Washingtonia robusta	Mexican fan palm
Yucca gloriosa (#)	Spanish Dagger

[1] Sources: California Exotic Pest Plant Council, United States Department of Agriculture-Division of Plant Health and Pest Prevention Services, California Native Plant Society, Fremontia Vol. 26 No. 4, October 1998, The Jepson Manual; Higher Plants of California, and County of San Diego Department of Agriculture.

Key to Table 4-113:
# indicates species not on CalEPPC October 1999 "Exotic Pest Plants of Greatest Ecological Concern in California" list
✓ indicates species known to be invasive in the Plan Area
✓✓ indicates particularly troublesome invasive species

4.5.6 Barriers

Land uses adjacent to or within a Conservation Area shall incorporate barriers in individual project designs to minimize unauthorized public access, domestic animal predation, illegal trespass, or dumping in a Conservation Area. Such barriers may include native landscaping, rocks/boulders, fencing, walls and/or signage.

4.5.7 Grading/Land Development

Manufactured slopes associated with site Development shall not extend into adjacent land in a Conservation Area.

4.6 Impact and Anticipated Levels of Take and Habitat Loss

This section summarizes anticipated Take levels. The information is necessary to assess the Plan's impacts on the Covered Species and the conserved natural communities and to delineate the extent of Take authorized under the permits. A full discussion of the Plan's effects on the Covered Species and conserved natural communities is found in the EIR/EIS accompanying the Plan.

In the Plan, anticipated Take for Listed Species (animal species) for which Habitat distribution models have been developed is measured in terms of Habitat acres affected by the Covered Activities both outside and within the Conservation Areas. For purposes of this calculation, it is assumed that all non-federal lands outside the Conservation Areas may be subject to Take. This represents a worst-case scenario, and Take or Habitat loss at that level is not likely to occur within the 75-year term of the Take Permits. The acres of Take or Habitat loss were determined by overlaying Habitat maps with the Plan Area

map, and calculating the Habitat areas outside the Conservation Areas. In addition, a small percentage of Take can occur within the Conservation Areas under the Plan. The amount of such Take or Habitat loss has been calculated for each species and natural community and included in Tables 4-114, and 4-115.

Table 4-114: Potential Acres of Impact and Conservation of Covered Species with a Habitat Distribution Model [1]

Species [2]	*Total Acres of Habitat in the Plan Area (incl. federal lands)*	*Acres of Habitat in the Plan Area Subject to the Permit* [3]	*Acres Authorized for Impact Outside the Conservation Areas*[4]	*Acres Authorized for Impact Inside the Conservation Areas*[5]	*Total Acres Authorized for Impact in the Plan Area*[6]	*Acres of Habitat within Existing Conservation Lands (ECL)*[7]	*Remaining Acres to be Conserved* [8]	*Total Acres To be Conserved in MSHCP Reserve System*[9]	*Total Known Occurrences in the Plan Area/ Occurrences Conserved/ Total ECL/ Take*[10]	*Total Acres of modeled Habitat on federal land Outside the Conservation Areas*
Mecca aster	63,163	21,070	4,968	1,360	6,328	42,436	12,231	54,667	21 / 16 / 10 / 5	2,146
CV milkvetch	36,398	30,210	14,084~~14,086~~	1,306	15,390 ~~15,392~~	7,707	11,652 ~~11,650~~ (1,117)[1]	19,359 ~~19,357~~	122 / 89 / 45 / 33	532
Triple-ribbed milkvetch	3,007	1,500	17	147	164	1,504	1,334	2,838	34 / 33 / 23 / 1	5
Orocopia sage	78,868	25,228	4,901	2,032	6,933	50,664	18,286	68,950	15 / 15 / 11 / 0	2,986
Little San Bernardino Mtns. linanthus	3,389	3,029	195	~~234~~283	478~~429~~	363	2,543~~2,592~~	2,906~~2,955~~	60 /58 / 1 / 2	0
CV giant sand-treader cricket	27,070	22,500	12,903	779	13,682	5,999	6,998	12,997	20 / 14 / 10 / 6	355
CV Jerusalem cricket	22,811	20,209	9,032~~9,034~~	959~~955~~	9,991~~9,989~~	3,429	8,618~~8,620~~ (466) [1]	12,047~~12,049~~	18 / 13 / 2 / 5	348
Desert pupfish	25.06	25.03	0.43	N/A	N/A	(45m^2)	25	25.05	31 / 31 / 6 / 0	0.002
Arroyo toad	2,095	759	10	78	88	1,301	706	2,007	1 / 1 / 0 / 0	0
Desert tortoise	571,098	240,247	49,501~~50,272~~	17,120~~16,957~~	66,621 ~~67,229~~	345,899	146,519 ~~145,911~~ (3,766) [1]	492,418 ~~491,810~~	200 / 186 / 165 / 14	8,239
CV fringe-toed lizard	27,070	22,500	12,903	778	13,681	5,999	6,999	12,998	N/A	355
Flat-tailed horned lizard– predicted	32,426	26,966	16,735	830~~827~~	17,565 ~~17,562~~	6,574	7,334	13,908	24 / 18 / 12 / 6	972
Flat-tailed horned lizard– potential	5,161	4,053	1,483	247~~237~~	1,730~~1,720~~	940	2,263 (110) [1]	3,203	1/1	120
Yuma clapper rail	762	475	16	47	63	271	426	697	14 / 6 / 5 / 8	0
California black rail	675	475	16	43	59	230	386	616	4 / 4 / 1 / 0	0

Table 4-114 (cont.)

Species [2]	*Total Acres of Habitat in the Plan Area (incl. federal lands)*	*Acres of Habitat in the Plan Area Subject to the Permit* [3]	*Acres Authorized for Impact Outside the Conservation Areas*[4]	*Acres Authorized for Impact Inside the Conservation Areas*[5]	*Total Acres Authorized for Impact in the Plan Area*[6]	*Acres of Habitat within Existing Conservation Lands (ECL)*[7]	*Remaining Acres to be Conserved* [8]	*Total Acres To be Conserved in MSHCP Reserve System*[9]	*Total Known Occurrences in the Plan Area/ Occurrences Conserved/ Total ECL/ Take*[10]	*Total Acres of modeled Habitat on federal land Outside the Conservation Areas*
SW willow flycatcher - breeding	2,730	1,627	59	109	168	1,526	1,037	2,563	18 / 12 / 5 / 6	0
SW willow flycatcher - migratory	57,589	35,407	13,000~~13,020~~	2,331~~1~~	15,331 ~~15,351~~	21,312	19,534~~34~~	40,846~~46~~	See breeding above [11]	1,358
Crissal thrasher	6,852	6,700	5,013	159	5,172	258	1,418	1,676	15 / 5 / 2 / 5	1
Le Conte's thrasher	243,242	179,174	87,235~~87,406~~	8,639~~8,727~~	95,874 ~~96,133~~	59,252	73,463 ~~73,204~~ (6,134) [1]	132,715 ~~132,456~~	33 / 19 / 8 / 14	8,557
Least Bell's vireo - breeding	3,675	2,488	626	135	761	1,629	1,282	2,911	37 / 24 / 8 / 13	0
Least Bell's vireo – migratory	56,643	34,648	12,450~~12,470~~	2,307~~2,305~~	14,757 ~~14,775~~	21,209	19,319 ~~19,301~~	40,528 ~~40,510~~	See breeding above [11]	1,358
Gray Vireo	105,562	22,336	2,447	1,466	3,913	88,350	13,194 (26)	101,544	2 / 2 / 1 / 0	75
Yellow warbler–breeding	2,730	1,627	59	109	168	1,526	1,037	2,563	23 / 17 / 7 / 6	0
Yellow warbler– migratory	57,589	35,510	13,020~~13,040~~	2,333~~2,331~~	15,353 ~~15,371~~	21,312	19,552 ~~19,534~~	40,864 ~~40,846~~	See breeding above [11]	1,352
Yellow-breasted chat – breeding	3,007	1,762	58	122	180	1,669	1,160	2,829	15 / 13 / 6 / 2	0
Yellow breasted chat – migratory	57,312	35,375	13,020~~13,040~~	2,320~~2,318~~	15,340 ~~15,358~~	21,169	19,432 ~~19,414~~	40,601 ~~40,583~~	See breeding above [11]	1,358
Summer tanager – breeding	2,730	1,627	59	109~~116~~	168~~175~~	1,526	1,037~~1,030~~	2,563~~2,556~~	7 / 5 / 3 / 2	0
Summer tanager – migratory	57,589	35,510	13,020~~13,040~~	2,333~~2,331~~	15,353 ~~15,371~~	21,312	19,552 ~~19,534~~	40,864 ~~40,846~~	See breeding above [11]	1,358

Table 4-114 (cont.)

Species [2]	*Total Acres of Habitat in the Plan Area (incl. federal lands)*	*Acres of Habitat in the Plan Area Subject to the Permit* [3]	*Acres Authorized for Impact Outside the Conservation Areas*[4]	*Acres Authorized for Impact Inside the Conservation Areas*[5]	*Total Acres Authorized for Impact in the Plan Area*[6]	*Acres of Habitat within Existing Conservation Lands (ECL)*[7]	*Remaining Acres to be Conserved* [8]	*Total Acres To be Conserved in MSHCP Reserve System*[9]	*Total Known Occurrences in the Plan Area/ Occurrences Conserved/ Total ECL/ Take*[10]	*Total Acres of modeled Habitat on federal land Outside the Conservation Areas*
Southern yellow bat	1,329	887	12	66	78	660	590	1,250	3 / 2 / 2 / 1	1
CV round-tailed ground squirrel	101,723	87,516	58,628~~58,765~~	2,491~~2,478~~	61,119 ~~61,243~~	13,357	20,593 ~~20,469~~ (3,101) [1]	33,950 ~~33,826~~	319 / 290 / 190 / 29	3,568
Palm Springs pocket mouse	142,539	119,256	70,808~~70,968~~	4,248~~4 ,336~~	75,056 ~~75,304~~	21,251	35,853 ~~35,605~~ (4,404) [1]	57,225 ~~56,856~~	52 / 40 / 12 / 12	5,933
Peninsular bighorn sheep	172,811	75,999	2,666[12]	3,867	6,533	135,630	30,226 (181)	165,856	N/A	352

1 Based on 1996 pre-MOU land ownership information.
2 There is no Habitat model for the burrowing owl and, therefore, no estimate of acreage was made. See Section 9.7.3.
3 Column (C) excludes all federal land.
4 Column (D) Total is from modeled Habitat outside the Conservation Area subject to the permit.
5 Column (E) Total is the sum of Take in each Conservation Area. See Section 9.0.
6 Column (F) Total is the sum of Column D+E (It should be noted that the Habitat outside the Conservation Areas is compromised (e.g., does not include Core Habitat, Essential Ecological) and may not support self-sustaining populations of Covered Species).
7 Column (G) Total is from the sum of all Existing Conservation Land for each species. See Section 9.0.
8 Column (H) Total is from the total acres in Conservation Area less Take (Column E) and Existing Conservation Land (Column G). Numbers within parentheses are acres of habitat in fluvial sand transport areas where the only Conservation Objective is to maintain fluvial sand transport. Habitat conservation is not an objective.
9 Column (I) is the Total of Columns G+H.
10 Column (J) includes known locations for each species. The number of locations within the Conservation Areas, the locations within the Existing Conservation Land (ECL), and the number of locations subject to Take outside the Conservation Areas.
11 Known locations for this species are not separated by breeding and migratory Habitat.
12 This habitat occurs on lands outside the Conservation Areas previously approved for development.

Note: Every effort was made to ensure accuracy in the data presented in this table. However, the "data error" includes mapping errors (e.g., when different GIS coverages overlap but do not match exactly, resulting in "sliver polygons"). Error for all of the data presented here amounts to a fraction of 1%.

Table 4-115: Conservation and Potential Loss of Conserved Natural Communities

Natural Community	*Total Acres in the Plan Area (including federal lands)*	*Acres in the Plan Area Subject to the Permit* [2]	*Total Acres Subject to Impact Outside the Conservation Areas*[3]	*Total Acres Subject to Impact Inside the Conservation Areas*[4]	*Total Acres Subject to Impact in the Plan Area*[5]	*Acres Within Existing Conservation Lands*[6]	*Remaining Acres to be Conserved* [7]	*Total Acres To be Conserved in MSHCP Reserve System*[8]	*Total Acres on federal land outside the Conservation Areas*
Active Desert Dunes	561	201	9	16	25	405	131	536	0
Stabilized & Partially Stabilized Desert Sand Dunes	418	391	37	35	72	29	319	348	0
Active Desert Sand Fields	5,484	3,381	1,345	148	1,493	2,665	1,325	3,990	1
Ephemeral Desert Sand Fields	5,745	4,742	430	354	784	1,748	3,176	4,924	40
Stabilized & Partially Stabilized Desert Sand Fields	1,549	1,322	165	112	277	223	1,003	1,226	4
Stabilized Shielded Desert Sand Fields	13,218	12,369	10,793	119	10,912	926	1,069	1,995	311
Mesquite Hummocks	848	778	517	28	545	104	244	348	0
Sonoran Creosote Bush Scrub	404,644	167,102	43,239~~43,312~~	11,633~~11,626~~	54,872~~54,938~~	221,622	101,946 ~~101,881~~ (4,088) [2]	323,568 ~~323,503~~	21,973
Sonoran Mixed Woody & Succulent Scrub	133,682	76,683	19,205~~19,820~~	4,254~~4,192~~	~~24,012~~23,459	72,572	34,746~~34,193~~ (678)	107,318 ~~106,765~~	1,607
Mojave Mixed Woody Scrub	104,212	30,811	3,098	2,766	5,864	68,256	24,779 (110) [2]	93,035	5,202
Desert Saltbush Scrub	5,325	5,325	4,435	89	4,524	0	801	801	0
Desert Sink Scrub	9,535	6,948	1,077	587	1,664	2,536	5,278	7,814	51
Chamise Chaparral	2,741	519	0	52	52	2,220	462 (6) [2]	2,688	1
Redshank Chaparral	13,282	3,251	724	253	977	9,987	2,274	12,261	51
Semi-Desert Chaparral	22,572	3,359	1	304	305	19,403	2,837 (26) [2]	22,240	1
Interior Live Oak Chaparral	20,574	5,744	3,767	91	3,858	7,760	822	8,582	7,963

Table 4-115 (cont.)

Natural Community	*Total Acres in the Plan Area (including federal lands)*	*Acres in the Plan Area Subject to the Permit* [2]	*Total Acres Subject to Impact Outside the Conservation Areas*[3]	*Total Acres Subject to Impact Inside the Conservation Areas*[4]	*Total Acres Subject to Impact in the Plan Area*[5]	*Acres Within Existing Conservation Lands*[6]	*Remaining Acres to be Conserved* [7]	*Total Acres To be Conserved in MSHCP Reserve System*[8]	*Total Acres on federal land outside the Conserv-ation Areas*
Cismontane Alkali Marsh[9]	321	228	0	(23)	23	93	228	321	0
Coastal & Valley Freshwater Marsh[9]	79	74	16	(6)	22	4	51	55	0
So. Arroyo Willow Riparian Forest[9]	117	0	2	(2)	4	95	15	110	5
Sonoran Cottonwood-Willow Riparian Forest[9]	636	321	35	(22)	57	321	282	603	1
Southern Sycamore-Alder Riparian Woodland[9]	669	425	8	(15)	23	498	163	661	1
Arrowweed Scrub[9]	277	134	0	(13)	13	143	134	277	0
Desert Fan Palm Oasis Woodland	1,309	867	14	65	79	660	572	1,232	1
Mesquite Bosque[9]	482	355	0	36	36	127	319	446	0
Desert Dry Wash Woodland	40,549	21,482	6,960	1,552~~1,550~~	8,512~~8,510~~	18,203	12,531~~12,513~~	30,734~~30,716~~	1,314
Mojavean Pinyon-Juniper Woodland	30,666	1,858	0	134	134	29,324	1,208	30,532	0
Peninsular Juniper Woodland And Scrub	37,544	12,430	308	771	1,079	30,382	6,076	36,458	10

1 Based on 1996 pre-MOU land ownership information.
2 Column (C) excludes all federal land.
3 Column (D) total is from natural community outside the Conservation Area subject to impact.
4 Column (E) total is the sum of acres of natural community subject to impact in each Conservation Area. See Section 10.0.
5 Column (F) total is the sum of Column D+E
6 Column (G) total is acres of each natural community within Existing Conservation Land. See Section 10.0.
7 Column (H) total is from the total acres in Conservation Area less acres subject to impact (Column E) and Existing Conservation Land (Column G). Numbers within parentheses are acres of natural community in fluvial sand transport areas where the only Conservation Objective is to maintain fluvial sand transport. Natural community conservation is not an objective.
8 Column (I) is the Total of Columns G+H.
9 For the remaining acreage of this natural community where disturbance is authorized by the Plan, ensure no net loss; disturbance may occur, but habitat loss would need to be replaced to ensure that the Conservation Objective is achieved.
Note: Every effort was made to ensure accuracy in the statistics presented in this table. However, "data error" includes mapping errors (when different GIS coverages overlap but do not match exactly, resulting in "sliver polygons"). Data error for all of the statistics presented here amounts to a fraction of 1%.

Table 4-116: Summary of Covered Species Conservation and Take Table

Species Common Name Scientific Name	*Species Conservation Objectives*	*Conservation Analysis Summary*	*Measures to Avoid, Minimize, and Mitigate Take*	*Management Activities Summary*	*Conservation and Take Summary*
			PLANTS		
Mecca Aster *Xylorhiza cognata*	➢ Ensure conservation of Core Habitat within five Conservation Areas. ➢ Protect Other Conserved Habitat in two Conservation Areas from a range of environmental conditions within which this species occurs. ➢ Implement biological monitoring and adaptive management to ensure long-term persistence of this species	➢ The Mecca aster will benefit from the establishment of the Reserve System to include Habitat in the Indio Hills and Mecca Hills. ➢ Implementation of the Plan to provide for persistence of this aster within the Plan Area, as currently unprotected areas of its Habitat and potential Habitat areas will be conserved. ➢ The combination of the overall Conservation measures; species-specific measures such management to minimize impacts in aster Habitat, monitoring to better understand the distribution and ecology of this species; enhancement, protection, and management of Mecca aster Habitat is expected to compensate for potential adverse impacts to this plant species.	➢ Permittees will protect and manage 12,238 acres of modeled habitat including 12,054 acres of Core Habitat. ➢ Conservation Areas in the Plan include approximately 90% of the occupied and potential habitat for Mecca aster. ➢ Management and Monitoring activities to ensure Conservation of this species, including control of activities that degrade its habitat.	➢ Control and manage activities that degrade Mecca aster Habitat. In the Indio Hills, edge effects and OHV activity could be a concern. ➢ Identify actions to reduce impacts from, and control where feasible, invasive species monitoring results indicate an impact. ➢ Develop and test models to address the distribution, abundance, and ecology of Mecca aster.	➢ 98% of the Core Habitat for this plant is conserved and 86% of the occupied or potential habitat is conserved under the Plan. ➢ 10% of all Habitat would be subject to take in areas of marginal Habitat, areas subject to edge effects, or in potential Habitat where habitat quality is compromised ➢ 3% of all habitat is on federal land outside the Conservation Areas.
CV milkvetch *Astragalus lentiginosus* var. *coachellae*	➢ Ensure conservation of Core Habitat within four Conservation Areas. ➢ Protect Other Conserved Habitat in 10 Conservation Areas ~~and 1 Special Provisions Area~~ from a range of environmental conditions within which this species occurs. ➢ Ensure conservation of Essential Ecological Processes including sand source/transport systems. ➢ Maintain Linkages among	➢ In addition to conserving currently unprotected habitat, the Conservation Areas benefit this species by securing the long-term sand transport-delivery systems for the Core Habitat and Other Conserved Habitat. At the present time, the sand transport corridors for the Snow Creek area, the Willow Hole area, and for the Thousand Palms Preserve are unprotected; the MSHCP Reserve Systems would protect these areas. ➢ Within the Conservation Areas, the goal is to conserve all of the Core Habitat; disturbance to these areas	➢ Permittees will protect and manage, in perpetuity, 11,652~~11,650~~ acres of the modeled Habitat for this species, together with Existing Conservation Land for a total of 19,359~~19,357~~ acres conserved, including 14,886 acres of Core Habitat. The conserved habitat includes 89 of the 122 known occurrences. ➢ Areas of modeled habitat for this species that are subject to take are those that are	➢ *Control and manage activities that degrade this milkvetch Habitat, such as sand compaction and/or vegetation destruction, including OHV travel within Core or Other Conserved Habitat; vegetation manipulation or clearing; and other human disturbance.* ➢ Control invasive species if it is determined from monitoring results that there are impacts to the milkvetch or its Habitat. ➢ Address the maintenance of the aeolian sand transport system through the Monitoring and	➢ 94% of the Core Habitat for this milkvetch is conserved and 53% of the total occupied or potential habitat is conserved under the Plan. ➢ 42% would be subject to take in areas where habitat quality is compromised by fragmentation, loss of Essential Ecological Processes or other impacts.

Table 4-116: Summary of Covered Species Conservation and Take Table

Species Common Name Scientific Name	*Species Conservation Objectives*	*Conservation Analysis Summary*	*Measures to Avoid, Minimize, and Mitigate Take*	*Management Activities Summary*	*Conservation and Take Summary*
Coachella Valley milkvetch *(cont.)*	all conserved populations. ➢ Implement biological monitoring and adaptive management to ensure long-term persistence of this species	will be avoided to the maximum extent feasible. The important Essential Ecological Processes, including wind corridors and sand sources, and Linkages would be protected under the Plan.	highly fragmented and/or where sand transport systems are compromised. These areas are primarily south of Interstate 10 in the area known as the Big Dune. ➢ All available and occupied habitats for this species were carefully considered. It was determined that only those areas within proposed Conservation Areas would provide long-term protection for self-sustaining populations of this species. ➢ Plan would protect the Core Habitat areas from Cabazon to Windy Point, to the Thousand Palms Preserve.	Management Programs.	
Triple-ribbed milkvetch *Astragalus tricarinatus*	➢ Ensure conservation of Core Habitat within two Conservation Areas. ➢ Protect Other Conserved Habitat in 3 Conservation Areas from a range of environmental conditions within which this milkvetch is known to occur. ➢ Protect Essential Ecological Processes, including hydrological regimes, necessary to maintain Habitat for this species. ➢ Implement biological monitoring and Adaptive	➢ Implementation of this Plan is expected to conserve and enhance population viability of the triple-ribbed milkvetch, as unprotected portions of its Habitat will be conserved. The potential for impacts from human uses appears to be very low, primarily related to occupied and potential habitat in the lower reaches of the Whitewater River and Mission Creek which may be affected by flood control maintenance activities that alter the wash and could disturb triple-ribbed milkvetch populations. ➢ The Plan will also secure potential habitat in each of the canyons where this species persists, including	➢ Permittees will protect and manage 1,334 acres of modeled habitat including 33 of the 34 known locations. ➢ Conservation Areas include approximately 94% of the occupied and potential habitat for this species. ➢ Protection of flooding regime which appears to be important for this species. ➢ Management and Monitoring activities to ensure Conservation of this species, including control of activities that degrade its	➢ Control and manage activities that degrade triple-ribbed milkvetch Habitat, such as vehicular travel within washes and flood control maintenance activities that could result in damage to plants and their Habitat outside of the flood control channel itself. ➢ Identify actions to reduce impacts from, and control where feasible, invasive species if monitoring results so indicate. ➢ Determine the conditions that favor germination and growth in this species and insure that these conditions persist (e.g. scouring by large floods).	➢ 96% of the Core Habitat for this plant is conserved and 94% of the occupied or potential habitat is conserved under the Plan. ➢ 5% would be subject to take in areas compromised by fragmentation, loss of Essential Ecological Processes or other impacts.

Table 4-116: Summary of Covered Species Conservation and Take Table

Species Common Name Scientific Name	*Species Conservation Objectives*	*Conservation Analysis Summary*	*Measures to Avoid, Minimize, and Mitigate Take*	*Management Activities Summary*	*Conservation and Take Summary*
	Management to ensure long-term persistence of this species. ➢ Maintain Biological Corridors and Linkages among all conserved populations to provide for seed dispersal and shifts in species distribution over time.	Whitewater, Mission Creek, Big Morongo, Dry Morongo, and Martinez/Aqua Alta Canyons. It is possible that the species could occur in canyons east of Big Morongo Canyon, including Long Canyon; the portion of this canyon where this species could occur is within Existing Conservation Land in Joshua Tree National Park Conservation Area. ➢ Management and monitoring prescriptions will further enhance long-term Conservation of this species.	habitat.	➢ In Mission Creek, coordinate with the Wildlands Conservancy to achieve Species Conservation Goals.	
Orocopia Sage *Salvia greatae*	➢ Ensure Conservation of Core Habitat within two Conservation Areas. ➢ Protect Other Conserved Habitat in Dos Palmas Conservation Area from a range of environmental conditions within which this species occurs. ➢ Implement biological monitoring and Adaptive Management to ensure long-term persistence of this species.	➢ The Orocopia sage will benefit from the establishment of the MSHCP Reserve System which will include Habitat in the Orocopia Mountains where they occur. ➢ Implementation of the Plan is expected to provide for persistence of this species within the Plan Area, as currently unprotected portions of its Habitat and potential Habitat in the Mecca Hills area will be conserved. ➢ The combination of the overall Conservation measures; species-specific measures such as management to minimize impacts in Orocopia sage Habitat, monitoring to better understand the distribution and ecology of this species, and long-term protection, management, and enhancement of Orocopia sage Habitat is expected to effectively compensate for potential adverse effects to this plant species.	➢ Permittees will protect and manage 18,286 acres of modeled habitat including 16,625 acres of Core Habitat. ➢ Conservation Areas in the Plan include approximately 96% of the occupied and potential habitat for this sage. ➢ Management and Monitoring activities to ensure Conservation of this species, including control of activities that degrade its habitat.	➢ Control and manage activities that degrade Orocopia sage Habitat. Edge effects and OHV activity could be a concern. ➢ Identify actions to reduce impacts from, and control where feasible, invasive species monitoring results indicate an impact. ➢ Develop and test models that will address the distribution, abundance, and ecology of Orocopia sage.	➢ 97% of the Core Habitat for this plant is conserved and 87% of the occupied or potential habitat is conserved under the Plan. ➢ 3% would be subject to take in areas compromised by fragmentation, loss of Essential Ecological Processes or other impacts.

Table 4-116: Summary of Covered Species Conservation and Take Table

Species Common Name Scientific Name	*Species Conservation Objectives*	*Conservation Analysis Summary*	*Measures to Avoid, Minimize, and Mitigate Take*	*Management Activities Summary*	*Conservation and Take Summary*
Little San Bernardino Mountains Linanthus *Linanthus maculatus (Gilia maculata)*	➢ Ensure Conservation of Core Habitat within two Conservation Areas~~ and one Special Provisions Area~~. ➢ Protect Other Conserved Habitat in two Conservation Areas through adherence to other Conservation Objectives. ➢ Ensure Conservation of Essential Ecological Processes including hydrological regimes. ➢ Maintain Linkages among all conserved populations. ➢ Implement biological monitoring and Adaptive Management to ensure long-term persistence of this species	➢ The Plan includes in Conservation Areas as much of the known habitat for this species as feasible, incorporating all known occurrences and all available and occupied habitat for populations in Whitewater Canyon and the Mission Creek/Big Morongo Canyon area. ➢ The network of drainages and interlaced washes that occur in the Mission Creek and Morongo Wash area, mostly east of Highway 62 are included in the MSHCP Reserve System. ➢ The Plan ensures that Essential Ecological Processes that maintain this species' habitat, including flooding events, can continue to occur.	➢ Permittees will protect and manage 2,543~~2,592~~ acres of modeled habitat together with Existing Conservation Land for a total of 2,906~~2,955~~ acres conserved, including 2,186~~2,235~~ acres of Core Habitat. ➢ At present, only one known occurrence, located east of Mission Lakes Country Club, is identified as subject to potential take. Take could occur primarily in the lower reaches of Mission Creek and Big Morongo Canyons, south of Indian Avenue.	➢ Control and manage activities that degrade linanthus Habitat, such as vehicular travel within washes and other activities that could damage plants and their Habitat. ➢ Identify actions to reduce impacts from, and control where feasible, invasive species if it is determined from monitoring results that there are impacts to linanthus or its Habitat. ➢ Develop and test models through the Management and Monitoring Program to address the distribution, abundance, and ecological requirements of the Little San Bernardino Mountains linanthus. ➢ Determine the conditions that favor germination and growth in this species and insure that these conditions can continue to occur (e.g. scouring by large floods). ➢ In Mission Creek, coordinate with the Wildlands Conservancy to achieve Species Conservation Goals.	➢ The Plan conserves 97%, or 58 of the 60 known occurrences for this species. ➢ 91~~93~~% of the Core Habitat for this plant is conserved and 86~~87~~% of the entire modeled potential habitat is conserved under the Plan. ➢ 8~~7~~% of all linanthus habitat would be subject to take in Conservation Areas; 6% subject to Take outside Conservation Areas in areas compromised by fragmentation, loss of Essential Ecological Processes or other impacts.

Table 4-116: Summary of Covered Species Conservation and Take Table

Species Common Name Scientific Name	*Species Conservation Objectives*	*Conservation Analysis Summary*	*Measures to Avoid, Minimize, and Mitigate Take*	*Management Activities Summary*	*Conservation and Take Summary*
Coachella Valley Giant sand-treader cricket *Macrobaenetes valgum*	➢ Ensure conservation of Core Habitat within three Conservation Areas. ➢ Protect Other Conserved Habitat in four Conservation Areas from a range of environmental conditions within which this species occurs. ➢ Ensure conservation of Essential Ecological Processes including sand source/transport systems. ➢ Implement biological monitoring and Adaptive Management to ensure Conservation of this species	➢ The Coachella Valley sand-treader cricket will benefit from the establishment of the Reserve System which will include Core Habitat from Snow Creek to the Thousand Palms Preserve and Other Conserved Habitat from Willow Hole to the East Indio Hills. Implementation of the Plan is Habitat is currently protected. The Plan will ensure the Conservation of an additional 26% of Habitat and potential Habitat areas; only 22% of the modeled Habitat is currently conserved. ➢ The combination of the overall Conservation measures: species-specific measures such as management to minimize impacts such as OHV trespass and disturbance during the emergence and breeding seasons, fragmentation and edge effects, monitoring to better understand the effects of these impacts on the species, and long-term protection, management, and enhancement of sand-treader cricket Habitat is expected to effectively compensate for potential adverse effects to this threatened and endangered species.	➢ Permittees will protect and manage 6,998 acres of modeled habitat together with Existing Conservation Land for a total of 12,997 acres conserved, including 10,421 acres of Core Habitat. ➢ The Conservation Areas would protect the Core Habitat areas from Snow Creek to the Thousand Palms Preserve. Other Conserved Habitat from a range of environmental conditions for this cricket will be protected from Willow Hole to Snow Creek and Cabazon. ➢ The Reserve System will incorporate additional sand source/sand transport areas for Snow Creek/ Windy Point, Willow Hole, Whitewater Floodplain, Flat Top Mountain, and the Thousand Palms area. ➢ Management and Monitoring activities to ensure Conservation of this species. Describe distribution, abundance, and habitat of the species.	➢ Control and manage activities that degrade giant sand-treader cricket Habitat. In particular, control and manage those activities that result in sand compaction or may crush burrows, which may include OHV travel within Core Habitat; vegetation manipulation or clearing, and other human disturbance. ➢ Restrict human access to occupied habitat during the emergence period in the winter months and during the breeding season in the spring. ➢ Identify actions to reduce impacts from, and control where feasible, invasive species if it is determined from monitoring results that there are impacts such as stabilization of sand dunes and sand fields or other impacts to sand-treader cricket habitat.	➢ 95% of the Core Habitat for this species is conserved and 48% of the occupied or potential habitat is conserved under the Plan. ➢ 6% would be subject to Take in Conservation Areas; 47% would be subject to take outside Conservation Areas in areas compromised by fragmentation, loss of Essential Ecological Processes or other impacts.

Table 4-116: Summary of Covered Species Conservation and Take Table

Species Common Name Scientific Name	*Species Conservation Objectives*	*Conservation Analysis Summary*	*Measures to Avoid, Minimize, and Mitigate Take*	*Management Activities Summary*	*Conservation and Take Summary*
Coachella Valley Jerusalem cricket *Stenopelmatus cahuilaensis*	➢ Ensure conservation of Core Habitat within the Snow Creek/Windy Point Conservation Area. ➢ Protect Other Conserved Habitat, to provide for population fluctuation, in six Conservation Areas from a range of environmental conditions within which this species occurs. ➢ Ensure conservation of Essential Ecological Processes including sand source/transport systems. ➢ Maintain Biological Corridors and Linkages to allow connectivity and shifts in distribution over time. ➢ Implement biological monitoring and Adaptive Management to ensure Conservation of this species	➢ The Coachella Valley Jerusalem cricket will benefit from the establishment of the MSHCP Reserve System which will conserve essential Core Habitat for this species in the Snow Creek/Windy Point area which appears to be the center of their distribution. ➢ Implementation of the Plan is expected to provide for Conservation of this rare cricket within the Plan Area, as currently unprotected portions of its Habitat and potential Habitat areas will be conserved. Currently, only 15% of this Habitat is conserved. ➢ The combination of the overall Conservation measures; species-specific measures such as management to minimize impacts in Core Habitat, monitoring and niche modeling to better describe the distribution and ecology of this species, and long-term protection, management, and enhancement of Jerusalem cricket Habitat is expected to effectively compensate for potential adverse effects to this species.	➢ Permittees will protect and manage 8,618~~8,620~~ acres of modeled habitat together with Existing Conservation Land for a total of 12,047~~12,049~~ acres conserved, including 1,540 acres of Core Habitat. ➢ The Conservation Areas would protect the Core Habitat areas from Snow Creek to Windy Point and Whitewater Canyon. Other Conserved Habitat from a range of environmental conditions for this cricket will be protected from Willow Hole east toward Thousand Palms area. ➢ The Plan will require Conservation of Essential Ecological Processes, including the sand source /sand transport areas for Snow Creek/Windy Point. ➢ Management and Monitoring to ensure Conservation of this species, including control of activities that degrade its habitat. Describe the distribution and abundance of the species.	➢ Control and manage activities that degrade Coachella Valley Jerusalem cricket Habitat, including activities that result in sand compaction or may crush burrows, vegetation manipulation or clearing, and other disturbance. ➢ Restrict human access to occupied habitat during the emergence period in the winter months and during the breeding season in the spring. ➢ Identify actions to reduce impacts from, and control where feasible, invasive species if it is determined from monitoring results that there are impacts to Jerusalem cricket Habitat. ➢ Through the Monitoring Program, better describe the distribution and Habitat for this species.	➢ 91% of the Core Habitat for this cricket is conserved and 53% of the occupied or potential habitat is conserved under the Plan. ➢ 4% would be subject to take within Conservation Areas; 39% subject to Take outside Conservation Areas in habitat that is compromised by fragmentation, loss of Essential Ecological Processes or other impacts. For this species habitat outside Conservation Areas is less likely to be occupied.

Table 4-116: Summary of Covered Species Conservation and Take Table

Species Common Name Scientific Name	*Species Conservation Objectives*	*Conservation Analysis Summary*	*Measures to Avoid, Minimize, and Mitigate Take*	*Management Activities Summary*	*Conservation and Take Summary*
Desert Pupfish *Cyprinodon macularius*	➢ Ensure conservation of occupied Habitat within two Conservation Areas. ➢ Ensure maintenance of refugia populations in the Thousand Palms and Dos Palmas Conservation Areas. ➢ Protect Essential Ecological Processes including hydrological regimes necessary to maintain Core Habitat and agricultural drain Habitat. ➢ Implement biological monitoring and Adaptive Management to ensure long-term persistence of this species.	➢ Significant known habitat would be protected under conservation ownership, including the Salt Creek population. The numerical evaluation of the acres of habitat conserved is a challenge in that the actual acres of habitat for this species within the Plan Area do not include most of the known locations, which are in agricultural drains that release agricultural runoff into the Salton Sea. The Plan requires that the agricultural drain population be conserved through a Management Program that ensures maintenance of agricultural drains in a manner that maintains viable habitat. Disturbance of the habitat and potential Take would be permitted in the Salton Sea agricultural drains as a result of operations and maintenance activities so long as the pupfish population is maintained. ➢ Implementation of the Plan is expected to maintain and enhance population viability of the species by helping to implement the Desert Pupfish Recovery Plan (USFWS 1993). The primary objective of the plan is to eliminate threats to extant populations and establish additional populations in secure habitat, so that the species can be downlisted from endangered to threatened.	➢ Plan will ensure that existing desert pupfish Habitat and refugia populations are protected and managed. ➢ CVWD will establish 25.05 acres of managed replacement Habitat for desert pupfish. ➢ Water quality and other important elements of pupfish Habitat will be monitored and maintained. ➢ Management and Monitoring activities to ensure Conservation of this species, including control of activities that degrade its habitat.	➢ Complete hydrology studies for the Salt Creek area to determine if the water sources for Salt Creek are adequately protected or if additional water sources may be needed and are available. ➢ Ensure agricultural drain maintenance and water supply. CVWD will develop a study to include surveys for pupfish presence in the agricultural drains. ➢ Control and manage, in cooperation with implementation of the recovery plan, exotic or invasive species in pupfish habitat, including tamarisk and other species, if monitoring identifies them as a threat. ➢ Maintain water levels, water quality, and proper functioning condition of ponds, springs, and drains, to the extent these activities are under Plan authority. ➢ Restore and enhance degraded habitat as necessary according to monitoring results. Conduct experiments on the timing and mechanics of drain cleaning that would minimize impacts to desert pupfish. ➢ Estimate and describe the distribution, abundance, and habitat parameters of desert pupfish in the Plan Area and survey contaminant levels in the water and in pupfish.	➢ The Plan conserves 100%, or 31 of the 31 known locations for this species. This includes Conservation of agricultural drains and shoreline pools.

Table 4-116: Summary of Covered Species Conservation and Take Table

Species Common Name Scientific Name	*Species Conservation Objectives*	*Conservation Analysis Summary*	*Measures to Avoid, Minimize, and Mitigate Take*	*Management Activities Summary*	*Conservation and Take Summary*
Amphibians					
Arroyo Toad *Bufo microscaphus californicus*	➢ Ensure conservation of significant populations, consistent with Arroyo Toad Recovery Plan. ➢ Conserve potential Habitat for this toad in Snow Creek and Upper Mission Creek areas. ➢ Protect Essential Ecological Processes including hydrological regimes necessary to maintain arroyo toad Habitat. ➢ Implement biological monitoring and adaptive management to ensure Conservation of this species.	➢ Under the Plan, 96% of the modeled habitat of the species within the Plan Area will be conserved. In addition, potential habitat in Snow Creek and Mission Creek will be conserved. The Plan requires avoidance and mitigation measures for Covered Activities in arroyo toad habitat (see Section 4.3.4). ➢ The Arroyo Toad Recovery Plan (USFWS 1999) identifies conserving 15 self-sustaining populations. The Whitewater River population is one of the 15 self-sustaining populations necessary for consideration of delisting the species. Implementation of the Plan is thus expected to maintain and enhance population viability of the arroyo toad by conserving and managing habitat in the Whitewater Canyon and protecting a Snow Creek and/or a Mission Creek population should one be located in these areas.	➢ Permittees will protect and manage 706 acres of modeled habitat together with Existing Conservation Land for a total of 2,007 acres conserved, including 2,004 acres of Core Habitat. ➢ Plan will ensure that existing arroyo toad Habitat and known locations are protected and managed. ➢ Management and Monitoring activities to ensure Conservation of this species, including maintenance of hydrological regimes and control of activities that degrade its habitat.	➢ Control and manage activities that adversely impact water quality and the hydrological regime in habitat. ➢ Control and manage activities, such as removal of boulders, OHV use, picnicking in sensitive areas, and alteration or disturbance of streamside gravel bars and terraces that impact arroyo toad habitat. ➢ Avoid activities that may disturb arroyo toad habitat, during March 1 to June 30 breeding season. ➢ Conduct an educational program about the arroyo toad and its Conservation needs for residents and visitors in Whitewater Canyon. ➢ Coordinate with the trout fishing facility to evaluate stream flow and water quality issues associated with arroyo toad habitat. ➢ Restore degraded habitat as deemed necessary from the results of the Monitoring Program. Identify actions to reduce impacts from, and control where feasible, invasive species if it is determined from monitoring results that there are impacts to the arroyo toad and its habitat.	➢ 96% of the Core Habitat for this toad is conserved and 96% of the occupied or potential habitat is conserved under the Plan. ➢ 4% would be subject to take within Conservation Areas; <1% subject to Take outside Conservation Areas in marginal habitat.

Table 4-116: Summary of Covered Species Conservation and Take Table

Species Common Name Scientific Name	*Species Conservation Objectives*	*Conservation Analysis Summary*	*Measures to Avoid, Minimize, and Mitigate Take*	*Management Activities Summary*	*Conservation and Take Summary*
			Reptiles		
Desert Tortoise *Gopherus agassizii*	➢ Ensure Conservation of Core Habitat, consistent with Desert Tortoise Recovery Plan, in seven Conservation Areas, from western to eastern part of Plan Area. ➢ Conserve potential and occupied Habitat for desert tortoise in seven Conservation Areas. ➢ Maintain Biological Corridors and Linkages to ensure connectivity for desert tortoise to move between Conservation Areas. ➢ Implement biological monitoring and Adaptive Management to ensure Conservation of desert tortoise and desert Habitat quality.	➢ Implementation of the Plan is expected to maintain and enhance population viability of the desert tortoise in the Plan Area by protecting the populations and additional habitat within a range of environmental conditions, and by providing connectivity with populations outside the Plan Area. Implementation of the Plan should coordinate with implementation of the NECO Plan. ➢ Reserve System conserved areas include 97% of the significant population in the Whitewater Hills, and 97% of the Critical Habitat designated in the area consistent with the Critical Habitat designation and with the NECO Plan. Plan implementation is expected to provide for Conservation of the desert tortoise within the Plan Area, as currently unprotected portions of its Habitat and potential Habitat areas will be conserved. The combination of overall Conservation measures, such as management to minimize impacts, monitoring to evaluate potential stressors, protection, management, and enhancement of desert tortoise Habitat is expected to compensate for potential adverse effects to this species.	➢ Permittees will protect and manage 146,705~~145,911~~ acres of modeled habitat together with Existing Conservation Land for a total of 492,604~~491,810~~ acres conserved, including 366,173~~365,379~~ acres of Core Habitat. ➢ Avoidance, minimization, and mitigation measures would be required for covered projects. ➢ Protection of Biological Corridors and Linkages that will maintain connectivity for desert tortoise from the western limits to the eastern part of the Plan Area. ➢ Management and Monitoring activities to ensure Conservation of this species, including control of activities that degrade its habitat.	➢ Control of invasive plant species or impacts from domestic animals if monitoring indicates such control is appropriate. ➢ Control of raven predation on desert tortoises in the area if monitoring determines it to be a problem to the growth and maintenance of the tortoise population. ➢ Control activities that may result in poaching, illegal collection, crushing of or disturbance to tortoises and tortoise burrows. ➢ Develop and implement fire management plans for Conservation Areas where desert tortoise habitat may be impacted by fire, such as the significant population in the Whitewater Hills area. ➢ Determine the need for tortoise fencing along the Interstate 10 corridor in Critical Habitat and install tortoise fencing where deemed necessary in conjunction with new projects.	➢ 97% of the Critical Habitat in the eastern Plan Area is conserved for desert tortoise and 86% of the occupied or potential habitat is conserved under the Plan. ➢ 3% would be subject to take within Conservation Areas, consistent with Conservation Objectives; 9% subject to Take outside Conservation Areas in marginal habitat.

Table 4-116: Summary of Covered Species Conservation and Take Table

Species Common Name Scientific Name	*Species Conservation Objectives*	*Conservation Analysis Summary*	*Measures to Avoid, Minimize, and Mitigate Take*	*Management Activities Summary*	*Conservation and Take Summary*
Coachella Valley Fringe-toed Lizard *Uma notata*	➢ Ensure conservation of Core Habitat within four Conservation Areas. ➢ Protect Other Conserved Habitat in three Conservation Areas from a range of environmental conditions within which this species occurs, to provide for population fluctuation and genetic diversity. ➢ Ensure conservation of Essential Ecological Processes including sand source/transport systems, necessary to maintain Core Habitat for this lizard. ➢ Maintain Biological Corridors and Linkages to ensure connectivity for fringe-toed lizard to move between Conservation Areas. ➢ Implement biological monitoring and Adaptive Management to ensure Conservation of this species.	➢ The fringe-toed lizard will benefit from the establishment of the MSHCP Reserve System which will include Core Habitat at Snow Creek, Whitewater Floodplain, Willow Hole, and the Thousand Palms Preserve and Other Conserved Habitat from Willow Hole to the East Indio Hills. Implementation of the Plan is expected to provide for persistence of the Coachella Valley fringe-toed lizard within the Plan Area, where only 22% of the modeled Habitat is currently protected. The Plan will ensure the Conservation an additional 26% of Habitat and potential Habitat areas. ➢ The combination of the overall Conservation measures; species-specific measures such as management to minimize impacts such as OHV trespass, fragmentation, and edge effects, monitoring to better understand the effects of these impacts on the species, and long-term protection, management, and enhancement of fringe-toed lizard Habitat is expected to effectively compensate for potential adverse effects to this threatened and endangered species.	➢ Permittees will protect and manage 6,999 acres of modeled habitat together with Existing Conservation Land for a total of 12,998 acres conserved, including 11,245 acres of Core Habitat. ➢ The Conservation Areas would protect the Core Habitat areas from Snow Creek to the Thousand Palms Preserve. Other Conserved Habitat from a range of environmental conditions within which this lizard is known to occur will be protected in from Willow Hole to the East Indio Hills Cabazon. ➢ The Reserve System will incorporate and protect additional sand source /sand transport areas for Snow Creek/Windy Point, Willow Hole, the White-water Floodplain, Flat Top Mountain, and the Thousand Palms area. ➢ Management and Monitoring activities to ensure Conservation of this species, including control of activities that degrade its habitat and data to describe distribution, abundance, and habitat of this species.	➢ Control and manage impacts that degrade Coachella Valley fringe-toed lizard habitat, including fragmentation by roads, OHV use in protected habitat (except on designated routes of travel, if any), and other human disturbance. ➢ Control human access to occupied habitat as necessary. ➢ Evaluate the need as determined by monitoring for perimeter fencing to keep lizards inside Conservation Areas and away from roadways. ➢ Identify actions to reduce impacts from, and control where feasible, invasive species if it is determined from monitoring results that there are impacts to fringe-toed lizard habitat or populations. ➢ Include measures to reduce the impacts to the lizards' food source, harvester ants, including aerial pesticide spraying (in coordination with the California Department of Food and Agriculture) or introduction of exotic species (e.g. fire ants).	➢ 95% of the Core Habitat for the fringe-toed lizard is conserved and 48% of the occupied or potential habitat is conserved under the Plan. ➢ 6% of modeled habitat subject to Take in Cons. Areas, consistent with Conservation Objectives; 47% would be subject to take outside Cons. Areas, in areas compromised by fragmentation, loss of Essential Ecological Processes or other impacts.

Table 4-116: Summary of Covered Species Conservation and Take Table

Species Common Name Scientific Name	*Species Conservation Objectives*	*Conservation Analysis Summary*	*Measures to Avoid, Minimize, and Mitigate Take*	*Management Activities Summary*	*Conservation and Take Summary*
Flat-tailed horned lizard *Phrynosoma mcalli*	➢ Ensure conservation of Core Habitat within the Thousand Palms Conservation Area. ➢ Protect Other Conserved Habitat in 5 Conservation Areas from a range of environmental conditions within which this species occurs. ➢ Ensure conservation of Essential Ecological Processes including sand source/transport systems. ➢ Maintain Biological Corridors and Linkages among conserved populations or Habitats. ➢ Implement biological monitoring and Adaptive Management to ensure Conservation of this species.	➢ Implementation of the Plan is expected to maintain and enhance population viability of the flat-tailed horned lizard as unprotected portions of its habitat, potential habitat areas, and Essential Ecological Processes for the sand dunes and fields will be conserved. ➢ The flat-tailed horned lizard will benefit from the establishment of the MSHCP Reserve System which will build on the existing Conservation of 20% of this species Habitat. Plan implementation will ensure Conservation of currently unprotected Core Habitat areas for this lizard. The combination of the overall Conservation measures; species-specific measures such as management to minimize edge effects, fragmentation, and other impacts in flat-tailed horned lizard Habitat, monitoring to better understand the distribution and ecology of this species and the impacts of stressors on this species, and long-term protection, management, and enhancement of its Habitat is expected to effectively compensate for potential adverse effects to the flat-tailed horned lizard.	➢ Permittees will protect and manage 7,340 acres of modeled habitat together with Existing Conservation Land for a total of 13,914 acres conserved, including 4,051 acres of Core Habitat. ➢ Core Habitat in the Thousand Palms and other Conserved Habitat from Snow Creek to Dos Palmas will be protected as a result of the Plan. ➢ The Plan will require Conservation of Essential Ecological Processes, including currently unprotected source /sand transport areas. ➢ Management and Monitoring activities to ensure conservation of this lizard, including control of activities that degrade its Habitat and data to describe distribution, abundance, and habitat of this species.	➢ Control and manage impacts that degrade flat-tailed horned lizard Habitat, such as, edge effects, OHV trespass, and other disturbance. ➢ Evaluate the need for perimeter fencing to keep lizards away from roadways. ➢ Identify actions to reduce impacts from, and control where feasible, invasive species if it is determined from monitoring results that there are impacts to lizards and their Habitat. ➢ Control human access to occupied habitat as necessary.	➢ 98% of the predicted Core Habitat for this lizard is conserved and 45% of the predicted or potential Habitat is conserved under the Plan. ➢ 6% of modeled habitat subject to Take in Cons. Areas, consistent with Conservation Objectives; 52% of predicted Habitat would be subject to Take outside Cons. Areas where habitat is compromised by fragmentation, loss of Essential Ecological Processes or other impacts.

Table 4-116: Summary of Covered Species Conservation and Take Table

Species Common Name Scientific Name	*Species Conservation Objectives*	*Conservation Analysis Summary*	*Measures to Avoid, Minimize, and Mitigate Take*	*Management Activities Summary*	*Conservation and Take Summary*
			Birds		
Yuma Clapper Rail *Longirostris yumanensis*	➢ Conserve existing populations, restore degraded Habitat, and establish additional Habitat in Dos Palmas and Coachella Valley Stormwater Channel and Delta Conservation Areas. ➢ Protect Essential Ecological Processes including hydrological regimes necessary to maintain rail Habitat. ➢ Implement biological monitoring and Adaptive Management to ensure Conservation of this endangered bird.	➢ Implementation of the Plan is expected to maintain and enhance population viability of the Yuma clapper rail by protecting its existing habitat in the Plan Area and restoring and enhancing additional habitat. At Dos Palmas, the Plan will coordinate with BLM and CNLM. ➢ The Yuma clapper rail will benefit from the establishment of the MSHCP Reserve System which will include Habitat in the Dos Palmas and Coachella Valley Stormwater Channel and Delta Conservation Areas. Only 36% of the modeled Habitat for this species is currently conserved. The combination of the overall Conservation measures; species-specific measures such as management to minimize impacts to rails and their Habitat, monitoring to better understand the distribution and population status of this species in the Plan Area, and long-term protection, management, and enhancement of Yuma clapper rail Habitat is expected to effectively compensate for potential adverse effects to this bird species.	➢ Permittees will protect and manage 426 acres of modeled habitat together with Existing Conservation Land for a total of 697 acres conserved. ➢ CVWD will establish 66 acres of permanent replacement rail Habitat. ➢ Water quality and other important elements of rail Habitat will be monitored and maintained. ➢ Management and Monitoring activities to ensure Conservation of this species, including control of activities that degrade its habitat. ➢ Surveys required in potential Habitat for this Fully Protected Species.	➢ Control invasive species, including plant species such as tamarisk and animal species such as non-native ants, brown-headed cowbirds, bullfrogs, and other species that threaten rail habitat. ➢ Complete hydrologic studies for the Salt Creek area to determine if the water sources for the clapper rail's habitat are adequately protected or if additional water sources may be needed. ➢ To the extent under Plan authority, maintain water levels, water quality, and condition of seeps, springs, marshes, and wetlands. Research the potential impacts of these activities on yuma clapper rails. ➢ Estimate population size or patch occupancy of the Yuma clapper rails in the Plan Area. ➢ Restore and enhance habitat for Yuma clapper rails. This may include enhancing specific features in marshes, such as nesting sites. ➢ Evaluate management actions for black rails as to affects on Yuma clapper rails. Research methods of drain maintenance that minimize impacts to Yuma clapper rails.	➢ 91% of the modeled clapper rail Habitat is conserved under the Plan. ➢ 6% of Habitat would be subject to Take in Conservation Areas if consistent with Conservation Objectives. Less than 2% of Habitat outside Conservation Areas subject to Take, compromised by fragmentation or other impacts.
California Black Rail *Laterallus jamaicensis*	➢ Conserve existing populations, restore degraded Habitat, and establish additional Habitat in Dos Palmas and Coachella Valley	➢ Implementation of the Plan is expected to maintain and enhance population viability of the California black rail by protecting its existing habitat in the Plan Area and restoring and enhancing additional habitat.	➢ Permittees will protect and manage 386 acres of modeled habitat together with Existing Conservation Land for a total of 616 acres conserved.	➢ Control invasive species, including plant species such as tamarisk and animal species such as non-native ants, brown-headed cowbirds, bull-frogs, crayfish, and other species that threaten black rail habitat.	➢ 91% of the modeled black rail Habitat is conserved under the Plan. ➢ 7% of Habitat would be subject to Take in

Table 4-116: Summary of Covered Species Conservation and Take Table

Species Common Name Scientific Name	*Species Conservation Objectives*	*Conservation Analysis Summary*	*Measures to Avoid, Minimize, and Mitigate Take*	*Management Activities Summary*	*Conservation and Take Summary*
	Stormwater Channel and Delta Conservation Areas. ➢ Establish 66 acres of permanent rail Habitat. ➢ Protect Essential Ecological Processes including hydrological regimes necessary to maintain rail Habitat. ➢ Implement biological monitoring and adaptive management to ensure Conservation of this rare bird.	➢ The California black rail will benefit from the establishment of the MSHCP Reserve System which will include Habitat in the Dos Palmas and Coachella Valley Stormwater Channel and Delta Conservation Areas. Only 33% of the modeled Habitat for this species is currently conserved. Species-specific measures such as management to minimize impacts to rails and their Habitat, monitoring to better understand the distribution and population status of this species in the Plan Area, and long-term protection, management, and enhancement of California black rail Habitat will benefit this species.	➢ CVWD will establish 66 acres of permanent replacement rail Habitat Water quality and other important elements of rail Habitat will be monitored and maintained. ➢ Management a Monitoring activities to ensure Conservation of this species, including control of activities that degrade its habitat. ➢ Surveys required in potential Habitat for this Fully Protected Species.	➢ As part of the Monitoring Program, complete hydrologic studies for the Salt Creek area to determine if the water sources for the black rail's habitat are adequately protected or if additional water sources may be needed. ➢ To the extent activities are under Plan authority, maintain water levels, water quality, and proper functioning condition of seeps, springs, marshes, and wetlands.	Conservation Areas, consistent with Conservation Objectives; less than 2% of Habitat outside Conservation Areas compromised by fragmentation or other impacts.
Burrowing Owl *Athene cunicularia*	➢ Ensure conservation of burrowing owl burrows within nine Conservation Areas. ➢ Protect Other Conserved Habitat in ten Conservation Areas to allow for population fluctuation and genetic diversity. ➢ Implement Avoidance, minimization, and mitigation measures for burrowing owl. ➢ Implement biological monitoring and Adaptive Management to ensure Conservation of this species.	➢ The Plan would ensure Conservation of known burrow sites for burrowing owls. Throughout the Plan Area, the protected known locations include those in the Snow Creek area, the Whitewater Floodplain Preserve, the Mission Creek area west of Highway 62, the Willow Hole-Edom Hill Preserve/ACEC area, the Thousand Palms Preserve, including the sand source area, and significant portions of the Indio Hills and the Mecca Hills. Other potential Habitat areas would be conserved. Burrowing owls would be protected from edge effects, from OHV impacts, and from any activities that may result in disturbance to owl burrows. ➢ Implementation of the Plan is expected to provide for persistence of the burrowing owl within the Plan	➢ Permittees will protect and manage 41 of the 74 known locations. Although modeled habitat was not described for the burrowing owl, the reserve design process focused on inclusion of areas of contiguous habitat in areas where burrowing owls are known to occur. This contiguous Habitat would also provide adequate foraging areas. ➢ The Plan will ensure Conservation of known burrow sites including foraging areas. ➢ Avoidance, minimization, and mitigation measures to limit disturbance to owls and burrows.	➢ Control and manage activities that degrade burrowing owl habitat. In particular, those activities that result in frightening birds away from their nests or that may crush burrows, including OHV travel in their habitat, and other human disturbance, will be controlled through fencing and patrolling. ➢ Consider whether a restriction on human access to occupied habitat during the breeding season is appropriate, from monitoring information. Burrowing owls, especially those in "colonies" during the breeding season, are vulnerable to disturbance (Haug, Millsap, and Martell 1993). ➢ Identify actions to reduce impacts from, and control where feasible, invasive species if it is determined	➢ 55% of the known locations for burrowing owls would be conserved under the Plan. ➢ Conserved Habitat for other Covered Species will provide habitat and foraging areas for burrowing owl. ➢ 45% of known locations for burrowing owl would be subject to Take in areas compromised by fragmentation, Development, and associated impacts.

Table 4-116: Summary of Covered Species Conservation and Take Table

Species Common Name Scientific Name	*Species Conservation Objectives*	*Conservation Analysis Summary*	*Measures to Avoid, Minimize, and Mitigate Take*	*Management Activities Summary*	*Conservation and Take Summary*
		Area, as currently unprotected portions of its habitat, burrow sites, foraging areas, and potential Habitat areas will be conserved. The combination of the overall Conservation measures; species-specific measures such as avoidance of active burrows during the breeding season; efforts by flood control and water districts to inventory and minimize impacts to burrowing owls; and long-term protection, management, and enhancement of burrowing owl Habitat is expected to benefit burrowing owls.	➢ Management and Monitoring activities to ensure Conservation of the burrowing owl, including control of activities that degrade its Habitat and data to describe distribution, abundance, and habitat of this species.	from monitoring results that there are impacts to burrowing owls. ➢ Encourage the presence of burrowing owls in agricultural areas by allowing them to remain at burrows established in levees and dikes. Avoid maintenance during the breeding season from March to July. Caution in use of pesticides in the vicinity of burrowing owl burrows is also important. Other measures that may enhance potential habitat in agricultural areas should be evaluated. ➢ Evaluate the need and potential for, and impacts of, establishment of artificial burrows in Conservation Areas after more information on current population status is obtained.	
Southwestern Willow Flycatcher *Empidonax traillii extimus*	➢ Conserve existing breeding Habitat and an assemblage of native Habitats important for migration. ➢ Ensure that CVWD will establish at least 44 acres of riparian forest in the Coachella Valley Stormwater Channel and Delta Conservation Area. ➢ Protect Essential Ecological Processes including hydrological regimes necessary to maintain riparian Habitat. ➢ Implement biological monitoring and Adaptive	➢ Implementation of the Plan is expected to maintain and enhance population viability of the southwestern willow flycatcher by protecting habitat for potential nesting and conserving habitat known to be used in migration. The Plan will also enhance riparian habitat through implementation of management prescriptions to remove non-native tamarisk and other invasive species. An agreement with CVWD regarding creation of riparian vegetation along the Whitewater River could result in enhanced habitat for flycatchers as well. Another benefit is the focus of attention on the presence of brown-headed cowbirds, including Adaptive	➢ <u>Breeding</u>: Permittees will protect and manage 1,037 acres of modeled breeding Habitat together with Existing Conservation Land for a total of 2,563 acres of breeding Habitat conserved. ➢ <u>Migratory</u>: Permittees will protect and manage 19,534 acres of modeled migratory Habitat together with Existing Conservation Land for a total of 40,846 acres of migratory Habitat conserved. ➢ The Conservation Areas in the Plan would protect 96% of the occupied and	➢ Control and manage activities that degrade southwestern willow flycatcher habitat in conserved areas. These activities include brown-headed cowbird nest parasitism, clearing or alteration of riparian vegetation, persistence or invasion of exotic plant species, human disturbance, edge effects, and predation of adults and nests by domestic animals. ➢ Restrict human access to southwestern willow flycatcher-occupied habitat during the breeding season, from May 1 to September 15. ➢ Enhance habitat through the restoration of disturbed habitats or	<u>Breeding</u>: ➢ 94% of the modeled willow flycatcher breeding Habitat is conserved under the Plan. ➢ 4% of Habitat would be subject to Take in Conservation Areas, consistent with Conservation Objectives; less than 2% of Habitat outside Conservation Areas, compromised by fragmentation or other impacts.

Table 4-116: Summary of Covered Species Conservation and Take Table

Species Common Name Scientific Name	*Species Conservation Objectives*	*Conservation Analysis Summary*	*Measures to Avoid, Minimize, and Mitigate Take*	*Management Activities Summary*	*Conservation and Take Summary*
	Management to ensure Conservation of this flycatcher.	Management activities to control their impacts to riparian birds such as the southwestern willow flycatcher.	potential breeding habitat and 95% of the potential migratory habitat for this species. ➢ Where disturbance of a given number of acres of a riparian natural community is authorized, an equivalent number of acres would be replaced to ensure that the no net loss occurs. ➢ CVWD will establish 44 acres of permanent Sonoran cottonwood-willow riparian forest in the Coachella Valley Stormwater Channel and Delta Conservation area as described in Section 4.3.20. ➢ Management and Monitoring will ensure the Conservation of this species.	the creation of new habitat where feasible. In particular, removal of tamarisk from existing riparian areas would enhance habitat for southwestern willow flycatcher and other riparian birds. Any habitat restoration should balance management of southwestern willow flycatcher habitat with management actions for other riparian-dependent species by ensuring a mix of vegetation successional stages in riparian habitats. ➢ Maintain upland buffers for all occupied habitat. Buffers should be a minimum of 50 feet wide. Access to surface water is important for this ➢ species within the habitat area.	Migratory: ➢ 71% of the modeled willow flycatcher migratory Habitat is conserved under the Plan. ➢ 4% of Habitat would be subject to Take in Conservation Areas and less than 23% of Habitat outside Conservation Areas in areas compromised by fragmentation or other impacts.

Table 4-116: Summary of Covered Species Conservation and Take Table

Species Common Name Scientific Name	*Species Conservation Objectives*	*Conservation Analysis Summary*	*Measures to Avoid, Minimize, and Mitigate Take*	*Management Activities Summary*	*Conservation and Take Summary*
Crissal thrasher *Toxostoma crissale*	➢ Protect at least two Core Habitat areas including occupied Habitat in Dos Palmas and Coachella Valley Stormwater Channel and Delta Conservation Areas. Ensure implementation of avoidance, mitigation, and minimization measures as described in Section 4.4. ➢ Protect Other Conserved Habitat to provide for population fluctuations within a range of environmental conditions. ➢ Protect Essential Ecological Processes including hydrological regimes necessary to maintain thrasher Habitat. ➢ Maintain Biological Corridors and Linkages for habitat connectivity. ➢ Implement biological monitoring and Adaptive Management to ensure Conservation of this thrasher.	➢ The crissal thrasher will benefit from the establishment of the MSHCP Reserve System which will include Conservation of Habitat in the Dos Palmas and Coachella Valley Stormwater Channel and Delta Conservation Areas where they are known to occur. Only 4% of the modeled Habitat for this species is currently conserved. Plan will provide for Conservation of the crissal thrasher unprotected portions of its Habitat and potential Habitat areas will be conserved. Because much of its Habitat was already fragmented and reduced to small patches, the potential for Habitat Conservation for this species was already compromised prior to this Plan. The combination of the overall Conservation measures; species-specific measures such as management to minimize impacts to thrashers and their Habitat, monitoring to better understand the distribution and population status of this species in the Plan Area, and long-term protection, management, and enhancement of crissal thrasher Habitat is expected to effectively compensate for potential adverse effects to this bird species.	➢ Permittees will protect and manage 1,418 acres of modeled habitat together with Existing Conservation Land for a total of 1,676 acres conserved. ➢ Avoidance, minimization, and mitigation measures require avoidance of mesquite as habitat for crissal thrashers. ➢ Occupied and potential Habitat conserved across range of conditions in Plan Area; only 4% currently protected. ➢ Management a Monitoring activities to ensure Conservation of this species, including control of activities that degrade its habitat.	➢ Control invasive species, if monitoring results indicate an impact on crissal thrashers. ➢ Avoid disturbance to nesting crissal thrashers to avoid the breeding season from January 15 through June 15 or until the young have fledged. ➢ Evaluate the impacts of groundwater management on crissal thrasher Habitat, particularly mesquite areas, to determine if the water sources for this Habitat are adequately protected or if additional water sources may be needed. ➢ Establish a research element as part of the Monitoring Program that addresses the distribution of the species, its home range size, dispersal distances and barriers to dispersal, and its population density throughout the Plan Area.	➢ 91% of the Core Habitat for is conserved under the Plan. ➢ 9% of Habitat would be subject to Take in Conservation Areas, consistent with Conservation Objectives; 72% of Habitat outside Conservation Areas would be subject to Take in areas that are highly fragmented, surrounded by development or agriculture, or other impacts.
Le Conte's thrasher *Toxostoma lecontei*	➢ Conserve Habitat across a range of environmental conditions in 20 Conservation Areas. ➢ Protect Essential Ecological Processes	➢ 54% of the modeled Habitat for this species in the Plan Area will be conserved. Habitat from Snow Creek in the west of the Plan Area to the Shavers Valley area in the extreme east of the Plan Area. Those areas	➢ Permittees will protect and manage 73,476~~73,204~~ acres of modeled habitat together with Existing Conservation Land for a total of 132,728~~132,456~~	➢ Control and manage activities that degrade Le Conte's thrasher Habitat. In particular, OHV activity can destroy nesting substrate and creosote bushes used for nesting. Similarly, shooting should not be	➢ 90~~95~~% of the predicted Other Conserved~~Core~~ Habitat for Le Conte's thrasher is conserved and 54% of the modeled Habitat is

Table 4-116: Summary of Covered Species Conservation and Take Table

Species Common Name Scientific Name	*Species Conservation Objectives*	*Conservation Analysis Summary*	*Measures to Avoid, Minimize, and Mitigate Take*	*Management Activities Summary*	*Conservation and Take Summary*
	including hydrological regimes necessary to maintain thrasher Habitat. ➢ Maintain Biological Corridors and Linkages for habitat connectivity. ➢ Implement biological monitoring and Adaptive Management to ensure Conservation of this rare bird.	where Take could be permitted for this species are primarily locations in the area west of Desert Hot Springs and scattered locations in the urbanized areas of Indio and Palms Springs. Roads and urban Development already fragment a significant portion of the Take area. Thus, implementation of the Plan will maintain and enhance population viability of the species by protecting large Habitat areas that otherwise would be subject to conversion to other uses. Only 24% of the modeled Habitat for this species is currently conserved. ➢ The combination of the overall Conservation measures; species-specific measures such as management to minimize impacts to thrashers and their Habitat, monitoring to better understand the distribution and population status of this species in the Plan Area, and long-term protection, management, and enhancement of Le Conte's thrasher Habitat is expected to effectively compensate for potential adverse effects to this bird species.	acres conserved. ➢ Avoidance, minimization, and mitigation measures require avoidance of Le Conte's thrasher nests. ➢ Occupied and potential Habitat conserved across range of conditions in Plan Area; only 24% currently protected. ➢ Management and Monitoring activities to ensure Conservation of this species, including control of activities that degrade its habitat.	allowed, as the Le Conte's thrasher is the largest and most conspicuous species in creosote scrub Habitat at certain times of the year. ➢ Control invasive species if it is determined from the monitoring results that they impact thrasher Habitat. Although brood parasitism by the brown-headed cowbird has not been documented in the literature, 11 of 11 Le Conte's thrasher pairs accepted artificially introduced cowbird eggs in a study. Cowbird control should be considered if monitoring indicates it is a problem. ➢ As part of the Monitoring Program, establish a research element that addresses the distribution of the species, its home range size, dispersal distances and barriers to dispersal, and its population density throughout the Plan Area.	conserved under the Plan. ➢ 4% of Habitat would be subject to Take in Conservation Areas, consistent with Conservation Objectives; 36% of Habitat outside Conservation Areas in areas that are highly fragmented, surrounded by development or agriculture, or other impacts.
Least Bell's vireo *Empidonax bellii pusillus*	➢ Conserve existing breeding Habitat and an assemblage of native Habitats important for migration. ➢ Ensure that CVWD will establish at least 44 acres of riparian forest in the Coachella Valley	➢ The MSHCP Reserve System would protect 79% of the potential and known breeding Habitat for this species. All of the known breeding locations for this species would be protected. The proposed Conservation Areas include the important breeding Habitat for least Bell's vireo in riparian woodland and	➢ Breeding: Permittees will protect and manage 1,282 acres of modeled breeding Habitat together with Existing Conservation Land for a total of 2,911 acres of breeding Habitat conserved. ➢ Migratory: Permittees will protect and manage	➢ Control and manage activities that degrade least Bell's vireo habitat, such as brown-headed cowbird nest parasitism, clearing or alteration of riparian vegetation, persistence or invasion of exotic plant species, human disturbance, edge effects, and predation of adults and nests by domestic	Breeding: ➢ 79% of the modeled vireo breeding Habitat is conserved under the Plan. ➢ 4% of Habitat would be subject to Take in Conservation Areas and less than 17% of

Table 4-116: Summary of Covered Species Conservation and Take Table

Species Common Name Scientific Name	*Species Conservation Objectives*	*Conservation Analysis Summary*	*Measures to Avoid, Minimize, and Mitigate Take*	*Management Activities Summary*	*Conservation and Take Summary*
	Stormwater Channel and Delta Conservation Area. ➢ Protect Essential Ecological Processes including hydrological regimes necessary to maintain riparian Habitat. ➢ Implement biological monitoring and Adaptive Management to ensure Conservation of this vireo.	forest communities and desert fan palm oasis woodland. Proposed Conservation Areas include riparian Habitat in Whitewater Canyon, Chino Canyon, and Willow Hole/Edom Hill ACEC where the species has been known to breed. Other natural Habitat used by least Bell's vireo in migration or foraging will be conserved. In total, the Plan would conserve 71% of the Habitat potentially used in migration by least Bell's vireo, according to the model. Temporary Habitat disturbance for flood control channel maintenance purposes would be permitted by the Plan in the Coachella Valley Stormwater channel. CVWD will establish offsite replacement riparian Habitat as described in Section 4.3.21. ➢ Implementation of the Plan is expected to maintain and enhance population viability of the least Bell's vireo by protecting its known breeding locations in the Plan Area and conserving Habitats that may be used in migration. The Plan will also enhance riparian Habitat through implementation of management prescriptions to remove non-native tamarisk and other invasive species from riparian areas. An agreement with CVWD will result in creation of additional riparian vegetation along the Coachella Valley Stormwater channel.	19,319~~19,301~~ acres of modeled migratory Habitat together with Existing Conservation Land for a total of 40,528~~40,510~~ acres of migratory Habitat conserved. ➢ The Conservation Areas in the Plan would protect 79% of the occupied and potential breeding habitat and 71% of the potential migratory habitat for this species. ➢ Where disturbance of a given number of acres of a riparian natural community is authorized, an equivalent number of acres would be replaced to ensure that the no net loss occurs. ➢ CVWD will establish 44 acres of permanent Sonoran cottonwood-willow riparian forest in the Coachella Valley Stormwater Channel and Delta Conservation area as described in Section 4.3.20. Management and Monitoring will ensure the Conservation of this species.	animals. ➢ Restrict human access to vireo habitat during the breeding season, from March 15 to September 15. ➢ Enhance habitat through the restoration of disturbed habitats or the creation of new habitat where feasible. In particular, removal of tamarisk from existing riparian areas would enhance habitat for least Bell's vireo and other riparian birds. ➢ Maintain upland buffers for all occupied habitat. Buffers should be a minimum of 50 feet wide. Access to surface water is important for this species within the habitat area.	Habitat outside Conservation Areas, compromised by fragmentation or other impacts. Migratory: ➢ 71% of the modeled vireo migratory Habitat is conserved under the Plan. ➢ 4% of Habitat would be subject to Take in Conservation Areas, consistent with Conservation Objectives and less than 22% of Habitat outside Conservation Areas, compromised by fragmentation or other impacts.

Table 4-116: Summary of Covered Species Conservation and Take Table

Species Common Name Scientific Name	*Species Conservation Objectives*	*Conservation Analysis Summary*	*Measures to Avoid, Minimize, and Mitigate Take*	*Management Activities Summary*	*Conservation and Take Summary*
Gray vireo *Vireo vicinior*	➢ Conserve occupied or potential Habitat in three Conservation Areas. ➢ Implement biological monitoring and Adaptive Management to ensure Conservation of this vireo.	➢ As shown in Table 9-25, the Plan would protect 96% of the potential Habitat for this species. All of the known locations for this species would be protected under this Plan. Habitat would also be conserved in a range of environmental conditions from Cabazon in the west end of the Plan Area to the Joshua Tree National Park in the north and east ends of the Plan Area. Those limited areas where Take could be permitted for this species are primarily locations in the already developed area around Pinyon Flat in the Santa Rosa Mountains. ➢ Implementation of the Plan will maintain and enhance population viability of the gray vireo by protecting additional potential Habitat for this species. The Plan will also enhance gray vireo Habitat through implementation of management prescriptions, which could include control of brown-headed cowbird parasitism and prescribed burning to revitalize Habitat. Implementation for this species will include research to determine the extent of its occurrence within the Plan Area and Habitat management needs.	➢ Permittees will protect and manage 13,194 acres of modeled habitat together with Existing Conservation Land for a total of 101,544 acres conserved. ➢ Occupied and potential Habitat conserved across range of conditions in Plan Area; 84% currently protected. ➢ Management a Monitoring activities to ensure Conservation of this species, including control of activities that degrade its habitat.	➢ Determine the distribution and abundance of the gray vireo throughout the Plan Area. This would include coordination with Joshua Tree National Park biologists to conduct surveys for this species in appropriate Habitat within the park. ➢ Control brown-headed cowbird nest parasitism if it is deemed to be a significant factor in the decline of this species. Any sign of parasitism or regular observations of cowbirds in breeding Habitat may warrant a cowbird control effort. Control invasive species if it is determined from the monitoring results that they impact gray vireo Habitat. ➢ Coordinate with USFS, BLM, and NPS regarding appropriate management prescriptions for Pinyon-juniper woodland and chaparral Habitats. Consideration should be given to the use of prescribed fire and/or standards for controlling wildfires to maintain or restore gray vireo Habitat.	➢ 96% of the occupied or potential habitat is conserved under the Plan. ➢ 1% would be subject to take within Conservation Areas, consistent with Conservation Objectives; 2% subject to Take outside Conservation Areas in habitat that is compromised by fragmentation, loss of Essential Ecological Processes or other impacts.
Yellow warbler *Dendroica petechia brewsteri*	➢ Conserve existing breeding Habitat and an assemblage of native Habitats important for migration. ➢ Ensure that CVWD will establish at least 44 acres	➢ Implementation of the Plan is expected to maintain and enhance population viability of the yellow warbler by protecting habitat for potential nesting and conserving habitat known to be used in migration. The Plan will also enhance riparian	<u>Breeding</u>: ➢ Permittees will protect and manage 1,037 acres of modeled breeding Habitat together with Existing Conservation Land for a total of 2,563 acres of	➢ Control and manage activities that degrade yellow warbler habitat in conserved areas. These activities include brown-headed cowbird nest parasitism, clearing or alteration of riparian vegetation, persistence or invasion of exotic plant species,	<u>Breeding</u>: ➢ 94% of the modeled yellow warbler breeding Habitat is conserved under the Plan. ➢ 4% of Habitat would be subject to Take in

Table 4-116: Summary of Covered Species Conservation and Take Table

Species Common Name Scientific Name	*Species Conservation Objectives*	*Conservation Analysis Summary*	*Measures to Avoid, Minimize, and Mitigate Take*	*Management Activities Summary*	*Conservation and Take Summary*
	of riparian forest in the Coachella Valley Stormwater Channel and Delta Conservation Area. ➢ Protect Essential Ecological Processes including hydrological regimes necessary to maintain riparian Habitat. ➢ Implement biological monitoring and Adaptive Management to ensure Conservation of this warbler.	habitat through implementation of management prescriptions to remove non-native tamarisk and other invasive species. An agreement with CVWD regarding creation of riparian vegetation along the Whitewater River could result in enhanced habitat for yellow warblers as well. Another benefit is the focus of attention on the presence of brown-headed cowbirds, including Adaptive Management activities to control their impacts to riparian birds such as the yellow warbler.	breeding Habitat conserved. Migratory: ➢ Permittees will protect and manage 19,552~~19,534~~ acres of modeled migratory Habitat together with Existing Conservation Land for a total of 40,864~~40,846~~ acres of migratory Habitat conserved. ➢ The Conservation Areas in the Plan would protect 94% of the occupied and potential breeding habitat and 71% of the potential migratory habitat for this species. ➢ Where disturbance of a given number of acres of a riparian natural community is authorized, an equivalent number of acres would be replaced to ensure that the no net loss occurs. ➢ CVWD will establish 44 acres of permanent Sonoran cottonwood-willow riparian forest as described in Section 4.3.20. ➢ Management and Monitoring will ensure the Conservation of this species.	human disturbance, edge effects, and predation of adults and nests by domestic animals. ➢ Restrict human access to yellow warbler-occupied habitat during the breeding season, from May 1 to September 15. ➢ Enhance habitat through the restoration of disturbed habitats or the creation of new habitat where feasible. In particular, removal of tamarisk from existing riparian areas would enhance habitat for yellow warbler and other riparian birds. ➢ Maintain upland buffers for all occupied habitat. Buffers should be a minimum of 50 feet wide. Access to surface water is important for this species within the habitat area.	Conservation Areas and less than 2% of Habitat outside Conservation Areas, compromised by fragmentation or other impacts. Migratory: ➢ 71% of the modeled yellow warbler migratory Habitat is conserved under the Plan. ➢ 4% of Habitat would be subject to Take in Conservation Areas and less than 23% of Habitat outside Conservation Areas, compromised by fragmentation or other impacts.
Yellow breasted chat *Icteria virens*	➢ Conserve existing breeding Habitat and an assemblage of native Habitats important for migration.	➢ Implementation of the Plan is expected to maintain and enhance population viability of the yellow-breasted chat by protecting Habitat for potential nesting and conserving	Breeding: ➢ Permittees will protect and manage 1,160 acres of modeled breeding Habitat together with Existing	➢ Control and manage activities that degrade yellow-breasted chat habitat in conserved areas. These activities include brown-headed cowbird nest parasitism, clearing or	Breeding: ➢ 94% of the modeled chat breeding Habitat is conserved under the Plan.

Table 4-116: Summary of Covered Species Conservation and Take Table

Species Common Name Scientific Name	*Species Conservation Objectives*	*Conservation Analysis Summary*	*Measures to Avoid, Minimize, and Mitigate Take*	*Management Activities Summary*	*Conservation and Take Summary*
Yellow breasted chat *(cont.)*	➢ Ensure that CVWD will establish at least 44 acres of riparian forest in the Coachella Valley Stormwater Channel and Delta Conservation Area. ➢ Protect Essential Ecological Processes including hydrological regimes necessary to maintain riparian Habitat. ➢ Implement biological monitoring and Adaptive Management to ensure Conservation of this chat.	Habitat known to be used in migration. The Plan will also enhance riparian Habitat through implementation of management prescriptions to remove non-native tamarisk and other invasive species. An agreement with CVWD regarding creation of riparian vegetation along the Whitewater River could result in enhanced Habitat for chats as well. Another benefit is the focus of attention on the presence of brown-headed cowbirds, including Adaptive Management activities to control their impacts to riparian birds such as the yellow-breasted chat.	Conservation Land for a total of 2,829 acres of breeding Habitat conserved. Migratory: ➢ Permittees will protect and manage 19,432~~19,414~~ acres of modeled migratory Habitat together with Existing Conservation Land for a total of 40,601~~40,583~~ acres of migratory Habitat conserved. ➢ Where disturbance of a given number of acres of a riparian natural community is authorized, an equivalent number of acres would be replaced to ensure that the no net loss occurs. ➢ CVWD will establish 44 acres of permanent Sonoran cottonwood-willow riparian forest as described in Section 4.3.20. ➢ Management and Monitoring will ensure the Conservation of this species.	alteration of riparian vegetation, persistence or invasion of exotic plant species, human disturbance, edge effects, and predation of adults and nests by domestic animals. ➢ Restrict human access to yellow-breasted chat-occupied habitat during the breeding season, from May 1 to September 15. ➢ Enhance habitat through the restoration of disturbed habitats or the creation of new habitat where feasible. In particular, removal of tamarisk from existing riparian areas would enhance habitat for this chat and other riparian birds. Any habitat restoration should ensure a mix of vegetation successional stages in riparian habitats. ➢ Maintain upland buffers for all occupied habitat. Buffers should be a minimum of 50 feet wide. Access to surface water is important for this species within the habitat area.	➢ 4% of Habitat would be subject to Take in Conservation Areas and less than 2% of Habitat outside Conservation Areas, compromised by fragmentation or other impacts. Migratory: ➢ 71% of the modeled yellow-breasted chat migratory Habitat is conserved under the Plan. ➢ 4% of Habitat would be subject to Take in Conservation Areas and less than 23% of Habitat outside Conservation Areas, compromised by fragmentation or other impacts.
Summer Tanager *Piranga rubra*	➢ Conserve existing breeding Habitat and an assemblage of native Habitats important for migration. ➢ Ensure that CVWD will establish at least 44 acres of riparian forest in the Coachella Valley	➢ Implementation of the Plan is expected to maintain and enhance population viability of the summer tanager by protecting Habitat for potential nesting and conserving Habitat known to be used in migration. The Plan will also enhance riparian Habitat through implementation of management	Breeding: ➢ Permittees will protect and manage 1,037 acres of modeled breeding Habitat together with Existing Conservation Land for a total of 2,563 acres of breeding Habitat conserved.	➢ Control and manage activities that degrade summer tanager habitat in conserved areas. These activities include brown-headed cowbird nest parasitism, clearing or alteration of riparian vegetation, persistence or invasion of exotic plant species, human disturbance, edge effects, and predation of adults and nests	Breeding: ➢ 94% of the modeled summer tanager breeding Habitat is conserved under the Plan. ➢ 4% of Habitat would be subject to Take in Conservation Areas and

Table 4-116: Summary of Covered Species Conservation and Take Table

Species Common Name Scientific Name	*Species Conservation Objectives*	*Conservation Analysis Summary*	*Measures to Avoid, Minimize, and Mitigate Take*	*Management Activities Summary*	*Conservation and Take Summary*
	Stormwater Channel and Delta Conservation Area. ➢ Protect Essential Ecological Processes including hydrological regimes necessary to maintain riparian Habitat. ➢ Implement biological monitoring and Adaptive Management to ensure Conservation of this tanager.	prescriptions to remove non-native tamarisk and other invasive species. An agreement with CVWD regarding creation of riparian vegetation along the Whitewater River could result in enhanced Habitat for warblers and other riparian birds as well. Another benefit is the focus of attention on the presence of brown-headed cowbirds, including Adaptive Management activities to control their impacts to riparian birds such as the summer tanager.	Migratory: ➢ Permittees will protect and manage 19,552~~19,534~~ acres of modeled migratory Habitat together with Existing Conservation Land for a total of 40,864~~40,846~~ acres of migratory Habitat conserved. ➢ Where disturbance of a given number of acres of a riparian natural community is authorized an equivalent number of acres would be replaced to ensure that the no net loss occurs. ➢ CVWD will establish 44 acres of permanent Sonoran cottonwood-willow riparian forest as described in Section 4.3.20. ➢ Management and Monitoring will ensure the Conservation of this species.	by domestic animals. Restrict human access to tanager-occupied habitat during the breeding season, from May 1 to September 15. ➢ Enhance habitat through the restoration of disturbed habitats or the creation of new habitat where feasible. In particular, removal of tamarisk from existing riparian areas would enhance habitat for summer tanager and other riparian birds. ➢ Maintain upland buffers for all occupied habitat. Buffers should be a minimum of 50 feet wide. Access to surface water is important for this species within the habitat area.	less than 2% of Habitat outside Conservation Areas, compromised by fragmentation or other impacts. Migratory: ➢ 71% of the modeled summer tanager migratory Habitat is conserved under the Plan. ➢ 4% of Habitat would be subject to Take in Conservation Areas and less than 23% of Habitat outside Conservation Areas, compromised by fragmentation or other impacts.
Mammals					
Southern yellow bat *Lasiurus ega or xanthinus*	➢ Conserve occupied and potential habitat in native fan palm oases. ➢ Protect Essential Ecological Processes including hydrological regimes necessary to maintain fan palm oases. ➢ Implement biological monitoring and adaptive management to ensure Conservation of yellow bat	➢ Under the Plan, 94% of the approximately 1,329 acres of naturally occurring Habitat of the species in the Plan Area will be conserved. The conserved area includes the entire known occupied, naturally-occurring Habitat. It should be noted that a significant amount of potential Habitat occurs on the Agua Caliente Indian Reservation and is not part of this Plan. The Agua Caliente Band of Cahuilla Indians is preparing its own	➢ Permittees will protect and manage 590 acres of modeled habitat together with Existing Conservation Land for a total of 1,250 acres conserved. Occupied and potential Habitat conserved across range of conditions in Plan Area; 44% currently protected.	➢ *Control and manage activities that degrade yellow bat Habitat, such as activities that result in disturbance or alteration to the vegetation structure of desert fan palm oases and the skirts of dead fronds on individual palm trees.* ➢ Control invasive species if it is determined from the monitoring results that they impact yellow bat Habitat. ➢ Assess, as part of the Monitoring	➢ 94% of the occupied or potential yellow bat Habitat is conserved under the Plan. ➢ 5% of modeled habitat would be subject to Take within Conservation Areas; Less than 1% of modeled Habitat is subject to Take outside Conservation Areas in

Table 4-116: Summary of Covered Species Conservation and Take Table

Species Common Name Scientific Name	*Species Conservation Objectives*	*Conservation Analysis Summary*	*Measures to Avoid, Minimize, and Mitigate Take*	*Management Activities Summary*	*Conservation and Take Summary*
	habitat.	MSHCP, and potential conservation on reservation lands will be addressed in that plan. Under the Plan, Take would be permitted on 12 acres, or less than 1%, of the naturally occurring Habitat outside the Conservation Areas. ➢ Implementation of the Plan will maintain and enhance population viability of the southern yellow bat by conserving its palm oasis Habitat, providing increased study of the ecology of the species, and by encouraging private landowners to manage potential Habitat in landscaped areas to maintain Habitat values.	➢ Management and Monitoring activities to ensure Conservation of this species, including control of activities that degrade its Habitat.	and Management Programs, whether a fire management plan is needed to reduce or avoid the impact of fire on this species. The Plan must also recognize that fire may be part of the ecology of *Washingtonia filifera* and may be beneficial. ➢ Restore and enhance degraded Habitat as necessary according to monitoring results. ➢ As part of the Monitoring Program, gather data on the distribution and Habitat parameters of the southern yellow bat throughout the MSHCP Reserve System.	Habitat that is compromised by fragmentation, loss of Essential Ecological Processes or other impacts. For this species Habitat outside Conservation Areas is less likely to be occupied.
Coachella Valley round-tailed ground squirrel *Spermophilus tereticaudus chlorus*	➢ Ensure conservation of Core Habitat within four Conservation Areas. ➢ Protect Other Conserved Habitat in 16 Conservation Areas through adherence to other Conservation Objectives. ➢ Ensure conservation of Essential Ecological Processes including sand source/sand transport systems. ➢ Maintain Linkages among all conserved populations. ➢ Implement biological monitoring and Adaptive Management to ensure long-term persistence.	➢ The Conservation Areas benefit this species by securing the long-term sand transport-delivery systems for the Core Habitat and Other Conserved Habitat. At the present time, the sand transport corridors for the Snow Creek area, the Willow Hole area, and for the Thousand Palms Preserve are unprotected; the MSHCP Reserve System would protect these areas. Potential Linkage areas would be protected between Highway 111 and Interstate 10 near Snow Creek. From Willow Hole east, Habitat that typically supports this species along the south-facing slopes of Edom Hill would be protected, providing a Linkage with Habitat to the east on the Thousand Palms Preserve. Essential Ecological Processes, including wind corridors	➢ Permittees will protect and manage 20,593~~20,469~~ acres of modeled habitat together with Existing Conservation Land for a total of 33,950~~33,826~~ acres conserved. ➢ Occupied and potential Habitat conserved across range of conditions in Plan Area; 13% currently protected. ➢ Management a Monitoring activities to ensure Conservation of this species, including control of activities that degrade its habitat. ➢ The Plan will ensure Conservation of mesquite hummocks as a significant	➢ Control and manage activities that degrade ground squirrel Habitat, such as activities that result in sand compaction and vegetation destruction, or which may crush their burrows, including OHV travel within Core Habitat; vegetation manipulation or clearing; and other human disturbance. Fencing, patrol and enforcement may be necessary to accomplish this goal. ➢ Control invasive species if it is determined from the monitoring results that there are impacts to the ground squirrel or its Habitat. ➢ Restore and enhance degraded Habitat as necessary according to monitoring results. This may include restoration of mesquite hummocks if research and monitoring results indicate	➢ 94% of the Core Habitat for this ground squirrel is conserved and 33% of the occupied or potential habitat is conserved under the Plan. ➢ 2% would be subject to take within Conservation Areas; 58% subject to Take outside Conservation Areas in habitat that is compromised by fragmentation, loss of Essential Ecological Processes or other impacts. For this species habitat outside Conservation Areas is less likely to be

Table 4-116: Summary of Covered Species Conservation and Take Table

Species Common Name Scientific Name	*Species Conservation Objectives*	*Conservation Analysis Summary*	*Measures to Avoid, Minimize, and Mitigate Take*	*Management Activities Summary*	*Conservation and Take Summary*
		and sand sources for the Habitat named above, would be protected under the Plan. Habitat at Dos Palmas would be conserved in the proposed Plan. Those areas where Take could be permitted are in areas that no longer have a viable sand transport/wind corridor and are highly fragmented by major roads. These fragmented blocks are more susceptible to edge effects, including mortality on roads and predation by feral animals.	habitat for Coachella Valley round-tailed ground squirrels. This will include monitoring of existing mesquite, groundwater levels, and restoration and enhancement of additional mesquite hummocks.	restoration is warranted. ➢ As part of the Monitoring Program, establish a research element that addresses the distribution, abundance, and Habitat parameters of the Coachella Valley round-tailed ground squirrel throughout the Plan Area.	occupied.
Palm Springs pocket mouse *Perognathus longimembris bangsi*	➢ Ensure conservation of Core Habitat within five Conservation Areas~~ and one Special Provisions Area~~. ➢ Protect Other Conserved Habitat in sixteen Conservation Areas ~~ and one Special Provisions Area~~ through adherence to other Conservation Objectives. ➢ Ensure conservation of Essential Ecological Processes including sand source/sand transport system. ➢ Maintain Linkages among all conserved populations. ➢ Implement biological monitoring and Adaptive Management to ensure long-term persistence.	➢ Implementation of the Plan will maintain and enhance population viability of the Palm Springs pocket mouse, which currently receives no protection outside of the existing CVFTL Preserve system. Management and monitoring prescriptions will further enhance long-term Conservation of this species. ➢ The Palm Springs pocket mouse will benefit from the establishment of the MSHCP Reserve System which will include Core Habitat. The proposed Conservation Areas in the Plan would protect 93% of the Core Habitat areas for this pocket mouse from Cabazon to Thousand Palms. This includes 77% of the known occurrences for the Palm Springs pocket mouse. The combination of the overall Conservation measures; species-specific Conservation Objectives and measures such as management to minimize OHV impacts in pocket	➢ Permittees will protect and manage 35,853~~35,605~~ acres of modeled habitat together with Existing Conservation Land for a total of 57,225~~56,856~~ acres conserved. ➢ Occupied and potential Habitat conserved across range of conditions in Plan Area; 15% currently protected. ➢ Management and Monitoring activities to ensure Conservation of this species, including control of activities that degrade its habitat.	➢ Control and manage activities that degrade pocket mouse Habitat, such as activities that adversely affect this species, which may include OHV travel within Core Habitat (except on designated routes of travel, if any); vegetation manipulation or clearing; and other human disturbance. Fencing, patrol and enforcement may be necessary to accomplish this goal. ➢ Identify actions to reduce impacts from, and control where feasible, invasive species if it is determined from monitoring results that there are impacts to pocket mouse Habitat or populations. ➢ Restore and enhance degraded Habitat as necessary according to monitoring results. ➢ Where necessary, develop fire management guidelines within conserved areas to protect populations from fires and disturbances associated with fire	➢ 93% of the Core Habitat for this pocket mouse is conserved and 40% of the occupied or potential habitat is conserved under the Plan. ➢ 3% would be subject to take within Conservation Areas; 50% subject to Take outside Conservation Areas in habitat that is compromised by fragmentation, loss of Essential Ecological Processes or other impacts. For this species habitat outside Conservation Areas is less likely to be occupied.

Table 4-116: Summary of Covered Species Conservation and Take Table

Species Common Name Scientific Name	*Species Conservation Objectives*	*Conservation Analysis Summary*	*Measures to Avoid, Minimize, and Mitigate Take*	*Management Activities Summary*	*Conservation and Take Summary*
		mouse Habitat, monitoring to better understand the distribution and ecology of this species, and long-term protection, management, and enhancement of Palm Springs pocket mouse Habitat is expected to effectively compensate for potential adverse effects to this species.		suppression. ➢ Complete studies to determine where Habitat interfaces occur between *P.l. bangsi* and other subspecies.	
Peninsular bighorn sheep *Ovis Canadensis nelsoni*	➢ Ensure species persistence in the Plan area by securing Essential Habitat and alleviating threats to the Plan Area population. ➢ Ensure implementation of avoidance, minimization, and mitigation measures as described in Section 4.4, and Land Use Adjacency Guidelines as described in Section 4.5. ➢ Ensure that implementation of the MSHCP is consistent with the recovery strategy delineated in the Recovery Plan for Bighorn Sheep in the Peninsular Ranges, California (USFWS, 2000). ➢ Ensure that any Development allowed does not fragment Essential Habitat, and that edge effects from such Development are minimized.	➢ Implementation of the Plan will maintain and enhance population viability of the Peninsular bighorn sheep by acquiring Essential Habitat and helping to implement the Recovery Plan. The goals of the Plan for the Peninsular bighorn sheep are consistent recovery strategy for the Peninsular bighorn sheep. ➢ The Peninsular bighorn sheep will benefit from the establishment of the MSHCP Reserve System which will include Essential Habitat in the Cabazon Conservation Area, Snow Creek/Windy Point Conservation Area, and Santa Rosa and San Jacinto Mountains Conservation Area. The proposed Conservation Areas in the Plan would protect 96% of the Essential Habitat for Peninsular bighorn sheep within the Plan Area. Implementation of the Plan is expected to provide for long-term Conservation of the Peninsular bighorn sheep within the Plan Area, as currently unprotected portions of its Habitat and potential Habitat areas will be conserved. The combination of the overall Conservation measures;	➢ Permittees will protect and manage 30,226 acres of modeled habitat together with Existing Conservation Land for a total of 165,856 acres conserved. ➢ Occupied and potential Habitat conserved across range of conditions in Plan Area; 78% currently protected. ➢ Avoidance, minimization, and mitigation measures will reduce impacts. ➢ Management and Monitoring activities to ensure Conservation of this species, including control of activities that degrade its habitat.	➢ Protect Essential Habitat for the peninsular bighorn sheep as delineated in the final Recovery Plan for Bighorn Sheep in the Peninsular Ranges, California (USFWS 2000). ➢ Control and manage activities that degrade peninsular bighorn sheep Essential Habitat within the Conservation area. This could include human disturbance, Habitat fragmentation, and edge effects. ➢ Identify actions to reduce impacts from, and control where feasible, invasive species if it is determined from monitoring results that there are impacts to the bighorn sheep or to its Habitat. Tamarisk is an identified threat to this species' Habitat and a control program is underway. ➢ Limit human access to lambing areas from January 15 to June 30 and from water source areas from July 1 to September 30. ➢ Restore and enhance degraded Habitat as necessary according to monitoring results. ➢ Where necessary, develop fire	➢ 96% of the Essential Habitat is conserved under the Plan. ➢ 2% would be subject to take within Conservation Areas, consistent with Conservation Objectives; 1% subject to Take outside Conservation Areas in areas previously approved for Development.

Table 4-116: Summary of Covered Species Conservation and Take Table

Species Common Name Scientific Name	*Species Conservation Objectives*	*Conservation Analysis Summary*	*Measures to Avoid, Minimize, and Mitigate Take*	*Management Activities Summary*	*Conservation and Take Summary*
	➢ Maintain connectivity by preventing Habitat fragmentation within and between the four recovery regions within Essential Habitat areas to allow dispersal and movement of bighorn sheep. ➢ Include Habitat Linkages and Biological Corridors within Essential Habitat areas to allow dispersal and movement of bighorn sheep. ➢ Ensure conservation of Habitat quality through biological monitoring and Adaptive Management actions to ensure Conservation of this species in the Plan Area. ➢ Implement monitoring and Adaptive Management actions.	species-specific Conservation Objectives and measures such as management to minimize disturbance in bighorn sheep Habitat, monitoring to better understand the distribution and ecology of this species, and long-term protection, management, and enhancement of Peninsular bighorn sheep Habitat is expected to effectively compensate for potential adverse effects to this species.		management guidelines within conserved areas to protect populations from fires and disturbances associated with fire suppression. Fire management is primarily an issue in the western, more mesic, portion of the Plan area where alien annual grasses may facilitate the spread of fire.	

Note: Table 4-116 summarizes the Take analyses described in Section 9.

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5.0 Costs of and Funding for Plan Implementation

This section delineates costs for implementing the Plan and identifies funding sources.

5.1 Costs of Plan Implementation

Plan implementation costs include the direct and indirect costs associated with land acquisition, the Monitoring Program, and the Management Program, including Adaptive Management. Additional costs include staff costs associated with Plan administration. Cost projections are intended to provide a realistic estimate of the costs for Plan implementation. This also assists the Wildlife Agencies in determining if the Plan meets Permit issuance criteria. The actual obligation of the Permittees, however, is to conserve the acreage that is their responsibility to meet the Conservation Goals and Conservation Objectives and to fund the Management Program, and the Monitoring Program, including Adaptive Management, in perpetuity. The actual costs over time may turn out to be more or less than those projected in this Plan.

5.1.1 Projected Permittee Acquisitions, State and Federal Contribution to the Acquisition Program, and Complementary Conservation

As shown in Table 5-1, Conservation through acquisition and other means that needed to occur as of November 2006 for Reserve System Assembly was 159,680 acres. As described in Section 4.2, 29,990 acres, as of November 2006, of this is projected to occur through Complementary Conservation, leaving a balance of 129,690 acres. Of this, 10,800 acres are public and quasi- public lands belonging to non-Permittees. As explained in Section 4.2.2.3, the Plan does not provide Take Authorization for activities on these lands and assumes that this acreage will be conserved through other means, which are not an obligation of the Permittees. That leaves a balance of 118,890 acres, of which 21,390 acres will be conserved by state and federal agencies as their Plan implementation contribution. This includes 640 acres of acquisition by State Parks, of which 100 acres can be developed for State Park facilities, as one of its mitigation obligations as a Permittee. In addition to State Parks' acquisition, the Permittees will conserve an additional 97,500 acres through acquisition or other means. Of this, ~~7,500~~7,700 acres are already owned by Permittees and that acreage will be conserved through the Plan. Thus the Permittees will acquire or otherwise conserve 90,000 acres as of November 2006. For purposes of estimating the maximum Plan implementation costs, it is assumed that all the approximately 90,000 acres to be conserved by the Permittees will be purchased. The actual acreage acquired by the Permittees could be less if some land is conserved through conditions of approval on Development or other means.

Table 5-1 shows the acres remaining to be conserved in the Conservation Areas.

Table 5-1: Analysis of Conservation Areas

Conservation Area	*(a)* *Total Acres in Cons. Area*[1]	*(b)* *Fluvial Sand Transport Only Areas (Take Authorized)* [1]	*(c)* *Additional Acres of Take Authori-zation (Based on 1996 acreage)*	*(d)* *Existing Cons. (1996)*[1, 2]	*(e)* *Acquired since 1996*[1]	*(f)* *Remaining Acres (to Conserve through Acquisition or other Means, as of November 2006)*
Cabazon	12,500	4,200	260	5,900	0	2,140
Stubbe/Cottonwood	9,800	0	270	7,100	600	1,830
Snow Creek/Windy Pt	2,900	0	260	300	1,000	1,340
Whitewater Cyn.	14,200	0	160	12,600	700	740
Hwy 111/I-10	400	0	40	0	0	360
Whitewater Flood	7,400	0	460	2,800	100	4,040
Upper Mission Ck.	29,400	0	990	17,600	4,200	6,610
Willow Hole	5,600	0	540	300	1,900	2,860
Long Canyon	800	700	0	100	0	0
Edom Hill	4,100	0	340	700	1,200	1,860
Thousand Palms	25,900	0	920	16,800	2,700	5,480
West Deception	4,200	2,900	100	100	1,100	0
Indio Hills/JTNP Linkage	13,400	0	1,170	1,700	8,700	1,830
Indio Hills Palms	6,200	0	250	3,700	1,000	1,250
East Indio Hills	4,100	0	310	1,100	100	2,590
Joshua Tree National Park	161,300	0	1,600	138,500	9,300	11,900
Desert Tortoise	89,900	0	5,150	38,800	900	45,050
Mecca Hills/Orocopia Mtns.	112,800	0	2,630	86,200	1,700	22,270
Dos Palmas	25,400	0	1,430	10,800	2,100	11,070
CV Stormwater	4,400	0	430	200	0	3,770
Santa Rosa/San Jacinto Mountains	211,200	0	5,110	151,100	22,300	32,690
TOTAL	745,900	7,800	22,420	496,400	59,600	159,680

[1] Rounded to the nearest 100.

[2] Existing Conservation in 1996 may include land that was purchased by a private conservation group and transferred to Federal ownership.

Note: in the table, columns (a) - (b) - (c) - (d) - (e) = (f)

5.1.2 Permittee Acquisition and Land Improvement Costs

This section describes the acquisition and land improvement costs, which include both the purchase price for land, land improvements, and the related costs for the transactions, including appraisals and escrow fees.

5.1.2.1 Acquisition Costs

The estimated purchase price for the Local Permittee share of land to be acquired is $301,459,900 in 2006 dollars, based on an updated Market Study with a validation date of August 2006. The related transaction costs for appraisals, escrow fees, and other fees are estimated to be approximately 5% of the total purchase price, or $15,072,995. The 5% figure is based on discussion with real estate professionals and the experience of the CVMC in its acquisition program over the last decade. The total for the acquisition program, not including staff costs, then, is $316,532,895 in 2006 dollars. CVCC proposes to complete the acquisition program in 30 years to minimize costs and potential land use conflicts. Assuming an annual increase in land value of 3.29%, the total cost over 30 years is estimated to be $526,705,000. Real estate markets are, of course, quite volatile in the short term. Land value may increase dramatically in some years – as it has done recently in many portions of the Plan Area - and may decline in other years. No definitive study of land values over an extended period of time is available for the Plan Area. Using a 3.29% annual increase for projected land values over the 30 year time horizon, which is lower than the rate at which land values have increased in the past three years, is considered to be a reasonable assumption because 28% of the acquisition will be front-loaded to occur in the first six years, and 43% in the first 11 years**.** This offsets some of the effect of appreciation in value over time. It is also assumed that the acquisition program in these early years will focus on the areas where land values have the highest potential to appreciate. At least 60% of the land to be acquired occurs in mountainous areas with little or no infrastructure; land values in these areas are expected to appreciate at a slower rate than the more developable areas. The actual costs over time may turn out to be more or less than those projected in this Plan. Rising land values over time may increase costs. Costs may also be reduced if some land in the Conservation Areas is protected through methods other than fee simple purchase. If land values rise at a higher rate than anticipated, CVCC may adjust the development mitigation fee by updating the Nexus Study in order to ensure adequate funding for the acquisition program. The CVCC will update the Nexus Study at least every five years, and more often if deemed necessary, to ensure that the Local Development Mitigation Fee is adequate over the life of the acquisition program to fund the necessary land acquisition and land improvement.

The estimate of land acquisition cost is based on *A Market Study of Land Values, Related to Several Areas of Prospective Acquisition, Associated with the Coachella Valley Multiple Species Habitat Conservation Plan* (Scarcella, July 2005). This study was based on the author's review of current sales and listings of comparable properties. Information on this study and the development of the cost estimate is found in Section 5.1 of Appendix I.

5.1.2.2 Land Improvement Costs

Land improvement refers to capital costs that occur when land is acquired in the Conservation Areas in order to render the land usable for the intended conservation purposes. These costs include but are not limited to fencing as necessary (but not ongoing maintenance of fencing), signage, and removal of trash and exotic species. In the first year of the acquisition program, $182,000 is allocated to land improvement. See Section 5.2 in Appendix I for additional information regarding the derivation of this cost. This cost is subject to 3.29% annual inflation**.** Over the 30-year term of the acquisition program, the total projected for land improvement is $9,080,000.

5.1.2.3 Acquisition Program Administration Costs

Administration costs are allocated between the Land Acquisition Fund and the Operating Fund (general MSHCP administration) on a total cost allocation basis, such that the amount of administration costs allocated to each is proportionate to the overall ratio of Land Acquisition expenditures to Operating Fund expenditures. Administration costs associated with the acquisition program include acquisition staff costs, and a proportionate share of other administrative costs to ensure collection of Development Mitigation Fees, administration of the revenues, etc. The total of administration costs allocated to the acquisition program in the first year is $493,000. This cost is subject to 3.29% annual inflation. At the end of Year 30, when land acquisition is expected to be completed, administration costs for acquisition will terminate. The total projected administration costs for the land acquisition and improvement program are $24,565,000. See Section 5.3 in Appendix I for additional information on administrative costs, including acquisition program administrative costs.

5.1.2.4 Interest Payments on Loans to the Acquisition Program

In order to complete land acquisition in the first 30 years of Plan implementation, $67,580,000 in loans from the Endowment Fund to the Land Acquisition and Improvement Fund are necessary. To offset the costs to the Endowment Fund, including lost interest revenue, interest at 5.73% will accrue and be paid to the Endowment Fund along with repayment of the principal**.** Loan repayment will be completed in Year 50 of Plan implementation. The total interest cost will be $61,151,388.

5.1.3 Non-Acquisition Program Administration Costs

CVCC will contract with CVAG for staff services for the first five years of Plan implementation and may continue to do so thereafter if desired. Administration costs are allocated between the Land Acquisition Fund and the Operating Fund (general MSHCP administration) on a total cost allocation basis, such that the amount of administration costs allocated to each is proportionate to the overall ratio of Land Acquisition expenditures to Operating Fund expenditures. Non-acquisition program administration costs include staffing the CVCC for matters including, but not limited to, Joint Project Review, preparation of annual reports, accounting, contract oversight, and meeting attendance. The total cost of the non-

acquisition program administrative services is estimated to be $56,000 in the first year, increasing by 3.29% annually to offset inflation. In addition, administration costs are reallocated at the conclusion of the acquisition program. The projected cost for the 75-year term of the Permits is $115,414,000. Costs thereafter will be funded with revenue from the Endowment Fund. For additional information on the cost for administrative services, see Section 5.3 of Appendix I.

5.1.4 Permittee Monitoring Program, Management Program, and Adaptive Management Costs

The Monitoring Program, Management Program, and Adaptive Management are described in Section 8. The Monitoring Program includes, but is not limited to, establishing baseline conditions, and monitoring threats and habitat and species status at the landscape, natural community, and species levels. The Management Program includes, but is not limited to, patrol, law enforcement, habitat restoration, maintaining fencing, and signage. Adaptive Management costs could include pilot projects to evaluate management tools, studies in response to results of the Monitoring Program, and Changed Circumstances. The Plan assumes that federal and state agencies will contribute to monitoring and land management by committing staff time and other available resources to participate with the Permittees in a coordinated Monitoring Program and to manage the state and federal lands in the Conservation Areas.

During the 75-year term of the Permits, an endowment will be established to fund the Monitoring Program, the Management Program, and Adaptive Management in perpetuity. The CVFTL HCP Endowment Fund of $3,200,000 will become part of the MSHCP Endowment Fund, and CVCC will assume responsibility for monitoring and management of the CVFTL Preserves as part of the MSHCP Reserve System. An additional $82,117,788 will be contributed to the Endowment Fund to fully fund it; this includes the $61,151,388 in debt service costs to repay the loans from the Endowment Fund to the acquisition program, and $20,966,400 in contributions from the Permittees related to mitigation for regional infrastructure and transportation projects. Revenue from this endowment will fund the Monitoring Program, Management Program, and Adaptive Management, as well as non-acquisition administration costs, in perpetuity after the endowment is fully funded in Year 75. As shown in Table 5-3b, for the 75-year term of the Permits, the total cost of the Monitoring Program is projected to be approximately $254,294,000; the total expended for the Management Program is projected to be approximately $221,252,000; and the total set aside for Adaptive Management is projected to be $14,903,000. In addition, as described in Section 8.2.4.2 of the Final MSHCP, a one-time Management Contingency Fund will be established within the first 10 years after Permit issuance. This has been included in the Operating Fund budget as a separate line item. See Table 5-3b. In the 75th year, reflecting a 3.29% annual increase over the previous 74 years, the annual cost for the Monitoring Program is $8,804,000; the annual cost for the Management Program is $7,648,000; and the annual set aside for Adaptive Management is $413,000. Each of these costs is projected to increase by 3.29% annually thereafter. The endowment is projected to generate a 5.73% annual rate of return, such that 2.44% of the return will be sufficient to fund these annual costs as well as the annual cost for Plan administration**.** The remaining 3.29% of the return will be reinvested to ensure that the endowment grows annually to offset inflation.

As stated above, an Adaptive Management fund is incorporated into the Plan budget. This fund will provide $100,000 annually (inflated by 3.29% each year for inflation) for Adaptive Management as described in Section 8. It is anticipated that expenditure of these funds will not be required every year. Any unspent funds will be carried over and be available in subsequent years. If for example, no Adaptive Management funds were expended during the first five years of Plan implementation, in Year 6 $648,000 would be available for Adaptive Management.

During the first ten years of Plan implementation a $5 million Management Contingency Fund, as described in Section 8.2.4.2, will be established. This has been included in the Operating Fund budget as a separate line item. See Table 5-3b.

5.1.5 Trail Related Costs

As described in Section 7.3.3.2.1, the Permits provide Take Authorization for the construction of perimeter trails and a Palm Desert to La Quinta connector trail in the Santa Rosa and San Jacinto Mountains Conservation Area, subject to the research and monitoring program's not indicating that these trails would adversely impact Peninsular bighorn sheep. The Plan also assumes that other trails and related facilities will be constructed over time in other Conservation Areas. Construction of the trails and facilities are not a Permittee obligation. Rather, construction of trails and other facilities are Covered Activities, which will be funded from non-Plan sources. CVCC will actively pursue funding sources, including grants and local contributions. Funding for the trails research program is described in Section 8.8.3 and shown in Table 8-11.

5.1.6 Cost Summary for Permittees' Obligations

The Permittees' intent is to complete land acquisition in 30 years and fund repayment of the loans to the Land Acquisition and Improvement Fund from the Endowment Fund in the ensuing 20 years. In addition, the Permittees will fund the annual costs for the Monitoring Program, the Management Program, and Adaptive Management, as well as general Plan administration, for the 75-year term of the Permits, and by the end of Year 75, will fully fund the endowment to provide in perpetuity for the Monitoring Program, the Management Program, Adaptive Management, and Plan administration. The estimated costs of Plan implementation for the Permittees over the 75-year term of the Permits are summarized in Table 5-2a, along with the value of the Endowment Fund in Year 75 and the balance in the Operating Fund in Year 75. Table 5-2b shows the revenue sources for Plan implementation.

Table 5-2a Summary of Permittees' Expenditures and Balances over the 75-Year Term of the Permits

Amount	***Item***
$115,414,000	Non-acquisition program administration costs (from Table 5-3b)
$254,294,000	Monitoring Program (from Table 5-3b)
$221,252,000	Management Program (from Table 5-3b)
$14,903,000	Adaptive Management (from Table 5-3b)
$526,705,000	Land acquisition costs (from Table 5-3c l)
$9,080,000	Land improvement costs (from Table 5-3c)
$24,565,000	Acquisition program administrative costs (from Table 5-3c)
$5,000,000	Management Contingency Fund (from Table 5-3b)
$1,171,213,000	**TOTAL Expenditures**
$860,741,000	Endowment Fund balance in Year 75 (from Table 5-3d)
$5,386,000	Fund balance in Operating Fund in Year 75 (from Table 5-3b)
$1,200,000	Repayment of Conservation Trust Fund advance to complete Plan
$2,038,540,000	***TOTAL***

Table 5-2b Summary of Revenue Sources

Amount	***Revenue Source***
$516,802,000	Local Development Mitigation Fee (from Table 5-3c)
$227,604,000	Conservation Trust Fund (from Table 5-3b)
$31,077,000	Regional Road Projects Mitigation (Measure A Sales Tax total contribution to acquisition and endowment; and freeway interchange/associated arterials contribution to endowment)
$~~60,208,000~~60,318,000	Regional Infrastructure Mitigation (Caltrans, CVWD, ~~and~~ IID, and MSWD contributions to acquisition and endowment)
$247,500,000	Eagle Mountain Environmental Mitigation Trust Fund (from Table 5-3b)
$3,200,000	Transfer from CVFTL HCP Endowment
$952,149,000	Interest on Investments (from Tables 5-3b, 5-3c, and 5-3d; interest generated on money in the Operating Fund, the Land Acquisition and Improvement Fund, and the Endowment Fund)
$2,038,~~540,000~~650,000	***TOTAL Revenues***

Tables 5-3a through 5-3e (updated in January 2007) show the projected costs and revenue sources in detail. The revenue sources are discussed in Section 5.2.

5.1.7 CVWD Responsibilities

In addition to the Permittees' monitoring and management responsibilities described in the preceding sections, CVWD has separate responsibilities, the costs of which are not currently known as they depend on plans to be developed for the establishment of riparian, wetland, and

desert pupfish habitat. These costs, therefore, are not included in the cost and revenue projections presented in Section 5. As explained in Section 6.6.1, the plans and cost determinations must be completed within two (2) years of Permit issuance. As a signatory to the IA, CVWD will be responsible for the costs of implementing the following:

- Ensuring a permanent water source for permanent habitat for the California black rail and Yuma clapper rail in the Coachella Valley Stormwater Channel and Delta Conservation Area. See Section 4.3.20.
- Ensuring a permanent water source for riparian habitat for Covered riparian bird Species in the Coachella Valley Stormwater Channel and Delta Conservation Area. See Section 4.3.20.
- Establishing and providing a permanent water source for desert pupfish habitat, and developing and implementing a monitoring and adaptive management program for desert pupfish in the agricultural drains and flood control channels. See Section 4.3.20.
- As described in Section 4.3.15, developing and implementing a mesquite restoration program on CVWD land in the East Indio Hills Conservation Area, and providing water, as needed, for maintaining the mesquite once established.

5.1.8 MSWD Responsibilities

In addition to the Permittees' monitoring and management responsibilities described in the preceding sections, MSWD has separate responsibilities, the costs of which are not currently known as they depend on plans to be developed for the monitoring and maintenance of mesquite hummocks. These costs, therefore, are not included in the cost and revenue projections presented in Section 5. As a signatory to the IA, MSWD will be responsible for the costs of implementing the following:

- With regard to the CVMSHCP requirements to maintain the mesquite hummock natural community, MSWD agrees to provide as available: 1) data on water levels in the Willow Hole Conservation Area, the "fault dunes" and associated mesquite hummocks east and west of Palm Drive; 2) water samples for a study of stable isotopes in mesquite tissue for use by the CVCC Monitoring Program team; 3) historical photographs or aerial imagery of the mesquite hummock areas in the Willow Hole Conservation Area that would help document changes from current conditions; 4) technical expertise of MSWD staff, or consultants as appropriate, in coordination with the CVCC Monitoring Team. MSWD is willing to provide any and all relevant data they have available to CVCC; however, MSWD does not have facilities which will provide needed data near the mesquite hummocks habitat. Additional facilities will be required to collect data on groundwater levels near the hummocks habitat. The District will also provide funds to be used for water monitoring wells or other means of gathering data on groundwater levels related to mesquite hummocks. The determination of how to best accomplish this monitoring, including placement of wells will be made in coordination with the CVCC staff, CVCC monitoring team, Wildlife Agencies, relevant Reserve Management committees, other relevant Permittees, and MSWD staff. These data and support from MSWD will enhance understanding of the hydrological regimes that support mesquite hummocks in the

CVMSHCP area and provide baseline data for the ongoing monitoring of mesquite hummocks. The District will provide funds to support monitoring and analysis of groundwater levels in the amount of $120,000.

- CVCC is responsible for evaluating the relationship between mesquite hummocks and groundwater through the Monitoring Program. MSWD will contribute to and participate in this research for the mesquite hummock areas within their district boundary. The objectives of this research will include, (1) to monitor the plant characteristics and hydrologic conditions of mesquite hummocks in the Coachella Valley; (2) to determine the source(s) of water utilized by the mesquite; and (3) to relate vegetation health and reproduction to varying hydrologic conditions in the Coachella Valley. The study will involve compiling existing vegetation and hydrologic data as GIS layers, coordination with MSWD on ground-water level data they collect from existing wells, and monitoring plant characteristics and hydrologic conditions at the sites including Willow Hole. The water-level trends from these sites can be compared to precipitation and pumping trends to help determine the natural and/or human-induced impacts on the groundwater system. The GIS will be updated on an annual basis with the data collected by other agencies during this study. These data will be used in conjunction with the hydrologic data to determine if there is a correlation between the health of the mesquite and the hydrologic properties at the site (depth to water and soil moisture). Persistence of the mesquite trees will be monitored to determine if there is a relationship between water-table depth, soil moisture, and reproduction.

- If a study undertaken by the CVCC demonstrates the decline of mesquite hummock areas in the Willow Hole Conservation Area, MSWD will work with CVCC, the Wildlife Agencies, and other relevant Permittees to identify and implement a plan to enhance, restore, and maintain the mesquite hummocks natural community and to address changed circumstances, identified in the CVMSHCP, that affect this natural community as a part of their CVMSHCP implementation activities. MSWD commits to participate in additional measures that will result from the CVMSHCP Adaptive Management Plan analysis to the extent that measures are reasonable, feasible, and within the resources of the MSWD. Further, MSWD confirms that the goals of the Water Management Plan it is preparing in cooperation with CVWD and Desert Water Agency are consistent with the objectives of the CVMSHCP to manage the groundwater resource in perpetuity for the benefit of mesquite hummocks and the species that depend on this natural community.

5.2 Funding for Plan Implementation

This section describes funding sources for the Permittees and potential funding sources for the state and federal governments. To accomplish the acquisition program in 30 years and fund the endowment for the Monitoring Program, the Management Program, including Adaptive Management, and Plan administration in 75 years, the Permittees will use a combination of annual revenues and loans from the Endowment Fund to the Land Acquisition and Improvement Fund. This would provide the necessary funding for acquisition and establishment of the

endowment in advance of the collection of all the revenue needed for those purposes. For purposes of calculation, loans are assumed to be repaid at 6% annual interest.

5.2.1 Funding Sources for the Permittees' Obligations

The Permittees' funding program includes funding from a variety of potential sources, including, but not limited to:

- Local Development Mitigation Fees
- Fees on the importation of waste into landfills in Riverside County
- Transportation project mitigation
- Mitigation for regional infrastructure projects
- Eagle Mountain Landfill Environmental Mitigation Trust Fund

5.2.1.1 Local Development Mitigation Fee

New Development affects the environment directly through construction activity and cumulatively through the activities of the population bases that result from Development. Government Code Section 66000 et seq. allows cities and counties to charge new Development for the costs of mitigating the impacts of new Development. Local jurisdictions will impose a mitigation fee on new Development within the Plan Area that impacts vacant land containing Habitat for the Covered Species or any of the conserved natural communities in the Plan through adoption, or amendment of an existing fee ordinance. In addition to large vacant areas, this also applies to small vacant lots within urban areas that still contain natural open space. The species Habitat distribution models and natural communities map prepared for the Plan may not show Habitat or a natural community on those parcels; however, this is only a result of the resolution at which those models and the natural communities map were prepared. If Development occurs on agricultural lands resulting in the conversion of the agricultural land to a non-agricultural use, that Development will also pay the fee. This reflects the fact that those agricultural lands still provide some Habitat values for Covered Species, whether it be foraging Habitat, small patches of undisturbed Habitat embedded in the agricultural lands, or connectivity between other Habitat areas through agricultural lands.

A fee of $5,730 per acre of Development is used in the revenue projection shown in Tables 5-3a through 5-3e. This is the estimated Local Development Mitigation Fee amount in the first year of Plan implementation. The fee ordinance adopted by the Cities and the County will provide for an annual CPI adjustment based upon the Consumer Price Index for “All Urban Consumers” in the Los Angeles-Anaheim-Riverside Area, measured as of the month of December in the calendar year which ends in the previous Fiscal Year. There will also be a provision for the fee to be reevaluated and revised should it be found insufficient to cover mitigation of new Development. The CVCC will update the Nexus Study at least every five years, and more often if deemed necessary, to ensure that the Local Development Mitigation Fee is adequate over the life of the acquisition program to fund the necessary land acquisition and land improvement. For purposes of projecting revenue, Table 5-3c assumes that the fee increases

3.29% annually. The projected revenue from the Local Development Mitigation Fee, as shown in Table 5-2b, is anticipated to be approximately $516,802,000 over the first 50 years of Plan implementation, based on the updated Nexus Study prepared in August 2006. The Local Permittees intend to generate funds for Plan implementation from sources in addition to the Local Development Mitigation Fee, as described below.

Pending adoption of the fee by the Cities and the County, it is anticipated that an Equivalent Benefit Unit approach will be used to determine the actual fee imposed on four categories of property: (1) residential with a density between 0 and 8.0 dwelling units per acre, (2) residential with a density between 8.1 and 14.0 dwelling units per acre, (3) residential with a density greater than 14.0 dwelling units per acre, and (4) non-residential. The CVCC will monitor the implementation of the residential Equivalent Benefit Unit approach over time and propose adjustments to the four categories if conditions warrant.

5.2.1.2 Fees on the Importation of Waste into Landfills and Transfer Stations (Conservation Trust Fund)

The County collects $1 per ton for all in-county waste deposited in County landfills. The funds are deposited in a Conservation Trust Fund. Based on tonnage generated in the Plan Area, the annual revenue from this is projected to be $575,000 in 2006 based on a Waste Tonnage Chart provided by the Riverside County Waste Resources Management District. That chart indicates a waste stream of 1,515 tons per day for the Coachella Valley in 2001, and assumes six days a week, or 312 days annually, of operations. County Waste projects that the tonnage, and hence the annual revenue, will increase at a rate of 4% annually thereafter. It is projected that funds from this source will be needed through Year 71 of Plan implementation. The total revenue in that period would be $227,604,000, as shown in Table 5-2b.

5.2.1.3 Regional Road Projects Mitigation

Measure A, a ½ cent sales tax in Riverside County, provides that funds can be used to mitigate the direct, indirect, and cumulative effects of transportation projects on the Covered Species and the conserved natural communities in the Plan. Fulfilling the Permittees' mitigation obligation under the Plan meets the mitigation needs for the transportation projects defined in Section 7.2.3. Thirty million dollars ($30,000,000) of Measure A funds will be contributed to Plan implementation to help accomplish the Permittees' mitigation obligation. In addition, CVAG or Caltrans will contribute $1,077,000 to the Endowment Fund as part of the mitigation for the Covered Activities in Table 7-1. Thus, the total revenue shown in Table 5-2b from regional road projects is $31,077,000.

5.2.1.4 Regional Infrastructure Project Mitigation

Caltrans has an obligation to acquire 5,791 acres of land to mitigate its non-interchange projects identified in Section 7.2.2**.** The projected cost for this is $27,875,000 (nominal dollars). These acquisitions must be accomplished in or by 2015. Caltrans must also contribute $7,600,000 towards the Endowment Fund in or by 2011.

The Plan assumes that CVWD will acquire 550 acres in the Thousand Palms Conservation Area to mitigate for the Whitewater River Flood Control Project at a projected cost of $20,625,000. CVWD will also make a contribution to the Endowment Fund to ensure adequate monitoring and management of these lands and other lands CVWD is committing to Conservation under the Plan. IID, which is also a Local Permittee, will also make a contribution to the Endowment Fund to ensure that lands they commit to Conservation under the Plan are adequately monitored and managed in perpetuity. As a result of the 2013 Major Amendment, MSWD will also make a contribution to the Endowment Fund. CVWD's, ~~and~~ IID's, and MSWD's contributions to the Endowment Fund are, respectively, $3,583,400, ~~and~~ $525,000, and $110,000 for a total of ~~$4,108,400~~ $4,218,400. The total revenue from Regional Infrastructure Project Mitigation, as shown in Table 5-2b, would, therefore, be ~~$60,208,000~~$60,318,000, rounded to the nearest thousand.

5.2.1.5 Eagle Mountain Landfill Environmental Mitigation Trust Fund

Another proposed funding source is the approved Eagle Mountain Landfill. In 1997, the County approved the use of the former Kaiser Steel mine at Eagle Mountain in eastern Riverside County as a regional landfill to serve primarily Los Angeles County. Subsequently, the Los Angeles County Sanitation District has acquired the rights to the Eagle Mountain Landfill and intends to begin operation of the landfill within the next few years, after resolution of litigation. The Development Agreement with the County would require the payment of $1 per ton for Habitat Conservation if the landfill is developed. Ten percent of the Trust Fund is earmarked for the National Park Foundation to benefit Joshua Tree National Park. The other 90 cents per ton would go into the Environmental Mitigation Trust Fund. The Local Permittees expect that the Eagle Mountain Landfill will provide funding to support implementation of the Plan beginning in Year 6 of implementation. It is also assumed that for the first 10 years of operation the landfill will accept a maximum of 4,000 tons per day from out of county waste pursuant to the terms of the Development Agreement for the landfill project specific plan. Beginning in year 16, it is assumed that the waste stream from out of county waste will then increase incrementally to an eventual maximum of 16,000 tons per day. Based on these assumptions, the revenue stream available for Plan implementation is:

Years	5-14:	$1,125,000	Annually	($11,250,000 for the ten-year period)
Years	15-24:	$2,250,000	Annually	($22,500,000 for the ten-year period)
Years	25-34:	$3,375,000	Annually	($33,750,000 for the ten-year period)
Years	35-71:	$4,500,000	Annually	($166,500,000 for the thirty-seven-year period)

The total revenue from Eagle Mountain projected for the 75-year term of the Permits (through establishment of the Endowment Fund for the Monitoring Program, the Management Program, Adaptive Management, and Plan administration) is $247,500,000, as shown in Table 5-2b.

5.2.1.6 Other Funding Sources

Interest on the revenue collected and invested will also provide funds for Plan implementation. The majority of this will come from funds in the Endowment Fund, but funds held in the Operating Fund and the Land Acquisition and Improvement Fund will also generate some interest. The total of interest generated during the 75-year term of the Permits is projected to be $952,149,000, as shown in Table 5-2b. As shown in Tables 5-3b through 5-3d, the interest generated from the different funds at 5.73% is as follows:

$ 912,778,000	Endowment Fund interest earned
$ 8,442,000	Operating Fund interest earned
$ 30,929,000	Land Acquisition and Improvement Fund interest earned
$ 952,149,000	***Total interest earned***

The CVFTL HCP endowment of $3,200,000 will be transferred to the MSHCP endowment, as described in Section 6.6.1.3. This amount is also shown in Table 5-2b.

CVCC and individual Permittees will pursue grants and other opportunities to secure additional funding to enhance Plan implementation. Such additional funding could allow for accelerated acquisitions and/or endowment establishment, complementary public education and interpretation opportunities, and trail construction. Application of the County's new Density Bonus Fee Program could also generate some revenues that could be contributed to Plan implementation. Because this program has not yet been implemented and no projections are available for how much revenue it could generate in the Plan Area, no funds are attributed to this source at this time.

5.2.2 Adequacy of Funding

The CVCC and the Wildlife Agencies will annually evaluate the performance of the funding mechanisms and, notwithstanding other provisions of the Plan, will develop any necessary modifications to the funding mechanisms to address additional funding needs. Additionally, this annual evaluation will include an assessment of the funding plan and anticipate funding needs over the ensuing 18 months for the purpose of identifying any potential deficiencies in cash flow. If deficiencies are identified through this evaluation, then the Permittees and the Wildlife Agencies will develop strategies to address any additional funding needs consistent with the terms and conditions of the Plan.

Additional funding needs may occur for a variety of reasons. The following section discusses potential causes of additional funding needs in the local funding program and how the need for additional funding will be addressed. As discussed below, Permittees will, to the extent allowed by law and consistent with the legal requirements governing local jurisdictions, respond to additional funding needs.

5.2.2.1 Funding Needs Resulting from Increased Land Acquisition Costs

The CVCC will annually review financing for land acquisition to update cost and financing projections. Appropriate adjustments to revenue from funding sources will be made to meet the Permittees' obligations. If a need for additional funding is projected due to increases in land values that exceed revenue from local funding sources:

- Local funding sources will be adjusted to cover the funding requirements, or
- New funding sources will be identified to supplement existing funding.

5.2.2.2 Increased Funding Needs Resulting from Monitoring Program, Management Program, and Adaptive Management Costs

The CVCC will annually review financing the Monitoring Program, the Management Program, and Adaptive Management and will update cost and financing projections as necessary during the life of the Plan. The CVCC will make appropriate adjustments to revenue from funding sources to meet the obligations of the Plan. If a need for additional funding is projected based upon increases in costs that exceed revenue from local funding sources:

- Local funding sources will be adjusted to cover funding requirements, or
- New funding sources will be identified to supplement existing funding, or
- Endowment funds may be advanced on a short-term basis to maintain the Monitoring Program, the Management Program, and Adaptive Management requirements of the Plan, or
- The length of time for the acquisition program may be extended to eliminate or reduce the need to borrow from the Endowment Fund, so that those funds may be available to fund biological monitoring, land management, or adaptive management costs.

5.2.2.3 Revenue Collections and Land Acquisitions in Relationship to Land Development (Rough Proportionality)

The local funding plan is intended to keep the local Conservation of Additional Conservation Lands to support MSHCP Reserve Assembly roughly proportional with the amount of Development occurring in the Plan Area. Over the 30-year "acquisition period," the following schedule shall be used to determine if additional Conservation is needed to keep Development and Conservation in "rough proportionality."

Year	*Projected % of Anticipated Residential, Commercial, and Industrial New Construction Developed*	*Test for "Rough Proportionality" % of Local MSHCP Conservation Area Lands Conserved*
5	17%	17%
10	33%	33%
15	50%	50%

20	67%	67%
25	83%	83%
30	100%	100%

If at the end of any five (5) year period the "rough proportionality" test has not been met, the Permittees and the Wildlife Agencies will meet within 90 days to begin to develop a strategy to address the need for a balance between Conservation and Development.

As an example of how this would function, if during the first thirty years of the Permits, 1,370 acres of Development occurs annually, 41,100 acres would be the total Development projected during the thirty years in which all acquisition is to occur. In the same time period, the Permittees are obligated to conserve 96,400 acres through acquisition or other means. This includes the 7,500 acres of Local Permittee owned land that would be conserved as a result of Plan implementation. Thus, for every acre of Development in the first thirty years of Plan implementation, the Permittees must conserve approximately 2.35 acres of land in the Conservation Areas for each acre Developed in the Plan Area. At the end of the first five years of Plan implementation, the Local Permittees would conserve approximately 17,625 acres in the Conservation Areas to maintain "rough proportionality", assuming that 7,500 acres of Development occurred.

5.2.2.4 Potential Additional Funding Sources

Since release of the Draft MSHCP, a lower court decision overturned the BLM land exchange on which the Eagle Mountain Landfill project depends, raising concern over whether the Environmental Mitigation Trust Fund can be relied upon as a revenue source for MSHCP implementation. Revenue from this source is projected to be used for monitoring and land management, Adaptive Management, Plan administration, and establishment of the Endowment Fund, but not for land acquisition, which is funded entirely from other sources. As described in Sections 5.2.1.2, 5.2.1.3, 5.2.1.4, and 5.2.1.6, Environmental Mitigation Trust Fund revenues are also not the only source of funds for monitoring and land management, Adaptive Management, Plan administration, and establishment of the Endowment Fund.

The MSHCP projects Environmental Mitigation Trust Fund revenues becoming available in Year 2010, and recognizes that litigation is still pending, potentially including an appeal of the lower court's ruling. The final outcome of the litigation is not likely to be known for some time, but most likely before 2010. For the present, it is still reasonable to project the Environmental Mitigation Trust Fund as a revenue source, recognizing that other funding sources could be necessary to offset revenues not available from the Environmental Mitigation Trust Fund. Other potential funding sources that the Permittees could consider to substitute for future revenue not available from the Environmental Mitigation Trust Fund include:

- Tipping fee revenue from an extension of the period for which the Habitat Conservation Fund tipping fee is committed to MSHCP implementation from the current 72 years to 75 years
- Tipping fee revenue from an increase in the Habitat Conservation Fund tipping fee

- Sales tax revenues if Measure A is extended beyond 2038 or a successor measure is approved by voters and future transportation projects that are not Covered Activities under the MSHCP require mitigation
- Revenue from the establishment of a Habitat Maintenance District
- Revenue from the establishment of a benefit assessment district
- Revenue from the establishment of a Community Facilities District
- Revenue from the establishment of a Community Services District
- Revenue from the establishment of a parcel tax

The foregoing list, while not intended to be exhaustive, illustrates the range of alternative funding sources that the CVCC and/or Permittees could consider if the need arises. Some of these funding sources would require voter approval, and additional legal and policy analysis would be undertaken before any source or combination of sources were identified as the appropriate funding sources. Because fees from the Eagle Mountain Environmental Mitigation Trust Fund are not projected to become available until 2010, the CVCC has four years or more to explore these and other potential funding sources should it become clear that Environmental Mitigation Trust Fund revenues would not be available.

5.2.3 Contributions to the Endowment for the Monitoring Program, the Management Program, Adaptive Management, and Plan Administration

In the 75-year period while the endowment is being established, the Plan will fund the annual Monitoring Program, the Management Program, and Adaptive Management, as well as Plan administration costs. As shown in Table 5-3d, during that 75-year period, sufficient funds will be contributed to establish a non-wasting endowment sufficient in size at the end of Year 75 to fund the Monitoring Program, the Management Program, and Adaptive Management as well as Plan administration costs in perpetuity with interest from the endowment. The endowment is projected to generate a 5.73% average annual rate of return, such that 2.44% of the return will be sufficient to fund these annual costs. The remaining 3.29% of the return will be reinvested to ensure that the endowment grows annually to offset inflation.

5.2.4 Funding Sources for the State and Federal Contributions

Maintaining the Permits does not depend on state and federal government adherence to any specific schedule for land acquisition or on any specific appropriations to state and federal agencies for land management. State and federal agencies, including USFS, NPS, USFWS, WCB, CDFG, and CVMC, may receive funds from a variety of sources to implement their responsibilities under the Plan. Potential state and federal funding sources include, but are not limited to:

- State appropriations
- Federal Land and Water Conservation Fund
- Land exchange
- State bond acts
- FESA Section 6 funds

Table 5-3a: Financing Plan Assumptions

Assumption			FY 2008 Value	Avg. Annual Increase
Revenue Assumptions				
Operating Fund				
Tipping Fees (Habitat Conservation Trust Fund only)			$575,000	4.00%
Land Acquisition and Improvement Fund				
Average Acres Developed			1,370	0.00%
Impact Fee			$5,730	3.29%
Cost Assumptions				
Operating Fund				
Management Program			$653,000	3.29%
Monitoring Program			$1,033,000	3.29%
Adaptive Management			$100,000	3.29%
Management Contingency (per year, Yrs. 1 - 10)			$500,000	0.00%
Land Acquisition and Improvement Fund				
Land acquisition (per acre)			$3,560	3.29%
Land Improvement			$182,465	3.29%
Administration	Expenditures Less Admin	Percent of Total		
Program-wide Costs				
Operating Fund	$ 80,398,000	13%	$ 56,000	3.29%
Land Acq. & Imp. Fund	535,785,000	87%	373,000	3.29%
Total	$ 616,183,000	100%	$429,000	
Land Acquisition Manager (Land Acq. & Imp. Fund)			$ 120,000	3.29%
Financing Assumptions				
Interest on Fund Balances (all funds)				5.73%
Operating Fund Ending Balance Percent of Expenditures				25%
Land Acquisition Loan Repayment to Endowment Fund				
Begin Repayment of Loan				2038
End Repayment of Loan				2057
Term of Loan				20
Amount of Loan				$71,843,000
Annual Debt Service Payment				$ 6,264,000
Interest On Endowment Loans				6.00%

Note: Interest on Fund Balances (all funds) based on average earnings from Local Agency Investment Fund, 1984-2004. Average Annual Increase based on 1984-2004 average in the Consumer Price Index.

Source: Coachella Valley Association of Governments; Coachella Valley Mountains Conservancy; MuniFinancial.

TABLE 5-3b: OPERATING FUND

Table 5-3b: Operating Fund

FY Ending June 30	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Plan Year	1	2	3	4	5	6	7	8	9	10	11
Beginning Fund Balance	*$ -*	*$ 586,000*	*$ 546,000*	*$ 559,000*	*$ 570,000*	*$ 585,000*	*$ 582,000*	*$ 622,000*	*$ 639,000*	*$ 655,000*	*$ 672,000*
Revenues											
Landfill Tipping Fees[1]											
Conservation Trust Func	$ 575,000	$ 598,000	$ 622,000	$ 647,000	$ 673,000	$ 700,000	$ 728,000	$ 757,000	$ 787,000	$ 818,000	$ 851,000
Eagle Mountain Open Space Trust	-	-	1,125,000	1,125,000	1,125,000	1,125,000	1,125,000	1,125,000	1,125,000	1,125,000	1,125,000
Transfer From/(To) Endowment Fund[2]	2,353,000	1,510,000	472,000	488,000	523,000	464,000	643,000	653,000	687,000	724,000	136,000
Interest Earnings[3]	-	34,000	31,000	32,000	33,000	34,000	33,000	36,000	37,000	38,000	39,000
Total Revenues	$ 2,928,000	$ 2,142,000	$ 2,250,000	$ 2,292,000	$ 2,354,000	$ 2,323,000	$ 2,529,000	$ 2,571,000	$ 2,636,000	$ 2,705,000	$ 2,151,000
Expenditures											
Monitoring Program	$ 1,033,000	$ 924,000	$ 955,000	$ 973,000	$ 1,004,000	$ 964,000	$ 995,000	$ 1,028,000	$ 1,061,000	$ 1,096,000	$ 1,131,000
Management Program	653,000	597,000	616,000	637,000	658,000	679,000	805,000	831,000	858,000	885,000	914,000
Adaptive Management	100,000	103,000	106,000	109,000	113,000	117,000	121,000	125,000	129,000	133,000	137,000
Management Contingency	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	-
Administration (program-wide share)	56,000	58,000	60,000	62,000	64,000	66,000	68,000	70,000	72,000	74,000	76,000
Total Expenditures	$ 2,342,000	$ 2,182,000	$ 2,237,000	$ 2,281,000	$ 2,339,000	$ 2,326,000	$ 2,489,000	$ 2,554,000	$ 2,620,000	$ 2,688,000	$ 2,258,000
Net Cash Flow	$ 586,000	$ (40,000)	$ 13,000	$ 11,000	$ 15,000	$ (3,000)	$ 40,000	$ 17,000	$ 16,000	$ 17,000	$ (107,000)
Ending Fund Balance	*$ 586,000*	*$ 546,000*	*$ 559,000*	*$ 570,000*	*$ 585,000*	*$ 582,000*	*$ 622,000*	*$ 639,000*	*$ 655,000*	*$ 672,000*	*$ 565,000*

Note: All values shown in current dollars, i.e. including inflation at three percent annually unless otherwise noted. See text for explanation of each revenue and cost line item.

[1] Landfill tipping fees continue to accrue to the Operating Fund and generate transfers out to the Endowment Fund until Endowment Fund balance generates sufficient interest earnings to fund an ongoing transfer to the Operating Fund equal to no more than 2.44 percent of the Endowment Fund balance. At this point both funds are self-sustaining in real terms (interest earnings net of 3.29 percent annual inflation).

[2] Transfers in calculated to fund contingency and working capital reserves. Transfers out represent surplus Operating Fund revenues.

[3] Based on a 5.73 percent interest rate applied to the beginning fund balance.

Sources: Tables 8-10 and 8-11; Coachella Valley Mountains Conservancy; Coachella Valley Association of Governments; Riverside County; MuniFinancial.

TABLE 5-3b: OPERATING FUND (*cont.*)

Table 5-3b: Operating Fund

FY Ending June 30	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Plan Year	12	13	14	15	16	17	18	19	20	21	22
Beginning Fund Balance	*$ 565,000*	*$ 583,000*	*$ 602,000*	*$ 622,000*	*$ 664,000*	*$ 676,000*	*$ 698,000*	*$ 720,000*	*$ 743,000*	*$ 768,000*	*$ 792,000*
Revenues											
Landfill Tipping Fees[1]											
Conservation Trust Func	$ 885,000	$ 920,000	$ 957,000	$ 995,000	$ 1,035,000	$ 1,076,000	$ 1,119,000	$ 1,164,000	$ 1,211,000	$ 1,259,000	$ 1,309,000
Eagle Mountain Open Space Trust	1,125,000	2,250,000	2,250,000	2,250,000	2,250,000	2,250,000	2,250,000	2,250,000	2,250,000	2,250,000	2,250,000
Transfer From/(To) Endowment Fund[2]	308,000	(775,000)	(734,000)	(582,000)	(607,000)	(552,000)	(506,000)	(458,000)	(408,000)	(360,000)	(309,000)
Interest Earnings[3]	32,000	33,000	34,000	36,000	38,000	39,000	40,000	41,000	43,000	44,000	45,000
Total Revenues	$ 2,350,000	$ 2,428,000	$ 2,507,000	$ 2,699,000	$ 2,716,000	$ 2,813,000	$ 2,903,000	$ 2,997,000	$ 3,096,000	$ 3,193,000	$ 3,295,000
Expenditures											
Monitoring Program	$ 1,168,000	$ 1,206,000	$ 1,245,000	$ 1,286,000	$ 1,328,000	$ 1,371,000	$ 1,416,000	$ 1,462,000	$ 1,510,000	$ 1,559,000	$ 1,609,000
Management Program	943,000	974,000	1,005,000	1,126,000	1,123,000	1,159,000	1,196,000	1,234,000	1,274,000	1,314,000	1,356,000
Adaptive Management	142,000	147,000	152,000	157,000	162,000	167,000	172,000	178,000	184,000	190,000	196,000
Management Contingency	-	-	-	-	-	-	-	-	-	-	-
Administration (program-wide share)	79,000	82,000	85,000	88,000	91,000	94,000	97,000	100,000	103,000	106,000	109,000
Total Expenditures	$ 2,332,000	$ 2,409,000	$ 2,487,000	$ 2,657,000	$ 2,704,000	$ 2,791,000	$ 2,881,000	$ 2,974,000	$ 3,071,000	$ 3,169,000	$ 3,270,000
Net Cash Flow	$ 18,000	$ 19,000	$ 20,000	$ 42,000	$ 12,000	$ 22,000	$ 22,000	$ 23,000	$ 25,000	$ 24,000	$ 25,000
Ending Fund Balance	*$ 583,000*	*$ 602,000*	*$ 622,000*	*$ 664,000*	*$ 676,000*	*$ 698,000*	*$ 720,000*	*$ 743,000*	*$ 768,000*	*$ 792,000*	*$ 817,000*

TABLE 5-3b: OPERATING FUND (*cont.*)

Table 5-3b: Operating Fund

FY Ending June 30	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Plan Year	23	24	25	26	27	28	29	30	31	32	33
Beginning Fund Balance	*$ 817,000*	*$ 867,000*	*$ 895,000*	*$ 925,000*	*$ 954,000*	*$ 985,000*	*$ 1,017,000*	*$ 1,050,000*	*$ 1,084,000*	*$ 1,323,000*	*$ 1,366,000*
Revenues											
Landfill Tipping Fees[1]											
Conservation Trust Func	$ 1,361,000	$ 1,415,000	$ 1,472,000	$ 1,531,000	$ 1,592,000	$ 1,656,000	$ 1,722,000	$ 1,791,000	$ 1,863,000	$ 1,938,000	$ 2,016,000
Eagle Mountain Open Space Trust	3,375,000	3,375,000	3,375,000	3,375,000	3,375,000	3,375,000	3,375,000	3,375,000	3,375,000	3,375,000	4,500,000
Transfer From/(To) Endowment Fund[2]	(1,263,000)	(1,230,000)	(1,169,000)	(1,113,000)	(1,050,000)	(986,000)	(922,000)	(856,000)	232,000	118,000	(910,000)
Interest Earnings[3]	47,000	50,000	51,000	53,000	55,000	56,000	58,000	60,000	62,000	76,000	78,000
Total Revenues	$ 3,520,000	$ 3,610,000	$ 3,729,000	$ 3,846,000	$ 3,972,000	$ 4,101,000	$ 4,233,000	$ 4,370,000	$ 5,532,000	$ 5,507,000	$ 5,684,000
Expenditures											
Monitoring Program	$ 1,662,000	$ 1,716,000	$ 1,772,000	$ 1,829,000	$ 1,889,000	$ 1,951,000	$ 2,015,000	$ 2,080,000	$ 2,148,000	$ 2,218,000	$ 2,290,000
Management Program	1,493,000	1,540,000	1,590,000	1,640,000	1,693,000	1,747,000	1,802,000	1,860,000	1,919,000	1,980,000	2,043,000
Adaptive Management	202,000	209,000	216,000	223,000	230,000	238,000	246,000	254,000	100,000	103,000	106,000
Management Contingency	-	-	-	-	-	-	-	-	-	-	-
Administration (program-wide share)	113,000	117,000	121,000	125,000	129,000	133,000	137,000	142,000	1,126,000	1,163,000	1,201,000
Total Expenditures	$ 3,470,000	$ 3,582,000	$ 3,699,000	$ 3,817,000	$ 3,941,000	$ 4,069,000	$ 4,200,000	$ 4,336,000	$ 5,293,000	$ 5,464,000	$ 5,640,000
Net Cash Flow	$ 50,000	$ 28,000	$ 30,000	$ 29,000	$ 31,000	$ 32,000	$ 33,000	$ 34,000	$ 239,000	$ 43,000	$ 44,000
Ending Fund Balance	*$ 867,000*	*$ 895,000*	*$ 925,000*	*$ 954,000*	*$ 985,000*	*$ 1,017,000*	*$ 1,050,000*	*$ 1,084,000*	*$ 1,323,000*	*$ 1,366,000*	*$ 1,410,000*

TABLE 5-3b: OPERATING FUND (*cont.*)

Table 5-3b: Operating Fund

FY Ending June 30	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051
Plan Year	34	35	36	37	38	39	40	41	42	43	44
Beginning Fund Balance	*$ 1,410,000*	*$ 1,455,000*	*$ 1,503,000*	*$ 1,552,000*	*$ 1,602,000*	*$ 1,654,000*	*$ 1,707,000*	*$ 1,762,000*	*$ 1,820,000*	*$ 1,879,000*	*$ 1,940,000*
Revenues											
Landfill Tipping Fees[1]											
Conservation Trust Func	$ 2,097,000	$ 2,181,000	$ 2,268,000	$ 2,359,000	$ 2,453,000	$ 2,551,000	$ 2,653,000	$ 2,759,000	$ 2,869,000	$ 2,984,000	$ 3,103,000
Eagle Mountain Open Space Trust	4,500,000	4,500,000	4,500,000	4,500,000	4,500,000	4,500,000	4,500,000	4,500,000	4,500,000	4,500,000	4,500,000
Transfer From/(To) Endowment Fund[2]	(811,000)	(705,000)	(598,000)	(490,000)	(377,000)	(263,000)	(146,000)	(22,000)	101,000	229,000	360,000
Interest Earnings[3]	81,000	83,000	86,000	89,000	92,000	95,000	98,000	101,000	104,000	108,000	111,000
Total Revenues	$ 5,867,000	$ 6,059,000	$ 6,256,000	$ 6,458,000	$ 6,668,000	$ 6,883,000	$ 7,105,000	$ 7,338,000	$ 7,574,000	$ 7,821,000	$ 8,074,000
Expenditures											
Monitoring Program	$ 2,364,000	$ 2,441,000	$ 2,521,000	$ 2,603,000	$ 2,688,000	$ 2,775,000	$ 2,865,000	$ 2,959,000	$ 3,055,000	$ 3,155,000	$ 3,257,000
Management Program	2,108,000	2,175,000	2,245,000	2,316,000	2,390,000	2,467,000	2,545,000	2,627,000	2,710,000	2,797,000	2,886,000
Adaptive Management	109,000	113,000	117,000	121,000	125,000	129,000	133,000	137,000	142,000	147,000	152,000
Management Contingency	-	-	-	-	-	-	-	-	-	-	-
Administration (program-wide share)	1,241,000	1,282,000	1,324,000	1,368,000	1,413,000	1,459,000	1,507,000	1,557,000	1,608,000	1,661,000	1,716,000
Total Expenditures	$ 5,822,000	$ 6,011,000	$ 6,207,000	$ 6,408,000	$ 6,616,000	$ 6,830,000	$ 7,050,000	$ 7,280,000	$ 7,515,000	$ 7,760,000	$ 8,011,000
Net Cash Flow	$ 45,000	$ 48,000	$ 49,000	$ 50,000	$ 52,000	$ 53,000	$ 55,000	$ 58,000	$ 59,000	$ 61,000	$ 63,000
Ending Fund Balance	*$ 1,455,000*	*$ 1,503,000*	*$ 1,552,000*	*$ 1,602,000*	*$ 1,654,000*	*$ 1,707,000*	*$ 1,762,000*	*$ 1,820,000*	*$ 1,879,000*	*$ 1,940,000*	*$ 2,003,000*

TABLE 5-3b: OPERATING FUND (*cont.*)

Table 5-3b: Operating Fund

FY Ending June 30	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062
Plan Year	45	46	47	48	49	50	51	52	53	54	55
Beginning Fund Balance	*$ 2,003,000*	*$ 2,068,000*	*$ 2,135,000*	*$ 2,204,000*	*$ 2,275,000*	*$ 2,349,000*	*$ 2,425,000*	*$ 2,503,000*	*$ 2,584,000*	*$ 2,668,000*	*$ 2,755,000*
Revenues											
Landfill Tipping Fees[1]											
Conservation Trust Func	$ 3,227,000	$ 3,356,000	$ 3,490,000	$ 3,630,000	$ 3,775,000	$ 3,926,000	$ 4,083,000	$ 4,246,000	$ 4,416,000	$ 4,593,000	$ 4,777,000
Eagle Mountain Open Space Trust	4,500,000	4,500,000	4,500,000	4,500,000	4,500,000	4,500,000	4,500,000	4,500,000	4,500,000	4,500,000	4,500,000
Transfer From/(To) Endowment Fund[2]	493,000	631,000	771,000	914,000	1,064,000	1,213,000	1,368,000	1,529,000	1,692,000	1,859,000	2,029,000
Interest Earnings[3]	115,000	118,000	122,000	126,000	130,000	135,000	139,000	143,000	148,000	153,000	158,000
Total Revenues	$ 8,335,000	$ 8,605,000	$ 8,883,000	$ 9,170,000	$ 9,469,000	$ 9,774,000	$ 10,090,000	$ 10,418,000	$ 10,756,000	$ 11,105,000	$ 11,464,000
Expenditures											
Monitoring Program	$ 3,363,000	$ 3,473,000	$ 3,586,000	$ 3,703,000	$ 3,824,000	$ 3,948,000	$ 4,076,000	$ 4,210,000	$ 4,347,000	$ 4,489,000	$ 4,635,000
Management Program	2,978,000	3,073,000	3,171,000	3,272,000	3,377,000	3,484,000	3,596,000	3,710,000	3,829,000	3,951,000	4,077,000
Adaptive Management	157,000	162,000	167,000	172,000	178,000	184,000	190,000	196,000	202,000	209,000	216,000
Management Contingency	-	-	-	-	-	-	-	-	-	-	-
Administration (program-wide share)	1,772,000	1,830,000	1,890,000	1,952,000	2,016,000	2,082,000	2,150,000	2,221,000	2,294,000	2,369,000	2,447,000
Total Expenditures	$ 8,270,000	$ 8,538,000	$ 8,814,000	$ 9,099,000	$ 9,395,000	$ 9,698,000	$ 10,012,000	$ 10,337,000	$ 10,672,000	$ 11,018,000	$ 11,375,000
Net Cash Flow	$ 65,000	$ 67,000	$ 69,000	$ 71,000	$ 74,000	$ 76,000	$ 78,000	$ 81,000	$ 84,000	$ 87,000	$ 89,000
Ending Fund Balance	*$ 2,068,000*	*$ 2,135,000*	*$ 2,204,000*	*$ 2,275,000*	*$ 2,349,000*	*$ 2,425,000*	*$ 2,503,000*	*$ 2,584,000*	*$ 2,668,000*	*$ 2,755,000*	*$ 2,844,000*

TABLE 5-3b: OPERATING FUND (*cont.*)

Table 5-3b: Operating Fund

FY Ending June 30	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073
Plan Year	56	57	58	59	60	61	62	63	64	65	66
Beginning Fund Balance	*$ 2,844,000*	*$ 2,936,000*	*$ 3,031,000*	*$ 3,130,000*	*$ 3,232,000*	*$ 3,336,000*	*$ 3,445,000*	*$ 3,556,000*	*$ 3,672,000*	*$ 3,791,000*	*$ 3,914,000*
Revenues											
Landfill Tipping Fees[1]											
Conservation Trust Func	$ 4,968,000	$ 5,167,000	$ 5,374,000	$ 5,589,000	$ 5,813,000	$ 6,046,000	$ 6,288,000	$ 6,540,000	$ 6,802,000	$ 7,074,000	$ 7,357,000
Eagle Mountain Open Space Trust	4,500,000	4,500,000	4,500,000	4,500,000	4,500,000	4,500,000	4,500,000	4,500,000	4,500,000	4,500,000	4,500,000
Transfer From/(To) Endowment Fund[2]	2,205,000	2,385,000	2,570,000	2,760,000	2,951,000	3,150,000	3,351,000	3,558,000	3,770,000	3,987,000	4,209,000
Interest Earnings[3]	163,000	168,000	174,000	179,000	185,000	191,000	197,000	204,000	210,000	217,000	224,000
Total Revenues	$ 11,836,000	$ 12,220,000	$ 12,618,000	$ 13,028,000	$ 13,449,000	$ 13,887,000	$ 14,336,000	$ 14,802,000	$ 15,282,000	$ 15,778,000	$ 16,290,000
Expenditures											
Monitoring Program	$ 4,786,000	$ 4,942,000	$ 5,103,000	$ 5,270,000	$ 5,442,000	$ 5,619,000	$ 5,802,000	$ 5,991,000	$ 6,187,000	$ 6,388,000	$ 6,597,000
Management Program	4,207,000	4,342,000	4,481,000	4,624,000	4,771,000	4,924,000	5,081,000	5,243,000	5,411,000	5,584,000	5,762,000
Adaptive Management	223,000	230,000	238,000	246,000	254,000	262,000	271,000	280,000	289,000	299,000	309,000
Management Contingency	-	-	-	-	-	-	-	-	-	-	-
Administration (program-wide share)	2,528,000	2,611,000	2,697,000	2,786,000	2,878,000	2,973,000	3,071,000	3,172,000	3,276,000	3,384,000	3,495,000
Total Expenditures	$ 11,744,000	$ 12,125,000	$ 12,519,000	$ 12,926,000	$ 13,345,000	$ 13,778,000	$ 14,225,000	$ 14,686,000	$ 15,163,000	$ 15,655,000	$ 16,163,000
Net Cash Flow	$ 92,000	$ 95,000	$ 99,000	$ 102,000	$ 104,000	$ 109,000	$ 111,000	$ 116,000	$ 119,000	$ 123,000	$ 127,000
Ending Fund Balance	*$ 2,936,000*	*$ 3,031,000*	*$ 3,130,000*	*$ 3,232,000*	*$ 3,336,000*	*$ 3,445,000*	*$ 3,556,000*	*$ 3,672,000*	*$ 3,791,000*	*$ 3,914,000*	*$ 4,041,000*

TABLE 5-3b: OPERATING FUND (*cont.*)

Table 5-3b: Operating Fund

FY Ending June 30	2074	2075	2076	2077	2078	2079	2080	2081	2082	2006 - 2080
Plan Year	67	68	69	70	71	72	73	74	75	Total
Beginning Fund Balance	*$ 4,041,000*	*$ 4,172,000*	*$ 4,307,000*	*$ 4,447,000*	*$ 4,591,000*	*$ 4,740,000*	*$ 4,894,000*	*$ 5,053,000*	*$ 5,217,000*	*$ -*
Revenues										
Landfill Tipping Fees[1]										
Conservation Trust Func	$ 7,651,000	$ 7,957,000	$ 8,275,000	$ 8,606,000	$ 8,950,000	$ 9,308,000	$ -	$ -	$ -	$ 227,604,000
Eagle Mountain Open Space Trust	4,500,000	4,500,000	4,500,000	4,500,000	4,500,000	4,500,000	-	-	-	247,500,000
Transfer From/(To) Endowment Fund[2]	4,434,000	4,667,000	4,906,000	5,148,000	5,397,000	5,650,000	20,090,000	20,740,000	21,413,000	132,703,000
Interest Earnings[3]	232,000	239,000	247,000	255,000	263,000	272,000	280,000	290,000	299,000	8,442,000
Total Revenues	$ 16,817,000	$ 17,363,000	$ 17,928,000	$ 18,509,000	$ 19,110,000	$ 19,730,000	$ 20,370,000	$ 21,030,000	$ 21,712,000	$ 616,249,000
Expenditures										
Monitoring Program	$ 6,811,000	$ 7,034,000	$ 7,263,000	$ 7,500,000	$ 7,744,000	$ 7,997,000	$ 8,257,000	$ 8,526,000	$ 8,804,000	$ 254,294,000
Management Program	5,946,000	6,136,000	6,333,000	6,535,000	6,744,000	6,959,000	7,182,000	7,411,000	7,648,000	221,252,000
Adaptive Management	319,000	329,000	340,000	351,000	363,000	375,000	387,000	400,000	413,000	14,903,000
Management Contingency	-	-	-	-	-	-	-	-	-	5,000,000
Administration (program-wide share)	3,610,000	3,729,000	3,852,000	3,979,000	4,110,000	4,245,000	4,385,000	4,529,000	4,678,000	115,414,000
Total Expenditures	$ 16,686,000	$ 17,228,000	$ 17,788,000	$ 18,365,000	$ 18,961,000	$ 19,576,000	$ 20,211,000	$ 20,866,000	$ 21,543,000	$ 610,863,000
Net Cash Flow	$ 131,000	$ 135,000	$ 140,000	$ 144,000	$ 149,000	$ 154,000	$ 159,000	$ 164,000	$ 169,000	$ 5,386,000
Ending Fund Balance	*$ 4,172,000*	*$ 4,307,000*	*$ 4,447,000*	*$ 4,591,000*	*$ 4,740,000*	*$ 4,894,000*	*$ 5,053,000*	*$ 5,217,000*	*$ 5,386,000*	*$ 5,386,000*

TABLE 5-3c: LAND ACQUISITION AND IMPROVEMENT FUND (INFLATED $)

Table 53-C: Land Acquisition & Impr. Fund (Inflated $)

FY Ending June 30	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Plan Year	1	2	3	4	5	6	7	8	9	10	11
Beginning Fund Balance	*$ -*	*$ 22,499,000*	*$ 30,159,000*	*$ 38,142,000*	*$ 36,446,000*	*$ 42,357,000*	*$ 40,650,000*	*$ 38,703,000*	*$ 34,277,000*	*$ 29,367,000*	*$ 33,163,000*
Revenues											
New Developed Acres	*1,370*	*1,370*	*1,370*	*1,370*	*1,370*	*1,370*	*1,370*	*1,370*	*1,370*	*1,370*	*1,370*
Local Mitigation Fee per Acre[1]	*$ 5,730*	*$ 5,919*	*$ 6,113*	*$ 6,314*	*$ 6,522*	*$ 6,737*	*$ 6,958*	*$ 7,187*	*$ 7,424*	*$ 7,668*	*$ 7,920*
Local Development Mitigation Fee	$ 7,850,000	$ 8,108,000	$ 8,375,000	$ 8,651,000	$ 8,935,000	$ 9,229,000	$ 9,533,000	$ 9,847,000	$ 10,170,000	$ 10,505,000	$ 10,851,000
Endowment Loan Proceeds[2]	-	-	-	-	-	-	-	-	-	-	-
Regional Road Project Mitigation	1,819,000	10,000,000	10,000,000	-	-	-	-	-	-	-	-
Regional Infrastructure Mitigation	20,625,000	-	-	-	7,836,000	-	-	-	-	9,206,000	-
Interest Earnings[3]	-	1,289,000	1,728,000	2,186,000	2,088,000	2,427,000	2,329,000	2,218,000	1,964,000	1,683,000	1,900,000
Total Revenues	$ 30,294,000	$ 19,397,000	$ 20,103,000	$ 10,837,000	$ 18,859,000	$ 11,656,000	$ 11,862,000	$ 12,065,000	$ 12,134,000	$ 21,394,000	$ 12,751,000
Expenditures[4]											
Land Cost Per Acre	*$ 3,560*	*$ 3,680*	*$ 3,800*	*$ 3,930*	*$ 4,060*	*$ 4,190*	*$ 4,330*	*$ 4,470*	*$ 4,620*	*$ 4,770*	*$ 4,930*
Acres Purchased[5]	*2,000*	*3,000*	*3,000*	*3,000*	*3,000*	*3,000*	*3,000*	*3,500*	*3,500*	*3,500*	*3,000*
Land Acquisition	$ 7,120,000	$ 11,040,000	$ 11,400,000	$ 11,790,000	$ 12,180,000	$ 12,570,000	$ 12,990,000	$ 15,645,000	$ 16,170,000	$ 16,695,000	$ 14,790,000
Land Improvement	182,000	188,000	194,000	200,000	207,000	214,000	221,000	228,000	236,000	244,000	252,000
Administration											
Land Acquisition Manager (contract)	120,000	124,000	128,000	132,000	136,000	140,000	145,000	150,000	155,000	160,000	165,000
Administration (program-wide share)	373,000	385,000	398,000	411,000	425,000	439,000	453,000	468,000	483,000	499,000	515,000
Endowment Loan Repayment[2]	-	-	-	-	-	-	-	-	-	-	-
Total Expenditures	$ 7,795,000	$ 11,737,000	$ 12,120,000	$ 12,533,000	$ 12,948,000	$ 13,363,000	$ 13,809,000	$ 16,491,000	$ 17,044,000	$ 17,598,000	$ 15,722,000
Net Cash Flow	$ 22,499,000	$ 7,660,000	$ 7,983,000	$ (1,696,000)	$ 5,911,000	$ (1,707,000)	$ (1,947,000)	$ (4,426,000)	$ (4,910,000)	$ 3,796,000	$ (2,971,000)
Ending Fund Balance	*$ 22,499,000*	*$ 30,159,000*	*$ 38,142,000*	*$ 36,446,000*	*$ 42,357,000*	*$ 40,650,000*	*$ 38,703,000*	*$ 34,277,000*	*$ 29,367,000*	*$ 33,163,000*	*$ 30,192,000*

Note: All values shown in current dollars, i.e. including inflation at three percent annually unless otherwise noted. See text for explanation of each revenue and cost line item.

[1] Inflated at a 3.29 percent annual rate while land is being acquired and then held constant at a rate sufficient to fund repayment of the Endowment Fund lo

[2] Loan enables completion of habitat acquisitions by Year 30. Interest accrues on outstanding balance. Principal and accrued interest repaid during Years 31 through 50. Interest rate is six percent per year.

Accrued Interest / (Annual Interest Payment)		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Accrued Principal / (Annual Principal Payment)	-	-	-	-	-	-	-	-	-	-	-
Total Accrued Loan / (Annual Loan Payment)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -

[3] Based on a 5.73 percent interest rate applied to the beginning fund balanc

[4] All expenditures except Endowment Loan Repayment inflated at a 3.29 percent annual rat

[4] Land acquisition is programmed to be completed by Year 3

Sources: Coachella Valley Mountains Conservancy; Coachella Valley Association of Governments; MuniFinancial.

TABLE 5-3c: LAND ACQUISITION AND IMPROVEMENT FUND (INFLATED $) (*CONT.*)

Table 53-C: Land Acquisition & Impr. Fund (Inflated $)

FY Ending June 30	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Plan Year	12	13	14	15	16	17	18	19	20	21	22
Beginning Fund Balance	$ 30,192,000	$ 26,898,000	$ 23,240,000	$ 19,211,000	$ 25,604,000	$ 21,362,000	$ 16,691,000	$ 11,547,000	$ 9,109,000	$ 6,429,000	$ 3,481,000
Revenues											
New Developed Acres	1,370	1,370	1,370	1,370	1,370	1,370	1,370	1,370	1,370	1,370	1,370
Local Mitigation Fee per Acre[1]	$ 8,181	$ 8,450	$ 8,728	$ 9,015	$ 9,312	$ 9,618	$ 9,934	$ 10,261	$ 10,599	$ 10,948	$ 11,308
Local Development Mitigation Fee	$ 11,208,000	$ 11,576,000	$ 11,957,000	$ 12,351,000	$ 12,757,000	$ 13,177,000	$ 13,610,000	$ 14,058,000	$ 14,521,000	$ 14,998,000	$ 15,492,000
Endowment Loan Proceeds[2]	-	-	-	-	-	-	-	-	-	-	-
Regional Road Project Mitigation	-	-	-	-	-	-	-	-	-	-	-
Regional Infrastructure Mitigation	-	-	-	10,833,000	-	-	-	-	-	-	-
Interest Earnings[3]	1,730,000	1,541,000	1,332,000	1,101,000	1,467,000	1,224,000	956,000	662,000	522,000	368,000	199,000
Total Revenues	$ 12,938,000	$ 13,117,000	$ 13,289,000	$ 24,285,000	$ 14,224,000	$ 14,401,000	$ 14,566,000	$ 14,720,000	$ 15,043,000	$ 15,366,000	$ 15,691,000
Expenditures[4]											
Land Cost Per Acre	$ 5,090	$ 5,260	$ 5,430	$ 5,610	$ 5,790	$ 5,980	$ 6,180	$ 6,380	$ 6,590	$ 6,810	$ 7,030
Acres Purchased[5]	3,000	3,000	3,000	3,000	3,000	3,000	3,000	2,500	2,500	2,500	2,500
Land Acquisition	$ 15,270,000	$ 15,780,000	$ 16,290,000	$ 16,830,000	$ 17,370,000	$ 17,940,000	$ 18,540,000	$ 15,950,000	$ 16,475,000	$ 17,025,000	$ 17,575,000
Land Improvement	260,000	269,000	278,000	287,000	296,000	306,000	316,000	326,000	337,000	348,000	359,000
Administration											
Land Acquisition Manager (contract)	170,000	176,000	182,000	188,000	194,000	200,000	207,000	214,000	221,000	228,000	236,000
Administration (program-wide share)	532,000	550,000	568,000	587,000	606,000	626,000	647,000	668,000	690,000	713,000	736,000
Endowment Loan Repayment[1]	-	-	-	-	-	-	-	-	-	-	-
Total Expenditures	$ 16,232,000	$ 16,775,000	$ 17,318,000	$ 17,892,000	$ 18,466,000	$ 19,072,000	$ 19,710,000	$ 17,158,000	$ 17,723,000	$ 18,314,000	$ 18,906,000
Net Cash Flow	$ (3,294,000)	$ (3,658,000)	$ (4,029,000)	$ 6,393,000	$ (4,242,000)	$ (4,671,000)	$ (5,144,000)	$ (2,438,000)	$ (2,680,000)	$ (2,948,000)	$ (3,215,000)
Ending Fund Balance	$ 26,898,000	$ 23,240,000	$ 19,211,000	$ 25,604,000	$ 21,362,000	$ 16,691,000	$ 11,547,000	$ 9,109,000	$ 6,429,000	$ 3,481,000	$ 266,000

Accrued Interest / (Annual Interest Payment)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Accrued Principal / (Annual Principal Payment)	-	-	-	-	-	-	-	-	-	-	-
Total Accrued Loan / (Annual Loan Payment)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -

TABLE 5-3c: LAND ACQUISITION AND IMPROVEMENT FUND (INFLATED $) (*CONT.*)

Table 53-C: Land Acquisition & Impr. Fund (Inflated $)

FY Ending June 30	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Plan Year	23	24	25	26	27	28	29	30	31	32	33
Beginning Fund Balance	$ 266,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Revenues											
New Developed Acres	1,370	1,370	1,370	1,370	1,370	1,370	1,370	1,370	1,370	1,370	1,370
Local Mitigation Fee per Acre[1]	$ 11,680	$ 12,064	$ 12,461	$ 12,871	$ 13,294	$ 13,732	$ 14,184	$ 14,650	$ 4,572	$ 4,572	$ 4,572
Local Development Mitigation Fee	$ 16,001,000	$ 16,528,000	$ 17,072,000	$ 17,633,000	$ 18,213,000	$ 18,813,000	$ 19,432,000	$ 20,071,000	$ 6,264,000	$ 6,264,000	$ 6,264,000
Endowment Loan Proceeds[2]	6,873,000	7,392,000	7,645,000	7,883,000	8,133,000	8,394,000	8,667,000	12,593,000	-	-	-
Regional Road Project Mitigation	-	-	-	-	-	-	-	-	-	-	-
Regional Infrastructure Mitigation	-	-	-	-	-	-	-	-	-	-	-
Interest Earnings[3]	15,000	-	-	-	-	-	-	-	-	-	-
Total Revenues	$ 22,889,000	$ 23,920,000	$ 24,717,000	$ 25,516,000	$ 26,346,000	$ 27,207,000	$ 28,099,000	$ 32,664,000	$ 6,264,000	$ 6,264,000	$ 6,264,000
Expenditures[4]											
Land Cost Per Acre	$ 7,260	$ 7,500	$ 7,750	$ 8,000	$ 8,260	$ 8,530	$ 8,810	$ 9,100			
Acres Purchased[5]	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,400	-	-	-
Land Acquisition	$ 21,780,000	$ 22,500,000	$ 23,250,000	$ 24,000,000	$ 24,780,000	$ 25,590,000	$ 26,430,000	$ 30,940,000	$ -	$ -	$ -
Land Improvement	371,000	383,000	396,000	409,000	422,000	436,000	450,000	465,000	-	-	-
Administration											
Land Acquisition Manager (contract)	244,000	252,000	260,000	269,000	278,000	287,000	296,000	306,000			
Administration (program-wide share)	760,000	785,000	811,000	838,000	866,000	894,000	923,000	953,000	-	-	-
Endowment Loan Repayment[2]	-	-	-	-	-	-	-	-	6,264,000	6,264,000	6,264,000
Total Expenditures	$ 23,155,000	$ 23,920,000	$ 24,717,000	$ 25,516,000	$ 26,346,000	$ 27,207,000	$ 28,099,000	$ 32,664,000	$ 6,264,000	$ 6,264,000	$ 6,264,000
Net Cash Flow	$ (266,000)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Ending Fund Balance	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -

Land Acquisition Completed

Accrued Interest / (Annual Interest Payment)	$ 412,000	$ 881,000	$ 1,367,000	$ 1,870,000	$ 2,388,000	$ 2,922,000	$ 3,475,000	$ 4,263,000	$ (4,311,000)	$ (4,194,000)	$ (4,070,000)
Accrued Principal / (Annual Principal Payment)	6,873,000	14,265,000	21,910,000	29,793,000	37,926,000	46,320,000	54,987,000	67,580,000	(1,953,000)	(2,070,000)	(2,194,000)
Total Accrued Loan / (Annual Loan Payment)	$ 7,285,000	$ 15,146,000	$ 23,277,000	$ 31,663,000	$ 40,314,000	$ 49,242,000	$ 58,462,000	$ 71,843,000	$ (6,264,000)	$ (6,264,000)	$ (6,264,000)

TABLE 5-3c: LAND ACQUISITION AND IMPROVEMENT FUND (INFLATED $) (*CONT.*)

Table 53-C: Land Acquisition & Impr. Fund (Inflated $)

FY Ending June 30	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051
Plan Year	34	35	36	37	38	39	40	41	42	43	44
Beginning Fund Balance	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Revenues											
New Developed Acres	1,370	1,370	1,370	1,370	1,370	1,370	1,370	1,370	1,370	1,370	1,370
Local Mitigation Fee per Acre[1]	$ 4,572	$ 4,572	$ 4,572	$ 4,572	$ 4,572	$ 4,572	$ 4,572	$ 4,572	$ 4,572	$ 4,572	$ 4,572
Local Development Mitigation Fee	$ 6,264,000	$ 6,264,000	$ 6,264,000	$ 6,264,000	$ 6,264,000	$ 6,264,000	$ 6,264,000	$ 6,264,000	$ 6,264,000	$ 6,264,000	$ 6,264,000
Endowment Loan Proceeds[2]	-	-	-	-	-	-	-	-	-	-	-
Regional Road Project Mitigation	-	-	-	-	-	-	-	-	-	-	-
Regional Infrastructure Mitigation	-	-	-	-	-	-	-	-	-	-	-
Interest Earnings[3]	-	-	-	-	-	-	-	-	-	-	-
Total Revenues	$ 6,264,000	$ 6,264,000	$ 6,264,000	$ 6,264,000	$ 6,264,000	$ 6,264,000	$ 6,264,000	$ 6,264,000	$ 6,264,000	$ 6,264,000	$ 6,264,000
Expenditures[4]											
Land Cost Per Acre											
Acres Purchased[5]	-	-	-	-	-	-	-	-	-	-	-
Land Acquisition	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Land Improvement	-	-	-	-	-	-	-	-	-	-	-
Administration											
Land Acquisition Manager (contract)											
Administration (program-wide share)	-	-	-	-	-	-	-	-	-	-	-
Endowment Loan Repayment[2]	6,264,000	6,264,000	6,264,000	6,264,000	6,264,000	6,264,000	6,264,000	6,264,000	6,264,000	6,264,000	6,264,000
Total Expenditures	$ 6,264,000	$ 6,264,000	$ 6,264,000	$ 6,264,000	$ 6,264,000	$ 6,264,000	$ 6,264,000	$ 6,264,000	$ 6,264,000	$ 6,264,000	$ 6,264,000
Net Cash Flow	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Ending Fund Balance	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Accrued Interest / (Annual Interest Payment)	$ (3,938,000)	$ (3,798,000)	$ (3,650,000)	$ (3,494,000)	$ (3,327,000)	$ (3,151,000)	$ (2,964,000)	$ (2,766,000)	$ (2,557,000)	$ (2,334,000)	$ (2,098,000)
Accrued Principal / (Annual Principal Payment)	(2,326,000)	(2,466,000)	(2,614,000)	(2,770,000)	(2,937,000)	(3,113,000)	(3,300,000)	(3,498,000)	(3,707,000)	(3,930,000)	(4,166,000)
Total Accrued Loan / (Annual Loan Payment)	$ (6,264,000)	$ (6,264,000)	$ (6,264,000)	$ (6,264,000)	$ (6,264,000)	$ (6,264,000)	$ (6,264,000)	$ (6,264,000)	$ (6,264,000)	$ (6,264,000)	$ (6,264,000)

TABLE 5-3c: LAND ACQUISITION AND IMPROVEMENT FUND (INFLATED $) (*CONT.*)

Table 53-C: Land Acquisition & Impr. Fund (Inflated $)

FY Ending June 30	2052	2053	2054	2055	2056	2057
Plan Year	45	46	47	48	49	50
Beginning Fund Balance	$ -	$ -	$ -	$ -	$ -	$ -
Revenues						
New Developed Acres	*1,370*	*1,370*	*1,370*	*1,370*	*1,370*	*1,370*
Local Mitigation Fee per Acre[1]	*$ 4,572*	*$ 4,572*	*$ 4,572*	*$ 4,572*	*$ 4,572*	*$ 4,572*
Local Development Mitigation Fee	$ 6,264,000	$ 6,264,000	$ 6,264,000	$ 6,264,000	$ 6,264,000	$ 6,264,000
Endowment Loan Proceeds[2]	-	-	-	-	-	-
Regional Road Project Mitigation	-	-	-	-	-	-
Regional Infrastructure Mitigation	-	-	-	-	-	-
Interest Earnings[3]	-	-	-	-	-	-
Total Revenues	$ 6,264,000	$ 6,264,000	$ 6,264,000	$ 6,264,000	$ 6,264,000	$ 6,264,000
Expenditures[4]						
Land Cost Per Acre						
Acres Purchased[5]	-	-	-	-	-	-
Land Acquisition	$ -	$ -	$ -	$ -	$ -	$ -
Land Improvement	-	-	-	-	-	-
Administration						
Land Acquisition Manager (contract)						
Administration (program-wide share)	-	-	-	-	-	-
Endowment Loan Repayment[2]	6,264,000	6,264,000	6,264,000	6,264,000	6,264,000	6,264,000
Total Expenditures	$ 6,264,000	$ 6,264,000	$ 6,264,000	$ 6,264,000	$ 6,264,000	$ 6,264,000
Net Cash Flow	$ -	$ -	$ -	$ -	$ -	$ -
Ending Fund Balance	$ -	$ -	$ -	$ -	$ -	$ -

Land Acquisition Fund Terminated

Accrued Interest / (Annual Interest Payment)	$ (1,848,000)	$ (1,583,000)	$ (1,303,000)	$ (1,005,000)	$ (689,000)	$ (355,000)
Accrued Principal / (Annual Principal Payment)	(4,416,000)	(4,681,000)	(4,961,000)	(5,259,000)	(5,575,000)	(5,909,000)
Total Accrued Loan / (Annual Loan Payment)	$ (6,264,000)	$ (6,264,000)	$ (6,264,000)	$ (6,264,000)	$ (6,264,000)	$ (6,264,000)

TABLE 5-3c: LAND ACQUISITION AND IMPROVEMENT FUND (INFLATED $) (*CONT.*)

Table 53-C: Land Acquisition & Impr. Fund (Inflated $)

	FY Ending June 30
	Plan Year
Beginning Fund Balance	
Revenues	
New Developed Acres	
Local Mitigation Fee per Acre[1]	
Local Development Mitigation Fee	
Endowment Loan Proceeds[2]	
Regional Road Project Mitigation	
Regional Infrastructure Mitigation	
Interest Earnings[3]	
Total Revenues	
Expenditures[4]	
Land Cost Per Acre	
Acres Purchased[5]	
Land Acquisition	
Land Improvement	
Administration	
Land Acquisition Manager (contract)	
Administration (program-wide share)	
Endowment Loan Repayment[1]	
Total Expenditures	
Net Cash Flow	
Ending Fund Balance	

Accrued Interest / (Annual Interest Payment)	
Accrued Principal / (Annual Principal Payment)	
Total Accrued Loan / (Annual Loan Payment)	

TABLE 5-3c: LAND ACQUISITION AND IMPROVEMENT FUND (INFLATED $) (*CONT.*)

Table 53-C: Land Acquisition & Impr. Fund (Inflated $)

FY Ending June 30 Plan Year	2008 - 2057 Total
Beginning Fund Balance	*$ -*
Revenues	
New Developed Acres	*68,500*
Local Mitigation Fee per Acre[1]	*NA*
Local Development Mitigation Fee	$ 516,802,000
Endowment Loan Proceeds[2]	67,580,000
Regional Road Project Mitigation	21,819,000
Regional Infrastructure Mitigation	48,500,000
Interest Earnings[3]	30,929,000
Total Revenues	$ 685,630,000
Expenditures[4]	
Land Cost Per Acre	*NA*
Acres Purchased[5]	*88,900*
Land Acquisition	$ 526,705,000
Land Improvement	9,080,000
Administration	
Land Acquisition Manager (contract)	5,963,000
Administration (program-wide share)	18,602,000
Endowment Loan Repayment[2]	125,280,000
Total Expenditures	$ 685,630,000
Net Cash Flow	$ -
Ending Fund Balance	*$ -*

	Total Repayment
Accrued Interest / (Annual Interest Payment)	$ (53,435,000)
Accrued Principal / (Annual Principal Payment)	(71,845,000)
Total Accrued Loan / (Annual Loan Payment)	$ (125,280,000)

TABLE 5-3d: ENDOWMENT FUND

Table 5-3d: Endowment Fund

FY Ending June 30	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Plan Year	1	2	3	4	5	6	7	8	9	10
Beginning Fund Balance	*$ (1,200,000)*	*$ 13,013,000*	*$ 12,249,000*	*$ 12,479,000*	*$ 20,306,000*	*$ 20,947,000*	*$ 21,683,000*	*$ 22,282,000*	*$ 22,906,000*	*$ 23,532,000*
Revenues										
Regional Road Project Mitigation	$ 9,258,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Regional Infrastructure Mitigation	4,108,000	-	-	7,600,000	-	-	-	-	-	-
CVFTL HCP Endowment Fund	3,200,000	-	-	-	-	-	-	-	-	-
Endowment Loan Proceeds[1]	-	-	-	-	-	-	-	-	-	-
Interest Earnings[2]	-	746,000	702,000	715,000	1,164,000	1,200,000	1,242,000	1,277,000	1,313,000	1,348,000
Total Revenues	$ 16,566,000	$ 746,000	$ 702,000	$ 8,315,000	$ 1,164,000	$ 1,200,000	$ 1,242,000	$ 1,277,000	$ 1,313,000	$ 1,348,000
Expenditures										
Transfer To/(From) Operating Fund[3]	$ 2,353,000	$ 1,510,000	$ 472,000	$ 488,000	$ 523,000	$ 464,000	$ 643,000	$ 653,000	$ 687,000	$ 724,000
Land Acquisition Loan[1]	-	-	-	-	-	-	-	-	-	-
Total Expenditures	$ 2,353,000	$ 1,510,000	$ 472,000	$ 488,000	$ 523,000	$ 464,000	$ 643,000	$ 653,000	$ 687,000	$ 724,000
Net Cash Flow	$ 14,213,000	$ (764,000)	$ 230,000	$ 7,827,000	$ 641,000	$ 736,000	$ 599,000	$ 624,000	$ 626,000	$ 624,000
Ending Fund Balance	*$ 13,013,000*	*$ 12,249,000*	*$ 12,479,000*	*$ 20,306,000*	*$ 20,947,000*	*$ 21,683,000*	*$ 22,282,000*	*$ 22,906,000*	*$ 23,532,000*	*$ 24,156,000*
Operating Fund Transfer Percent of Fund Balance[4]	*18.08%*	*12.33%*	*3.78%*	*2.40%*	*2.50%*	*2.14%*	*2.89%*	*2.85%*	*2.92%*	*3.00%*

Note: All values shown in current dollars, i.e. including inflation at three percent annually unless otherwise noted. See text for explanation of each revenue and cost line item.

[1] Loan enables completion of habitat acquisitions by Year 30. Interest accrues on outstanding balance. Principal and accrued interest repaid during Years 31 through 50. Interest rate is six percent per year.

[2] Based on a 5.73 percent interest rate applied to the beginning fund balance.

[3] Transfers out calculated to maintain required Operating Fund reserves. Transfers in represent surplus Operating Fund revenues and continue until Endowment Fund balance generates sufficient interest earnings to fund an ongoing transfer to the Operating Fund equal to no more than 2.44 percent of the Endowment Fund balance. At this point both funds are self-sustaining in real terms (interest earnings net of 3.0 percent annual inflation).

Sources: Coachella Valley Mountains Conservancy; Coachella Valley Association of Governments; MuniFinancial.

TABLE 5-3d: ENDOWMENT FUND (*CONT.*)

Table 5-3d: Endowment Fund

FY Ending June 30	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Plan Year	11	12	13	14	15	16	17	18	19	20
Beginning Fund Balance	*$ 24,156,000*	*$ 25,404,000*	*$ 26,552,000*	*$ 28,848,000*	*$ 31,235,000*	*$ 33,607,000*	*$ 36,140,000*	*$ 38,763,000*	*$ 41,490,000*	*$ 44,325,000*
Revenues										
Regional Road Project Mitigation	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Regional Infrastructure Mitigation	-	-	-	-	-	-	-	-	-	-
CVFTL HCP Endowment Fund	-	-	-	-	-	-	-	-	-	-
Endowment Loan Proceeds[1]	-	-	-	-	-	-	-	-	-	-
Interest Earnings[2]	1,384,000	1,456,000	1,521,000	1,653,000	1,790,000	1,926,000	2,071,000	2,221,000	2,377,000	2,540,000
Total Revenues	$ 1,384,000	$ 1,456,000	$ 1,521,000	$ 1,653,000	$ 1,790,000	$ 1,926,000	$ 2,071,000	$ 2,221,000	$ 2,377,000	$ 2,540,000
Expenditures										
Transfer To/(From) Operating Fund[3]	$ 136,000	$ 308,000	$ (775,000)	$ (734,000)	$ (582,000)	$ (607,000)	$ (552,000)	$ (506,000)	$ (458,000)	$ (408,000)
Land Acquisition Loan[1]	-	-	-	-	-	-	-	-	-	-
Total Expenditures	$ 136,000	$ 308,000	$ (775,000)	$ (734,000)	$ (582,000)	$ (607,000)	$ (552,000)	$ (506,000)	$ (458,000)	$ (408,000)
Net Cash Flow	$ 1,248,000	$ 1,148,000	$ 2,296,000	$ 2,387,000	$ 2,372,000	$ 2,533,000	$ 2,623,000	$ 2,727,000	$ 2,835,000	$ 2,948,000
Ending Fund Balance	*$ 25,404,000*	*$ 26,552,000*	*$ 28,848,000*	*$ 31,235,000*	*$ 33,607,000*	*$ 36,140,000*	*$ 38,763,000*	*$ 41,490,000*	*$ 44,325,000*	*$ 47,273,000*
Operating Fund Transfer Percent of Fund Balance[4]	*0.54%*	*1.16%*	*(2.69%)*	*(2.35%)*	*(1.73%)*	*(1.68%)*	*(1.42%)*	*(1.22%)*	*(1.03%)*	*(0.86%)*

TABLE 5-3d: ENDOWMENT FUND (*CONT.*)

Table 5-3d: Endowment Fund

FY Ending June 30	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Plan Year	21	22	23	24	25	26	27	28	29	30
Beginning Fund Balance	*$ 47,273,000*	*$ 50,342,000*	*$ 53,536,000*	*$ 50,994,000*	*$ 47,754,000*	*$ 44,014,000*	*$ 39,766,000*	*$ 34,962,000*	*$ 29,557,000*	*$ 23,506,000*
Revenues										
Regional Road Project Mitigation	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Regional Infrastructure Mitigation	-	-	-	-	-	-	-	-	-	-
CVFTL HCP Endowment Fund	-	-	-	-	-	-	-	-	-	-
Endowment Loan Proceeds[1]	-	-	-	-	-	-	-	-	-	-
Interest Earnings[2]	2,709,000	2,885,000	3,068,000	2,922,000	2,736,000	2,522,000	2,279,000	2,003,000	1,694,000	1,347,000
Total Revenues	$ 2,709,000	$ 2,885,000	$ 3,068,000	$ 2,922,000	$ 2,736,000	$ 2,522,000	$ 2,279,000	$ 2,003,000	$ 1,694,000	$ 1,347,000
Expenditures										
Transfer To/(From) Operating Fund[3]	$ (360,000)	$ (309,000)	$ (1,263,000)	$ (1,230,000)	$ (1,169,000)	$ (1,113,000)	$ (1,050,000)	$ (986,000)	$ (922,000)	$ (856,000)
Land Acquisition Loan[1]	-	-	6,873,000	7,392,000	7,645,000	7,883,000	8,133,000	8,394,000	8,667,000	12,593,000
Total Expenditures	$ (360,000)	$ (309,000)	$ 5,610,000	$ 6,162,000	$ 6,476,000	$ 6,770,000	$ 7,083,000	$ 7,408,000	$ 7,745,000	$ 11,737,000
Net Cash Flow	$ 3,069,000	$ 3,194,000	$ (2,542,000)	$ (3,240,000)	$ (3,740,000)	$ (4,248,000)	$ (4,804,000)	$ (5,405,000)	$ (6,051,000)	$ (10,390,000)
Ending Fund Balance	*$ 50,342,000*	*$ 53,536,000*	*$ 50,994,000*	*$ 47,754,000*	*$ 44,014,000*	*$ 39,766,000*	*$ 34,962,000*	*$ 29,557,000*	*$ 23,506,000*	*$ 13,116,000*
Operating Fund Transfer Percent of Fund Balance[4]	*(0.72%)*	*(0.58%)*	*(2.48%)*	*(2.58%)*	*(2.66%)*	*(2.80%)*	*(3.00%)*	*(3.34%)*	*(3.92%)*	*(6.53%)*

TABLE 5-3d: ENDOWMENT FUND (*CONT.*)

Table 5-3d: Endowment Fund

FY Ending June 30	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047
Plan Year	31	32	33	34	35	36	37	38	39	40
Beginning Fund Balance	*$ 13,116,000*	*$ 19,900,000*	*$ 27,186,000*	*$ 35,918,000*	*$ 45,051,000*	*$ 54,601,000*	*$ 64,592,000*	*$ 75,047,000*	*$ 85,988,000*	*$ 97,442,000*
Revenues										
Regional Road Project Mitigation	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Regional Infrastructure Mitigation	-	-	-	-	-	-	-	-	-	-
CVFTL HCP Endowment Fund	-	-	-	-	-	-	-	-	-	-
Endowment Loan Proceeds[1]	6,264,000	6,264,000	6,264,000	6,264,000	6,264,000	6,264,000	6,264,000	6,264,000	6,264,000	6,264,000
Interest Earnings[2]	752,000	1,140,000	1,558,000	2,058,000	2,581,000	3,129,000	3,701,000	4,300,000	4,927,000	5,583,000
Total Revenues	$ 7,016,000	$ 7,404,000	$ 7,822,000	$ 8,322,000	$ 8,845,000	$ 9,393,000	$ 9,965,000	$ 10,564,000	$ 11,191,000	$ 11,847,000
Expenditures										
Transfer To/(From) Operating Fund[3]	$ 232,000	$ 118,000	$ (910,000)	$ (811,000)	$ (705,000)	$ (598,000)	$ (490,000)	$ (377,000)	$ (263,000)	$ (146,000)
Land Acquisition Loan[1]	-	-	-	-	-	-	-	-	-	-
Total Expenditures	$ 232,000	$ 118,000	$ (910,000)	$ (811,000)	$ (705,000)	$ (598,000)	$ (490,000)	$ (377,000)	$ (263,000)	$ (146,000)
Net Cash Flow	$ 6,784,000	$ 7,286,000	$ 8,732,000	$ 9,133,000	$ 9,550,000	$ 9,991,000	$ 10,455,000	$ 10,941,000	$ 11,454,000	$ 11,993,000
Ending Fund Balance	*$ 19,900,000*	*$ 27,186,000*	*$ 35,918,000*	*$ 45,051,000*	*$ 54,601,000*	*$ 64,592,000*	*$ 75,047,000*	*$ 85,988,000*	*$ 97,442,000*	*$ 109,435,000*
Operating Fund Transfer Percent of Fund Balance[4]	*1.17%*	*0.43%*	*(2.53%)*	*(1.80%)*	*(1.29%)*	*(0.93%)*	*(0.65%)*	*(0.44%)*	*(0.27%)*	*(0.13%)*

TABLE 5-3d: ENDOWMENT FUND (*CONT.*)

Table 5-3d: Endowment Fund

FY Ending June 30	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057
Plan Year	41	42	43	44	45	46	47	48	49	50
Beginning Fund Balance	*$ 109,435,000*	*$ 121,992,000*	*$ 135,145,000*	*$ 148,924,000*	*$ 163,361,000*	*$ 178,493,000*	*$ 194,354,000*	*$ 210,983,000*	*$ 228,422,000*	*$ 246,711,000*
Revenues										
Regional Road Project Mitigation	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Regional Infrastructure Mitigation	-	-	-	-	-	-	-	-	-	-
CVFTL HCP Endowment Fund	-	-	-	-	-	-	-	-	-	-
Endowment Loan Proceeds[1]	6,264,000	6,264,000	6,264,000	6,264,000	6,264,000	6,264,000	6,264,000	6,264,000	6,264,000	6,264,000
Interest Earnings[2]	6,271,000	6,990,000	7,744,000	8,533,000	9,361,000	10,228,000	11,136,000	12,089,000	13,089,000	14,137,000
Total Revenues	$ 12,535,000	$ 13,254,000	$ 14,008,000	$ 14,797,000	$ 15,625,000	$ 16,492,000	$ 17,400,000	$ 18,353,000	$ 19,353,000	$ 20,401,000
Expenditures										
Transfer To/(From) Operating Fund[3]	$ (22,000)	$ 101,000	$ 229,000	$ 360,000	$ 493,000	$ 631,000	$ 771,000	$ 914,000	$ 1,064,000	$ 1,213,000
Land Acquisition Loan[1]	-	-	-	-	-	-	-	-	-	-
Total Expenditures	$ (22,000)	$ 101,000	$ 229,000	$ 360,000	$ 493,000	$ 631,000	$ 771,000	$ 914,000	$ 1,064,000	$ 1,213,000
Net Cash Flow	$ 12,557,000	$ 13,153,000	$ 13,779,000	$ 14,437,000	$ 15,132,000	$ 15,861,000	$ 16,629,000	$ 17,439,000	$ 18,289,000	$ 19,188,000
Ending Fund Balance	*$ 121,992,000*	*$ 135,145,000*	*$ 148,924,000*	*$ 163,361,000*	*$ 178,493,000*	*$ 194,354,000*	*$ 210,983,000*	*$ 228,422,000*	*$ 246,711,000*	*$ 265,899,000*
Operating Fund Transfer Percent of Fund Balance[4]	*(0.02%)*	*0.07%*	*0.15%*	*0.22%*	*0.28%*	*0.32%*	*0.37%*	*0.40%*	*0.43%*	*0.46%*

TABLE 5-3d: ENDOWMENT FUND (CONT.)

Table 5-3d: Endowment Fund

FY Ending June 30	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067
Plan Year	51	52	53	54	55	56	57	58	59	60
Beginning Fund Balance	*$ 265,899,000*	*$ 279,767,000*	*$ 294,269,000*	*$ 309,439,000*	*$ 325,311,000*	*$ 341,922,000*	*$ 359,309,000*	*$ 377,512,000*	*$ 396,573,000*	*$ 416,537,000*
Revenues										
Regional Road Project Mitigation	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Regional Infrastructure Mitigation	-	-	-	-	-	-	-	-	-	-
CVFTL HCP Endowment Fund	-	-	-	-	-	-	-	-	-	-
Endowment Loan Proceeds[1]	-	-	-	-	-	-	-	-	-	-
Interest Earnings[2]	15,236,000	16,031,000	16,862,000	17,731,000	18,640,000	19,592,000	20,588,000	21,631,000	22,724,000	23,868,000
Total Revenues	$ 15,236,000	$ 16,031,000	$ 16,862,000	$ 17,731,000	$ 18,640,000	$ 19,592,000	$ 20,588,000	$ 21,631,000	$ 22,724,000	$ 23,868,000
Expenditures										
Transfer To/(From) Operating Fund[3]	$ 1,368,000	$ 1,529,000	$ 1,692,000	$ 1,859,000	$ 2,029,000	$ 2,205,000	$ 2,385,000	$ 2,570,000	$ 2,760,000	$ 2,951,000
Land Acquisition Loan[1]	-	-	-	-	-	-	-	-	-	-
Total Expenditures	$ 1,368,000	$ 1,529,000	$ 1,692,000	$ 1,859,000	$ 2,029,000	$ 2,205,000	$ 2,385,000	$ 2,570,000	$ 2,760,000	$ 2,951,000
Net Cash Flow	$ 13,868,000	$ 14,502,000	$ 15,170,000	$ 15,872,000	$ 16,611,000	$ 17,387,000	$ 18,203,000	$ 19,061,000	$ 19,964,000	$ 20,917,000
Ending Fund Balance	*$ 279,767,000*	*$ 294,269,000*	*$ 309,439,000*	*$ 325,311,000*	*$ 341,922,000*	*$ 359,309,000*	*$ 377,512,000*	*$ 396,573,000*	*$ 416,537,000*	*$ 437,454,000*
Operating Fund Transfer Percent of Fund Balance[4]	*0.49%*	*0.52%*	*0.55%*	*0.57%*	*0.59%*	*0.61%*	*0.63%*	*0.65%*	*0.66%*	*0.67%*

TABLE 5-3d: ENDOWMENT FUND (CONT.)

Table 5-3d: Endowment Fund

FY Ending June 30	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077
Plan Year	61	62	63	64	65	66	67	68	69	70
Beginning Fund Balance	*$ 437,454,000*	*$ 459,370,000*	*$ 482,341,000*	*$ 506,421,000*	*$ 531,669,000*	*$ 558,147,000*	*$ 585,920,000*	*$ 615,059,000*	*$ 645,635,000*	*$ 677,724,000*
Revenues										
Regional Road Project Mitigation	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Regional Infrastructure Mitigation	-	-	-	-	-	-	-	-	-	-
CVFTL HCP Endowment Fund	-	-	-	-	-	-	-	-	-	-
Endowment Loan Proceeds[1]	-	-	-	-	-	-	-	-	-	-
Interest Earnings[2]	25,066,000	26,322,000	27,638,000	29,018,000	30,465,000	31,982,000	33,573,000	35,243,000	36,995,000	38,834,000
Total Revenues	$ 25,066,000	$ 26,322,000	$ 27,638,000	$ 29,018,000	$ 30,465,000	$ 31,982,000	$ 33,573,000	$ 35,243,000	$ 36,995,000	$ 38,834,000
Expenditures										
Transfer To/(From) Operating Fund[3]	$ 3,150,000	$ 3,351,000	$ 3,558,000	$ 3,770,000	$ 3,987,000	$ 4,209,000	$ 4,434,000	$ 4,667,000	$ 4,906,000	$ 5,148,000
Land Acquisition Loan[1]	-	-	-	-	-	-	-	-	-	-
Total Expenditures	$ 3,150,000	$ 3,351,000	$ 3,558,000	$ 3,770,000	$ 3,987,000	$ 4,209,000	$ 4,434,000	$ 4,667,000	$ 4,906,000	$ 5,148,000
Net Cash Flow	$ 21,916,000	$ 22,971,000	$ 24,080,000	$ 25,248,000	$ 26,478,000	$ 27,773,000	$ 29,139,000	$ 30,576,000	$ 32,089,000	$ 33,686,000
Ending Fund Balance	*$ 459,370,000*	*$ 482,341,000*	*$ 506,421,000*	*$ 531,669,000*	*$ 558,147,000*	*$ 585,920,000*	*$ 615,059,000*	*$ 645,635,000*	*$ 677,724,000*	*$ 711,410,000*
Operating Fund Transfer Percent of Fund Balance[4]	*0.69%*	*0.69%*	*0.70%*	*0.71%*	*0.71%*	*0.72%*	*0.72%*	*0.72%*	*0.72%*	*0.72%*

TABLE 5-3d: ENDOWMENT FUND (*CONT.*)

Table 5-3d: Endowment Fund

FY Ending June 30	2078	2079	2080	2081	2082	2006 - 2080
Plan Year	71	72	73	74	75	Total
Beginning Fund Balance	*$ 711,410,000*	*$ 746,777,000*	*$ 783,917,000*	*$ 808,745,000*	*$ 834,346,000*	*$ (1,200,000)*
Revenues						
Regional Road Project Mitigation	$ -	$ -	$ -	$ -	$ -	$ 9,258,000
Regional Infrastructure Mitigation	-	-	-	-	-	11,708,000
CVFTL HCP Endowment Fund	-	-	-	-	-	3,200,000
Endowment Loan Proceeds[1]	-	-	-	-	-	125,280,000
Interest Earnings[2]	40,764,000	42,790,000	44,918,000	46,341,000	47,808,000	912,778,000
Total Revenues	$ 40,764,000	$ 42,790,000	$ 44,918,000	$ 46,341,000	$ 47,808,000	$ 1,062,224,000
Expenditures						
Transfer To/(From) Operating Fund[3]	$ 5,397,000	$ 5,650,000	$ 20,090,000	$ 20,740,000	$ 21,413,000	$ 132,703,000
Land Acquisition Loan[1]	-	-	-	-	-	67,580,000
Total Expenditures	$ 5,397,000	$ 5,650,000	$ 20,090,000	$ 20,740,000	$ 21,413,000	$ 200,283,000
Net Cash Flow	$ 35,367,000	$ 37,140,000	$ 24,828,000	$ 25,601,000	$ 26,395,000	$ 861,941,000
Ending Fund Balance	*$ 746,777,000*	*$ 783,917,000*	*$ 808,745,000*	*$ 834,346,000*	*$ 860,741,000*	*$ 860,741,000*
Operating Fund Transfer Percent of Fund Balance[4]	*0.72%*	*0.72%*	*2.48%*	*2.49%*	*2.49%*	

TABLE 5-3e: SUMMARY – ALL FUNDS (NET OF TRANSFERS)

Table 5-3e: Summary - All Funds (net of transfers)

FY Ending June 30	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Plan Year	1	2	3	4	5	6	7	8	9	10
Beginning Fund Balance	*$ (1,200,000)*	*$ 36,098,000*	*$ 42,954,000*	*$ 51,180,000*	*$ 57,322,000*	*$ 63,889,000*	*$ 62,915,000*	*$ 61,607,000*	*$ 57,822,000*	*$ 53,554,000*
Revenues										
Landfill Tipping Fees										
Conservation Trust Func	$ 575,000	$ 598,000	$ 622,000	$ 647,000	$ 673,000	$ 700,000	$ 728,000	$ 757,000	$ 787,000	$ 818,000
Eagle Mountain Open Space Trust	-	-	1,125,000	1,125,000	1,125,000	1,125,000	1,125,000	1,125,000	1,125,000	1,125,000
Local Development Mitigation Fee	7,850,000	8,108,000	8,375,000	8,651,000	8,935,000	9,229,000	9,533,000	9,847,000	10,170,000	10,505,000
Regional Road Project Mitigation	11,077,000	10,000,000	10,000,000	-	-	-	-	-	-	-
Regional Infrastructure Mitigation	24,733,000	-	-	7,600,000	7,836,000	-	-	-	-	9,206,000
CVFTL HCP Endowment Fund	3,200,000	-	-	-	-	-	-	-	-	-
Interest Earnings	-	2,069,000	2,461,000	2,933,000	3,285,000	3,661,000	3,604,000	3,531,000	3,314,000	3,069,000
Total Revenues	$ 47,435,000	$ 20,775,000	$ 22,583,000	$ 20,956,000	$ 21,854,000	$ 14,715,000	$ 14,990,000	$ 15,260,000	$ 15,396,000	$ 24,723,000
Expenditures										
Monitoring Program	$ 1,033,000	$ 924,000	$ 955,000	$ 973,000	$ 1,004,000	$ 964,000	$ 995,000	$ 1,028,000	$ 1,061,000	$ 1,096,000
Management Program	653,000	597,000	616,000	637,000	658,000	679,000	805,000	831,000	858,000	885,000
Adaptive Management	100,000	103,000	106,000	109,000	113,000	117,000	121,000	125,000	129,000	133,000
Management Contingency	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000
Land Acquisition	7,120,000	11,040,000	11,400,000	11,790,000	12,180,000	12,570,000	12,990,000	15,645,000	16,170,000	16,695,000
Land Improvement	182,000	188,000	194,000	200,000	207,000	214,000	221,000	228,000	236,000	244,000
Administration	549,000	567,000	586,000	605,000	625,000	645,000	666,000	688,000	710,000	733,000
Total Expenditures	$ 10,137,000	$ 13,919,000	$ 14,357,000	$ 14,814,000	$ 15,287,000	$ 15,689,000	$ 16,298,000	$ 19,045,000	$ 19,664,000	$ 20,286,000
Net Cash Flow	$ 37,298,000	$ 6,856,000	$ 8,226,000	$ 6,142,000	$ 6,567,000	$ (974,000)	$ (1,308,000)	$ (3,785,000)	$ (4,268,000)	$ 4,437,000
Ending Fund Balance	*$ 36,098,000*	*$ 42,954,000*	*$ 51,180,000*	*$ 57,322,000*	*$ 63,889,000*	*$ 62,915,000*	*$ 61,607,000*	*$ 57,822,000*	*$ 53,554,000*	*$ 57,991,000*

Note: All values shown in current dollars (except last column), i.e. including inflation at three percent annually unless otherwise noted. See text for explanation of each revenue and cost line item.

[1] All revenues and expenditures discounted at 3.29 percent annual rate.

Sources: MuniFinancial.

TABLE 5-3e: SUMMARY – ALL FUNDS (NET OF TRANSFERS) (*CONT.*)

Table 5-3e: Summary - All Funds (net of transfers)

FY Ending June 30	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Plan Year	11	12	13	14	15	16	17	18	19	20
Beginning Fund Balance	*$ 57,991,000*	*$ 56,161,000*	*$ 54,033,000*	*$ 52,690,000*	*$ 51,068,000*	*$ 59,875,000*	*$ 58,178,000*	*$ 56,152,000*	*$ 53,757,000*	*$ 54,177,000*
Revenues										
Landfill Tipping Fees										
Conservation Trust Func	$ 851,000	$ 885,000	$ 920,000	$ 957,000	$ 995,000	$ 1,035,000	$ 1,076,000	$ 1,119,000	$ 1,164,000	$ 1,211,000
Eagle Mountain Open Space Trust	1,125,000	1,125,000	2,250,000	2,250,000	2,250,000	2,250,000	2,250,000	2,250,000	2,250,000	2,250,000
Local Development Mitigation Fee	10,851,000	11,208,000	11,576,000	11,957,000	12,351,000	12,757,000	13,177,000	13,610,000	14,058,000	14,521,000
Regional Road Project Mitigation	-	-	-	-	-	-	-	-	-	-
Regional Infrastructure Mitigation	-	-	-	-	10,833,000	-	-	-	-	-
CVFTL HCP Endowment Fund	-	-	-	-	-	-	-	-	-	-
Interest Earnings	3,323,000	3,218,000	3,095,000	3,019,000	2,927,000	3,431,000	3,334,000	3,217,000	3,080,000	3,105,000
Total Revenues	$ 16,150,000	$ 16,436,000	$ 17,841,000	$ 18,183,000	$ 29,356,000	$ 19,473,000	$ 19,837,000	$ 20,196,000	$ 20,552,000	$ 21,087,000
Expenditures										
Monitoring Program	$ 1,131,000	$ 1,168,000	$ 1,206,000	$ 1,245,000	$ 1,286,000	$ 1,328,000	$ 1,371,000	$ 1,416,000	$ 1,462,000	$ 1,510,000
Management Program	914,000	943,000	974,000	1,005,000	1,126,000	1,123,000	1,159,000	1,196,000	1,234,000	1,274,000
Adaptive Management	137,000	142,000	147,000	152,000	157,000	162,000	167,000	172,000	178,000	184,000
Management Contingency	-	-	-	-	-	-	-	-	-	-
Land Acquisition	14,790,000	15,270,000	15,780,000	16,290,000	16,830,000	17,370,000	17,940,000	18,540,000	15,950,000	16,475,000
Land Improvement	252,000	260,000	269,000	278,000	287,000	296,000	306,000	316,000	326,000	337,000
Administration	756,000	781,000	808,000	835,000	863,000	891,000	920,000	951,000	982,000	1,014,000
Total Expenditures	$ 17,980,000	$ 18,564,000	$ 19,184,000	$ 19,805,000	$ 20,549,000	$ 21,170,000	$ 21,863,000	$ 22,591,000	$ 20,132,000	$ 20,794,000
Net Cash Flow	$ (1,830,000)	$ (2,128,000)	$ (1,343,000)	$ (1,622,000)	$ 8,807,000	$ (1,697,000)	$ (2,026,000)	$ (2,395,000)	$ 420,000	$ 293,000
Ending Fund Balance	*$ 56,161,000*	*$ 54,033,000*	*$ 52,690,000*	*$ 51,068,000*	*$ 59,875,000*	*$ 58,178,000*	*$ 56,152,000*	*$ 53,757,000*	*$ 54,177,000*	*$ 54,470,000*

TABLE 5-3e: SUMMARY – ALL FUNDS (NET OF TRANSFERS) (*CONT.*)

Table 5-3e: Summary - All Funds (net of transfers)

FY Ending June 30	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Plan Year	21	22	23	24	25	26	27	28	29	30
Beginning Fund Balance	*$ 54,470,000*	*$ 54,615,000*	*$ 54,619,000*	*$ 51,861,000*	*$ 48,649,000*	*$ 44,939,000*	*$ 40,720,000*	*$ 35,947,000*	*$ 30,574,000*	*$ 24,556,000*
Revenues										
Landfill Tipping Fees										
Conservation Trust Func	$ 1,259,000	$ 1,309,000	$ 1,361,000	$ 1,415,000	$ 1,472,000	$ 1,531,000	$ 1,592,000	$ 1,656,000	$ 1,722,000	$ 1,791,000
Eagle Mountain Open Space Trust	2,250,000	2,250,000	3,375,000	3,375,000	3,375,000	3,375,000	3,375,000	3,375,000	3,375,000	3,375,000
Local Development Mitigation Fee	14,998,000	15,492,000	16,001,000	16,528,000	17,072,000	17,633,000	18,213,000	18,813,000	19,432,000	20,071,000
Regional Road Project Mitigation	-	-	-	-	-	-	-	-	-	-
Regional Infrastructure Mitigation	-	-	-	-	-	-	-	-	-	-
CVFTL HCP Endowment Fund	-	-	-	-	-	-	-	-	-	-
Interest Earnings	3,121,000	3,129,000	3,130,000	2,972,000	2,787,000	2,575,000	2,334,000	2,059,000	1,752,000	1,407,000
Total Revenues	$ 21,628,000	$ 22,180,000	$ 23,867,000	$ 24,290,000	$ 24,706,000	$ 25,114,000	$ 25,514,000	$ 25,903,000	$ 26,281,000	$ 26,644,000
Expenditures										
Monitoring Program	$ 1,559,000	$ 1,609,000	$ 1,662,000	$ 1,716,000	$ 1,772,000	$ 1,829,000	$ 1,889,000	$ 1,951,000	$ 2,015,000	$ 2,080,000
Management Program	1,314,000	1,356,000	1,493,000	1,540,000	1,590,000	1,640,000	1,693,000	1,747,000	1,802,000	1,860,000
Adaptive Management	190,000	196,000	202,000	209,000	216,000	223,000	230,000	238,000	246,000	254,000
Management Contingency	-	-	-	-	-	-	-	-	-	-
Land Acquisition	17,025,000	17,575,000	21,780,000	22,500,000	23,250,000	24,000,000	24,780,000	25,590,000	26,430,000	30,940,000
Land Improvement	348,000	359,000	371,000	383,000	396,000	409,000	422,000	436,000	450,000	465,000
Administration	1,047,000	1,081,000	1,117,000	1,154,000	1,192,000	1,232,000	1,273,000	1,314,000	1,356,000	1,401,000
Total Expenditures	$ 21,483,000	$ 22,176,000	$ 26,625,000	$ 27,502,000	$ 28,416,000	$ 29,333,000	$ 30,287,000	$ 31,276,000	$ 32,299,000	$ 37,000,000
Net Cash Flow	$ 145,000	$ 4,000	$ (2,758,000)	$ (3,212,000)	$ (3,710,000)	$ (4,219,000)	$ (4,773,000)	$ (5,373,000)	$ (6,018,000)	$ (10,356,000)
Ending Fund Balance	*$ 54,615,000*	*$ 54,619,000*	*$ 51,861,000*	*$ 48,649,000*	*$ 44,939,000*	*$ 40,720,000*	*$ 35,947,000*	*$ 30,574,000*	*$ 24,556,000*	*$ 14,200,000*

TABLE 5-3e: SUMMARY – ALL FUNDS (NET OF TRANSFERS) (*CONT.*)

Table 5-3e: Summary - All Funds (net of transfers)

FY Ending June 30	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047
Plan Year	31	32	33	34	35	36	37	38	39	40
Beginning Fund Balance	*$ 14,200,000*	*$ 21,223,000*	*$ 28,552,000*	*$ 37,328,000*	*$ 46,506,000*	*$ 56,104,000*	*$ 66,144,000*	*$ 76,649,000*	*$ 87,642,000*	*$ 99,149,000*
Revenues										
Landfill Tipping Fees										
Conservation Trust Func	$ 1,863,000	$ 1,938,000	$ 2,016,000	$ 2,097,000	$ 2,181,000	$ 2,268,000	$ 2,359,000	$ 2,453,000	$ 2,551,000	$ 2,653,000
Eagle Mountain Open Space Trust	3,375,000	3,375,000	4,500,000	4,500,000	4,500,000	4,500,000	4,500,000	4,500,000	4,500,000	4,500,000
Local Development Mitigation Fee	6,264,000	6,264,000	6,264,000	6,264,000	6,264,000	6,264,000	6,264,000	6,264,000	6,264,000	6,264,000
Regional Road Project Mitigation	-	-	-	-	-	-	-	-	-	-
Regional Infrastructure Mitigation	-	-	-	-	-	-	-	-	-	-
CVFTL HCP Endowment Fund	-	-	-	-	-	-	-	-	-	-
Interest Earnings	814,000	1,216,000	1,636,000	2,139,000	2,664,000	3,215,000	3,790,000	4,392,000	5,022,000	5,681,000
Total Revenues	$ 12,316,000	$ 12,793,000	$ 14,416,000	$ 15,000,000	$ 15,609,000	$ 16,247,000	$ 16,913,000	$ 17,609,000	$ 18,337,000	$ 19,098,000
Expenditures										
Monitoring Program	$ 2,148,000	$ 2,218,000	$ 2,290,000	$ 2,364,000	$ 2,441,000	$ 2,521,000	$ 2,603,000	$ 2,688,000	$ 2,775,000	$ 2,865,000
Management Program	1,919,000	1,980,000	2,043,000	2,108,000	2,175,000	2,245,000	2,316,000	2,390,000	2,467,000	2,545,000
Adaptive Management	100,000	103,000	106,000	109,000	113,000	117,000	121,000	125,000	129,000	133,000
Management Contingency	-	-	-	-	-	-	-	-	-	-
Land Acquisition	-	-	-	-	-	-	-	-	-	-
Land Improvement	-	-	-	-	-	-	-	-	-	-
Administration	1,126,000	1,163,000	1,201,000	1,241,000	1,282,000	1,324,000	1,368,000	1,413,000	1,459,000	1,507,000
Total Expenditures	$ 5,293,000	$ 5,464,000	$ 5,640,000	$ 5,822,000	$ 6,011,000	$ 6,207,000	$ 6,408,000	$ 6,616,000	$ 6,830,000	$ 7,050,000
Net Cash Flow	$ 7,023,000	$ 7,329,000	$ 8,776,000	$ 9,178,000	$ 9,598,000	$ 10,040,000	$ 10,505,000	$ 10,993,000	$ 11,507,000	$ 12,048,000
Ending Fund Balance	*$ 21,223,000*	*$ 28,552,000*	*$ 37,328,000*	*$ 46,506,000*	*$ 56,104,000*	*$ 66,144,000*	*$ 76,649,000*	*$ 87,642,000*	*$ 99,149,000*	*$ 111,197,000*

TABLE 5-3e: SUMMARY – ALL FUNDS (NET OF TRANSFERS) (*CONT.*)

Table 5-3e: Summary - All Funds (net of transfers)

FY Ending June 30	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057
Plan Year	41	42	43	44	45	46	47	48	49	50
Beginning Fund Balance	*$ 111,197,000*	*$ 123,812,000*	*$ 137,024,000*	*$ 150,864,000*	*$ 165,364,000*	*$ 180,561,000*	*$ 196,489,000*	*$ 213,187,000*	*$ 230,697,000*	*$ 249,060,000*
Revenues										
Landfill Tipping Fees										
Conservation Trust Func	$ 2,759,000	$ 2,869,000	$ 2,984,000	$ 3,103,000	$ 3,227,000	$ 3,356,000	$ 3,490,000	$ 3,630,000	$ 3,775,000	$ 3,926,000
Eagle Mountain Open Space Trust	4,500,000	4,500,000	4,500,000	4,500,000	4,500,000	4,500,000	4,500,000	4,500,000	4,500,000	4,500,000
Local Development Mitigation Fee	6,264,000	6,264,000	6,264,000	6,264,000	6,264,000	6,264,000	6,264,000	6,264,000	6,264,000	6,264,000
Regional Road Project Mitigation	-	-	-	-	-	-	-	-	-	-
Regional Infrastructure Mitigation	-	-	-	-	-	-	-	-	-	-
CVFTL HCP Endowment Fund	-	-	-	-	-	-	-	-	-	-
Interest Earnings	6,372,000	7,094,000	7,852,000	8,644,000	9,476,000	10,346,000	11,258,000	12,215,000	13,219,000	14,272,000
Total Revenues	$ 19,895,000	$ 20,727,000	$ 21,600,000	$ 22,511,000	$ 23,467,000	$ 24,466,000	$ 25,512,000	$ 26,609,000	$ 27,758,000	$ 28,962,000
Expenditures										
Monitoring Program	$ 2,959,000	$ 3,055,000	$ 3,155,000	$ 3,257,000	$ 3,363,000	$ 3,473,000	$ 3,586,000	$ 3,703,000	$ 3,824,000	$ 3,948,000
Management Program	2,627,000	2,710,000	2,797,000	2,886,000	2,978,000	3,073,000	3,171,000	3,272,000	3,377,000	3,484,000
Adaptive Management	137,000	142,000	147,000	152,000	157,000	162,000	167,000	172,000	178,000	184,000
Management Contingency	-	-	-	-	-	-	-	-	-	-
Land Acquisition	-	-	-	-	-	-	-	-	-	-
Land Improvement	-	-	-	-	-	-	-	-	-	-
Administration	1,557,000	1,608,000	1,661,000	1,716,000	1,772,000	1,830,000	1,890,000	1,952,000	2,016,000	2,082,000
Total Expenditures	$ 7,280,000	$ 7,515,000	$ 7,760,000	$ 8,011,000	$ 8,270,000	$ 8,538,000	$ 8,814,000	$ 9,099,000	$ 9,395,000	$ 9,698,000
Net Cash Flow	$ 12,615,000	$ 13,212,000	$ 13,840,000	$ 14,500,000	$ 15,197,000	$ 15,928,000	$ 16,698,000	$ 17,510,000	$ 18,363,000	$ 19,264,000
Ending Fund Balance	*$ 123,812,000*	*$ 137,024,000*	*$ 150,864,000*	*$ 165,364,000*	*$ 180,561,000*	*$ 196,489,000*	*$ 213,187,000*	*$ 230,697,000*	*$ 249,060,000*	*$ 268,324,000*

TABLE 5-3e: SUMMARY – ALL FUNDS (NET OF TRANSFERS) (*CONT.*)

Table 5-3e: Summary - All Funds (net of transfers)

FY Ending June 30	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067
Plan Year	51	52	53	54	55	56	57	58	59	60
Beginning Fund Balance	*$ 268,324,000*	*$ 282,270,000*	*$ 296,853,000*	*$ 312,107,000*	*$ 328,066,000*	*$ 344,766,000*	*$ 362,245,000*	*$ 380,543,000*	*$ 399,703,000*	*$ 419,769,000*
Revenues										
Landfill Tipping Fees										
Conservation Trust Func	$ 4,083,000	$ 4,246,000	$ 4,416,000	$ 4,593,000	$ 4,777,000	$ 4,968,000	$ 5,167,000	$ 5,374,000	$ 5,589,000	$ 5,813,000
Eagle Mountain Open Space Trust	4,500,000	4,500,000	4,500,000	4,500,000	4,500,000	4,500,000	4,500,000	4,500,000	4,500,000	4,500,000
Local Development Mitigation Fee	-	-	-	-	-	-	-	-	-	-
Regional Road Project Mitigation	-	-	-	-	-	-	-	-	-	-
Regional Infrastructure Mitigation	-	-	-	-	-	-	-	-	-	-
CVFTL HCP Endowment Fund	-	-	-	-	-	-	-	-	-	-
Interest Earnings	15,375,000	16,174,000	17,010,000	17,884,000	18,798,000	19,755,000	20,756,000	21,805,000	22,903,000	24,053,000
Total Revenues	$ 23,958,000	$ 24,920,000	$ 25,926,000	$ 26,977,000	$ 28,075,000	$ 29,223,000	$ 30,423,000	$ 31,679,000	$ 32,992,000	$ 34,366,000
Expenditures										
Monitoring Program	$ 4,076,000	$ 4,210,000	$ 4,347,000	$ 4,489,000	$ 4,635,000	$ 4,786,000	$ 4,942,000	$ 5,103,000	$ 5,270,000	$ 5,442,000
Management Program	3,596,000	3,710,000	3,829,000	3,951,000	4,077,000	4,207,000	4,342,000	4,481,000	4,624,000	4,771,000
Adaptive Management	190,000	196,000	202,000	209,000	216,000	223,000	230,000	238,000	246,000	254,000
Management Contingency	-	-	-	-	-	-	-	-	-	-
Land Acquisition	-	-	-	-	-	-	-	-	-	-
Land Improvement	-	-	-	-	-	-	-	-	-	-
Administration	2,150,000	2,221,000	2,294,000	2,369,000	2,447,000	2,528,000	2,611,000	2,697,000	2,786,000	2,878,000
Total Expenditures	$ 10,012,000	$ 10,337,000	$ 10,672,000	$ 11,018,000	$ 11,375,000	$ 11,744,000	$ 12,125,000	$ 12,519,000	$ 12,926,000	$ 13,345,000
Net Cash Flow	$ 13,946,000	$ 14,583,000	$ 15,254,000	$ 15,959,000	$ 16,700,000	$ 17,479,000	$ 18,298,000	$ 19,160,000	$ 20,066,000	$ 21,021,000
Ending Fund Balance	*$ 282,270,000*	*$ 296,853,000*	*$ 312,107,000*	*$ 328,066,000*	*$ 344,766,000*	*$ 362,245,000*	*$ 380,543,000*	*$ 399,703,000*	*$ 419,769,000*	*$ 440,790,000*

TABLE 5-3e: SUMMARY – ALL FUNDS (NET OF TRANSFERS) (*CONT.*)

Table 5-3e: Summary - All Funds (net of transfers)

FY Ending June 30	2078	2079	2080	2081	2082	Total 2008 - 2082	
Plan Year	71	72	73	74	75	Current	Discounted[1]
Beginning Fund Balance	*$ 716,001,000*	*$ 751,517,000*	*$ 788,811,000*	*$ 813,798,000*	*$ 839,563,000*	*$ (1,200,000)*	*$ (1,200,000)*
Revenues							
Landfill Tipping Fees							
Conservation Trust Func	$ 8,950,000	$ 9,308,000	$ -	$ -	$ -	$ 227,604,000	$ 53,304,000
Eagle Mountain Open Space Trust	4,500,000	4,500,000	-	-	-	247,500,000	73,182,000
Local Development Mitigation Fee	-	-	-	-	-	516,802,000	270,994,000
Regional Road Project Mitigation	-	-	-	-	-	31,077,000	30,132,000
Regional Infrastructure Mitigation	-	-	-	-	-	60,208,000	52,279,000
CVFTL HCP Endowment Fund	-	-	-	-	-	3,200,000	3,200,000
Interest Earnings	41,027,000	43,062,000	45,198,000	46,631,000	48,107,000	952,149,000	182,032,000
Total Revenues	$ 54,477,000	$ 56,870,000	$ 45,198,000	$ 46,631,000	$ 48,107,000	$ 2,038,540,000	$ 665,123,000
Expenditures							
Monitoring Program	$ 7,744,000	$ 7,997,000	$ 8,257,000	$ 8,526,000	$ 8,804,000	$ 254,294,000	$ 61,348,000
Management Program	6,744,000	6,959,000	7,182,000	7,411,000	7,648,000	221,252,000	52,228,000
Adaptive Management	363,000	375,000	387,000	400,000	413,000	14,903,000	4,677,000
Management Contingency	-	-	-	-	-	5,000,000	4,341,000
Land Acquisition	-	-	-	-	-	526,705,000	316,784,000
Land Improvement	-	-	-	-	-	9,080,000	5,462,000
Administration	4,110,000	4,245,000	4,385,000	4,529,000	4,678,000	139,979,000	35,632,000
Total Expenditures	$ 18,961,000	$ 19,576,000	$ 20,211,000	$ 20,866,000	$ 21,543,000	$ 1,171,213,000	$ 480,472,000
Net Cash Flow	$ 35,516,000	$ 37,294,000	$ 24,987,000	$ 25,765,000	$ 26,564,000	$ 867,327,000	$ 184,651,000
Ending Fund Balance	*$ 751,517,000*	*$ 788,811,000*	*$ 813,798,000*	*$ 839,563,000*	*$ 866,127,000*	*$ 866,127,000*	*$ 183,451,000*

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6.0 Plan Implementation

This section provides information on Plan implementation.

6.1 Organizational Structure

6.1.1 Coachella Valley Conservation Commission

Implementation of the MSHCP will be overseen and administered by the Coachella Valley Conservation Commission (CVCC), a joint powers authority formed by the Local Permittees pursuant to the requirements of the California Government Code and other appropriate legal authorities.

CVCC shall have adequate authority to carry out its responsibilities under the Plan. CVCC shall sign the IA and shall be a Permittee under the Permits. CVCC shall be formed as a separate and independent joint powers authority, prior to issuance of the Permits. CVAG shall organize the first meeting of CVCC representatives who will formally establish CVCC and adopt its by-laws consistent with all applicable legal requirements.

For the first five years of Plan implementation, CVCC shall contract with CVAG for staff services. The CVCC Executive Director shall be the contact person for the Wildlife Agencies. Thereafter, CVCC may renew the contract with CVAG for staff services, retain its own staff, or contract for services.

6.1.1.1 Composition and Voting Requirements

CVCC shall consist of the members of the Riverside County Board of Supervisors and an elected official from each of the Cities, CVWD, ~~and~~ IID, and MSWD. Each of these entities may also designate an alternate, who shall also be an elected official. Each voting member of CVCC shall have one vote at meetings of CVCC.

6.1.1.2 Duties and Responsibilities of CVCC

CVCC shall provide the policy direction for the implementation of the MSHCP and will provide opportunities for public participation in the decision-making process. Duties of CVCC shall include but are not limited to the following:

1. Establish the Acquisition and Funding Coordinating Committee, the Reserve Management Oversight Committee (RMOC), and the Reserve Management Unit Committees (RMUCs), and ensure designation of the Monitoring Program Administrator (MPA).
2. Establish a Trails Management Subcommittee to the RMUC for the Santa Rosa and San Jacinto Mountains Conservation Area, as described in Section 6.3.

3. Establish policies as appropriate under which the Acquisition and Funding Coordinating Committee will make recommendations to CVCC.
4. Identify and make decisions on Permittee MSHCP Reserve System acquisitions, except as set forth in Section 6.6.2, based on MSHCP Conservation Goals and Objectives, and recommendations from the Acquisition and Funding Coordinating Committee.
5. Ensure adequate management of locally managed Reserve Lands.
6. Contract with outside entities for specific services, such as land management and law enforcement, as needed.
7. Manage and coordinate the MSHCP local funding plan as set forth in Section 5 of this document.
8. Develop and implement financing strategies to maximize funding sources.
9. Develop an investment policy and review policy annually.
10. Adopt an annual budget, including but not limited to expenses associated with land acquisition, the Monitoring Program, the Management Program, and Adaptive Management, consistent with their respective annual work plans as described in Section 8.7.
11. Annually review Local Development Mitigation Fee remittance for compliance and accuracy.
12. Act as custodian of records for information concerning MSHCP implementation.
13. Maintain a record of the amount of Take and Habitat loss for each Local Permittee.
14. Maintain a record of the amount of Take Authorization to Participating Special Entities as set forth in Section 11.7 of the IA.
15. Extend Take coverage to Participating Special Entities and others as set forth in Section 11.7 of the IA.
16. Hold regularly scheduled public meetings.
17. Prepare or cause to be prepared an annual audit.
18. Accept and manage MSHCP Reserve System property including conservation easements that have been conveyed to it by the County, Cities or other entity, agency or individual.

6.1.1.3 Duties and Responsibilities of the CVCC Executive Director

Duties of the CVCC Executive Director shall include but are not limited to the following:

1. Plan, organize, coordinate, and direct CVCC staff to develop goals and annual work plans of CVCC that are then acted on by CVCC.
2. Develop and direct the implementation of goals and work activities adopted by the CVCC.
3. Coordinate implementation of the Plan by Local Permittees and the Wildlife Agencies. During the first three (3) years of implementation of the MSHCP, the CVCC Executive Director and Wildlife Agencies' representatives shall meet every ninety (90) days, at a

minimum, to review the status of Plan implementation. Thereafter, the meetings shall occur every six months or as otherwise agreed upon. Within 30 days of Permit issuance, the Executive Director will circulate a Draft Implementation Manual to the Local Permittees and the Wildlife Agencies for review and comment. Within 30 days of circulation of the Draft, the Executive Director will arrange a meeting with the appropriate staff of the Local Permittees to discuss the Implementation Manual.

4. Ensure that conservation mechanisms are properly recorded for lands dedicated by Local Permittees.

5. Ensure that conservation mechanisms are properly recorded on existing CVFTL Preserve lands consistent with Section 6.6.1.3 of the Plan.

6. In coordination with the RMUCs, draft the MSHCP Reserve Management Unit Plans (RMUPs) for review and approval by the RMOC to define specific management actions, schedules, and responsibilities for each Reserve Management Unit (RMU).

7. Ensure an adequate exchange of information among the RMUCs, the Land Manager, and the MPA so that management takes into account the findings of the Monitoring Program and the latter reflects the needs of the former.

8. Ensure that the functions of the MPA are being satisfactorily carried out.

9. As needed, obtain the services of Independent Science Advisors to address specific issues and to provide recommendations concerning scientific aspects of the Plan based on the best available scientific information.

10. Oversee data management, including maintaining the Plan's GIS database and providing a back-up copy to the County annually. The database will also be provided to the Wildlife Agencies. The database will be updated at least annually with:

    a. Data derived from inventory and research activities on species occurrences and Habitat distribution in the Conservation Areas.

    b. Data on the status of land in the Conservation Areas, including lands acquired or otherwise protected and lands on which any Development has occurred.

    c. Data derived from reports from the Local Permittees on the status of land outside the Conservation Areas, including Habitat loss, annexations and incorporations.

11. Create and maintain remote sensing database of current and historical aerial photos and/or satellite images.

12. As described in Section 4.4, maintain a list of biologists, acceptable to the Wildlife Agencies, who may be used to conduct surveys required by avoidance and minimization measures for specified Covered Species.

13. For surveys required by avoidance and minimization measures, maintain a list of survey protocols approved by CDFG and/or USFWS.

14. Maintain and provide to Permittees maps of modeled Habitat for Covered Species and a natural community map.

15. Maintain peer reviewed journal articles that provide information on siting and design of wildlife crossings for Covered Species.

16. Coordinate with State and Federal agencies on MSHCP funding.

17. Ensure transmission of Local Development Mitigation Fees from the County and the Cities to CVCC on a monthly basis.
18. Manage and account for all Local Permittee and Participating Special Entity revenues transmitted to CVCC for Plan implementation.
19. Prepare an Annual Report as described in Sections 6.4 and 8.7 providing information and evaluating progress toward Plan implementation and attainment of the Conservation Goals and Objectives of the Plan.
20. Maintain a record of land acquired or otherwise conserved by Conservation Area.
21. Maintain a record of all Major and Minor Amendments and Like Exchanges.
22. Prepare and submit to the Wildlife Agencies all applications for Major Amendments to the MSHCP as described in Section 6.12.4 of this document.
23. Coordinate with Permittees in the preparation and submittal to the Wildlife Agencies of Minor Amendments to the MSHCP, including seeking expedited processing of such amendments and maintaining records reflecting such amendments.
24. Participate in the Joint Project Review Process and provide appropriate data and analysis to ensure consistent Plan implementation and oversight, including providing the relevant Local Permittee an analysis of how the proposed project would impact the Conservation Area Conservation Objectives, and what the status of Rough Step is in the affected Conservation Area.
25. Concurrent with any annexation or deannexation, provide to the affected Parties a revised calculation of the applicable Conservation Objectives and other relevant information to the affected Permittees.
26. Assist in resolving disputes between the Permittees and the Wildlife Agencies.
27. Coordinate the preparation and administration of CVCC's annual budget.
28. Administer CVCC'S affairs as determined by CVCC Joint Powers Agreement.
29. Serve as Secretary of CVCC or designate a Secretary.
30. Develop policies and procedures to administer CVCC functions and activities.
31. Ensure compliance with federal, state and local laws and regulations.

6.1.2 Acquisition and Funding Coordinating Committee

To assist in implementing its duties under the MSHCP, CVCC shall form an Acquisition and Funding Coordinating Committee to provide input on funding priorities and Permittee acquisitions. The Committee shall be formed within one hundred twenty (120) days of the issuance of the Permits. The Committee shall be comprised of one representative from each of the Permittees that requests membership. Each such Permittee shall designate its representative and an alternate. The Wildlife Agencies shall be *ex officio* members of the Committee.

The Acquisition and Funding Coordinating Committee shall advise CVCC on Permittee Additional Conservation Land acquisitions and funding priorities, as requested. CVCC, however, will have the final decision-making authority in establishing and implementing these local

priorities. The Acquisition and Funding Coordinating Committee will also provide a forum to discuss Wildlife Agencies, BLM, NPS, USFS, State Parks, and CVMC land acquisition priorities and keep CVCC informed on acquisitions by non-local sources. CVCC shall establish policies, as appropriate, under which the Acquisition and Funding Coordinating Committee will make recommendations to CVCC. Such policies will include conflict of interest guidelines for the Committee members.

CVCC will acquire land and may administer a grant program to non-profit organizations and Permittees to conserve lands that contribute to MSHCP Reserve Assembly. CVCC will also coordinate conservation easement agreements with landowners, seek grants and other funding sources to assist with acquisition, and coordinate with other state and federal acquisition programs in the Plan Area to ensure efficiency and consistency among acquisition programs.

Acquisitions will be only from a willing seller. All appraisals to be used for the Local Permittees' acquisition program must be prepared to the Uniform Standards of Professional Appraisal Practice. CVCC will develop a process to resolve differences concerning the valuation of property.

6.1.3 Reserve Management Oversight Committee

The RMOC is the primary inter-agency group that will coordinate implementation of the Plan. The RMOC shall report to CVCC and shall be assembled within one hundred twenty (120) days of the issuance of the Permits. CVCC shall appoint the chair of the RMOC from among those listed below. The RMOC shall be composed of, at a minimum, one representative of each of the following:

1. Bureau of Land Management (designated by BLM)
2. California Department of Fish and Game (designated by CDFG)
3. California Department of Parks and Recreation (designated by State Parks)
4. Coachella Valley Conservation Commission (designated by CVCC)
5. U. S. Fish and Wildlife Service (designated by USFWS)
6. County of Riverside (designated by the Board of Supervisors)
7. Up to five other private or public entities that hold Reserve Lands as appointed by CVCC.

National Park Service (designated by NPS) and U. S. Forest Service (designated by USFS) will be *ex officio* members.

In the event one or more of the agencies represented on the RMOC does not at any time have a designated representative on the RMOC, the RMOC shall continue to function without that representation. CVCC may appoint additional members as deemed necessary to carry out the functions of the RMOC.

RMOC representatives shall have the authority necessary to ensure that the RMOC's oversight and advisory duties and responsibilities are successfully executed. The duties of the RMOC shall include, but not be limited to, the following:

1. Advise CVCC on and oversee implementation of the MSHCP Reserve System Management Program and Monitoring Program as described in Section 8 of this document, including assisting in prioritizing management activities that benefit the Reserve Lands. It is recognized that each agency that owns Reserve Lands has the ultimate responsibility for managing that property pursuant to the MSHCP.
2. Provide biological, technical, and operational expertise involving oversight of the Reserve Lands, including management, adaptive management procedures, and monitoring.
3. Provide technical assistance to RMUCs and the MPA.
4. Coordinate with RMUCs regarding management activities and issues.
5. Assist fire protection entities in identifying and mapping potential fuel reduction zones or fire break locations, as well as access routes for fire equipment in the event of wildland fires that pose safety concerns.
6. Review and provide input on reports and annual work plans prepared by the Land Manager on behalf of the RMUCs and by the MPA.
7. Review the Reserve Lands management budget and make recommendations to CVCC Executive Director regarding the budget.
8. Make recommendations to CVCC Executive Director regarding the format and timing of Annual Reports as required by Section 6.4 of this document.
9. Assist CVCC in the preparation of annual written reports on the Reserve Lands, including baseline assessments of Additional Conservation Lands.
10. Assist Permittees in the implementation of the terms and conditions of the MSHCP, as requested.
11. Review and approve RMUPs and amendments thereto.

The RMOC shall meet, at a minimum, twice annually or more frequently as needed. The RMOC shall attempt to reach consensus on recommendations. If at the determination of the chairperson of the RMOC a consensus cannot be reached within a reasonable time, the action shall be by majority vote of the members. Under all circumstances, the state and federal agencies reserve their rights under the MSHCP, IA, and state and federal law to take actions as they believe appropriate with respect to the management of their lands, even if those actions are in contradiction to the majority decision.

6.1.4 Reserve Management Unit Committees

Within one hundred twenty (120) days of the issuance of the Permits, an RMUC shall be established by CVCC for each of the RMUs, which are geographic areas within the MSHCP Reserve System where coordinated management by different entities is needed to achieve the Conservation Objectives. RMUs consist of one or more Conservation Areas and were identified

based on ownership and natural community patterns and similarities of anticipated management needs. RMUs are composed of land administered by NPS, USFS, and BLM; Wildlife Agency and Local Permittee Existing Conservation Lands; and Additional Conservation Lands. Within the RMUs, management obligations under the Plan may vary depending on land ownership or administrating agency. Six RMUs have been designated (See Figure 8-1) and are described below:

Unit 1. This unit consists of the following Conservation Areas: Cabazon, Stubbe and Cottonwood Canyons, Whitewater Canyon, Snow Creek/Windy Point, Highway 111/I-10, Whitewater Floodplain, Upper Mission Creek/Big Morongo Canyon, Willow Hole, Long Canyon, Edom Hill, Thousand Palms, West Deception Canyon, Indio Hills/Joshua Tree National Park Linkage, Indio Hills Palms, and East Indio Hills.

Unit 2. This unit consists of the Joshua Tree National Park Conservation Area.

Unit 3. This unit consists of the following Conservation Areas: Desert Tortoise and Linkage, and Mecca Hills/Orocopia Mountains.

Unit 4. This unit consists of the Dos Palmas Conservation Area.

Unit 5. This unit consists of the Coachella Valley Stormwater Channel and Delta Conservation Area.

Unit 6. This unit consists of the Santa Rosa and San Jacinto Mountains Conservation Area.

The Land Manager, as identified in Section 6.1.5, shall represent CVCC and the Local Permittees on the RMUCs. The Wildlife Agencies will also be represented on the RMUCs in RMUs in which they manage land. CVCC will also pursue MOUs with other entities that manage conservation land within an RMU whereby those entities will provide a representative to serve on the applicable RMUC. Through the Land Manager's participation in the RMUCs, CVCC will ensure that management of Local Permittee Mitigation Lands is consistent with the Plan Conservation Goals and Objectives. Through the RMUCs, CVCC will also seek to coordinate land management with the other entities that manage conservation land in the RMUs to optimize the management of all conserved land.

A RMUC shall be established for each of the RMUs with initial representation as follows:

Unit 1. The RMUC consists of the Land Manager, BLM, CDFG, USFWS, USFS, State Parks, TNC, CVWD, MSWD, and CNLM.

Unit 2. The RMUC consists of the Land Manager and NPS.

Unit 3. The RMUC consists of the Land Manager and BLM.

Unit 4. The RMUC consists of the Land Manager, BLM, CDFG, State Parks, CVWD and CNLM.

Unit 5. The RMUC consists of the Land Manager, CVWD, IID, and BLM.

Unit 6. The RMUC consists of the Land Manager, BLM, CDFG, State Parks, CVMC, the University of California Natural Reserve System (UCNRS), and USFS. A

representative of the Trails Advisory Subcommittee to the Santa Rosa and San Jacinto Mountains National Monument Advisory Committee (MAC) and a representative of USFWS shall be consulted as appropriate.

The composition of RMUCs may change as land is acquired or exchanged within the Plan Area.

The RMUCs have the following duties and responsibilities:

1. Manage land within the RMUs pursuant to the Plan.
2. Evaluate best available scientific data obtained from the Monitoring Program against the biological objectives in the RMUP applicable to the RMU and make recommendations on Adaptive Management to the RMOC.
3. Provide the necessary information to the Land Manager designated by CVCC for that RMU to prepare and submit an Annual Report on completed and proposed management actions to CVCC and the RMOC.
4. Coordinate with other RMUCs, the MPA, and the ISA, including attendance at annual meetings to discuss data collection methodologies and other reserve management issues.
5. The RMUC of the Santa Rosa and San Jacinto Mountains Conservation Area shall meet annually, or more often as needed, with the Trails Management Subcommittee (see Section 6.3) to review the results of the trails monitoring program and other relevant data, and shall advise the RMOC and CVCC regarding any issues identified through the monitoring.
6. Coordinate with the Land Manager in the preparation of an annual work plan for the RMU. The annual work plan will describe the conserved lands, the potential threats and proposed management prescriptions, a work schedule for management actions, and a budget.
7. Assist CVCC in the preparation of a RMUP for the RMU, in coordination with the Land Manager.

6.1.5 Land Manager

CVCC may retain or contract with a person or entity to manage Local Permittee Mitigation lands and coordinate through the RMUCs with the entities managing conservation land in the RMUs. The duties of the Land Manager include:

1. Manage the Local Permittees' Mitigation lands pursuant to the Plan.
2. Coordinate construction of fencing and barriers designed to control and manage public use of the Conservation Areas and maintain/replace those structures as needed over time.
3. Provide liaison between the RMUCs and appropriate law enforcement entities to keep trespass and illegal dumping activities under control.

4. Coordinate the construction and maintenance of public access trails and kiosks in appropriate locations approved by the RMOC, and provide current informational literature to the public.
5. Organize and coordinate a docent/volunteer corps to help with public access, interpretation, and construction of public trails and kiosk facilities.
6. Respond to public inquiries.
7. In coordination with the agencies on whose land the control activities would occur, carry out and coordinate exotic species control activities, focusing on those exotic species with the greatest impacts on the Covered Species, conserved natural communities, and the functioning of natural processes within the Conservation Areas.
8. In coordination with the agencies on whose land the exotic species control activities would occur, carry out, coordinate and/or contract for any additional management activity called for in the MSHCP Reserve System Management Program.
9. Facilitate the exchange of information regarding all completed and proposed management and Adaptive Management actions.
10. Prepare an annual work plan, in coordination with the RMUC, to be reviewed and commented on by the RMOC, and then submitted to the CVCC for budget approval. The elements of the annual work plan are described in Section 8.7
11. Provide annual reporting to CVCC and the RMOC on all completed and proposed land management and adaptive management actions.
12. Coordinate with the MPA regarding the Monitoring Program.

6.1.6 Monitoring Program Administrator (MPA)

The CVCC is responsible for Monitoring Program administration. Final responsibility will rest with the CVCC Executive Director. The Executive Director may appoint a staff member as his or her designee for purposes of overseeing Monitoring Program administration, but ultimate responsibility will remain with the Executive Director. Day to day responsibility for Monitoring Program administration will be part of the contract for the Monitoring Program, and a specific individual will be identified by the contractor as the Monitoring Program Administrator (MPA). That individual will report to the CVCC Executive Director or his/her designee. To ensure that Monitoring Program administration is adequately addressed the CVCC shall consult with the Wildlife Agencies regarding the provisions for the MPA in developing the Request for Proposals for the Monitoring Program contract.

The MPA's duties shall include but not be limited to the following:

1. Oversee the Monitoring Program for the Reserve Lands pursuant to Section 8 of this document, including, but not limited to, updating and refining the Natural Communities Map, compiling existing scientific data on Covered Species, and conducting inventories to determine plant and animal species' distribution and abundance.

2. Design and carry out the Monitoring Program in coordination with the Wildlife Agencies and other participating scientists. Coordinate the logistics of implementing the Monitoring Program with the Land Manager.
3. Provide Annual Reports to the CVCC for distribution to the RMOC, RMUCs, and other appropriate entities.
4. Prepare and submit other reports to CVCC, the RMOC, RMUCs, and the Land Manager as required by Section 8 of this document.
5. Coordinate with RMUCs; the Land Manager; and the ISA, other agencies, and entities as appropriate, to facilitate sharing information obtained through monitoring efforts. The MPA shall attend the RMOC and RMUC meetings as needed to ensure ongoing coordination and adequate information exchange between the Monitoring Program and the Management Program. The MPA shall meet quarterly with the RMOC, or the Wildlife Agencies if the RMOC does not meet quarterly, to review the progress of the Monitoring Program. The frequency of the meetings may be changed by the RMOC to be less often if appropriate.
6. Submit an annual budget proposal to CVCC Executive Director and a 3 to 5 year projected work plan and cost estimate for implementation of the Biological Monitoring Program.
7. Track other monitoring programs and regional monitoring efforts not included in the Plan and coordinate these with the Monitoring Program as appropriate.

6.2 MSHCP Reserve Management Unit Plan

CVCC or its designee shall work with the RMUCs to develop RMUPs for review and approval by the RMOC to define specific management actions, schedules, and responsibilities for each RMU. Each RMUP shall be prepared within three (3) years after Permit issuance. Coordination with other RMUs should be reflected in the RMUP as appropriate. The RMUP shall incorporate the Management Program measures and activities in Section 8 with appropriate refinements. The RMUP shall generally contain the following elements:

1. A brief description of each RMU, including acreage, regional setting, current staffing and management efforts, existing partnerships, recreational uses, and previous land uses.
2. The MSHCP Plan Conservation Goals and Objectives for Covered Species, Essential Ecological Processes, Biological Corridors and Linkages, and conserved natural communities.
3. A physical description of each RMU including, but not limited to, distribution and abundance of Covered Species, conserved natural communities present, significant problems that may affect the RMU, and the context of the RMU with respect to the MSHCP Plan.
4. Maps of proposed future conditions, including recreational facilities, administrative facilities, special management areas, etc.
5. Identification, prioritization, and costs of specific management actions needed to implement the RMUP.

6. Identification of staffing, including law enforcement, and funding requirements to implement the RMUP.
7. Identification of potential threats to the RMU, such as toxic spills, and any preventive measures and coordinated response measures that would be Feasible to avoid or minimize impacts.
8. Identification of partnership opportunities.
9. A description of the Monitoring Program activities that will occur within the RMUs.
10. A delineation of the coordination between the Monitoring Program and the Management Program, including Adaptive Management, for the RMU.

6.3 Trails Management Subcommittee

A Trails Management Subcommittee will be established by CVCC to annually review and evaluate the Public Use and Trails Plan for the Santa Rosa and San Jacinto Mountains Conservation Area. Information to be considered yearly will include data gathered through monitoring activities and relevant information from other sources. The Subcommittee will report to both the RMOC and the MAC regarding implementation of and recommended modifications to the Public Use and Trails Plan. The RMOC or MAC may also request the Subcommittee to address other issues as needed.

The Subcommittee will consist of:

- One representative each from the cities of Palm Springs, Cathedral City, Rancho Mirage, Palm Desert, Indian Wells, Indio, and La Quinta. The city representatives shall be appointed by the respective city councils.
- One representative each from the CVMC, County Parks, the Wildlife Agencies, USFS, BLM, and the MAC. Each of these agencies shall appoint its representative.
- At least five individual representatives of trail interest organizations, environmental organizations, and independent researchers. These representatives shall be appointed by CVCC.

The CVCC may from time to time alter the composition and functions of the Trails Management Subcommittee.

Decisions on Allowable Uses will ultimately be made by the agency or jurisdiction responsible for management of those lands.

The Trails Management Subcommittee's duties shall include but not be limited to the following:

1. Complete an annual review of the effectiveness of the overall trails management program. Annual review will include an assessment of bighorn sheep population trends, recreational trail use data, and other new data.

2. Make recommendations to both the Santa Rosa and San Jacinto Mountains RMUC and the Santa Rosa and San Jacinto Mountains National Monument Advisory Committee regarding modifications to the trails management program. The RMUC will make recommendations to CVCC for the portions of trails on non-federal land; the Monument Advisory Committee will make recommendations to the Federal land management agencies.
3. Make recommendations for decommissioning and removing trails to the RMOC and Monument Advisory Committee. Final approval for trail decommissioning and removal rests with the entity having jurisdiction over the applicable lands.
4. Assist the RMUCs, the Land Manager, and the land management agencies with providing information and education to trail users about the trails management program.

6.4 Annual Reporting

To ensure that the Permittees are in compliance with the Plan, an Annual Report will be prepared by CVCC and submitted to the Wildlife Agencies and Permittees. The Annual Report for the preceding calendar year must be submitted by March 30. The report will be presented at a CVCC meeting, which will be a public workshop, and copies of the report will be made available to the public. The Annual Report will include the following information:

1. An overview of the status of the Conservation Areas.
2. Results of biological monitoring, identification of Adaptive Management actions identified, and whether or not such actions were implemented.
3. A description of Reserve Lands' management activities for the previous year.
4. An accounting of the number of acres acquired (in fee or conservation easement), conserved through MOUs for cooperative management, or otherwise protected during the previous year to achieve identified Conservation Objectives. This information will be used in conjunction with the information in 6.5 below to delineate the progress made toward achieving each of the Plan's Conservation Objectives and to demonstrate that the Species' Conservation Goals and Objectives remain achievable.
5. An accounting of the number of acres of Core Habitat, Essential Ecological Processes, Biological Corridors and Linkages, and conserved natural communities within each Conservation Area developed or impacted by Covered Activities during the previous year.
6. An accounting of the number of acres of Core Habitat and Other Conserved Habitat for the species and conserved natural communities outside the Conservation Areas developed or impacted by Covered Activities during the previous year. This will be derived from information provided by the Local Permittees based on acres calculated at the issuance of grading permits, or such other permits as may be issued to authorize the disturbance.
7. An accounting of the status of each Covered Species with respect to the Species Conservation Goals and Objectives in Sections 4 and 9.
8. An evaluation of any significant issues encountered in Plan implementation during the previous year and their proposed resolution.

9. Expenditures for acquisition and Reserve Lands management over the previous year and applicable budgets for the upcoming fiscal year.
10. Summary of compliance activities required of Permittees, such as adoption of ordinances.
11. A copy of the audit of CVCC finances for the most recent fiscal year available.
12. Summary of all unauthorized/unpermitted activities detected and enforcement actions taken during the previous year.
13. Additional technical, commercial, and scientific information and/or data that are reasonably available and necessary to evaluate performance and compliance with the commitments and objectives of the Plan shall be provided to the Wildlife Agencies upon written request.

6.5 Rough Step and Rough Proportionality Analyses

The MSHCP Reserve System will be assembled over time and, when assembly is completed, must be in a configuration and contain suitable habitats (both location and acres) that provide for the Conservation of Covered Species. Acquisition is an essential component of Reserve System Assembly. As the Additional Conservation Lands are acquired, the Parties and the public must be able to determine that:

1. Lands being conserved within the Conservation Areas achieve the Conservation Objectives for Covered Species;
2. Development on lands within the Conservation Areas is not substantially reducing the opportunity to conserve the Additional Conservation Lands and thereby protect those areas that are critical to meeting Covered Species and natural community Conservation Objectives; and
3. Acquisition priorities at any point in time are appropriately focused on conserving parcels within the Conservation Areas needed to meet Covered Species and conserved natural communities Conservation Objectives.

To assist the Parties in this evaluation, there will be an annual Rough Step analysis conducted by CVCC for each Conservation Area. Section 6.1 of Appendix I lists the Conservation Objectives for Core Habitats, Essential Ecological Process areas, Biological Corridors and Linkages, and conserved natural communities for each Conservation Area. The annual Rough Step analysis will be done for each Conservation Objective**.** In addition, a real-time Rough Step analysis will be prepared for a Conservation Area whenever a Development is proposed in that Conservation Area. This information will be provided to the Permittee considering the proposed Development and to the Wildlife Agencies as part of the Joint Project Review Process described in Section 6.6.1.1.

Selection of the Rough Step Analysis Units was based on several factors including:

1. The Conservation Areas are discrete units based on biological, and to a lesser extent jurisdictional considerations, and are the geographic units used in delineating Conservation Objectives.
2. The Conservation Objectives within each Conservation Area identify how many acres of different Core Habitats, Essential Ecological Processes, Biological Corridors and Linkages and conserved natural communities must be conserved.

The rule for determining if the Plan is within the Rough Step parameters is:

$$a_t \leq r \times c_t + .1 \times [a - (r \times c_t)]$$

$$r = a/c$$

Where:

a = total acres of a Core Habitat, Essential Ecological Process area, Biological Corridor or Linkage, or natural community in the Conservation Area that could be developed while still meeting the Conservation Area's Conservation Objectives.

a_t = the number of acres of a Core Habitat, Essential Ecological Process area, Biological Corridor or Linkage, or natural community in the Conservation Area that could be lost at a point in time (t) while being consistent with the Rough Step rule.

c = the total number of additional acres of Core Habitat, Essential Ecological Process area, Biological Corridor or Linkage, or natural community in the Conservation Area that has to be conserved to meet the Conservation Area's Conservation Objectives.

c_t = the acres of Conservation of a Core Habitat, Essential Ecological Process area, Biological Corridor or Linkage, or natural community within the Conservation Area that have been conserved based on the definition of Additional Conservation Lands.

Rough Step analysis ensures**,** on an annual basis, that Conservation of Additional Conserved Lands is within 10% of the level needed to stay in balance with the level of Development.

If the Rough Step rule is not met during any analysis period, the Permittees must conserve appropriate lands necessary to meet a specific Conservation Objective within the Rough Step Analysis Unit to bring the Plan back into the parameters of the rule prior to authorizing additional loss of the Core Habitat, Essential Ecological Process area, Biological Corridor or Linkage, or natural community for which the rule was not achieved. It is anticipated that as the Additional Conservation Lands are acquired in each Conservation Area, it may be appropriate to transfer acreage Conservation Goals associated with Conservation Objectives for both specific conserved natural communities and Covered Species between Conservation Areas. Section 6.12.3 of this document addresses this situation. Section 23.5 of the IA describes the Wildlife Agencies' rights to revoke or suspend all or portions of the Permits, in accordance with

the laws and regulations in force at the time, for failure to comply with the Rough Step requirements.

CVCC will include in the Annual Report habitat losses and gains associated with public and private Development projects and will track MSHCP Reserve System Assembly.

The Annual Report will also provide this information by Conservation Objective for Core Habitats, Essential Ecological Process areas, Biological Corridors or Linkages, and conserved natural communities, consistent with "HabiTrak" methodology. HabiTrak, an ArcView extension, was developed cooperatively by the Wildlife Agencies, local jurisdictions, special districts, and others to meet the reporting requirements for multiple species HCPs. It is designed to be an easy-to-use, stand-alone desk-top application that can be used by non-GIS staff. The tool uses common and standardized data to prepare standardized tables and maps for the Annual Reports.

Section 5.2.2.3 discusses rough proportionality, which assures that Conservation keeps pace with Development in the Plan Area.

6.6 Obligations of the Participants

6.6.1 Obligations of the Local Permittees

The Local Permittees are the cities of Cathedral City, Coachella, Desert Hot Springs, Indian Wells, Indio, La Quinta, Palm Desert, Palm Springs, and Rancho Mirage; the County; County Flood Control; County Parks; County Waste; CVCC, CVAG, CVWD,~~;~~ Mission Springs Water District (MSWD), and IID. The Local Permittees will conserve 96,400 acres (inclusive of Caltrans' obligation) in the Conservation Areas. Of this, ~~7,500~~7,700 acres are already owned by Permittees and that acreage will be conserved through the Plan. The Local Permittees shall establish an endowment to fund the Monitoring and Management Programs for those lands in perpetuity. The Local Permittees must also comply with all other terms and conditions of the MSHCP and IA (See Section 13.0 of the IA), including, but not limited to:

- ***Within Conservation Areas***
  - -- Ensure achievement of the Plan's Conservation Goals and Objectives and Required Measures in each Conservation Area identified in Section 4.3 and attainment of the Species Conservation Goals and Objectives identified in Section 9.
  - -- As described in Sections 4.1.2 and 4.2.2.2.1, conserve Local Permittee owned land in the Conservation Areas. Except as otherwise set forth in this section, the Local Permittees shall commit their currently not-conserved lands to conservation in perpetuity within 3 years of Permit issuance.
  - -- Existing and future lands on which the County Flood Control has Take Authorization for construction, operation, and maintenance of facilities that are Covered Activities will be conserved only to the extent compatible with the construction, operation, and maintenance of the facilities.

- -- Participate in the Joint Project Review Process for projects within Conservation Areas as described in Section 6.6.1.1 and implement the Land Use Adjacency Guidelines described in Section 4.5.
- -- Upon request from the Wildlife Agencies, the Local Permittees shall provide (a) an analysis and determination of consistency with the Plan at the time of, and along with, certification of applicable CEQA documents for approval of Development projects within Conservation Areas and (b) a copy of the final project approval documents within 30 days.
- -- Applicable Permittees will employ HANS as described in Section 6.6.1.2 as appropriate.
- -- Jurisdictions that received Take Authorization for the Coachella Valley fringe-toed lizard pursuant to the Incidental Take Permit issued for that species pursuant to the CVFTL HCP will relinquish the Permit and comply with Section 6.6.1.3 and IA Section 16.2.

➢ ***Within and Outside Conservation Areas***

- -- Ensure that habitat preservation is occurring in rough proportionality with Development and that Reserve Assembly occurs as contemplated in the MSHCP.
- -- Ensure compliance for public and private projects with all applicable Required Measures in Section 4.4.
- -- If a project shares a common boundary with a Conservation Area, require compliance with Land Use Adjacency Guidelines set forth in Section 4.5.
- -- Ensure compliance with Plan requirements for public projects.
- -- Impose adopted Local Development Mitigation Fees. The Local Permittees shall be responsible for collecting all revenues generated within their respective jurisdictional boundaries for Plan implementation and transferring those revenues to CVCC within thirty (30) days of collection.
- -- Adopt an appropriate Plan implementation mechanism as set forth in Section 11.1 of the IA.
- -- Maintain a record of total acres and location of Development within its jurisdiction and transmit this information to CVCC monthly. The undeveloped portions of parcels in Conservation Areas on which Development is approved by a Permittee shall count toward meeting the MSHCP's Conservation Objectives only when the undeveloped portion of the parcel is legally described and permanently protected through an appropriate Legal Instrument, and provision is made for the land to be monitored and managed pursuant to the MSHCP's Monitoring Program and Management Program. Review of individual Development projects will occur in accordance with the Implementation Manual.
- -- At the end of each calendar year, convey any changes in city boundaries or general plan land use designations to CVCC for inclusion in its Annual Report to the Wildlife Agencies.
- -- Take will be allocated by the relevant Permittee(s).

-- On parcels approved for Development, the Permittees shall encourage the opportunity to salvage Covered sand-dependent species in accordance with the Implementation Manual.

To mitigate the impacts of the interchange and related arterial projects identified in Section 7.2.1, Caltrans, CVAG, and CVCC will acquire 1,795 acres in Conservation Areas in accordance with the mitigation matrix shown in Section 6.2 of Appendix I to contribute to Plan implementation and will contribute $1,077,000 to the Endowment Fund for the Monitoring and Management Programs, including Adaptive Management of those lands. This acreage is part of the 96,400 acre Local Permittee obligation described above.

To mitigate the impacts of those transportation projects identified as Covered Activities in Section 7.2.3, CVAG shall contribute $30 million from Measure A or other funds toward acquisition and the Monitoring Program, the Management Program, and Adaptive Management If the Permits issued in conjunction with the Plan are ever suspended or revoked, these transportation projects will, as described in the IA, be mitigated through the establishment of a conservation bank that incorporates and recognizes the contributions made by CVAG to Plan implementation as adequate mitigation for the projects. Covered Activity transportation projects not specifically listed in Sections 7.2.1, 7.2.2, or 7.2.3 of the MSHCP would mitigate through payment of the Local Development Mitigation Fee or by other appropriate means.

Of the approximately 7,000 acres that CVWD owns in the Conservation Areas, CVWD shall cooperate with CVCC toward the conservation of those lands, as follows:

- Approximately 1,200 acres of the 7,000 acres are in the Whitewater Floodplain Conservation Area and are currently conserved pursuant to the CVFTL HCP. These lands will be permanently committed to conservation under the MSHCP.
- Lands on which CVWD has Take Authorization for O&M of facilities that are Covered Activities, will be conserved only to the extent compatible with the O&M of the facilities.
- Future facilities (Dike 4 and Martinez recharge basins and future water- related facilities) that are Covered Activities requiring a Minor Plan Amendment with criteria will be mitigated by commitment of CVWD lands within Essential Peninsular bighorn sheep Habitat to conservation at a 1:1 ratio of Conservation to Development. If, in addition to these Covered Activities, CVWD develops any of its land in a Conservation Area consistent with the Conservation Objectives, CVWD may commit an equivalent dollar value of its lands in the Conservation Areas to permanent conservation in lieu of paying the Development Mitigation fee. CVCC will continue to be responsible for ensuring that the Conservation Area Conservation Objectives are met.
- For future projects outside the Conservation Areas, CVWD may commit an equivalent dollar value of its lands in the Conservation Areas to permanent conservation in lieu of paying the Local Development Mitigation Fee. These lands are not subject to the requirement that Local Permittee-owned lands that are not currently conserved must be committed to Conservation in perpetuity within 3 years of Permit issuance.
- If before Year 50 of Plan implementation, CVWD still owns land in the Conservation Areas that has not been conserved by any of the foregoing methods, CVWD shall

cooperate with CVCC in the conservation of these lands through acquisition by CVCC or other means.

- Conservation will be accomplished through conveyance of fee title to CVCC, recordation of a conservation easement, or entering into an MOU for cooperative management with CVCC.

CVWD will contribute $3,583,400 toward the Endowment Fund for the Monitoring Program, the Management Program, and Adaptive Management. This may be paid in full the first full fiscal year after Permit issuance, or it may be paid in installments over a maximum of five years, beginning in the first full fiscal year after Permit issuance. Interest shall be paid by CVWD at the annual rate of 5.14% on the outstanding balance.

Additional CVWD contributions are:

1. CVWD will establish 66 acres of permanent habitat for California black rail and Yuma clapper rail in the Coachella Valley Stormwater Channel and Delta Conservation Area to replace habitat that is periodically altered by flood control and drain maintenance activities. CVWD will ensure that the water used to support the managed marsh habitat is irrigation water from the Lower Colorado River (LCR) or is other water with the same selenium concentration as water from the LCR or that meets an EPA selenium standard for protection of aquatic life that has received a No Jeopardy determination from USFWS, whichever is greatest. Within two years of Permit issuance, a plan detailing the location, water supply, monitoring and management responsibilities, and funding, shall be prepared by CVWD and submitted to the Wildlife Agencies for review and approval. The habitat will be established within three years of approval by the Wildlife Agencies of this plan to establish the habitat. As part of its Water Management Plan, CVWD will conduct monitoring of selenium concentrations in the drains and the Coachella Valley Stormwater Channel.
2. CVWD will establish permanent riparian habitat including at least 44 acres of Sonoran cottonwood-willow riparian forest in the Coachella Valley Stormwater Channel and Delta Conservation Area to replace habitat that is periodically altered by flood control maintenance activities. The habitat will contribute to the conservation of this natural community and the riparian birds covered by the Plan. Within two years of Permit issuance, a plan detailing the location, water supply, and monitoring and management responsibilities, including funding, shall be prepared by CVWD and submitted to the Wildlife Agencies for review and approval. The habitat will be established within three years of approval by the Wildlife Agencies of this plan to establish the habitat.
3. CVWD will establish at least 25 acres of managed replacement habitat on a 1:1 ratio for desert pupfish, using low selenium water, at a site or sites to be determined with concurrence from the Wildlife Agencies. It is estimated that approximately 325 acre-ft/yr of water would be required to maintain 25 acres of replacement habitat, replacing evaporation and maintaining appropriate flow-through rate. Ongoing maintenance and adjustments will be required, including vegetation control and dike and bank maintenance, to achieve desired habitat characteristics. This habitat will replace the 25 acres of habitat that is periodically altered by maintenance activities in drains and flood control channels that contain pupfish habitat. CVWD will also develop a study to

evaluate the potential effect of routine drain maintenance on pupfish occupying the drains and to determine the efficacy of modifying maintenance practices to avoid or minimize potential Take. The study will include method of surveying for pupfish, effects of the direction in which drains are cleaned (upstream or downstream), the manner in which the drain is cleaned (one side at a time or both), and the timing of sediment and vegetation removal. The study proposal will be prepared and submitted to the Wildlife Agencies within two years of Permit issuance. The study will be initiated in the field season immediately following approval by the Wildlife Agencies. If the findings indicate that modification of the maintenance practices would significantly minimize impacts to pupfish, CVWD will modify its maintenance practices. As part of its Water Management Plan, CVWD will conduct monitoring of selenium concentrations in the drains and the Coachella Valley Stormwater Channel.

4. As described in Section 4.3.15, CVWD will enhance and manage Coachella Valley round-tailed ground squirrel habitat on land it owns in the East Indio Hills Conservation Area to offset impacts to this species from CVWD's O&M activities in the Coachella Valley Stormwater Channel and Delta Conservation Area.

Of the approximately 900 acres that IID owns in the Conservation Areas, IID shall cooperate with CVCC toward the conservation of those lands, as follows:

- Lands on which IID has Take Authorization for O&M of facilities that are Covered Activities, will be conserved only to the extent compatible with the O&M of the facilities.
- For future projects outside the Conservation Areas, IID may commit an equivalent dollar value of its lands in the Conservation Areas to permanent Conservation in lieu of paying the Local Development Mitigation Fee. These lands are not subject to the requirement that Local Permittee-owned lands that are not currently conserved must be committed to Conservation in perpetuity within 3 years of Permit issuance.
- If IID develops any of its land in a Conservation Area consistent with the Conservation Objectives, IID may commit an equivalent dollar value of its lands in the Conservation Areas to permanent conservation in lieu of paying the Local Development Mitigation Fee. CVCC will continue to be responsible for ensuring that the Conservation Area Conservation Objectives are met.
- If before Year 50 of Plan implementation, IID still owns land in the Conservation Areas that has not been conserved by any of the foregoing methods, IID shall cooperate with CVCC in the conservation of this land through acquisition by CVCC or other means.
- Conservation will be accomplished through conveyance of fee title to CVCC, recordation of a conservation easement, or entering into an MOU for cooperative management with CVCC.

IID will contribute $525,000 toward the Endowment Fund for the Monitoring Program, the Management Program, and Adaptive Management. This may be paid in full the first full fiscal year after Permit issuance, or it may be paid in installments over a maximum of five years, beginning in the first full fiscal year after Permit issuance. Interest shall be paid by IID at the annual rate of 5.14% on the outstanding balance.

Of the approximately 61 acres that MSWD owns in the Conservation Areas, MSWD shall cooperate with CVCC toward the conservation of those lands, as follows:

- Lands on which MSWD has Take Authorization for O&M of facilities that are Covered Activities, will be conserved only to the extent compatible with the O&M of the facilities.
- For future projects outside the Conservation Areas, MSWD may commit an equivalent dollar value of its lands in the Conservation Areas to permanent Conservation in lieu of paying the Local Development Mitigation Fee. These lands are not subject to the requirement that Local Permittee-owned lands that are not currently conserved must be committed to Conservation in perpetuity within 3 years of Permit issuance.
- For future facilities that are Covered Activities in a Conservation Area for which MSWD is the lead agency, MSWD may commit an equivalent dollar value of its lands in the Conservation Areas to permanent conservation in lieu of paying the Local Development Mitigation Fee. CVCC will continue to be responsible for ensuring that the Conservation Area Conservation Objectives are met.
- If before Year 45 of CVMSHCP implementation, MSWD still owns land in the Conservation Areas that has not been conserved by any of the foregoing methods, MSWD shall cooperate with CVCC in the conservation of these lands through acquisition by CVCC or other means.
- Conservation will be accomplished through conveyance of fee title to CVCC, recordation of a conservation easement or other legal instrument, or entering into an MOU for cooperative management with CVCC.
- It is understood that some portion of MSWD's 61 acres will be needed for future facilities including permanent operational sites. These future facilities will require limited area; MSWD agrees to cooperate with CVCC to ensure that these facilities are consistent with the CVMSHCP conservation goals and objectives, required measures, avoidance and minimization measures, and land use adjacency guidelines as applicable.

MSWD will contribute a total of $350,000 toward the CVMSHCP as described above to support the Monitoring Program, the Management Program, and Adaptive Management. This may be paid in full the first full fiscal year after approval of the Major Amendment, or it may be paid in installments over a maximum of five years, beginning in the first full fiscal year after approval of the Major Amendment. Interest shall be paid by MSWD at the annual rate of 5.14% on the outstanding balance.

Additional MSWD contributions are:

1. A contribution of $110,000 toward the Endowment Fund for the Monitoring Program, the Management Program, and Adaptive Management. This contribution will provide for the permanent monitoring and management of the MSWD lands in the Conservation Areas in perpetuity as required by the CVMSHCP, including removal of invasive species and monitoring of mesquite hummocks. CVCC would also assume responsibility for the monitoring and management of those lands transferred by MSWD in perpetuity as a result of MSWD's contribution to the Endowment Fund. Prior to transfer of lands to CVCC, MSWD will cooperate with CVCC to enhance and manage the mesquite

hummocks on land it owns in the Conservation Areas to mitigate and provide for the Conservation of impacts to this natural community from MSWD's operation and management activities in the CVMSHCP Conservation Areas. The MSWD contribution to the CVCC Endowment Fund will also support management and monitoring of mesquite hummocks on other CVCC lands additional to those transferred to CVCC by MSWD.

2. With regard to the CVMSHCP requirements to maintain the mesquite hummock natural community, MSWD agrees to provide as available: 1) data on water levels in the Willow Hole Conservation Area, the "fault dunes" and associated mesquite hummocks east and west of Palm Drive; 2) water samples for a study of stable isotopes in mesquite tissue for use by the CVCC Monitoring Program team; 3) historical photographs or aerial imagery of the mesquite hummock areas in the Willow Hole Conservation Area that would help document changes from current conditions; 4) technical expertise of MSWD staff, or consultants as appropriate, in coordination with the CVCC Monitoring Team. MSWD is willing to provide any and all relevant data they have available to CVCC; however, MSWD does not have facilities which will provide needed data near the mesquite hummocks habitat. Additional facilities will be required to collect data on groundwater levels near the hummocks habitat. The District will also provide funds to be used for water monitoring wells or other means of gathering data on groundwater levels related to mesquite hummocks. The determination of how to best accomplish this monitoring, including placement of wells will be made in coordination with the CVCC staff, CVCC monitoring team, Wildlife Agencies, relevant Reserve Management committees, other relevant Permittees, and MSWD staff. These data and support from MSWD will enhance understanding of the hydrological regimes that support mesquite hummocks in the CVMSHCP area and provide baseline data for the ongoing monitoring of mesquite hummocks. The District will provide funds to support monitoring and analysis of groundwater levels in the amount of $120,000.

3. To improve the water available to mesquite hummocks, MSWD will provide funds to CVCC to be used for the removal of non-native tamarisk from the Willow Hole Conservation Area in the amount of $100,000 to cover the costs of tamarisk removal from approximately_30 acres of conservation lands. CVCC will ensure that removal of tamarisk occurs on lands controlled by CVCC or other public or private conservation lands.

4. MSWD will contribute $20,000 to the cost of a study being conducted by CVCC of the feasibility of mesquite restoration and development of a mesquite restoration plan. CVCC has initiated this study with creation of a constraints analysis detailing site conditions where current stands of mesquite are now absent (but were extant within the past century), declining, or are currently doing well (defined by leaf area and fruit production). MSWD will contribute to the mesquite study plan which will detail the location, water requirements, and monitoring and management responsibilities, including funding, for this mesquite restoration effort. CVCC will provide the final study to the Wildlife Agencies for review and approval.

5. CVCC is responsible for evaluating the relationship between mesquite hummocks and groundwater through the Monitoring Program. MSWD will contribute to and participate

in this research for the mesquite hummock areas within their district boundary. The objectives of this research will include: (1) to monitor the plant characteristics and hydrologic conditions of mesquite hummocks in the Coachella Valley; (2) to determine the source(s) of water utilized by the mesquite; and (3) to relate vegetation health and reproduction to varying hydrologic conditions in the Coachella Valley. The study will involve compiling existing vegetation and hydrologic data as GIS layers, coordination with MSWD on ground-water level data they collect from existing wells, and monitoring plant characteristics and hydrologic conditions at the sites including Willow Hole. The water-level trends from these sites can be compared to precipitation and pumping trends to help determine the natural and/or human-induced impacts on the groundwater system. The GIS will be updated on an annual basis with the data collected by other agencies during this study. These data will be used in conjunction with the hydrologic data to determine if there is a correlation between the health of the mesquite and the hydrologic properties at the site (depth to water and soil moisture). Persistence of the mesquite trees will be monitored to determine if there is a relationship between water-table depth, soil moisture, and reproduction.

6. If a study undertaken by the CVCC demonstrates the decline of mesquite hummock areas in the Willow Hole Conservation Area, MSWD will work with CVCC, the Wildlife Agencies, and other relevant Permittees to identify and implement a plan to enhance, restore, and maintain the mesquite hummocks natural community and to address changed circumstances, identified in the CVMSHCP, that affect this natural community as a part of their CVMSHCP implementation activities. MSWD commits to participate in additional measures that will result from the CVMSHCP Adaptive Management Plan analysis to the extent that measures are reasonable, feasible, and, within the available resources of the MSWD. Further, MSWD confirms that the goals of the Water Management Plan it is preparing in cooperation with CVWD and Desert Water Agency are consistent with the objectives of the CVMSHCP to manage the groundwater resource in perpetuity for the benefit of mesquite hummocks and the species that depend on this natural community.

6.6.1.1. Joint Project Review Process within Conservation Areas

For purposes of overseeing compliance with the requirements of the MSHCP and the IA, a Joint Project Review Process shall be instituted by CVCC for all projects under the Local Permittees' jurisdiction in a Conservation Area that would result in disturbance to Habitat, natural communities, Biological Corridors, or Essential Ecological Processes. O&M of Covered Activities is not subject to the Joint Project Review Process. This process shall in no way limit the Local Permittees' land use authority. The purpose of the Joint Project Review Process is to allow CVCC to facilitate and monitor implementation of the MSHCP. To assist the Local Permittees in meeting the Conservation Goals and Objectives and implementing the Required Measures of the Plan, Local Permittees' Covered Activities identified in Tables 7-1 through 7-12 as having the potential to affect connectivity of habitat within the Conservation Areas shall consult with CVCC at the pre-design stage regarding the size, location, and configuration of wildlife undercrossings. Consultation with CVCC is needed at this early stage to ensure that alternatives are fully evaluated to achieve Conservation Area Conservation Objectives prior to public release of environmental documents prepared pursuant to CEQA.

CVCC staff shall participate in the Joint Project Review Process to ensure consistent Plan implementation and oversight. CVCC shall have neither jurisdiction over land use decisions by Permittees nor the authority to prevent a Permittee from approving a project. The application will not be deemed complete by the Permittee prior to completion of the Joint Project Review Process. The review process is as follows:

Step 1. Within thirty (30) calendar days of receipt of an application for a project in a Conservation Area, the Local Permittee shall provide CVCC with a copy of the project application. Alternatively, a potential project applicant may request a pre-application review directly with CVCC, who shall provide notice to the applicable Local Permittee. A project application or a request for a pre-application review shall include, at a minimum, a project description; a map in either electronic format compatible with CVCC's GIS or a map on a USGS 7.5 minute topographic map, indicating the location of the proposed project, including section, township, and range; and Assessors Parcel Number(s).

Step 2. Upon receipt of the project information, CVCC staff shall use a spatial data base such as GIS coverages of species habitat distribution models, Essential Ecological Process areas, and Biological Corridors and Linkages, to provide the Local Permittee an analysis of how the proposed project would impact the Conservation Area Conservation Objectives and Required Measures delineated in Section 4.3 for each Conservation Area and in Section 9 for each proposed Covered Species' Goals and Objectives, and how the project would affect the maintenance of Rough Step in the affected Conservation Area. At the discretion of the Local Permittee after submittal of an application, an initial project review meeting may be held with CVCC staff and the project applicant. Any initial project review meeting shall be scheduled by CVCC to occur within thirty (30) calendar days of the transmittal of the project information to CVCC. Within thirty (30) calendar days of receipt of the project information, or within fourteen (14) calendar days after an initial project review meeting if one is held, CVCC staff shall prepare and distribute comments that address the proposed project's consistency with the Conservation Area Conservation Objectives and Required Measures and delineate the status of Rough Step in the affected Conservation Area. The comments shall be sent to the appropriate Local Permittee, the project applicant, and the Wildlife Agencies. CVCC shall also send the Wildlife Agencies a copy of the project application. The Implementation Manual should be consulted to determine the specifics of calculating impacts of new or repowered wind energy facilities.

Step 3. The Wildlife Agencies' comments, if any, shall be sent to CVCC and the appropriate Local Permittee within thirty (30) calendar days of receipt of CVCC's comments.

Step 4. Based on CVCC's analysis and any Wildlife Agencies' comments, if CVCC finds that the proposed project is consistent with the Conservation Area's Conservation Objectives and Required Measures as defined in Section 4.3 and Goals and Objectives for each proposed Covered Species as defined in Section 9, the Local Permittee shall be so notified with copies to the Wildlife Agencies.

Step 5. Based on CVCC's analysis and any Wildlife Agencies' comments, in the event CVCC identifies inconsistencies between the Conservation Area Conservation Objectives and the proposed project, and/or failure to incorporate applicable Required Measures, CVCC staff and appropriate Local Permittee and project applicant representatives shall meet and confer to

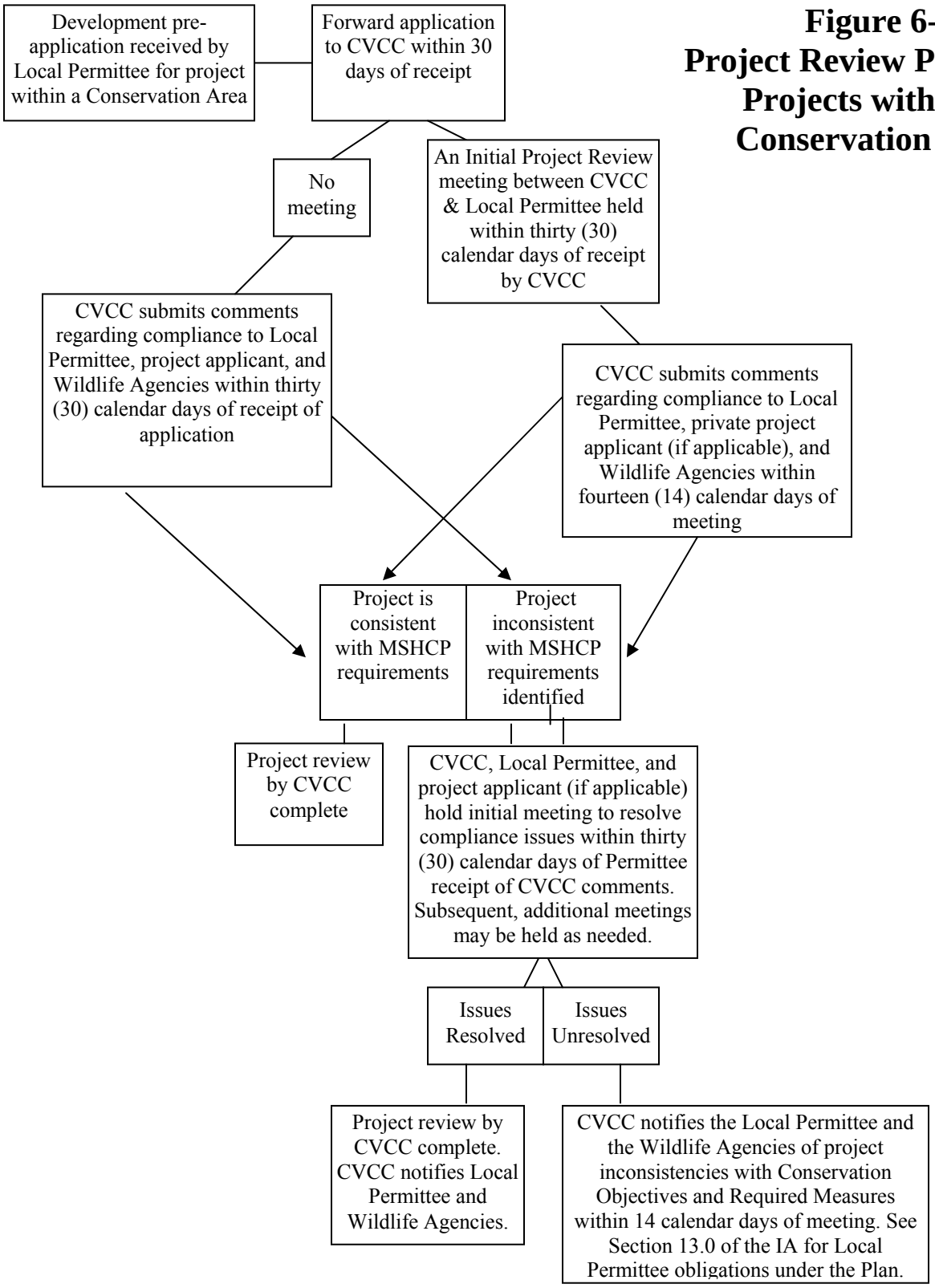
identify requirements necessary to achieve compliance. Alternatively, CVCC may propose acquisition of the property if the owner is a willing Seller. Section 4.2.2.2.2 describes the acquisition program. The initial meeting to resolve inconsistencies shall be held within thirty (30) calendar days following the CVCC deadline for receipt of Wildlife Agencies' comments. Additional meetings may be held as necessary. If the inconsistencies are resolved, CVCC will notify the Local Permittee and Wildlife Agencies of the resolution within fourteen (14) calendar days of the meeting. If the inconsistencies cannot be resolved, CVCC will provide written notice to the Local Permittee and the Wildlife Agencies of the Conservation Objectives and Required Measures with which the Development proposal is inconsistent within fourteen (14) calendar days of the meeting. See Sections 13.0 of the IA for the Local Permittees' obligations under the Plan and see Section 23.0 of the IA for potential remedies for failure to comply with the obligations.

6.6.1.2 Property Owner Initiated Habitat Evaluation and Acquisition Negotiation Strategy (HANS)

The County and impacted cities will employ HANS in conjunction with the Joint Project Review Process in portions of the Santa Rosa and San Jacinto Mountains Conservation Area. A map of the area where the HANS Process will be used is shown in Section 4.3.21. HANS applies to property in the identified areas that may be needed for inclusion in the MSHCP Reserve System. HANS ensures that a determination will be made of what properties in this area are needed for the MSHCP Reserve System, that the owners of property needed for the MSHCP Conservation Area are compensated, and that owners of land not needed for the MSHCP Conservation Area shall receive Take Authorization for Covered Species through the Permits issued to the County and the Cities pursuant to the MSHCP.

The County, the Cities, CVCC, or various State and Federal Agencies may obtain interests in property needed to implement the MSHCP over time (interest may be obtained in fee, conservation easement, deed restriction, land exchange, or other type of interest acceptable to CVCC, the County, the Cities, acquiring State and/or Federal Agency, and property owner). Fee ownership of property may not be required. If it is determined that all or a portion of property is needed for inclusion in the MSHCP Reserve System, various incentives may be available to the property owner in lieu of or in addition to monetary compensation in exchange for the conveyance of a property interest. These incentives may include, but shall not be limited to, the waiver and/or reduction of certain development fees, monetary compensation for entering into an option agreement, fast track processing, density bonuses, clustering, density transfers, and property reassessment and tax credits if determined to be Feasible. The incentives are intended to provide a form of compensation to property owners who convey their property. As a property interest is obtained, it will become part of the MSHCP Reserve System.

Figure 6-1
Project Review Process for Projects within the Conservation Areas



All proposed Development projects within the area defined in Section 4.3.21 shall be subject to review under HANS. HANS will not be construed as a limitation on the County's or Cities' ability to approve or deny a Development application consistent with the Conservation Objectives and Required Measures. Applications for proposed projects which are within the area defined in Section 4.3.21 shall be subject to an initial review to determine if all or part of the property is necessary for inclusion in the MSHCP Reserve System to achieve the Conservation Objectives and Required Measures. The initial review period will be up to 45 days. This period may be extended upon the mutual consent of the parties. The applicant for a proposed project shall be required to submit the following information/documents for purposes of conducting this review:

a. a definition of the project area,
b. a written project description with maps as appropriate,
c. a written description of biological information available for the project site including the results of any available mapping or surveys, and specifically information regarding the proximity of proposed Development to Peninsular bighorn sheep lambing areas and water sources, and
d. quantification of anticipated impacts to biological resources identified for the project.

The County, Cities, CVCC, and the Wildlife Agencies shall provide the applicant with any information in their possession that would assist the applicant in preparing the aforementioned information/documents for submittal.

Full Inclusion of Property. In those instances where all of the property is needed for inclusion in the MSHCP Reserve System, negotiations will focus on the acquisition of the property including establishing a purchase price and the application of other non-monetary incentives which may compensate the property owner and assist with the acquisition. In no event shall the purchase price exceed the fair market value of the property. Unless otherwise agreed to by the parties, the fair market value for the property shall be determined by an appraisal ordered by the County or the Cities and conducted in accordance with the "Uniform Appraisal Standards for Federal Land Acquisitions" and the "Uniform Standards of Professional Appraisal Practice." In the event of any conflict between these standards, the "Uniform Appraisal Standards for Federal Land Acquisitions" will control. Fee title of property to be conveyed may not be required. The type of ownership to be conveyed will be taken into consideration when conducting the appraisal. Appraisal instructions shall be jointly prepared and agreed upon by the County, City, or CVCC and the property owner. Appraisal instructions will direct appraisers not to consider the MSHCP Conservation Area as relevant to the appraisal.

Partial Inclusion of Property. In those instances where only part of the property is needed for inclusion in the MSHCP Reserve System, negotiations will focus on incentives in exchange for the conveyance of property. Such incentives may include monetary compensation. However, property owners shall not be provided monetary compensation (but may be eligible for other incentives) for property which would normally be set aside as part of the County's or Cities' entitlement process as this process occurs throughout the County. As an incentive to convey property needed for inclusion in the MSHCP Reserve System and for which monetary compensation shall not be provided, Take Authorization may be granted upon project approval.

In order to obtain this early authorization of Take, the conveyance must occur within 45 days after project approval. Any subsequent suspension or revocation of Permits terminating Take Authorization shall not be applicable to the Take Authorization granted upon the project's approval.

If it is determined that only part of the property is needed for inclusion in the MSHCP Reserve System, then upon completion of the initial application review, a complete application for the proposed project may be filed on that portion of the land not required for inclusion in the MSHCP Reserve System and processed concurrently during the time periods set forth below for the negotiation of terms and incentives, and, if necessary, conflict resolution. When the initial project review process identifies the need for acquisition of a portion of the property proposed for Development, the entitlement process may proceed on the portion of the property not proposed for Conservation concurrently with the acquisition process. The property owner may process a Development application on the portion of the property under negotiation for acquisition prior to the completion of the acquisition period.

Negotiations. When it is determined that all or part of the property is needed for inclusion in the MSHCP Reserve System, then the parties may enter into negotiations on the terms under which the property or any part thereof shall be included and conserved. The negotiation period shall be up to 120 days (following the 45-day initial application review period). If at the end of this 120-day period, agreement between the parties is not achieved, each party shall submit in writing the party's proposed resolution of terms. Thereafter, the negotiation period may be extended upon the mutual consent of the parties for a longer period.

If the parties agree on the incentives and the terms prior to the expiration of the negotiation period, appropriate legal documents shall be prepared for consideration and approval by the County, City or CVCC. Alternatively, if the parties are unable to reach agreement during the negotiation period, then the conflict resolution process (described below) may be commenced.

Conflict Resolution Process. In order to address in a fair and consistent manner, disputes which may arise concerning the (i) application of MSHCP Conservation Objectives, (ii) available incentives, or (iii) the valuation of property, a conflict resolution process is necessary. Conflict resolution may be initiated by the property owner or the County or City and allows for a neutral third party to assist in resolving disputes concerning the aforementioned issues. Mediation will initially be required to resolve differences between the parties over the proposed Development options for the property (including the application of incentives) as well as differences regarding the application of the Conservation Objectives. Mediation may not be used to require the County or Cities to acquire property it has determined is not necessary for inclusion in the MSHCP Reserve System. If the dispute involves the application of Conservation Objectives, the initiating party must consult with the Wildlife Agencies concerning the application of the Objectives prior to the initiation of mediation. The consultation period will be 30 days and may be extended with the consent of the initiating party.

The mediation period will be up to 90 days. This period may be extended upon the mutual consent of the parties. The parties shall also mutually agree to the appointment of a mediator. If the parties are unable to mutually agree to such an appointment, the Presiding Judge of the Riverside Superior Court shall be requested to appoint a mediator. All costs associated

with the mediation shall be divided equally between the parties. Upon completion of the mediation, the mediated resolution shall be complied with, and where a project is proposed, then the project may continue through the normal Development review process. Alternatively, the property owner may either (i) request review of any remaining dispute by the Board of Supervisors (in the case of property within the unincorporated area of the County) or the appropriate city council, or (ii) initiate arbitration solely for disputes concerning the application of MSHCP Conservation Objectives and Required Measures (as indicated below).

Appraisal Review. Should a party opt to commence the conflict resolution process as a result of the parties' inability to resolve differences concerning the valuation of property, a second appraisal shall be conducted, at the expense of the property owner, in accordance with the "Uniform Appraisal Standards for Federal Land Acquisitions" and the "Uniform Standards of Professional Appraisal Practice." In the event of any conflict between these standards, the "Uniform Appraisal Standards for Federal Land Acquisitions" will control. Fee ownership of property to be conveyed may not be required. The type of ownership to be conveyed shall be taken into consideration when conducting the second appraisal. Any discrepancies between this appraisal and the appraisal previously prepared by the County or CVCC shall be reviewed by a third appraiser mutually agreed to by both parties. Review by this appraiser shall be completed within 90 days after the parties mutually agree to the selection of the appraiser. If the parties are unable to agree upon the choice of a third appraiser, the Presiding Judge of the Riverside Superior Court shall be requested to select the third appraiser.

Upon completion of this review, the appraiser shall make recommendations as to which appraisal should be approved. If such a recommendation cannot be made, the third appraiser shall within 90 days conduct an appraisal in accordance with the aforementioned standards. The third appraisal shall then establish the fair market value of the property. Any recommendations of the third/review appraiser upon completion of the third appraiser's review or if necessary any third appraisal shall be binding upon the parties solely with respect to the issue of establishing the fair market value of the property. Should any subsequent acquisition of the property involve state and/or federal monies, an update or review of the third appraisal may be necessary. The cost for conducting this review and any necessary third appraisal shall be divided equally between the parties.

Arbitration. If the parties are unable to resolve through mediation differences concerning the application of Conservation Objectives and Required Measures, arbitration may be initiated by either party, with the consent of the property owner. The arbitration period will be up to 180 days. This period may be extended upon the mutual consent of the parties. The parties shall also mutually agree to the appointment of an arbitrator. If the parties are unable to mutually agree to an appointment, the Presiding Judge of the Riverside Superior Court shall be requested to appoint an arbitrator. The property owner, the County, City, or CVCC may submit to the arbitrator, evidence concerning the application of the MSHCP Conservation Objectives and Required Measures to the property in question. Any cost for such evidence shall be born by the party submitting said evidence. The decision of the arbitrator shall be based solely upon the Conservation Objectives as applied to the property in question and any evidence supporting the application of the Conservation Objectives and Required Measures. The arbitrator's decision shall be binding upon both parties.

Completion of Acquisition. Following conclusion of successful negotiations or appraisal review under the conflict resolution process and any necessary action by the Board of Supervisors or city council, the property shall be promptly purchased provided sufficient MSHCP funds are available. The General Fund of the County or the Cities shall not be obligated to fund the purchase of property for inclusion in the MSHCP Reserve System. In addition to the County, Cities, and CVCC, it is anticipated and expected that State and Federal agencies, as described in Section 4.2.2.1, may either purchase or provide funding to purchase property for inclusion in the MSHCP Reserve System.

Completion of Acquisition or Submittal of Development Application if Funding is Not Immediately Available. If sufficient MSHCP funds are not immediately available, several options may be pursued:

(1) Conveyance of Property (with Purchase Price of $100,000 or Less) and for which a Development Application is Intended to be Pursued – If it is anticipated that the property may not be purchased within one year after a purchase or option agreement is entered into (whether due to lack of funds or otherwise), then the County or Cities shall initiate an amendment to the MSHCP Conservation Area at least nine months prior to the expiration of this one year period. The County or City shall confer with the property owner when drafting the proposed amendment to the MSHCP, and use its best efforts to insure completion of the amendment within this one year time period or any longer period of time agreed to by the parties. Because the USFWS must conduct an internal formal consultation under Section 7 of FESA for any such amendment to the MSHCP, USFWS shall provide a draft copy of its internal Biological Opinion for review and comment to the County or City prior to approval or denial of the Permit amendment. The County or City shall share the draft Biological Opinion with the property owner and provide any comments from the property owners along with the County's or City's comments to USFWS. The property owner shall have an opportunity to meet and confer with USFWS with regard to the effects of the proposed amendment. The County or City shall use its best efforts to insure completion of the amendment within this one year time period or any longer period of time agreed to by the parties. Thereafter, if the property is not purchased or removed from the Conservation Area within one year after a purchase or option agreement is entered into, then the property owner may request that the County or Cities process a Development application for the property intended to be acquired without further consideration of the Conservation Objectives and Required Measures. Such Development must comply with all other County and City requirements for that type of Development. However, payment of the Local Development Mitigation Fee shall be required as a condition of any approval. This process shall not be construed as a limitation on the County's or Cities' ability to approve or deny a Development application except that a project consistent with this Process may not be denied solely because a Development application does not comply with the Conservation Objectives and Required Measures. Prior to issuance of a grading permit which would result in ground disturbance, the CVCC, County, Cities or appropriate state or federal agency may negotiate with the property owner and enter into a new purchase or option agreement to purchase the property.

Any Development application subsequently approved by the County or Cities that precludes compliance with the Conservation Objectives shall result in suspension or revocation of the Permits terminating Third Party Take Authorization under the MSHCP and IA. Such suspension or revocation may occur entirely or only as to specified Conservation Areas, Covered

Species, or Covered Activities, and future Development applications affected by the suspension or revocation shall no longer be subject to the Conservation Objectives and Required Measures.

In the alternative, if the property is not immediately purchased, then at the request of the property owner, the purchase agreement may be renegotiated and the property shall be placed on a priority list for acquisition. This list will be established in order to provide some level of assurance to the property owner that the property shall be purchased when funding is available. Placement on the list will be based solely upon the date a property owner requests to be placed on the list. Funding for the acquisition of properties on the priority list will be provided through a separate designated fund (percentage of MSHCP funds received will be included in this fund). This fund will provide funding solely for the acquisition of property for which a Development application is intended to be filed.

The provisions of this section shall not be applicable to conveyance of adjoining property (or property within the same subdivision) by the same owner which if considered together would exceed $100,000. Any such conveyance shall be subject to the provisions involving the conveyance of property with a purchase price of more than $300,000 or the total value of the lands together, whichever is less.

(2) Conveyance of Property (with Purchase Price of $200,000 or Less) and for which a Development Application is Intended to be Pursued – If it is anticipated that the property may not be purchased within two years after a purchase or option agreement is entered into (whether due to lack of funds or otherwise), then the County or Cities shall initiate an amendment to the MSHCP Conservation Area at least nine months prior to the expiration of this two-year period. The County or City shall confer with the property owner when drafting the proposed amendment to the MSHCP, and use its best efforts to insure completion of the amendment within this one year time period or any longer period of time agreed to by the parties. Because the USFWS must conduct an internal formal consultation under Section 7 of FESA for any such amendment to the MSHCP, the USFWS shall provide a draft copy of its internal Biological Opinion for review and comment to the County or City prior to approval or denial of the Permit amendment. The County or City shall share the draft Biological Opinion with the property owner and provide any comments from the property owners along with the County's or City's comments to the USFWS. The property owner shall have an opportunity to meet and confer with the USFWS with regard to the effects of the proposed amendment. The County or City shall use its best efforts to insure completion of the amendment within this one year time period or any longer period of time agreed to by the parties. Thereafter, if the property is not purchased or removed from the Conservation Area within two years after a purchase or option agreement is entered into, then the property owner may request that the County or Cities process a Development application for the property intended to be acquired without further consideration of the Conservation Objectives and Required Measures. Such Development must comply with all other County and City requirements for that type of Development. However, payment of the Local Development Mitigation Fee shall be required as a condition of any approval. This process shall not be construed as a limitation on the County's or Cities' ability to approve or deny a Development application except that a project consistent with this Process may not be denied solely because a Development application does not comply with the Conservation Objectives and Required Measures. Prior to issuance of a grading permit which would result in ground disturbance, the CVCC, County, Cities or appropriate state or federal agency may negotiate with the property owner and enter into a new purchase or option agreement to purchase the property.

Any Development application subsequently approved by the County or Cities that precludes compliance with the Conservation Objectives and Required Measures shall result in suspension or revocation of the Permits terminating Third Party Take Authorization under the MSHCP and IA. Such suspension or revocation may occur entirely or only as to specified Conservation Areas, Covered Species, or Covered Activities, and future Development applications affected by the suspension or revocation shall no longer be subject to the Conservation Objectives and Required Measures.

In the alternative, if the property is not immediately purchased, then at the request of the property owner, the purchase agreement may be renegotiated and the property shall be placed on a priority list for acquisition. This list will be established in order to provide some level of assurance to the property owner that the property shall be purchased when funding is available. Placement on the list will be based solely upon the date a property owner requests to be placed on the list. Funding for the acquisition of properties on the priority list will be provided through a separate designated fund (percentage of MSHCP funds received will be included in this fund). This fund will provide funding solely for the acquisition of property for which a Development application is intended to be filed.

The provisions of this section shall not be applicable to conveyance of adjoining property (or property within the same subdivision) by the same owner which if considered together would exceed $200,000. Any such conveyance shall be subject to the provisions involving the conveyance of property with a purchase price of more than $300,000 or the total value of the lands together, whichever is less.

(3) Conveyance of Property (with Purchase Price of $300,000 or Less) and for which a Development Application is Intended to be Pursued – If it is anticipated that the property may not be purchased within three years after a purchase or option agreement is entered into (whether due to lack of funds or otherwise), then the County or Cities shall initiate an amendment to the MSHCP Conservation Area at least nine months prior to the expiration of this three-year period. The County or City shall confer with the property owner when drafting the proposed amendment to the MSHCP, and use its best efforts to insure completion of the amendment within this one year time period or any longer period of time agreed to by the parties. Because the USFWS must conduct an internal formal consultation under Section 7 of FESA for any such amendment to the MSHCP, the USFWS shall provide a draft copy of its internal Biological Opinion for review and comment to the County or City prior to approval or denial of the Permit amendment. The County or City shall share the draft Biological Opinion with the property owner and provide any comments from the property owners along with the County's or City's comments to the USFWS. The property owner shall have an opportunity to meet and confer with the USFWS with regard to the effects of the proposed amendment. The County or City shall use its best efforts to insure completion of the amendment within this three-year time period or any longer period of time agreed to by the parties. Thereafter, if the property is not purchased or removed from the Conservation Area within one year after a purchase or option agreement is entered into, then the property owner may request that the County or Cities process a Development application for the property intended to be acquired without further consideration of the Conservation Objectives and Required Measures. Such Development must comply with all other County and City requirements for that type of Development. However, payment of the Local Development Mitigation Fee shall be required as a condition of any approval. This process shall not be construed as a limitation on the County's or Cities' ability to approve or deny a

Development application except that a project consistent with this Process may not be denied solely because a Development application does not comply with the Conservation Objectives and Required Measures. Prior to issuance of a grading permit which would result in ground disturbance, the CVCC, County, Cities or appropriate state or federal agency may negotiate with the property owner and enter into a new purchase or option agreement to purchase the property.

Any Development application subsequently approved by the County or Cities that precludes compliance with the Conservation Objectives shall result in suspension or revocation of the Permits terminating Third Party Take Authorization under the MSHCP and IA. Such suspension or revocation may occur entirely or only as to specified Conservation Areas, Covered Species, or Covered Activities, and future Development applications affected by the suspension or revocation shall no longer be subject to the Conservation Objectives and Required Measures.

In the alternative, if the property is not immediately purchased, then at the request of the property owner, the purchase agreement may be renegotiated and the property shall be placed on a priority list for acquisition. This list will be established in order to provide some level of assurance to the property owner that the property shall be purchased when funding is available. Placement on the list will be based solely upon the date a property owner requests to be placed on the list. Funding for the acquisition of properties on the priority list will be provided through a separate designated fund (percentage of MSHCP funds received will be included in this fund). This fund will provide funding solely for the acquisition of property for which a Development application is intended to be filed.

The provisions of this section shall not be applicable to conveyance of adjoining property (or property within the same subdivision) by the same owner which if considered together would exceed $300,000. Any such conveyance shall be subject to the provisions involving the conveyance of property with a purchase price of more than $300,000.

(4) Conveyance of Property (with Purchase Price of More Than $300,000) and for which a Development Application is Intended to be Pursued – If it is anticipated that the property may not be purchased within four years after a purchase or option agreement is entered into (whether due to lack of funds or otherwise), then the County or Cities shall initiate an amendment to the MSHCP Conservation Area at least nine months prior to the expiration of this four-year period. The County or City shall confer with the property owner when drafting the proposed amendment to the MSHCP, and use its best efforts to insure completion of the amendment within this one year time period or any longer period of time agreed to by the parties. Because the USFWS must conduct an internal formal consultation under Section 7 of FESA for any such amendment to the MSHCP, the USFWS shall provide a draft copy of its internal Biological Opinion for review and comment to the County or City prior to approval or denial of the Permit amendment. The County or City shall share the draft Biological Opinion with the property owner and provide any comments from the property owners along with the County's or City's comments to the USFWS. The property owner shall have an opportunity to meet and confer with the USFWS with regard to the effects of the proposed amendment. The County or City shall use its best efforts to ensure completion of the amendment within this four-year time period or any longer period of time agreed to by the parties. Thereafter, if the property is not purchased or removed from the Conservation Area within four years after a purchase or option agreement is entered into, then the property owner may request that the County or Cities process a Development application for the property intended to be acquired without further consideration

of the Conservation Objectives and Required Measures. Such Development must comply with all other County and City requirements for that type of Development. However, payment of the Local Development Mitigation Fee shall be required as a condition of any approval. This process shall not be construed as a limitation on the County's or Cities' ability to approve or deny a Development application except that a project consistent with this Process may not be denied solely because a Development application does not comply with the Conservation Objectives and Required Measures. Prior to issuance of a grading permit which would result in ground disturbance, the CVCC, County, Cities or appropriate state or federal agency may negotiate with the property owner and enter into a new purchase or option agreement to purchase the property.

Any Development application subsequently approved by the County or Cities that precludes compliance with the Conservation Objectives and Required Measures shall result in suspension or revocation of the Permits terminating Third Party Take Authorization under the MSHCP and IA. Such suspension or revocation may occur entirely or only as to specified Conservation Areas, Covered Species, or Covered Activities, and future Development applications affected by the suspension or revocation shall no longer be subject to the Conservation Objectives and Required Measures.

If the property is not immediately purchased, then at the request of the property owner, the purchase agreement may be renegotiated and the property shall be placed on a priority list for acquisition. This list will be established in order to provide some level of assurance to the property owner that the property shall be purchased when funding is available. Placement on the list will be based solely upon the date a property owner requests to be placed on the list. Funding for the acquisition of properties on the priority list will be provided through a separate designated fund (percentage of MSHCP funds received will be included in this fund). This fund will provide funding solely for the acquisition of property for which a Development application is intended to be filed.

(5) Conveyance of Property for Which a Development Application is Not Intended to be Filed – If the property is not immediately purchased after a purchase agreement is entered into, or after expiration of an option agreement, or any longer period of time which may be agreed to by the parties (whether due to the lack of funds or otherwise), then the property will be placed on a priority list for acquisition. This list will be established in order to provide some level of assurance to the property owner that the property shall be purchased when funding is available. Placement on the list shall be based solely upon the date a purchase or option agreement was entered into or any longer period of time which may have been agreed to by the parties. Funding for the acquisition of properties on the priority list will be provided through a separate designated fund (percentage of MSHCP funds received will be included in this fund). This fund will provide funding solely for the acquisition of property for which a Development application is not intended to be filed. The property owner may at any time remove his/her property from this list.

Options or other mechanisms that would allow CVCC to make annual payments to property owners for purposes of payment of property taxes or other carrying costs during the acquisition period will be considered as part of the HANS Process. In addition, Local Permittees and the CVCC will advocate for property tax relief measures when lands are pending acquisition for conservation as appropriate.

6.6.1.3 Relinquishment of CVFTL Incidental Take Permit

The CVFTL HCP required establishment of three preserves for the conservation of the CVFTL and its habitat. These are the Coachella Valley Preserve in the Thousand Palms area, the Willow Hole/Edom Hill Preserve near the west end of the Indio Hills, and the Whitewater Floodplain Preserve east of Indian Avenue in the Whitewater River area. These lands are displayed in Figure 6-2. These preserves consist of BLM, CDFG, USFWS, State Parks, CVMC, CVWD, TNC, and CNLM lands. Table 6-1 shows the ownership in the three reserves. Of the land in the reserves, approximately 1,200 acres in the Whitewater Floodplain Reserve is CVWD land, and approximately 500 acres was acquired with local CVFTL mitigation fees. The CVCC and applicable Permittees will implement the following as part of the MSHCP:

- Within six months of Permit issuance, the CVFTL Incidental Take Permit will be relinquished as described in Section 16.2 of the IA.
- Prior to relinquishment of the CVFTL Permit, CVCC shall obtain an appropriate Legal Instrument guaranteeing protection in perpetuity to the non state and federal lands in the CVFTL Preserve system acquired with CVFTL mitigation fees.
- Prior to relinquishment of the CVFTL Permit, CVWD will conserve the 1,200 acres it owns in the CVFTL HCP Whitewater Floodplain Preserve (part of the Whitewater Floodplain Conservation Area) in perpetuity as part of the MSHCP Reserve System by recording an appropriate Legal Instrument.
- CVCC will implement the Monitoring and Management Programs, on the above lands in perpetuity.
- CVCC will assume responsibility for the CVFTL endowment, which will be incorporated into the MSHCP endowment and earmarked to ensure funding for the Monitoring and Management of the CVFTL and its associate habitat in perpetuity.
- Within 3 months of Permit issuance, the applicable Local Permittees will provide a final accounting of all local mitigation funds collected pursuant to the CVFTL HCP, the Take and Conservation that occurred pursuant to the CVFTL HCP, the funds collected pursuant to the October 4, 2000 MOU between the Cities, the County, CNLM, and the Wildlife Agencies regarding measures to minimize Take of the CVFTL, and the Take and Conservation that occurred pursuant to that MOU. As part of the final report, all biological data collected over the life of the permit will be submitted.

Table 6-1: Land Ownership in the CVFTL Preserves

Entity	*Thousand Palms Preserve (acres owned)*	*Willow Hole/Edom Hill Preserve (acres owned)*	*Whitewater Floodplain Preserve (acres owned)*	*Total*
BLM	9,928	1,824	24	**11,776**
CNLM	----	160	----	**160**
CVMC	----	135	----	**135**
CVWD	113	----	1,170	**1,283**
DFG	695	----	----	**695**
Entity	*Thousand Palms Preserve (acres owned)*	*Willow Hole/Edom Hill Preserve (acres owned)*	*Whitewater Floodplain Preserve (acres owned)*	*Total*
Private	186	167	----	**353**
State Parks	2,207	----	----	**2,207**
TNC	875	----	----	**875**
USFWS	3,616	----	----	**3,616**
Total	**17,620**	**2,286**	**1,194**	**21,100**

6.6.2 Obligations of the State Permittees

The State Permittees are Caltrans, CVMC, and State Parks. The State Permittees' obligations are described below.

Caltrans. Caltrans has the following obligations under the Plan:

- In three phases, in years 2010, 2015, and 2020, acquire and convey to CVCC or provide funding to the CVCC sufficient to acquire 5,791 acres of Additional Conservation Lands in the Conservation Areas as a contribution to Plan implementation for the Covered Activities described in Section 7.2.2. This acreage is included in the 96,400 acres described in Section 6.6.1. Not later than 2011, Caltrans will provide $7.6 million to CVCC for the Monitoring and Management Program for the 5,791 acres, and CVCC shall monitor and manage the lands as part of the MSHCP Reserve System. As land is acquired and transferred to CVCC, the appropriate percentage of the endowment contribution will be transferred to CVCC. Within one year of Permit issuance, CVCC and Caltrans shall prepare an agreement that specifies that if the MSHCP Permits are ever revoked, a conservation bank shall be established whereby the contributed lands are conveyed to CDFG with an endowment sufficient to provide for the permanent monitoring, land management, and adaptive management of the land. CVCC, the Wildlife Agencies, and Caltrans will enter into a Conservation Bank Agreement once a portion or all of the 5,791 acres are acquired. If the Permits issued in conjunction with the Plan are ever suspended or revoked, the conservation bank will provide unused credit for lands acquired to provide mitigation for future transportation projects. Caltrans may, as

described in the IA, utilize available credits from the bank towards meeting the mitigation requirement for a project.

- As described in Section 6.6.1, cooperate with CVAG and CVCC in the acquisition of 1,795 acres to mitigate the interchange and associated arterial projects, and the contribution of $1,077,000 to the endowment for the Monitoring Program, Management Program, and Adaptive Management of those lands.
- With respect to its Covered Activities:
  - -- Implement all applicable Required Measures identified as needed in Section 4.3 for Caltrans' Covered Activities.
  - -- If a project shares a common boundary with a Conservation Area, comply with Land Use Adjacency Guidelines set forth in Section 4.5.

Caltrans will comply with the applicable avoidance and minimization measures described in Section 4.4 for Covered Activities. Emergency activities necessary to protect public health and safety may be conducted as needed.

CVMC. CVMC has the following obligations under the Plan:

- Cooperate with CVCC and other agencies as appropriate to ensure management and monitoring of the approximately 2,600 acres of CVMC Existing Conservation Lands and any additional lands CVMC acquires in the Conservation Areas.

State Parks. State Parks has the following obligations under the Plan:

- With respect to its land in the Conservation Areas:
  - Participate as a member of the RMUC for RMUs within which State Parks manages lands.
  - Monitor and manage State Parks lands for the benefit of Covered Species.
  - Monitor and control/eradication of invasive, exotic species.
  - Prescribed fire management and wildfire management.
  - Erosion control.
  - Ecological restoration/rehabilitation on previously damaged lands.
  - Law enforcement patrols.
- With respect to its Covered Activities:
  - Implement all applicable required avoidance, minimization, and mitigation measures for desert tortoise and burrowing owl as set forth in Section 4.4.
  - If a project shares a common boundary with a Conservation Area, comply with Land Use Adjacency Guidelines set forth in Section 4.5.
- Prior to construction of camping, trailhead, and trail facilities as a Covered Activity in the Indio Hills/Joshua Tree National Park Linkage Conservation Area, acquire a minimum of

640 acres in the Conservation Area, of which a maximum of 100 acres may be developed as the Covered Activity. Development of the camping and trailhead facility must be consistent with the Conservation Objectives for the Conservation Area. Take Authorization for the Covered Activity is contingent on the preparation of a RMUP which will reflect the scope of work and obligation of State Parks to manage and monitor State Parks land in the Conservation Area pursuant to the RMUP.

6.6.2.1 Review of State Permittee Projects within the Conservation Areas

The Wildlife Agencies and the appropriate State Permittee shall jointly review proposed State Permittee projects that are Covered Activities within the Conservation Areas. State Permittees shall submit project information to the Wildlife Agencies and CVCC, including, at a minimum, a project description, a concept map indicating the location of the proposed project, and application of MSHCP requirements. The Wildlife Agencies or State Permittee may schedule a meeting to discuss a proposed project. CVCC shall be invited to participate in this meeting.

6.6.3 Actions by Federal and State Governments

This section describes the actions to be taken by the state and federal agencies that are participating in the Plan. (See Section 4.2.2.1 for details on the federal and state commitments to land acquisition.)

Wildlife Agencies. The Wildlife Agencies will contribute to Plan implementation by managing their lands in the Conservation Areas in a manner consistent with achieving the Plan's Conservation Goals and Conservation Objectives. The Wildlife Agencies will participate in the Monitoring Program, and will facilitate ecological research or restoration activities by other entities on federal and state lands that benefit MSHCP resources. The Wildlife Agencies will acquire additional lands in the Conservation Areas. The Wildlife Agencies will review the Annual Report prepared by CVCC and will meet annually with Local Permittees to discuss progress in implementing the Plan. The Wildlife Agencies will expeditiously review proposed boundary adjustments and Plan or Permit amendments, and expeditiously determine Conservation measures needed and conservation responsibilities for newly Listed Species and species proposed for listing that are not on the Covered Species list.

6.7 Time Frame for Implementation

Section 2820(a)(9) of the California Fish and Game Code requires that the Plan include the estimated timeframe and process by which the MSHCP Reserve System will be assembled and other conservation measures implemented, including obligations of landowners and plan signatories and consequences of the failure to acquire lands in a timely manner.

The Permits will be for a 75 year term. This term was selected because the acquisition program is projected to require 30 years to acquire all the Permittee obligation land, and full funding of the endowment for the Monitoring Program, the Management Program, Adaptive Management, and ongoing administration costs is projected to require 75 years. The MSHCP

Reserve System will be assembled as described in Section 4.2. The non-acquisition components of MSHCP Reserve System Assembly will be ongoing for the life of the Plan. The acquisition component of Reserve System Assembly is anticipated to occur in the first 30 years of the Permits. The rate at which land in the Conservation Areas is acquired will depend on the availability of funds (See Section 5.2) and Development patterns. Section 6.5 will ensure that a rough proportionality will be maintained between Conservation and Development.

If the Local Permittees do not maintain "rough proportionality" between Development and Conservation, the Wildlife Agencies, CVCC and other applicable Local Permittees shall meet to discuss potential actions to meet the Plan's rough proportionality requirements. In the event that these Parties do not reach agreement on such potential actions, the Wildlife Agencies may initiate revocation or suspension of all or part of the Permits as set forth in Section 23.5 of the IA.

6.8 Assurances for Unforeseen and Changed Circumstances

6.8.1 No Surprises Rule

In accordance with the Habitat Conservation Plan ("No Surprises") Assurances Rule (63 Federal Register 8859, as codified in 50 C F.R. Sections 17.3, 17.22[b] and 17.32[b]), it is acknowledged that the purpose of the Coachella Valley MSHCP is to provide for the Conservation of Covered Species and the mitigation, minimization and compensatory measures required in connection with incidental taking of the Covered Species in the course of otherwise lawful and permitted activities within the MSHCP Plan Area. Accordingly, as described below and except as otherwise required by law and/or provided under the terms of the MSHCP Plan and except for Unforeseen Circumstances, in particular as these requirements are addressed in Section 6.8.2 of this document, no further mitigation or compensation shall be required by USFWS to address impacts of Covered Activities undertaken by the Permittees, Third Parties Granted Take Authorization and Participating Special Entities, pursuant to the Federal Endangered Species Act. Pursuant to 50 Code of Federal Regulations, sections 17.22(b)(5) and 17.32(b)(5), USFWS shall not require from the Permittees, Third Parties Granted Take Authorization, Participating Special Entities, or other individuals or entities receiving Take Authorization under the Permits the commitment of additional land or financial compensation or additional restrictions on the use of land or other natural resources with regard to Covered Activities and their impact on Covered Species beyond that provided pursuant to the Coachella Valley MSHCP, provided that the Permittees are properly implementing the Plan, the IA, and the Permits. In the event that the USFWS makes a finding of Unforeseen Circumstances and such Unforeseen Circumstances warrant the requirement of additional mitigation, enhancement or compensation measures, any such additional measures shall be restricted to modification of the management of the Additional Conservation Lands, and shall be the least burdensome measures available to address the Unforeseen Circumstances.

A. DEFINED - "Unforeseen Circumstances" (defined in 50 C.F.R. Section 17.3) means any significant, unanticipated adverse change in the status of species covered under the MSHCP or in their Habitats or any significant unanticipated adverse change in impacts of

the MSHCP or in other factors upon which the MSHCP is based, in accordance with 63 Federal Register 8859 (February 23, 1998). The term "Unforeseen Circumstances" as defined in the IA is intended to have the same meaning as it is used to define the limit of the Permittees' obligation on the "No Surprises" regulations set forth in 50 Code of Federal Regulations, Sections 17.22 (b)(5) and 17.32 (b)(5).

B. RELEVANT FACTORS - In deciding whether Unforeseen Circumstances exist which might warrant requiring additional conservation measures, USFWS shall consider, but not be limited to, the factors identified in 50 Code of Federal Regulations, Sections 17.22(b)(5)(C) and 17.32(b)(5)(C) (the No Surprises Rule), which are:

1. The extent of the current range of the affected Covered Species;
2. The percentage of the range of the affected Covered Species and Habitat that has been adversely affected by the Covered Activities;
3. The percentage in the range of the affected Covered Species and Habitat that has been conserved by the Coachella Valley MSHCP;
4. The ecological significance of that portion of the range or Habitat of the affected Covered Species;
5. The level of knowledge about the affected Covered Species and Habitat and the degree of specificity of the conservation program for that species or Habitat under the Coachella Valley MSHCP; and
6. Whether failure to adopt additional conservation measures would appreciably reduce the likelihood of survival and recovery of the Covered Species in the wild.

C. BURDEN AND DOCUMENTATION - As described in 50 Code of Federal Regulations, Sections 17.22(b)(5)(C) and 17.32(b)(5)(C), the No Surprises Rule, USFWS shall have the burden of demonstrating that Unforeseen Circumstances exist, using the best scientific and commercial data available. Any findings of Unforeseen Circumstances must be clearly documented and based upon reliable technical information regarding the biological status and Habitat requirements of the affected species.

D. ADVANCE NOTICE - Except where there is substantial threat of imminent, significant adverse impacts to a Covered Species, USFWS shall provide the Permittees at least sixty (60) calendar days written notice of a proposed finding of Unforeseen Circumstances, during which time USFWS shall meet with the CVCC and any affected Permittee to discuss the proposed finding, to provide the CVCC and any affected Permittee with an opportunity to submit information to rebut the proposed finding, and to consider any proposed changes to the Conservation strategies for the Additional Conservation Lands.

E. LIMITS ON ADDITIONAL CONSERVATION MEASURES - If USFWS makes a finding of Unforeseen Circumstances in accordance with the procedures described above, and determines that additional Conservation measures are warranted, such additional Conservation measures shall conform to the maximum extent possible to the original terms of the MSHCP. Additional Conservation measures shall be limited to those modifications, restrictions and agreements described below.

For additional discussion of No Surprises, see Section 14.11 of the IA.

6.8.2 Reconciliation of the No Surprises Rule, Unforeseen Circumstances and Adaptive Management in the MSHCP

The No Surprises Rule states, in part, that:

> In negotiating Unforeseen Circumstances, USFWS shall not require without the consent of the Permittee, the commitment of additional land, water or financial compensation or additional restrictions on the use of land, water, including quantity and timing of delivery, or other natural resources beyond the level otherwise agreed upon for the species covered by the conservation plan.
>
> If additional Conservation and mitigation measures are deemed necessary to respond to Unforeseen Circumstances, USFWS may require additional measures of the Permittee where the Conservation plan is being properly implemented, but only if such measures are limited to modifications within conserved Habitat areas, if any or to the Conservation plan's operating Conservation program for the affected species, and maintain the original terms of the Conservation plan to the maximum extent possible. Additional Conservation and mitigation measures shall not involve the commitment of additional land, water or financial compensation or restrictions on the use of land, water (including quantity and timing of delivery), or other natural resources otherwise available for Development or use under the original terms of the Conservation plan, without the consent of the Permittee.

Thus, in the event that Unforeseen Circumstances adversely affect any of the MSHCP Covered Species during the life of the Plan, the Permittees, Third Parties Granted Take Authorization, and Participating Special Entities would not be required to provide additional financial compensation, land or land restrictions beyond those required by the Plan at the time of issuance of the Section 10(a) Take Authorization without their consent, except as provided for Changed Circumstances as described in Section 6.8.3.

In light of the MSHCP's Adaptive Management Program, which allows certain changes to occur throughout the life of the Plan, it is necessary to clarify what aspects of the Conservation program are subject to the "No Surprises" Rule and for which, therefore, USFWS may not require additional mitigation as a result of Unforeseen Circumstances without the consent of the Permittees.

The Adaptive Management Program allows the MSHCP to be revised as a result of new information on the life history or ecology of Covered Species generated through continuing research or information on the effectiveness of mitigation measures, and as a result of the Monitoring Programs. As a result, revisions may be made to several of the Conservation components, including the technical aspects of mitigation land management and enhancement, implementation of Take Minimization Measures and monitoring of Covered Species. Pursuant to the "No Surprises" Rule, the Permittees and USFWS agree that the following MSHCP

components are not subject to modification as a result of the MSHCP's Adaptive Management provisions without the consent of the Permittees, except for those projects that constitute an action authorized, funded or carried out by a federal agency (i.e., have federal involvement) which are exempt from such assurances.

1. The boundaries of the Conservation Areas.
2. The measures required to implement the Plan, Land Use Adjacency Guidelines, and avoidance and minimization measures, as described in Section 4.
3. The Covered Activities described in Section 7 of this document.
4. The MSHCP funding plan described in Section 5 of this document.
5. Any other change not currently described in this Plan that would significantly increase the Plan's costs or the interests in land of the Permittees, or any landowner in the MSHCP Plan Area.
6. Additional compensation measures shall not be imposed on Third Parties Granted Take Authorization where the Permittees have already granted final project approvals unless such additional Conservation measures are agreed to by the Third Party Granted Take Authorization.

6.8.3 Changed Circumstances

Changed Circumstances are defined under the Federal "No Surprises" rule as "changes in circumstances affecting a Covered Species or geographic area covered by a conservation plan, including the MSHCP, or agreement that can reasonably be anticipated by plan or agreement developers and USFWS and that can be planned for." Changed Circumstances potentially affecting the Reserve Lands are defined as future events for which it is reasonably foreseeable that such an event may occur during the life of the MSHCP Permit, and that such an event may negatively affect the Covered Species and/or their associated habitat within the Reserve Lands. Changed Circumstances addressed by the MSHCP include the following:

- Drought
- Fire
- Invasion by new exotic species
- Lowering of the water table
- New Listings of Species Not Covered by the MSHCP

6.8.3.1 Drought

For the purpose of defining Changed Circumstances, drought is defined as climatic drought at least three years in length, as declared by the California Department of Water Resources.

Risk Assessment

Drought is a cyclical weather phenomenon that is beyond human control. Drought is not uncommon in Southern California, and it is a phenomenon to which local natural communities and species have adapted over time. Drought occurs slowly over a multi-year period, differing from the catastrophic events of fire and flood, which occur rapidly and afford little time for preparing for disaster response. Drought conditions may adversely affect Covered Species if the species and/or conserved natural communities are unable to adapt to the challenging conditions. Rainfall data assembled by the County over the past 120 years indicates a general eight year periodicity in wet and dry conditions with more infrequent occurrences of dry years extending for more than a one to two year period. Based on these data, and the fact that drought is an expected occurrence in Southern California, a drought event significantly affecting Covered Species is not anticipated to occur during the life of the Permit. Nevertheless, measures will be taken to monitor the effects of drought, as defined above, on Covered Species.

Preventive Measures

No measures are available to prevent climatic drought within the Reserve Lands. Measures to ameliorate the effects of drought may involve providing artificial water sources for Covered Species such as Peninsular bighorn sheep adversely affected by drought.

Planned Response to Drought

If a climatic drought occurs within the MSHCP Plan Area as defined by this section, the CVCC Executive Director will notify the Wildlife Agencies of this Changed Circumstance, or the Wildlife Agencies may notify the CVCC Executive Director. The Executive Director will assess the damage caused by the drought and initiate the following actions:

- Prepare a damage assessment report.
- Recommend actions to ameliorate the effects of the climatic drought on Covered Species; such actions may include provision of temporary artificial water sources for the benefit of Covered Species adversely affected by drought.
- Implement measures through Adaptive Management.

6.8.3.2 Fire

For the purpose of defining Changed Circumstances, a fire event that may adversely affect Covered Species and conserved natural communities is fire in a natural community that is not typically subjected to fire and is not adapted to it. The natural communities within the Plan Area that are fire-adapted include chamise chaparral, redshank chaparral, semi-desert chaparral, interior live oak chaparral, Mojavean pinyon-juniper woodland, and peninsular juniper woodland and scrub. A high density of exotic plants can facilitate wildfires in desert habitats where vegetation would be otherwise too sparse to carry fires. Such fires can dramatically alter habitats that have no adaptations to survive being burned. There are no data to indicate the sensitivity of species living on the alluvial fans to exotic species invasions. Clearly, the habitat alterations resulting from wildfire would have impacts across trophic levels that could last decades or longer.

Risk Assessment

As documented in the Safety Element of the Riverside County General Plan on file with the County of Riverside, the higher elevation portions of MSHCP Plan Area support highly flammable native vegetation and are rated as potential wildland fire areas by the Sate of California Department of Forestry and Fire Prevention (CDF) and the General Plan Safety Element. Fire potential within the MSHCP Plan Area is typically greatest in the months of August, September and October when dry vegetation co-occurs with hot, dry Santa Ana winds.

Generally, the vegetation communities within the Reserve Lands where fires are a normal occurrence are adapted to the existing fire regime and will naturally recover from fire. The type of fire event that is defined as a Changed Circumstance is fire in a desert ecosystem where fire is not a normal event, but where increasing exotic plant invasion is creating the potential for fire. Landscape level monitoring will attempt to explore the relationship between areas occupied by exotic plants, including grasses, and historical fire sites. Habitat and natural community level vegetation monitoring will directly measure exotic plant species richness and abundance.

Preventive Measures

For specific types of fire that are damaging to biological resources within the Reserve Lands, the cause of the fire will be reviewed and preventive measures such as the following will be developed:

- Redesign, reconfigure, and/or review fuel breaks.
- Work with local fire agencies to improve fire suppression preparedness.
- Develop a public education program.

For desert ecosystem fires, the challenge will be to develop effective tools to control the exotic species, as those tools that are currently available may be insufficient. Monitoring will enable managers to evaluate the efficacy of whatever control tools are employed. Unless effective exotic plant control tools are developed, fuel modification zones (firebreaks) may need to be maintained in areas where public roads abut Conservation Areas, in order to inhibit the spread of wildfires. An additional measure is:

- Contact fire-fighting authorities to identify appropriate strategies to fight fires to minimize habitat damage.

Planned Response to Fire

If a fire occurs within the Reserve Lands as defined above, the CVCC Executive Director will notify the Wildlife Agencies of this Changed Circumstance, or the Wildlife Agencies may notify the CVCC Executive Director. The Executive Director will assess the damage caused by the fire and initiate the following actions:

- Develop and implement a monitoring program to monitor natural re-growth within the damage area for an appropriate period.

- If it is determined that natural re-growth is not occurring and that such absence of natural re-growth will adversely affect Covered Species, an action plan will be developed and implemented; the action plan will involve efforts to improve habitat conditions
- Implement response measures through Adaptive Management.

6.8.3.3 Invasion by New Exotic Species

For the purpose of defining Changed Circumstance, invasion by exotic species is defined as an unanticipated occurrence of a new exotic species within the Reserve Lands.

Risk Assessment

Invasive and exotic species are currently present within areas identified for Conservation in the Reserve Lands, and monitoring of and research into their effects as described in Section 8 and appropriate management and Adaptive Management will occur as needed. The monitoring and research will be used to identify existing exotic species on Reserve Lands so that new exotic species can be identified if one occurs.

Preventive Measures

Section 8 describes monitoring programs to assess the spread of exotic and invasive species and their impacts on Covered Species and conserved natural communities. Monitoring will also enable managers to evaluate the efficacy of whatever control tools are employed. This monitoring program increases the probability of early detection of a new exotic species. Early detection improves the chances of successfully addressing any threat posed by the new exotic species.

Planned Response to Invasion by Exotic Species

Responses to anticipated invasion by exotic species are incorporated in the Monitoring and Management Programs presented in Section 8 of this document. If an unanticipated invasion by a new exotic species occurs in the Reserve Lands, the CVCC Executive Director will notify the Wildlife Agencies of this Changed Circumstance, or the Wildlife Agencies may notify the CVCC Executive Director. The Executive Director will assess the damage caused by the unanticipated invasion by a new exotic species and initiate the following actions:

- Prepare a damage assessment report.
- Recommend actions to address the threat(s) resulting from the unanticipated invasion by a new exotic species.
- Implement response through Adaptive Management.

6.8.3.4 Lowering of the Water Table

For the purpose of defining Changed Circumstances, lowering of the water table is defined as an increase in the depth to groundwater that significantly affects water availability to mesquite plants in the Willow Hole, East Indio Hills, or Thousand Palms Conservation Areas.

Risk Assessment

Substantial lowering of the water table in areas that could significantly affect mesquite hummocks and associated Covered Species in the Willow Hole, East Indio Hills, or Thousand Palms Conservation Area could result from groundwater withdrawals. As described in Section 10.2.7.2, CVCC will ensure monitoring of the hydrological regimes that support mesquite hummocks.

Preventive Measures

Sections 8.1.2 and 10.2.7.2 describe monitoring programs to determine whether substantial lowering of the water table occurs. Monitoring will also enable managers to evaluate the efficacy of the control tools that are employed. This monitoring program increases the probability of early detection of a substantial lowering of the water table. Early detection improves the chances of successfully addressing any threat posed by a substantial lowering of the water table. Should monitoring detect such a substantial lowering, appropriate Adaptive Management actions will be taken.

Planned Response to Lowering of the Water Table

As discussed in Section 8, the Monitoring Program will include the use of appropriate methods and technology (which may change over time) to monitor groundwater levels in the Willow Hole, East Indio Hills, and Thousand Palms Conservation Areas where a substantial lowering of the water table could significantly adversely impact mesquite hummocks and associated Covered Species. Should monitoring detect a substantial lowering or a decline in mesquite health, the following actions will be taken.

- Evaluate the results of the monitoring.
- Prepare a damage assessment report.
- Develop Feasible measures to ameliorate the effects of substantial lowering of the water table on mesquite hummocks and associated Covered Species.
- Implement measures through Adaptive Management.

6.8.3.5 New Listings of Species Not Covered by the MSHCP

USFWS may list additional species under FESA as Threatened or Endangered, delist species that are currently listed, or declare Listed Species as extinct. In the event of a new listing of one or more species not covered by the MSHCP, USFWS and the Permittee(s) will identify actions that may cause Take, jeopardy or adverse modification of Critical Habitat, and the Permittee(s) will avoid such actions in the implementation of their Covered Activities until approval of an amendment to the MSHCP to address the newly-listed species in accordance with the modifications and amendments procedures described in Section 6.12. Such avoidance measures will include the following:

(1) Evaluation of applications for Covered Activities with respect to potential effects on the newly-listed species; such evaluations will include assessment of the presence of suitable

habitat for the newly-listed species within the areas potentially affected by the proposed Covered Activity and surveys for the newly-listed species, as appropriate, using accepted protocols; and

(2) Implementation of measures to avoid impacts to the newly-listed species based on the results of the data collected in Item 1 above and the evaluation of those data in the context of the design of the proposed Covered Activity.

6.8.4 Changed Circumstances Not Provided for in the Plan

Pursuant to the No Surprises Rule at 50 C.F.R. 17.22(b)(5)(ii), the USFWS may not require (1) any Conservation or mitigation measures in addition to those provided for under Section 6.8.3 in response to a Changed Circumstance; or (2) additional Conservation or mitigation measures for any Changed Circumstance that is not identified in Section 6.8.3 without the consent of the Permittees, provided the Permittees are properly implementing the MSHCP Plan.

As recognized in the No Surprises Rule at 50 C.F.R. 17.22(b)(6) and 17.32(b)(6), the USFWS, any Federal, State or local agency, or a private entity may take additional actions at their own expense to protect or conserve a Covered Species within the MSHCP Plan Area.

6.9 Application of Certain FESA Requirements

Critical Habitat Designation for Covered Species

The USFWS has adopted designations for the following species within the MSHCP Plan Area:

- Coachella Valley fringe-toed lizard
- Peninsular bighorn sheep

The USFWS acknowledges and agrees that the MSHCP and the IA provide a comprehensive, habitat-based approach to the protection of Covered Species by focusing on the lands essential for the long-term Conservation of the Covered Species and appropriate management for those lands. This approach is consistent with the overall purposes of FESA to provide a means whereby the ecosystems upon which Endangered and Threatened Species depend may be conserved. FESA regulations specify that the criteria to be used in designating Critical Habitat include "those physical and biological features that are essential to the conservation of a given species and that may require special management considerations or protection." (50 C.F.R. § 424.12(b).)

The MSHCP and the IA provide for the protection of "those physical and biological features essential to the conservation" of the Covered Species in a manner consistent with USFWS regulations concerning the designation of Critical Habitat. The USFWS agrees that, to the maximum extent allowable after public review and comment, in the event that a Critical Habitat determination is made for any Covered Species, and unless the USFWS finds that the

MSHCP is not being implemented, lands within the boundaries of the MSHCP will not be designated as Critical Habitat. In addition, if Critical Habitat is designated within the MSHCP boundaries, pursuant to Section 14.9 of the IA and except as expressly provided in Section 14.11 of the IA and Section 6.8.2 of this document regarding Unforeseen Circumstances, no subsequent evaluation of the Covered Species, nor any mitigation, compensation, conservation enhancement or other protective measures other than those set forth in the MSHCP will be required. Moreover, to the maximum extent allowable after public review and comment, the USFWS agrees to reassess and revise the boundaries of existing designated and proposed Critical Habitat of Covered Species within the MSHCP boundaries after its approval, although the Parties recognize that funding constraints may influence the timing of such regulatory action.

Future Recovery Plans

Recovery plans under FESA delineate actions necessary to recover and protect federally-listed species. These plans frequently include information, or may lead to the development of information, that can contribute to Adaptive Management. However, recovery plans do not obligate any Permittee, individual or entity to undertake specific tasks.

The Parties acknowledge that FESA recovery plans have no effect on the implementation of this MSHCP, except to the extent that they may contribute information to, or assist in achieving the goals of, Adaptive Management. Any recovery plan applicable to any Covered Species within the MSHCP Plan Area that is developed after the Effective Date shall:

1. Not require any additional land or financial compensation by Permittees;
2. Be finalized only after the USFWS has consulted with and requested input from CVCC on the preparation of the recovery plan; and
3. Not in any way diminish the Take Authorization for Covered Species granted to Permittees pursuant to the MSHCP, this Agreement, or the Section 10(a) Permit.

Section 7 Consultations

USFWS shall evaluate the direct, indirect, and cumulative effects of the Covered Activities in its internal FESA Biological Opinion issued in connection with the MSHCP and issuance of the Section 10(a) Permit. As a result, and to the maximum extent allowable, in any consultation under Section 7 of FESA subsequent to the Effective Date involving the Permittee(s) or entity with Third Party Take Authorization with regard to Covered Species and Covered Activities, USFWS shall ensure that the FESA Biological Opinion issued in connection with the proposed project that is the subject of the consultation is consistent with the internal FESA Biological Opinion. Such project must be consistent with the terms and conditions of the MSHCP and the IA. Any reasonable and prudent measures included under the terms and conditions of a FESA Biological Opinion issued subsequent to the Effective Date with regard to the Covered Species and Covered Activities shall, to the maximum extent appropriate, be consistent with the implementation measures of the MSHCP and the IA. USFWS shall not impose measures in excess of those that have been or will be required by the Permittee(s) or entity with Third Party Take Authorization pursuant to the MSHCP and this Agreement. USFWS shall process subsequent FESA consultations for Covered Activities in accordance with the process and time periods set forth in 50 C.F.R.§ 402.14. An extension of the time periods in 50

C.F.R. § 402.14 may be sought as set forth in Section 402.14(e). The Parties agree that this section does not create an independent cause of action.

6.10 State Assurances

Pursuant to California Fish and Game Code Section 2820(f), CDFG "may provide assurances for plan participants commensurate with long-term conservation assurances and associated implementation measures pursuant to the approved plan".

Further, in accordance with California Fish and Game Code Section 2820(f)(2), if there are Unforeseen Circumstances, CDFG shall not require additional land, water or financial compensation or additional restrictions on the use of land, water or other natural resources for the life of the NCCP Permit without the consent of the Permittees, unless CDFG determines that continued implementation of this Agreement, the MSHCP, and/or the Permits would jeopardize the continued existence of a Covered Species, or as required by law and would therefore lead to NCCP Permit revocation or suspension. (See Section 15.3 of the IA for additional details.)

Pursuant to Section 15.7 of the IA, except as otherwise required by law, CDFG shall not recommend or otherwise seek to impose through consultation with other public agencies any mitigation, compensation or habitat enhancement requirements regarding impacts to Covered Species that exceed the requirements prescribed in and pursuant to the MSHCP and the IA, including, without limitation, in the form of comments offered by CDFG in the context of any CEQA process associated with approvals for Covered Activities, with regard to effects on Covered Species.

6.11 Relationship to Existing Wetland Regulations

Projects that affect wetland natural communities shall be required to comply with the applicable regulatory standards related to wetlands functions and values. The purpose of this discussion is to identify current regulatory processes and indicate their relationship to the process set forth in the MSHCP. It should be noted that current wetland regulatory processes beyond the process described in this section are not relied upon for coverage of species addressed in the MSHCP. Many wetland communities (*e.g.*, freshwater marsh, riparian forests, riparian woodlands, open water, flood channel, river and stream beds) within the Plan Area include areas subject to California Fish and Game Code (CFG Code) Section 1600 et seq. and the federal Clean Water Act (Sections 401, 402 and 404). Such areas will continue to be regulated by state and federal agencies. The U.S. Army Corps of Engineers (ACOE) shall continue to consult with the USFWS pursuant to Section 7 of the FESA on projects that may affect federally listed species within ACOE jurisdictional wetlands and waters. Section 23.6 of the IA describes “meet and confer” provisions between USFWS and affected Permittees. The CDFG shall continue to work closely with the ACOE, USFWS, and local jurisdictions to ensure that the CFG Code Section 1600 et seq. agreements are consistent with the mitigation required for Covered Species. In addition, other existing regulations related to wetland Habitats, such as the Porter-Cologne Act shall continue to apply.

6.12 Modifications, Like Exchanges to Conservation Areas, and Amendments to the MSHCP

MSHCP modifications, Like Exchanges to Conservation Areas, and amendments are not anticipated on a regular basis. However, certain events may trigger modifications, Like Exchanges to Conservation Areas, or Minor or Major Amendments to the MSHCP. Any signatory to the IA may seek a modification, Like Exchanges to Conservation Area Boundary Adjustment, or amendment to the MSHCP.

6.12.1 Modifications

Clerical Changes

Clerical changes to the MSHCP shall be made by the CVCC on its own initiative or in response to a written request submitted by any Permittee or Wildlife Agency, which includes documentation supporting the proposed clerical change. Clerical changes shall not require any amendment to the MSHCP, the Permits, or the IA. Clerical changes include corrections of typographical, grammatical, and similar editing errors that do not change the intended meaning and corrections of any maps or exhibits to correct insignificant errors in mapping. The Parties anticipate that most clerical changes to the MSHCP will occur during the first ten (10) years of the Permits. Annual Reports shall include a summary of clerical changes made to the MSHCP in the preceding calendar year.

Land Use Changes

The Parties agree that the adoption and amendment of general plans, specific plans, community plans, zoning ordinances and similar land use ordinances, and the granting of implementing land use entitlements by the County and the Cities are matters within the sole discretion of the County and Cities and shall not require amendments to the IA, MSHCP, or the Permits, or the approval of other Parties to the IA. However, the Parties agree that: (1) no such action by the County or the Cities shall in any way alter or diminish their obligations under the IA, the MSHCP, or the Management and Monitoring Programs; and (2) approval of certain projects may lead to revocation or suspension of the Permits pursuant to Section 23.5 of the IA.

Adaptive Management Changes

Except as otherwise provided, changes to avoidance, minimization, compensation and MSHCP Conservation Area management strategies developed through and consistent with the Adaptive Management Program described in Section 8 of this document shall not require any amendment to the MSHCP, the IA, or the Permits.

6.12.2 Like Exchanges to Conservation Areas

The design of the Conservation Areas focused on natural communities, Core Habitat for Covered Species, Essential Ecological Processes, Biological Corridors and Linkages. The natural communities and Covered Species also occur outside of the Conservation Areas. In some

instances it may be possible to achieve the Plan's Conservation Goals while not increasing the level of Take analyzed in the Plan through a different configuration of one or more Conservation Areas.

Like Exchanges are changes proposed by a Permittee to modify the boundary of one or more Conservation Areas in exchange for reducing or modifying the boundary of a Conservation Area. A Like Exchange must result in equal or greater benefits to Covered Species and conserved natural communities as compared to those benefits analyzed in the Plan. In addition, the level of Take of Covered Species must be no greater than that analyzed in the Plan.

When a Like Exchange is proposed, the applicable Permittee(s) shall meet and confer with the Wildlife Agencies prior to submittal of Like Exchange analysis to the CVCC. The Permittee will prepare an equivalency analysis. Upon submittal of a completed equivalency analysis, the Wildlife Agencies shall respond in writing within 60 days (of acknowledged receipt) as to their concurrence with the Like Exchange. If the Wildlife Agencies do not concur the action shall require an Amendment to the MSHCP. Like Exchanges must also be submitted to applicable Permittees for approval.

The Like Exchange analysis shall include assembly of necessary project information and completion of an equivalency analysis as described below:

- **Like Exchange Information and Analysis Requirements**

The following information shall be included in the analysis:

1. Maps clearly and precisely delineating the proposed Boundary Adjustment, showing land to be removed from the Conservation Area in the context of the entire Conservation Area, and land to be added to this or another Conservation Area;
2. Narrative and graphic description of the proposed project;
3. Narrative and graphic description of biological information available for the Boundary Adjustment sites (land to be removed and land to be added) including current project-specific vegetation mapping, modeled habitat and appropriate species surveys, land identified as part of a Biological Corridor or Linkage, and land identified as part of an Essential Ecological Process area;
4. Narrative and graphic description of the project's efforts to be consistent with the Conservation Area Conservation Objectives and explanation of the rationale why consistency has been determined to be infeasible;
5. Quantification and characterization of effects/benefits of the proposed Boundary Adjustment on Habitats for Covered Species, natural communities, Biological Corridors and Linkages, Essential Ecological Processes, and Conservation Area reserve design and manageability; and
6. Any other information deemed necessary by the Permittee to make the appropriate findings.

- **Analysis**

Based on the assembled information, an equivalency analysis shall be provided by the applicable Permittee(s) to the CVCC and the Wildlife Agencies in narrative and graphic form comparing the effects/benefits of the proposed Like Exchange. The equivalency analysis shall address the following categories:

1. Effects on the level of Take of Covered Species;
2. Effects on Habitats of Covered Species, including Core Habitat; potential habitat fragmentation, reduction in size of Core Habitat patches, and increase in edge effects;
3. Effects on natural communities, including potential fragmentation, reduction in patch size, and increase in edge effects;
4. Effects on Biological Corridors and Linkages;
5. Effects on Essential Ecological Processes;
6. Effects on Conservation Area configuration and management (such as increases or decreases in edge);
7. Effects on ecotones (defined as areas of adjoining natural communities, generally characterized by greater biological diversity) and other conditions affecting species diversity (such as invasion by exotics);
8. Equivalent or greater acreage contributed to the Conservation Areas;
9. Applicant must demonstrate agreements or control over mitigation property being offered under the equivalency analysis.

The equivalency analysis shall draw conclusions regarding the degree to which the proposed project incorporating Boundary Adjustments is considered to be biologically equivalent or superior to a project on the same site not deviating from the Conservation Area Conservation Objectives. Projects determined to be biologically equivalent or superior shall be determined to be acceptable refinements to the MSHCP Conservation Area boundaries and amendment to the MSHCP shall not be required prior to approval of such projects. Projects not determined to be biologically equivalent or superior shall be determined to be unacceptable deviations from the Conservation Area Conservation Objectives and an amendment to the MSHCP would be required prior to approval of such projects.

In 2006, the Citrus Ranch, Indio Water Authority Water Reservoir Sites, Lumkes Family Trust/Ruthersford, and Nott Family Trust Like Exchanges were approved. The acreages of these exchanges are reflected in the Conservation Area descriptions in Section 4.0. The Like Exchange agreements are included in *Appendix V*. In addition, a transfer of take from the County of Riverside to the City of Indio for the Indio Trails development project and a transfer of take from the County of Riverside to the City of Palm Springs for the Shadowrock development project have been approved. These agreements are included in *Appendix V*.

6.12.3 Minor Amendments

Minor Amendments are amendments to the MSHCP of a minor or technical nature where the effect on Covered Species, level of Take, and Permittees' ability to implement the MSHCP are not significantly different than those described in the MSHCP as originally adopted. Minor Amendments to the MSHCP shall not require amendments to the IA or the Permits.

Minor Amendments Not Requiring Wildlife Agencies' Concurrence

1. Minor corrections to land ownership.
2. Adjustment of land ownership and conservation acreages in the Santa Rosa and San Jacinto Mountains Conservation Area upon completion of a land exchange between the Agua Caliente Band of Cahuilla Indians and BLM. See Section 4.2.1.1 for additional information.
3. Minor revisions to survey, monitoring, reporting and/or management protocols that clearly do not affect Covered Species or overall MSHCP Conservation Area functions and values.
4. Application of Take Authorization to Development within Cities incorporated within the MSHCP boundaries after the Effective Date of the IA, pursuant to Section 11.5 of the IA provided such inclusion does not preclude Reserve Assembly, significantly increase the cost of MSHCP Additional Conservation Lands management or MSHCP Reserve System Assembly, or preclude achieving Conservation Area Conservation Objectives and Species Conservation Goals.
5. Annexation or deannexation of property pursuant to Section 11.4 of the IA, provided such inclusion does not preclude MSHCP Reserve System Assembly, significantly increase the cost of MSHCP Additional Conservation Lands management or MSHCP Reserve System Assembly, or preclude achieving Conservation Area Conservation Objectives and Species Conservation Goals.
6. Updates/corrections to the conserved natural communities map and/or species occurrence data.
7. Changes to the RMU boundaries.

Minor Amendments Requiring Wildlife Agencies' Concurrence

1. As described in Section 6.12.2, proposed Like Exchanges not determined to be biologically equivalent or superior to the existing Conservation Areas would require an amendment to the MSHCP.
2. Construction and operation of CVWD water recharge and storage and other water related facilities as described in Section 7.3 of the MSHCP.
3. Modification of the alignment of the Palm Desert to La Quinta Connector Trail from the alignment in the Trails Plan in the Final MSHCP.
4. Transfer of Conservation Objectives for conserved natural communities and/or identified Covered Species between Conservation Areas or between Recovery Zones in the Santa

Rosa and San Jacinto Mountains Conservation Area may occur if the following is demonstrated:

- The transfer does not reduce the number of acres anticipated by the Plan of the natural community or the species' habitat conserved.
- The transfer does not reduce the conservation value of the lands that will be conserved based on natural community patch size, configuration, and juxtaposition within the matrix of Conserved Habitat and is of greater or equal habitat value.
- There is no reduction in conservation and no increase in Take.
- Transfers must be within kind (for a Covered Species or natural community). Any shifts must be species-specific and meet the above criteria.

5. Changes to the list of exotic species in Table 4-112.
6. Future proposals for new trails on Reserve Lands in the Santa Rosa and San Jacinto Mountains Conservation Area, other than the identified new trails (including perimeter trails).
7. Construction of the Morongo Wash Flood Control Facility as described in Section 7.3.1.

Procedure

Any Party may propose Minor Amendments to the MSHCP or the IA by providing written notice to all affected Parties. Such notice shall include a description of the proposed Minor Amendment, an explanation of the reason for the proposed Minor Amendment, an analysis of its environmental effects including any impacts to the Conservation of Covered Species, and a description of why that Party believes the effects of the proposed Minor Amendment: (1) are not significantly different from, and are biologically equivalent to, the terms in the MSHCP as originally adopted; (2) substantially conform to the terms in the MSHCP as originally adopted; and (3) will not significantly reduce the ability to acquire the Additional Conservation Lands. The Wildlife Agencies and affected Parties shall submit any comments on the proposed Minor Amendments in writing within sixty (60) days of receipt of such notice. Any Party can institute the informal meet and confer process set forth in Section 20.4.4 of the IA to resolve disagreements concerning Minor Amendments.

For the Minor Amendments requiring Wildlife Agencies' concurrence, any non-concurrence must occur within 60 days of receipt of written notice as referenced above. If the Wildlife Agencies concur, or if they fail to respond within the 60-day period, the Minor Amendment may be approved.

6.12.4 Major Amendments

Major Amendments are those proposed changes to the MSHCP and the Permits that are not modifications as described in Section 6.12.1 or Minor Amendments. Major Amendments to the MSHCP shall require a subsequent amendment to the IA and the Permits, and public notice as required by applicable laws and regulations. The CVCC shall submit any proposed Major Amendments to the Wildlife Agencies.

Major Amendments

Major amendments include, but are not limited to, the following:

1. All amendments not contemplated in the IA as modifications or Minor Amendments to the MSHCP, except subsequent minor changes which are not specifically listed as a Minor Amendment in the IA that the Wildlife Agencies have determined to be insubstantial and appropriate for implementation as a Minor Amendment.
2. Changes to the boundary of the MSHCP Plan Area.
3. Addition of species to the Covered Species list.
4. Changes in anticipated MSHCP Reserve Assembly or funding strategies and schedules that would have substantial adverse effects on the Covered Species.

Procedure

Major Amendments shall require the same process followed for the original MSHCP approval. A Major Amendment will require an amendment to the MSHCP and the IA addressing the new circumstances, subsequent publication and public notification, CEQA/NEPA compliance and intra-Service Section 7 Consultation, if one is deemed necessary. Major Amendments shall be subject to review and approval by the CVCC and other Permittees as appropriate, at a noticed public hearing. The Wildlife Agencies shall use reasonable efforts to process proposed Major Amendments within one hundred twenty (120) days after approval by the Permittee(s).

6.13 Annexations

Each of the Permittees shall enforce the terms of the Plan and the IA with respect to all individuals or entities subject to its jurisdiction, including lands in the Plan Area annexed into the Permittee's jurisdiction after Plan approval. Any land annexed within the MSHCP Plan Area shall receive Take Authorization pursuant to the Permits provided the Minor Amendment requirements of Section 20.4 of the IA have been met. If the Minor Amendment requirements cannot be met, a Major Amendment will be required.

In the event of the deannexation of any land within the Plan Area to another jurisdiction that is not a Permittee, the parties shall seek to enter into an agreement among the Permittees, the Local Agency Formation Commission ("LAFCO"), the annexing jurisdiction, and the Wildlife Agencies as part of the annexation process to ensure that any Development of the annexed lands proceeds in accordance with the Conservation Objectives of all affected Conservation Areas. If an agreement can be reached, that jurisdiction shall become a Permittee after executing an addendum to the IA. If agreement cannot be reached, or if the MSHCP requirements are not imposed by LAFCO, then the deannexed land will not receive Take Authorization pursuant to the Permits. Additionally, such deannexation may result in the revocation or suspension of the Permits pursuant to Section 23.5 of the IA. Parties with deannexed land that qualify as Participating Special Entities may receive Take Authorization as set forth in Section 11.7.1 of the IA.

Concurrent with the annexation or deannexation, CVCC shall provide to the affected Parties a revised calculation of the applicable Conservation Objectives and other relevant information to the affected Permittees.

7.0 Take Authorization for Covered Activities and Term of Permit

The proposed action is the issuance of a long-term (75-year) Permit for the Take of Covered Species to the Permittees. Covered Species include both listed and non-listed species that are adequately conserved by the Plan. The Permits provide for the Take of these species or loss of their habitat, so long as compliance with the Plan requirements is achieved. Although fully protected species are included in the list of Covered Species, Take of these species is not authorized in the NCCP Permit and is prohibited by the California Fish and Game Code. The following species in the MSHCP are fully protected under the California Fish and Game Code: 1) Peninsular bighorn sheep; 2) Yuma clapper rail and 3) California black rail. The CDFG acknowledges and agrees that if the measures set forth in the MSHCP are fully complied with, the Covered Activities are not likely to result in Take of these species except as provided for pursuant to Fish and Game Code Section 2081.7.

Figure 7-1 depicts areas where Take Authorization is provided. Take authorized as part of the Plan applies only to non-federal lands.

7.1 Covered Activities outside Conservation Areas

The Permits will provide Take Authorization for the following types of Covered Activities outside Conservation Areas:

- ***Development permitted or approved by Local Permittees.*** This includes, but is not limited to, new projects approved pursuant to county and city general plans, including the circulation element of said general plans, transportation improvement plans for roads in addition to those addressed in Section 7.2, master drainage plans, capital improvement plans, water and waste management plans, the County's adopted Trails Master Plan, and other plans adopted by the Permittees. See Section 6.9 for information on the Section 7 consultation process for projects that have a federal nexus and require a Section 7 consultation. Covered Activities include Development on agricultural lands.
- ***Public facility construction, operations, and maintenance and safety activities by the Permittees for existing and future facilities, including both on and off site activities.*** Such facilities include, but are not limited to, publicly maintained roads and rights-of-way; materials pits; maintenance yards; flood control facilities; landfills, transfer stations, and other solid waste related facilities, including those for the processing of organic materials; public buildings; water development, production, storage, treatment, and transmission facilities; sewage treatment and transmission facilities; reclaimed water storage and transmission facilities; public parks; substations and electric transmission

facilities; and other public utility facilities providing services essential to the health, safety, and welfare of the public.

- ***Emergency response activities by Permittees required to protect the public health, safety, and welfare***. Such emergency response activities by Permittees include emergency response to wildfire, flooding, earthquakes, and other emergency situations.

The Permits do not provide Take Authorization for agricultural operations.

The Take Authorization does not cover approved Development Projects with legal vested rights as of the date the Permits are issued. Development Projects with legal vested rights (as of the date of Permit issuance) could voluntarily obtain take coverage, provided the applicable Permittee requires the execution of a Certificate of Inclusion by the Project Applicant that requires compliance with all applicable Plan requirements. Alternatively, a Project Applicant with legal vested rights (at the time of Permit issuance) could seek Take Authorization directly from the Wildlife Agencies.

7.2 Transportation Projects within and outside Conservation Areas

Transportation projects identified in Tables 7-1 through 7-3 are Covered Activities. These include projects both within and outside of Conservation Areas.

7.2.1 Interchange Projects and Associated Arterials

The Plan includes Permits for the interchange projects shown in Table 7-1 outside the Conservation Areas. Widening of the local arterials associated with these interchange projects are also Covered Activities. These associated arterials are also shown in the table. Portions of some of these related arterials are within Conservation Areas. The interchange projects and associated arterials are depicted in Figure 7-2. The mitigation obligation for the interchange projects and associated arterials is described in Section 6.6.1.

Table 7-1: Covered Activities – Interchanges and Associated Arterials

Facility	***Conservation Area in or Bordering***
Indian Avenue I-10 Interchange	Willow Hole; Whitewater Floodplain
From I-10 Interchange Indian Avenue arterial to Dillon Road	Willow Hole
From I-10 Interchange Indian Avenue arterial to San Rafael	Whitewater Floodplain
Palm Drive/Gene Autry Trail I-10 Interchange	Willow Hole; Whitewater Floodplain
From I-10 Interchange Palm Drive arterial to 20th Avenue	Willow Hole
Gene Autry arterial to Vista Chino	Whitewater Floodplain

Facility	***Conservation Area in or Bordering***
Varner Rd. arterial from Palm Drive to Mountain View Rd.	Willow Hole
Date Palm Drive I-10 Interchange	Willow Hole; Whitewater Floodplain
Facility	***Conservation Area in or Bordering***
From I-10 Interchange Date Palm arterial to Varner Rd.	Willow Hole
From I-10 Interchange Date Palm arterial to Ramon Rd.	Whitewater Floodplain
Varner Rd. arterial from Mountain View Rd. to Vista Chino	Willow Hole; Edom Hill
Bob Hope Drive I-10 Interchange	Thousand Palms
Bob Hope arterial from Ramon Rd. to Dina Shore Drive	None
Ramon Road arterial from Los Alamos to Bob Hope Drive	None
Ramon Road arterial from I-10 to Bob Hope Drive	None
Ramon Road arterial from I-10 to Varner Rd.	Thousand Palms
Ramon Road arterial from Varner Rd. to Monterey	Thousand Palms
Varner Rd. arterial from Vista Chino to ½ mile before Rio Del Sol	Thousand Palms
Varner Rd. from Ramon Rd. to Harry Oliver Trail	Thousand Palms
Jefferson Avenue I-10 Interchange	None
Jefferson Avenue arterial from I-10 to 40th Avenue	None

7.2.2 Caltrans Projects

The Caltrans' projects listed in Table 7-2 are also Covered Activities. Portions of some of these projects are in Conservation Areas. Figure 7-3 shows the location of these Caltrans' projects that are in addition to the projects in Section 7.2.1 for which Caltrans is the lead agency.

Table 7-2: Covered Activities–Caltrans Facilities

Facility	***Conservation Area***	***Avoidance/Minimization Measures Required***
Morongo Parkway I-10 Interchange, and O&M	Cabazon	None[1]
I-10 widening from Fields Road to SR 111, and O&M	Cabazon, Stubbe/Cottonwood Canyons, Snow Creek/Windy Point	Fluvial sand transport; Biological Corridor; Desert tortoise
I-10 widening from SR-111 to SR-62/I-10 Separation, and O&M	Whitewater Canyon, Hwy 111/I-10	Fluvial sand transport; Biological Corridor;
I-10 widening from SR-62/I-10 Separation to Edom Wash, and O&M	Willow Hole, Whitewater Floodplain	Fluvial sand transport; Biological Corridor;
I-10 widening from Edom Wash to Jct. 111, and O&M	Willow Hole, Whitewater Floodplain	Fluvial sand transport; Biological Corridor;
I-10 widening from Jct. 111 to SR-86S, and O&M	None	None[1]
I-10 widening from SR-86S to SR-177 [c. 2,500' west of Red Cloud Rd.] , and O&M	Desert Tortoise and Linkage	Fluvial sand transport; Biological Corridor; Desert tortoise

Facility	***Conservation Area***	***Avoidance/Minimization Measures Required***
SR 62 widening from Jct. I-10 to Mission Creek Rd, and O&M	Upper Mission Creek/Big Morongo Canyon	Fluvial sand transport; Biological Corridor; Desert tortoise
Facility	***Conservation Area***	***Avoidance/Minimization Measures Required***
SR 62 widening from Mission Creek Rd to SB County Line, and O&M	Upper Mission Creek/Big Morongo Canyon	Fluvial sand transport; Biological Corridor; Desert tortoise
SR 74 widening from Dead Indian Ck to 1.4 mi W/O Cahuilla Hills Road, and O&M	None	None[1]
SR 74 widening from 1.4 mi W/O Cahuilla Hills Rd to Starburst Rd/Carriage Tr., and O&M	None	None[1]
SR 74 widening from Starburst Rd/Carriage Trail to Mesa View Drive, and O&M	None	None[1]
SR 74 widening from Mesa View Dr to Jct. SR-111, and O&M	None	None[1]
SR 74 from Dead Indian Ck southerly and westerly through the Plan Area, O&M only	Santa Rosa and San Jacinto Mountains Conservation Area	PBS in Essential Habitat
SR 86 widening from Imperial Co Line to Jct. I-10, and O&M	Coachella Valley Stormwater Channel and Delta	None[1]
SR 111 widening from Imperial Co. Line to Jct. SR86 Route Break, and O&M	Dos Palmas	Desert pupfish
SR 111 widening from N Jct. Rte 86 to Ave 45, and O&M	None	None[1]
SR 111 widening from Ave 45 to Jct. 86, and O&M	None	None[1]
SR 111 widening from 86 to Jct. Rte 74, and O&M	none	None[1]
SR 111 widening from Jct. Rte 74 to Palm Desert City Limit, and O&M	None	None[1]
SR 111 widening from Palm Desert City Limit to Bob Hope Dr, and O&M	None	None[1]
SR 111 widening from Bob Hope Dr to Gene Autry Trail, and O&M	None	None[1]
SR 111 widening from Gene Autry Trail to Cherokee Way, and O&M	None	None[1]

Facility	***Conservation Area***	***Avoidance/Minimization Measures Required***
SR 111 widening from Cherokee Way to Mesquite Rd, and O&M	None	None[1]
SR 111 widening from Mesquite Rd to Vista Chino, and O&M	None	None[1]
Facility	***Conservation Area***	***Avoidance/Minimization Measures Required***
SR 111 widening from Vista Chino to Roberto Miguel, and O&M	None	None[1]
SR 111 widening from Roberto Miguel to Palm Canyon Drive, and O&M	None	None[1]
SR 111 widening from Palm Canyon Drive to Begin Indep. Align Lt lanes, and O&M	None	None[1]
SR 111 widening from begin Indep. Align to End Indep. Align, and O&M	Snow Creek/Windy Point	None[1]
SR 111 widening from end Indep. Align to Jct. I-10, and O&M	Snow Creek/Windy Point	Fluvial sand transport; Biological Corridor; Desert tortoise

[1] The project is either outside a Conservation Area or has no impact requiring specific avoidance and minimization measures. The projects are mitigated through Caltrans' land acquisition and monitoring and management obligations, as described in Section 6.6.2.

Avoidance, minimization, and mitigation measures for the applicable road projects as identified in the table are described in Section 4.4. The mitigation obligation for these projects is described in Section 6.6.2.

7.2.3 Regional Road Projects

The Permits will also provide Take Authorization for the regional road projects shown in Table 7-3. Figure 7-4 shows the location of these regional road projects.

Table 7-3: CVAG Regional Road Projects

Street Name	**Agency**	**Segment Description**
NORTH – SOUTH REGIONAL ARTERIALS		
GENE AUTRY TRAIL	PS	Vista Chino to Whitewater River Crossing
	PS	Whitewater River Bridge Crossing
	PS	Whitewater River to So. of Railroad Crossing
	PS	Railroad Crossing to Salvia Road
	PS	Salvia Road to and including I-10 Interchange

Table 7-3 (cont.)

Street Name	Agency	Segment Description
PALM DRIVE	DHS	Two Bunch Palms to Hacienda Avenue
	DHS	Hacienda Avenue to Pierson Boulevard
	DHS	Pierson Boulevard to Mission Lakes
CATHEDRAL CANYON	CC	Bridge over Whitewater Channel
DATE PALM DRIVE	CC	Palm Canyon to Gerald Ford including Whitewater Bridge widening
	CC	Gerald Ford to Dinah Shore
	CC	Dinah Shore to Ramon Rd.
	CC	Vista Chino to I-10 (IC & RR Bridge)
	CC	I-10 to Varner Road (includes realignment)
DA VALL ROAD	CAL/CC	Da Vall I-10 Interchange
BOB HOPE DRIVE	UNC/RM	Dinah Shore Drive to Ramon Road
MONTEREY AVENUE	RM/PD	Clancy Lane to Country Club Drive
	RM/UNC/PD	Country Club Drive to Frank Sinatra Drive
	RM/UNC	Intersection of Monterey & Frank Sinatra
	RM/PD	Intersection of Monterey & Country Club
	PD	Intersection of Monterey & Fred Waring
	UNC	I-10 to Ramon Road
COOK STREET	PD	Frank Sinatra Drive to Gerald Ford Drive
	PD	Country Club to Whitewater Brg.
	PD	Whitewater Brg. to Fred Waring Dr.
	PD	Bridge over Whitewater Channel
WASHINGTON STREET	LQ	52nd Avenue to 50th Avenue includes Bridge over La Quinta Evacuation Channel
	LQ	50th Avenue to Hwy. 111
	LQ	Hwy 111 to Whitewater River Channel (includes bridge over Whitewater Channel)
	LQ/UNC	Whitewater Bridge to Fred Waring Drive

Table 7-3 (cont.)

Street Name	Agency	Segment Description
	PD/UNC/LQ	Fred Waring Drive to 42nd Avenue
	PD/UNC/LQ	42nd Avenue to Country Club Drive
	UNC	I-10 to 38th Avenue
	UNC	38th Avenue to Ramon Rd.
ADAMS STREET	LQ	Bridge over Whitewater Channel
DUNE PALMS ROAD	LQ	Bridge over Whitewater Channel
JEFFERSON STREET	LQ	54th Avenue to 52nd Avenue (Includes Bridge over All American Canal)
	LQ/IN	52nd Avenue to 49th Avenue (Indio City Limit)
	LQ/IN	49th Avenue to Hwy. 111
	IN	Bridge over La Quinta Evacuation Channel (in JEF3)
	LQ/IN	Hwy. 111 to Westward Ho
	IN	Westward Ho to Miles Avenue
	LQ	Bridge over Whitewater Channel (in JEF4)
	LQ/IN	Miles Avenue to Fred Waring Drive
	IN	Fred Waring Drive to Indio Blvd.
	IN	I-10 Interchange and Bridge over Railroad
	IN	I-10 to Avenue 40
	IN	Avenue 40 to Avenue 38
MADISON STREET	UNC	60th Avenue to 58th Avenue
	LQ	58th Avenue to 56th Avenue (Airport Blvd.)
	LQ	56th Avenue to 54th Avenue
	LQ	54th Avenue to 52nd Avenue (missing link)
	IN/LQ	52nd Avenue to 50th Avenue (Includes Bridge over All American Canal)
	IN	50th Avenue to 49th Avenue (missing link)
	IN	49th Avenue to Hwy. 111 (Includes missing link .25 miles north of 49th Avenue)
	IN	Hwy. 111 to Miles Avenue
	IN/UNC	Miles Avenue to Fred Waring Drive (missing link)
	IN	Fred Waring Drive to Indio Blvd.
	CAL/IN	I-10 Interchange and Bridge over Railroad

Table 7-3 (cont.)

Street Name	Agency	Segment Description
VAN BUREN STREET	IN/UNC	Indio Blvd. to 48th Avenue
	COA	48th Avenue to 50th Avenue
	COA/UNC	50th Avenue to 52nd Avenue
	COA/UNC	52nd Avenue to 54th Avenue
	COA/UNC	54th Avenue to Avenue 56/Airport
INDIAN CANYON DRIVE	PS	Ramon Road to Tahquitz
	PS	Tahquitz to Alejo
	PS	Alejo to Tacheva
	PS	Tacheva to Vista Chino
	PS	Vista Chino to Racquet Club
	PS	Racquet Club to Old City limits
PALM CANYON DRIVE	PS	Vista Chino to Tacheva
	PS	Tacheva to Alejo
	PS	Alejo to Tahquitz
	PS	Tahquitz to Ramon
	PS	Ramon to Mesquite
	PS	Mesquite to East Palm Canyon
	PS	East Palm Canyon to Sunrise
	PS	Sunrise to Farrell
	PS	Farrell to Gene Autry
	CC	Westerly City Limits to Cathedral Cyn Dr. including widening bridge at West Cathedral Canyon Channel
	CC	200 ft. west of Sungate to easterly City Limits
INDIAN AVENUE	PS	Old City Limit to RR Crossing (including bridge over Whitewater River)
	PS	RR Crossing to 20th Avenue
	PS	I-10 Interchange (in IND2)
	PS	Intersection of Indian Av. & 20th Av.
	PS	20th Av. to 19th Av.
	PS/UNC	19th Av. to Dillon Rd
	UNC	Dillon Rd. to 14th Av.
	DHS	14th Av. to Pierson Blvd.
	DHS	Pierson Blvd. to Mission Lakes
	DHS	Mission Lakes to SR-62

Table 7-3 (cont.)

Street Name	Agency	Segment Description
LITTLE MORONGO ROAD	DHS	Mission Lakes Blvd. to Pierson Blvd.
	DHS	Pierson Blvd. to Two Bunch Palms Tr.
	DHS	Two Bunch Palms to Dillon Road
MOUNTAIN VIEW	DHS	Hacienda Av. to Dillon Rd.
	DHS	Dillon Rd. to 20th Av.
	UNC/CC	20th Av. to Varner Rd.
THOUSAND PALMS RD	UNC	Ramon Rd. to Dillon Rd.
CHASE SCHOOL ROAD	UNC	I-10 to south of the Whitewater Flood Control Project levee
MONROE STREET	IN/UNC	40th Avenue to I-10 Interchange
	IN	I-10 interchange to Miles Ave.
	IN	Miles Ave. to 48th Ave.
	IN	48th Ave. to 50th Ave.
	IN	50th Ave. to 52nd Ave.
	CAL/IN	Monroe Street I-10 Interchange
JACKSON STREET	IN/UNC	40th Avenue to I-10 Interchange
	IN	I-10 interchange to 46th Ave.
	IN	46th Ave. to 48th Ave.
	IN/COA	48th Ave. to 50th Ave.
	IN/UNC	50th Ave. to 52nd Ave.
	CAL/IN/UNC	Jackson Street I-10 Interchange
GOLF CENTER PKWY	IN	Golf Center Pkwy. I-10 Interchange
INDIO BOULEVARD	IN	Jefferson / I-10 to Madison
	IN	Madison to Monroe
	IN	Monroe to Jackson
	IN	Jackson to Hwy 111
PORTOLA AVENUE	PD	Hwy. 111 to Magnesia Falls Dr.
	PD	Magnesia Falls Dr. to Country Club Dr.

Table 7-3 (cont.)

Street Name	Agency	Segment Description
	PD	Country Club Dr. to Frank Sinatra Dr.
	PD	Frank Sinatra Dr. to Gerald Ford Dr.
	PD	Bridge over Whitewater Channel
	CAL/PD	Portola Avenue I-10 Interchange
HIGHWAY 111	RM	Bob Hope Drive to Fairway Drive (relinquished by Caltrans to the City of Rancho Mirage)
EAST – WEST REGIONAL ARTERIALS		
VISTA CHINO	PS	Palm Canyon Dr. to Sunrise Way
	PS	Gene Autry Trail to Whitewater River
	PS	Whitewater River Bridge Crossing
	CC	East Bank of Whitewater Bridge to Landau Blvd.
	CC	Date Palm to Da Vall (missing link parallel to Railroad)
RAMON ROAD	PS	Palm Canyon Drive to Indian Canyon Drive
	PS	Indian Canyon to Sunrise Way (includes crossing of Baristo Storm Channel)
	PS	Sunrise Way to Farrell Drive
	PS	Farrell Drive to El Cielo Road
	PS	El Cielo Road to Gene Autry Trail
	PS/CC	Gene Autry Trail to West Bank of the Whitewater River
	PS/CC	Bridge at Whitewater River
	CC	Landau Blvd. to Date Palm Drive
	CC	Date Palm Drive to Da Vall Drive
	RM/UNC	Da Vall Drive to Bob Hope Drive
	UNC	Intersection of Ramon Road & Varner Road
	UNC	I-10 to Monterey Avenue
	UNC	Intersection of Ramon Rd. & Monterey Av.
	UNC	Monterey Av. to Thousand Palms Canyon Rd.
GERALD FORD DRIVE	PD	Portola Avenue to Cook St.
FRANK SINATRA DRIVE	RM	Whitewater River Bridge (within FS1)

Table 7-3 (cont.)

Street Name	Agency	Segment Description
	RM	Bob Hope Drive to Vista Del Sol Road
	RM	Vista Del Sol Road to Monterey Avenue
	PD	Cook Street to El Dorado Drive
	PD	El Dorado Drive to Tamarisk Row Drive
	RM/UNC	Intersection of Frank Sinatra & Monterey
	RM	Intersection of Frank Sinatra & Bob Hope
COUNTRY CLUB DRIVE	RM	Bob Hope Drive to Monterey Avenue
	PD/UNC	Monterey Avenue to Portola Avenue
	PD	Portola Avenue to Cook Street
	PD	El Dorado Drive to Oasis Club Drive
	UNC/PD	Oasis Club Drive to Washington Street
FRED WARING DRIVE	IW	Intersection of Eldorado & Fred Waring
	PD	California Dr. to Elkhorn Trail (north side) (part of FW4)
	PD/UNC/IW	Elkhorn Trail to Washington Street
	LQ/UNC	Washington Street to Jefferson Street
	IN/UNC	Silverwood Drive to Indio Blvd.
	PD	Intersection of Portola and Fred Waring
	PD	Hwy. 111 to Town Center Way (including bridge)
	PD	Town Center Way to Monterey Avenue
	PD	Monterey Avenue to Portola Avenue
	PD	Portola Avenue to Deep Canyon Drive
	PD	Deep Canyon Drive to Phyllis Jackson Ln.
AVENUE 44		Avenue 44 Bridge/Low Water Crossing
AVENUE 48	IN	Jefferson Street to All American Canal
	IN	All American Canal Bridge Crossing
	IN	Hjorth Street to Jackson Street
	IN/COA	Jackson Street to Van Buren Street (center line)
	COA/IN/UNC	Van Buren Street to West of Hwy. 86
	COA/IN/CAL	Intersection of 48th and Hwy. 86
	COA	Grade Separation at Hwy. 111/SPRR

Table 7-3 (cont.)

Street Name	Agency	Segment Description
AVENUE 50	CAL/COA	Future Interchange of 50th Avenue and Realigned Route 86
	LQ	Washington to Jefferson
	IN/LQ	Jefferson to Madison
	IN	Madison to Monroe
	IN	Monroe to Jackson
	IN/COA	Jackson to Van Buren
	COA	Van Buren to Harrison (Old 86)
	COA	Harrison (Old 86) to Hwy 111
	COA	Hwy.111 to New SR86 inc. Bridge over Whitewater Channel
	COA	Grade Separation Hwy. 111/SPRR
	COA	New SR-86 to I-10
	COA	Bridge at All American Canal (in 50K)
	CAL/COA	I-10 Interchange
AVENUE 52	LQ	Washington Street to Jefferson Street
	LQ	Jefferson Street to Madison Street (Includes Bridge at All American Canal)
	UNC/IN	Madison Street to Monroe Street
	UNC/IN	Monroe Street to Jackson Street
	UNC	Jackson Street to Calhoun Street
	UNC/COA	Calhoun Street to Fredrick Street
	COA	Fredrick Street to Harrison Street (Hwy 86)
	COA	Intersection of 52nd Avenue and Hwy. 86
	COA	Harrison Street to Hwy. 111
	COA	Intersection of 52nd and Hwy. 111
	COA	Grade Separation at Hwy. 111/SPRR
	CAL/COA	Future Interchange of 52nd Avenue and Realigned Route 86
	COA	Hwy 111 to New SR86 including bridge
AVENUE 54	COA	Van Buren to Harrison (Old 86)
	COA	Harrison (Old 86) to Tyler Street
	COA	Tyler St. to Hwy 111
	COA	Hwy 111 to Fillmore (Include Bridge at Whitewater Channel and Interchange at New SR-86)

Table 7-3 (cont.)

Street Name	Agency	Segment Description
	COA CAL	Grade Separation at Hwy. 111/SPRR SR-86 Interchange
AVENUE 56 / AIRPORT BLVD.	LQ	Madison Street to 0.5 miles East of Madison Street (La Quinta City Limit)
	UNC/LQ	0.5 miles East of Madison Street to Jackson Street
	UNC	Jackson St. to 0.25 miles West of Van Buren St.
	COA	0.25 miles West of Van Buren Street to Harrison Street
	UNC	Harrison Street to Tyler Street
	UNC	Tyler Street to Polk Street
	UNC	Polk Street to Hwy. 111
	UNC	Grade Separation over Hwy. 111 and SPRR
	UNC/COA	SPRR to East side of Bridge over Coachella Valley Storm Channel
	CAL/COA/UNC	Interchange at New Extension of Route 86
AVENUE 62	CAL/UNC	Avenue 62 SR86 Interchange
AVENUE 66	CAL/UNC	Avenue 66 SR86 Interchange
	UNC	Avenue 66 Bridge/Low Water Crossing
DILLON ROAD	UNC	SR-62 to Indian Avenue
	UNC	Intersection of Dillon Rd. & Indian Av.
	UNC	Indian Av. to Palm Dr.
	UNC	Intersection of Dillon Rd. & Palm Dr.
	UNC	Palm Dr. to Mountain View
	UNC	Mountain View to Bennett Rd.
	UNC	Bennett Rd. to Thousand Palms Canyon Rd.
	UNC	Thousand Palms Canyon Rd. to Sunny Rock Rd.
	UNC	Sunny Rock Rd. to 44th Avenue
	UNC	44th Avenue to I-10
	UNC	I-10 to Whitewater Bridge
	UNC	Bridge over Whitewater Channel
	UNC	Whitewater Bridge to Hwy 111

Table 7-3 (cont.)

Street Name	Agency	Segment Description
	UNC	Dillon Road I-10 Interchange
	CAL/UNC	Dillon Road SR 86 Interchange
	UNC	Grade Separation at Hwy. 111/SPRR
VARNER ROAD	UNC/CC	Palm Drive to Mountain View Road
	CC	Mountain View Road to Date Palm Drive
	UNC/CC	Date Palm Drive to Ramon Road
	UNC	Intersection of Varner Road & Ramon Road
	UNC	Ramon Road to Monterey Avenue
	UNC	Monterey Avenue to Chase School Road
	UNC	Chase School Road to Washington Street
	UNC	Washington to Jefferson
	IN	Jefferson to Madison (42nd Ave.)
	IN	Madison to Monroe (42nd Ave.)
	IN	Monroe to Jackson (42nd Ave.)
	IN	Jackson to Van Buren (42nd Ave.)
PIERSON BLVD.	DHS	SR-62 to Indian Avenue
	DHS	Indian Avenue to Little Morongo Road
	DHS	Little Morongo Road to Palm Drive
	DHS	Palm Drive to Eastern Terminus of Desert View
MISSION LAKES	DHS	Indian Avenue to Little Morongo Road
	DHS	Little Morongo Road to Palm Drive
	DHS	Palm Drive to Eastern Terminus at Verbena Drive
HACIENDA AVENUE	DHS	Little Morongo Road to Palm Drive
	DHS	Palm Drive to Mountain View
	DHS	Mountain View to Dillon Road
TWO BUNCH PALMS	DHS	Indian Ave. to Little Morongo Rd. (missing link)
	DHS	Little Morongo Road to Palm Drive
	DHS	Palm Drive to Miracle Hill

Table 7-3 (cont.)

Street Name	Agency	Segment Description
MILES AVENUE	IW/UNC	Hwy 111 to Washington Street
	IW/UNC	Whitewater River temporary undercrossing (missing link) (in MIL1)
	LQ	Washington to Jefferson
	IN	Jefferson to Clinton
	IN	Clinton to Monroe
	IN	Monroe to Indio Blvd.

NOTE: PS=Palm Springs, UNC=Unincorporated, DHS=Desert Hot Springs, CC=Cathedral City, RM=Rancho Mirage, PD=Palm Desert, IW=Indian Wells, IN=Indio, LQ=La Quinta, COA=Coachella, CAL=CALTRANS.

The road projects in the table will comply with all applicable avoidance, minimization, and mitigation measures described in Section 4.4. The Permittees' mitigation obligation to acquire land and fund the Monitoring Program, the Management program, and Adaptive Management is described in Section 6.6.1.

7.3 Activities in Conservation Areas

Implementation of the Plan will provide Permits for Covered Species for the Covered Activities in the Conservation Areas described in 7.3.1 and 7.3.1.1, and for the Compatible Activities in the Conservation Areas described in Section 7.3.3.

7.3.1 Covered Activities

Implementation of the Plan will provide Permits for Covered Species for the following Covered Activities within the Conservation Areas:

- ***Construction and maintenance of trails, public access facilities, and campground facilities, except on federal land, as provided for in this Plan consistent with the Species Conservation Goals and the Conservation Objectives for the Conservation Areas, and consistent with the guidelines for trails and public access in Section 7.3.4.2***. As applicable, these activities are subject to the avoidance and minimization measures described in Section 4.4. See also Section 7.3.3.2 for a description of the various types of recreational uses that are Allowable Uses in the Conservation Areas and Section 7.3.4 for a description of conditionally compatible uses.

  Specific projects and operation and maintenance activities listed in Tables 7-1 through 7-13~~1~~. Where indicated in the tables, these activities are subject to applicable Required Measures listed in Sections 4.3.1 through 4.3.21, and to the applicable avoidance and minimization measures described in Section 4.4. A list of operation and maintenance activities is found in Section 7.3.1.1. Take for the projects and O&M activities listed in Tables 7-1 through 7-13~~1~~ and for the O&M activities listed in Section 7.3.1.1 does not

count against the acres of Take allowed in the Conservation and Take Authorization tables for the Conservation Areas in Section 4.3.

- ***Development permitted or approved by Local Permittees***. Development and the associated ground disturbance, consistent with the Conservation Goals and Conservation Objectives within Conservation Areas and Species Conservation Goals and Objectives; and including the construction, operation, and maintenance of new flood control facilities and local roadways (less than 74 feet in width and no more than one through travel lane in each direction) which are either: (1) approved as part of a development proposal or (2) dedicated, or offered for dedication, for public use, are Covered Activities. As applicable, these activities are subject to the avoidance and minimization measures described in Section 4.4.

  New ground disturbance associated with repowering or development of new wind energy facilities shall be treated as a Covered Activity similar to development projects permitted or approved by Local Permittees. Within each Permittee's jurisdiction, existing wind turbines may be replaced with new turbines. If old turbines are removed and the former impact area is restored to a natural condition, an equal new area may be disturbed without counting toward the calculation of net disturbance. The MSHCP Plan does not provide Take authorization for wind energy turbine operation. For further clarification of and discussion related to wind power facilities, see Section 6.6.1.1 of the Plan and the Implementation Manual.

- ***Expansion of mining operations on non-federal land***. Expansion of mining operations holding a valid existing permit as of the date of Permit issuance must be consistent with the Conservation Objectives for the relevant Conservation Area.

The Permits do not provide Take Authorization for agricultural operations.

The Take Authorization does not cover approved Development Projects with legal vested rights as of the date the Permits are issued. Development Projects with legal vested rights (as of the date of Permit issuance) could voluntarily obtain take coverage, provided the applicable Permittee requires the execution of a Certificate of Inclusion by the Project Applicant that requires compliance with all applicable Plan requirements. Alternatively, a Project Applicant with legal vested rights (at the time of Permit issuance) could seek Take Authorization directly from the Wildlife Agencies.

Tables 7-4 through 7-13~~0~~ identify specific projects and activities that are Covered Activities for Permittees in the Conservation Areas. Roads may be included in more than one table. In each table, the named roads refer only to those portions of the road in that jurisdiction's area. Following each table is a discussion of specific mitigation, avoidance, and minimization measures for which the jurisdiction is responsible.

Note that within the Conservation Areas emergency response activities and emergency repair activities by Permittees are considered to be Allowable Uses and Compatible Activities, respectively, as described in Sections 7.3.2.1 and 7.3.3.1.

Table 7-4: Covered Activities - City of Cathedral City's Facilities in Conservation Areas

Facility	*Conservation Area Where Located*	*Avoidance/Minimization Measures Required*
(a) Date Palm Drive-Varner Road; intersection realignment and O&M	Willow Hole	None (on edge of Conservation Area)
(b) East Palm Canyon (SR 111); widening and O&M	Santa Rosa and San Jacinto Mtns.	Fence if needed to protect bighorn sheep
(c) Edom Hill Road, widening and O&M	Willow Hole; Edom Hill	None (no impacts to Biological Corridors/ Linkages, or fluvial sand transport)
(d) Frontage road north of I-10; construction of new road and O&M	Willow Hole	Wildlife undercrossing; maintain fluvial sand transport
(e) Long Canyon Wash flood control; construction of new facility and O&M	Willow Hole	Maintain fluvial and aeolian sand transport
(f) Mountain View Road, widening and O&M	Willow Hole	Wildlife undercrossing
(g) Varner Road, widening and O&M	Willow Hole	Wildlife undercrossing; maintain fluvial sand transport

Avoidance, minimization, and mitigation measures for the Date Palm Drive-Varner Road, East Palm Canyon (SR 111), Frontage road north of I-10, Long Canyon Wash flood control, and Varner Road projects are described in Sections 4.3.8 and 4.4. Figures 7-5a through 7-5g depict the Covered Activities for Cathedral City (letters correspond to letters in "Facility" column of Table 7-4). Impacts of the above projects are also mitigated through Permittees' portion of Reserve Assembly and through the Monitoring Program, Management Program, and Adaptive Management.

Figure 7-5a: City of Cathedral City's Covered Activities in Conservation Areas

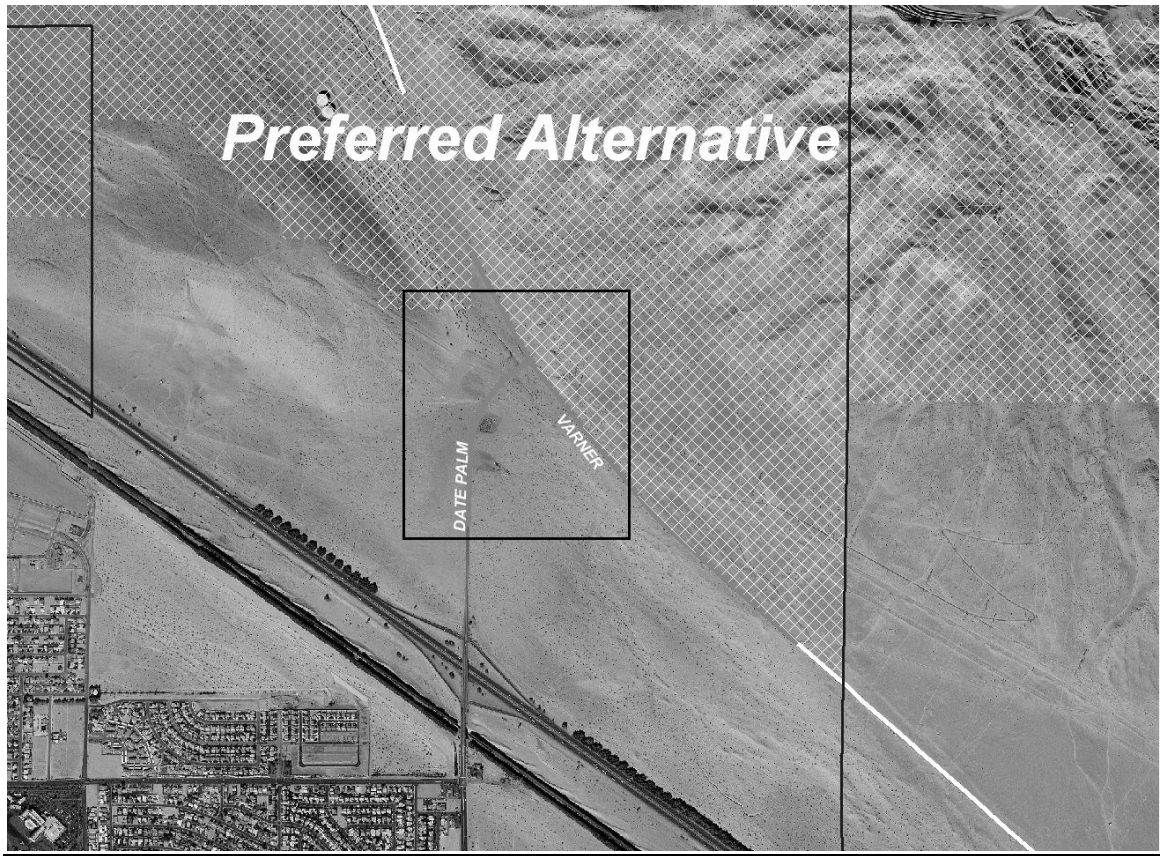


Figure 7-5b: City of Cathedral City's Covered Activities in Conservation Areas

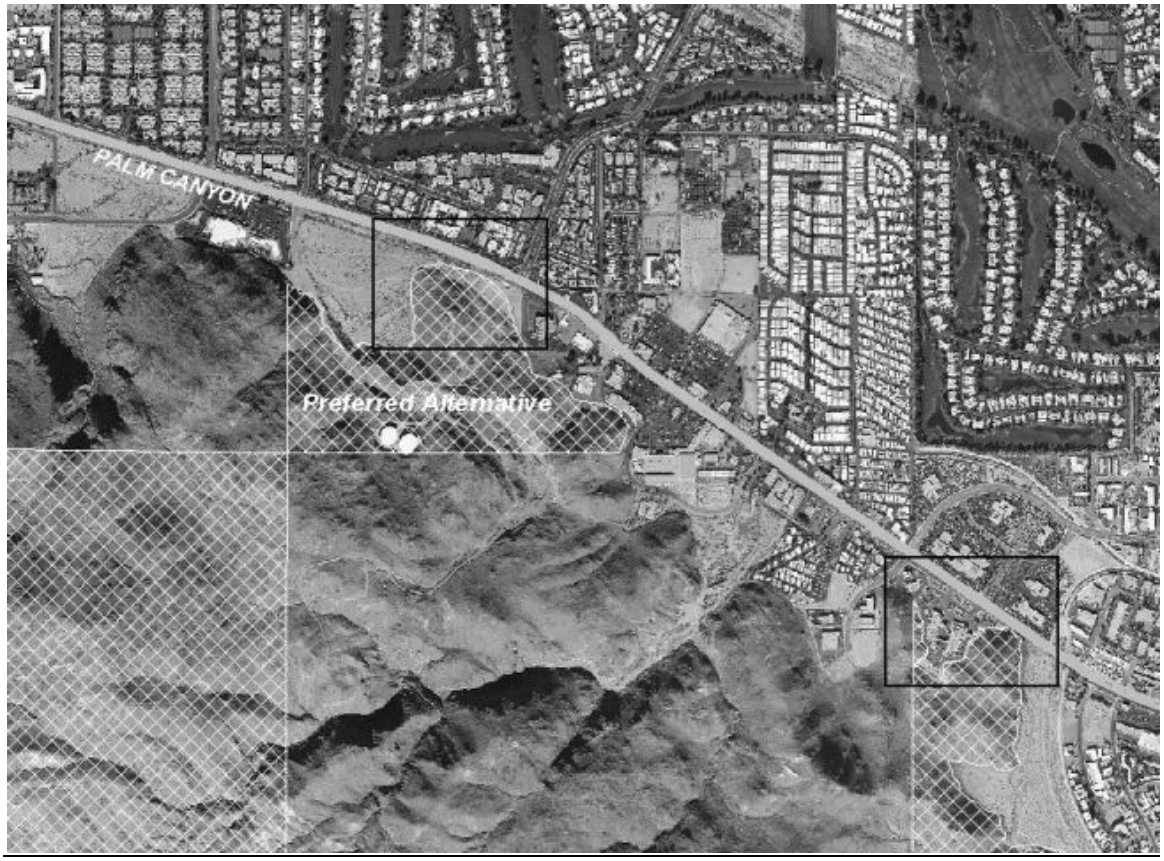


Figure 7-5c: City of Cathedral City's Covered Activities in Conservation Areas

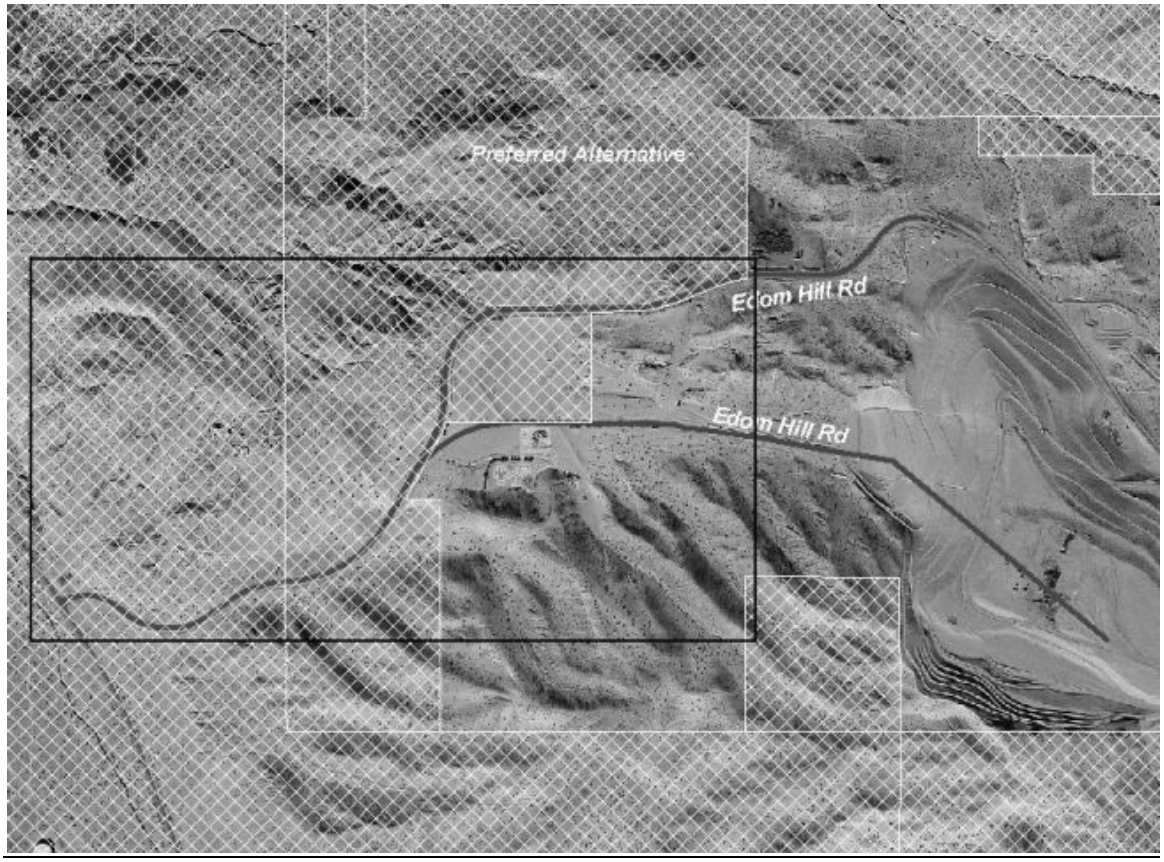


Figure 7-5d: City of Cathedral City's Covered Activities in Conservation Areas

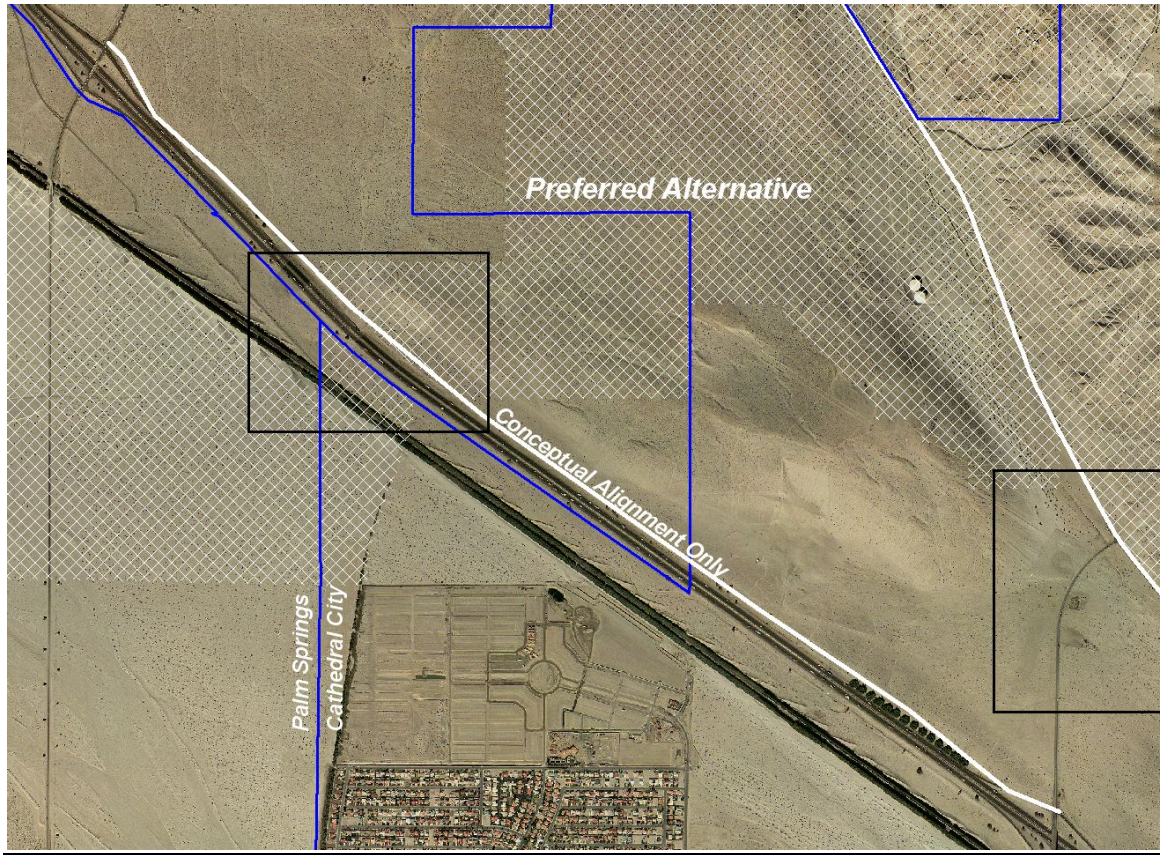


Figure 7-5e: City of Cathedral City's Covered Activities in Conservation Areas

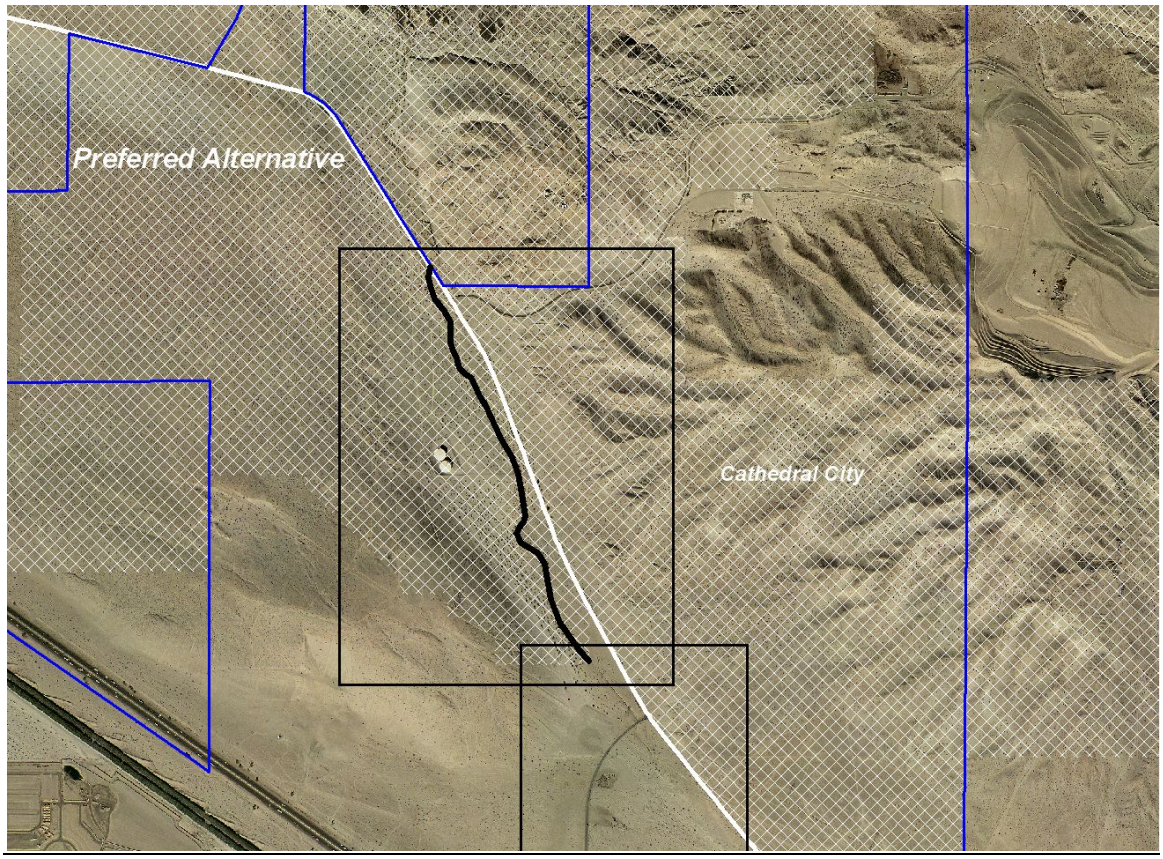


Figure 7-5f: City of Cathedral City's Covered Activities in Conservation Areas

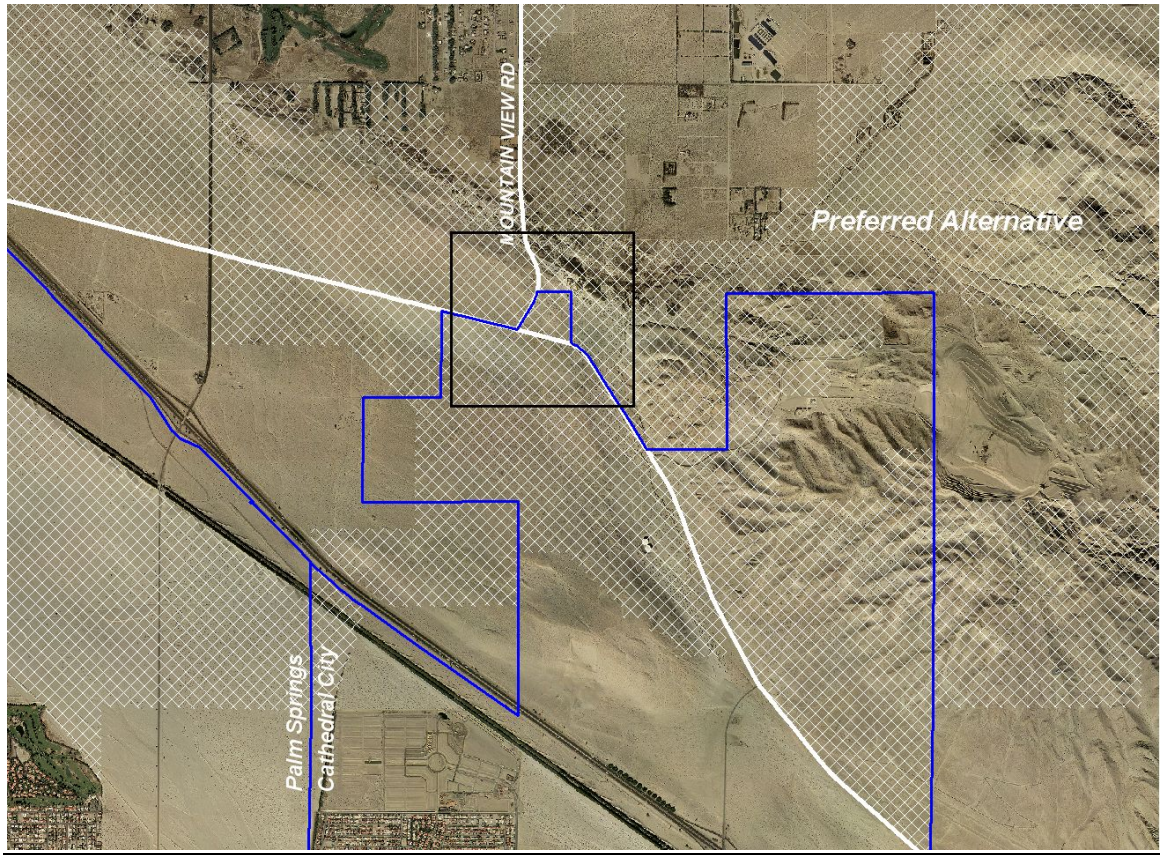


Figure 7-5g: City of Cathedral City's Covered Activities in Conservation Areas

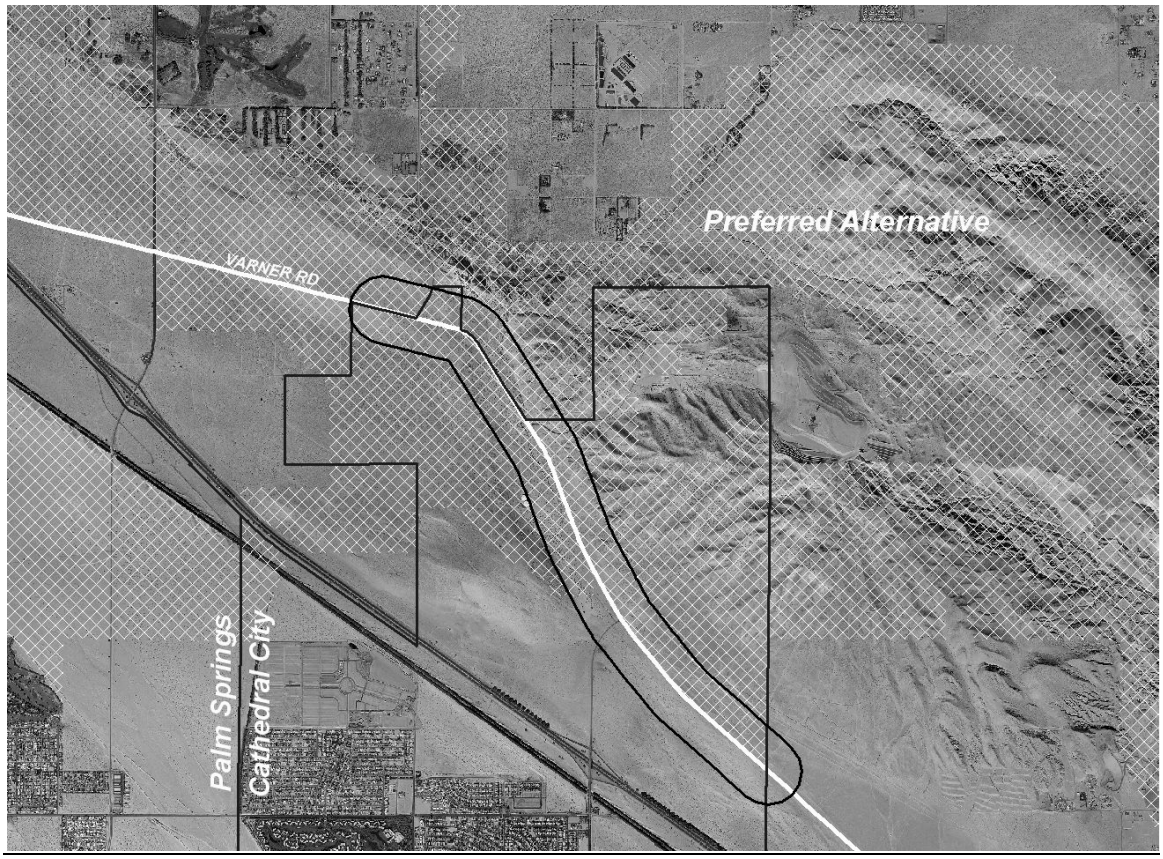


Table 7-5: Covered Activities - City of Palm Springs' Facilities in Conservation Areas

(a) Gene Autry Trail, widening to 6 lanes and O&M	Whitewater Floodplain	Fluvial sand transport; Biological Corridor
(a) Indian Canyon Drive, widening to 6 lanes and O&M	Whitewater Floodplain	Fluvial sand transport; Biological corridor
(a) Salvia Road (Micro Place) and Garnet Avenue Extension, construction of new road and O&M	Whitewater Floodplain	Fluvial sand transport; Biological Corridor
(b) North Palm Canyon Drive Bridge at Chino Canyon Creek, construction of bridge on west bound lanes and O&M	Boundary between Whitewater Floodplain and Santa Rosa and San Jacinto Mountains	Biological Corridor

Figures 7-6a and 7-6b depict the Covered Activities for Palm Springs (letters correspond to letters in "Facility" column of Table 7-5). Avoidance, minimization, and mitigation measures

for the Gene Autry Trail, Indian Canyon Drive, Salvia Road/Garnet Avenue, and North Palm Canyon Bridge projects are described in Sections 4.3.6 and 4.4. Impacts of the above projects are also mitigated through Permittees' portion of Reserve Assembly and through the Monitoring Program, Management Program, and Adaptive Management.

Figure 7-6a: City of Palm Springs' Covered Activities in Conservation Areas

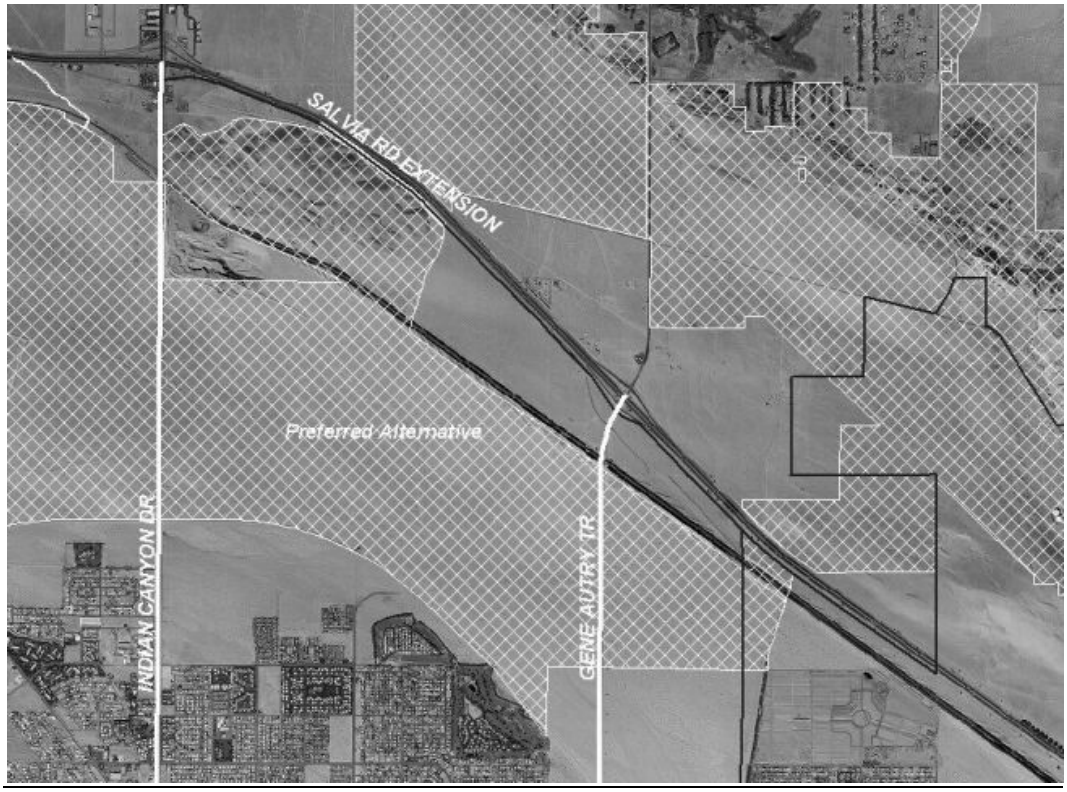


Figure 7-6b: City of Palm Springs' Covered Activities in Conservation Areas

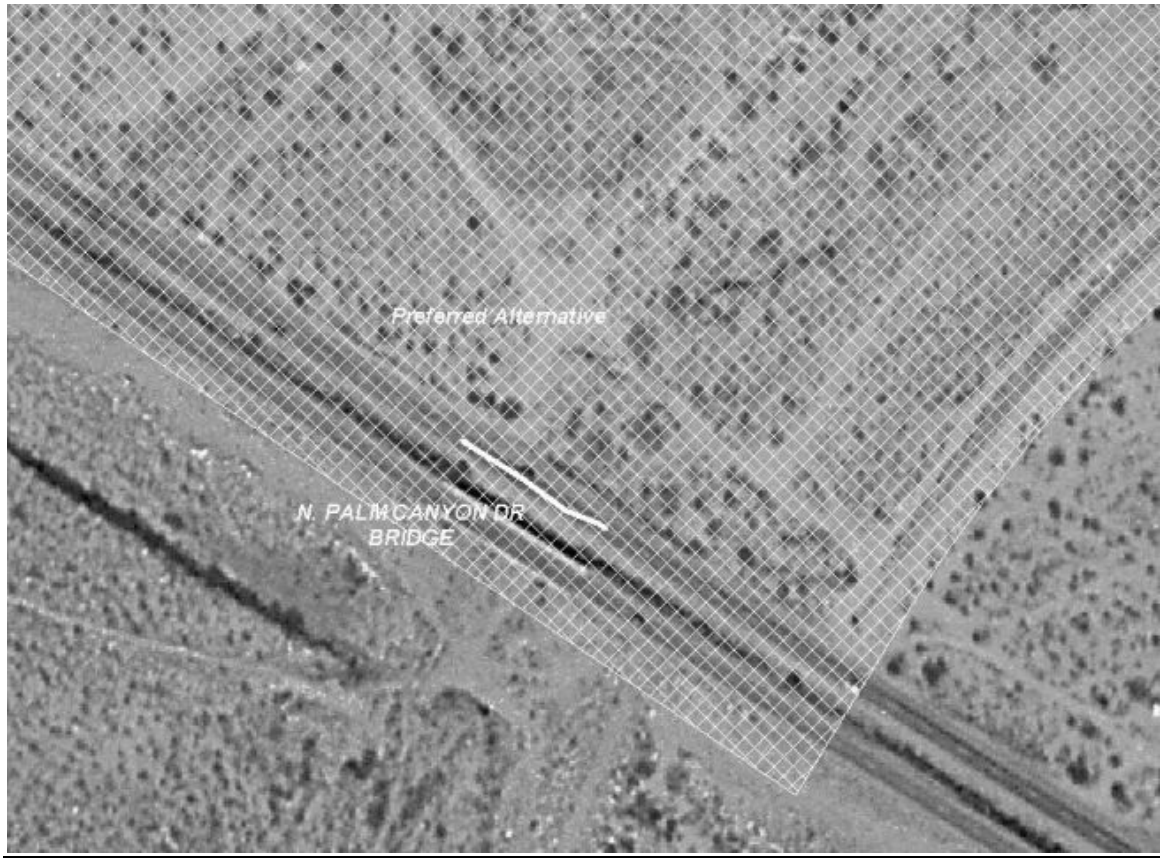


Table 7-6: Covered Activities – Coachella Valley Water District's Facilities in Conservation Areas

Facility	*Conservation Area Where Located*	*Avoidance/minimization Measures Required*
(a)ALERT (**A**utomated **L**ocal **E**valuation in **R**eal **T**ime) stations, all except Upper Bear Creek	Santa Rosa and San Jacinto Mtns.; Whitewater Canyon Whitewater Floodplain; Thousand Palms; Coachella Valley Stormwater Channel and Delta; Desert Tortoise Critical Habitat and Linkage	None[1]
(b)Coachella Valley (Whitewater) Stormwater Channel, including increased flows resulting from the Water Management Plan	Coachella Valley Stormwater Channel and Delta	Provision of replacement habitat; burrowing owl
(c) East valley drains, including increased flows resulting from the Water Management Plan	Coachella Valley Stormwater Channel and Delta	Desert pupfish, Yuma clapper rail, California black rail
(d) Oasis area drains, including increased flows resulting from the Water Management Plan	Coachella Valley Stormwater Channel and Delta	Desert pupfish, Yuma clapper rail, California black rail
(e) Coachella Canal; canal siphons and overshoots; East side dike and evacuation channels	Dos Palmas; Mecca Hills/Orocopia Mountains; East Indio Hills	None[1]
(f) WRP 7 recharge facility (construction and O&M)	East Indio Hills	Tamarisk removal; Mesquite restoration
(g) ALERT station, Upper Bear Ck.	Santa Rosa and San Jacinto Mtns.	Bighorn sheep
(h) Deep Canyon training dikes and channel	Santa Rosa and San Jacinto Mtns.	None[1]
(i) Dead Indian Canyon debris basin	Santa Rosa and San Jacinto Mtns.	Bighorn sheep
(j) East La Quinta detention basins, channels, and dikes	Santa Rosa and San Jacinto Mtns.	Bighorn sheep
(k) Magnesia Canyon detention basin	Santa Rosa and San Jacinto Mtns.	Bighorn sheep
(l) Stormwater drain inlets	Santa Rosa and San Jacinto Mtns.	Bighorn sheep
(m) Dike No. 4 Recharge Facility, (construction and O&M)	Santa Rosa and San Jacinto Mtns.	Minor amendment with criteria; Bighorn sheep
(n) Martinez Recharge Facility, construction and O&M	Santa Rosa and San Jacinto Mtns.	Minor amendment with criteria; Bighorn sheep
(o) Reservoirs and associated booster stations and transmission mains (existing)	Santa Rosa and San Jacinto Mtns.	Bighorn sheep

Table 7-6: (cont.) Covered Activities – Coachella Valley Water District's Facilities in Conservation Areas

Facility	*Conservation Area Where Located*	*Avoidance/minimization Measures Required*
(p) Reservoirs and associated booster stations and transmission mains, (construction and O&M)	Santa Rosa and San Jacinto Mtns.	Minor amendment with criteria; Bighorn sheep
(q) Reservoirs and associated booster stations and transmission mains	Thousand Palms	Fluvial sand transport
(r) Reservoirs and associated booster stations and transmission mains, (construction and O&M)	Thousand Palms	Fluvial sand transport
(s) Transmission water mains	Thousand Palms; West Deception Canyon	None[1]
(t) Whitewater River flood control levees, construction and O&M	Thousand Palms	Subject to terms and conditions of Section 7 consultation
(u) Colorado River Aqueduct turnout and recharge channel, O&M	Whitewater Canyon; Whitewater Floodplain	None[1]
(v) Spreading area for Colorado River Aqueduct water, O&M	Whitewater Floodplain	Sediment removal and placement in deposition area
(w) Cathedral City transmission mains	Santa Rosa and San Jacinto Mtns.	Bighorn sheep

[1] These projects have no impact requiring specific avoidance and minimization measures. The projects are mitigated through CVWD's mitigation obligations, as described in Section 6.6.1.

Applicable avoidance, minimization, and mitigation measures for the above projects are described in Section 4.3 under the relevant Conservation Areas, and in Section 4.4. Within one year of Permit issuance, CVWD shall develop a maintenance plan, approved by the Wildlife Agencies, for its facilities in Conservation Areas that will minimize impacts to Covered Species and natural communities. CVWD's mitigation obligations are described in Section 6.6.1. See Figure 7-7 for CVWD's Covered Activities Facilities in Conservation Areas.

Construction of the facilities listed below is anticipated by the Plan. They will be Permitted through Minor Amendments if the specified criteria are met.

1. CVWD proposes to site water recharge facilities and associated transmission mains in or adjacent to essential habitat for the Peninsular bighorn sheep in the Santa Rosa and San Jacinto Mountains. One facility, Dike No. 4 Recharge Facility, is proposed to be located at the westerly end of Avenue 62, approximately in Section 34, Township 6 South, Range 7 East. The other facility, the Martinez Canyon recharge facility is proposed to be located at the westerly end of Avenue 72, approximately in Section 29 Township 7 South, Range

8 East. These facilities may be Covered Activities through Minor Amendments to the Plan if the following criteria are met:

- The facility shall be located at the lowest feasible elevation on the site.
- If it is determined that a lambing area is located within one mile of the site, construction shall be undertaken outside of the period from February 1 to June 30.
- Measures acceptable to the Wildlife Agencies will be taken to control disease vectors.
- Measures, including fencing if needed, shall be taken to ensure that peninsular bighorn sheep are not exposed to any hazardous conditions on the site.

2. If future Development patterns outside the Conservation Area require it, CVWD may need to site new reservoirs and associated booster stations and transmission mains in the Santa Rosa and San Jacinto Mountains Conservation Area. Such facilities may be Covered Activities through Minor Amendments to the Plan if the following criteria are met:

- The facility shall be located at the lowest feasible elevation consistent with the functionality of the facility.
- If it is determined that a lambing area is located within one mile of the site, construction shall be undertaken outside of the period from February 1 to June 30.
- Any roads constructed to provide access to the site shall be gated, closed to the public and such closure shall be enforced by CVWD. Final road alignment shall be reviewed and approved by the Wildlife Agencies.
- Measures, including fencing if needed, shall be taken to ensure that Peninsular bighorn sheep are not exposed to any hazardous conditions on the site.

3. CVWD proposes to construct a new reservoir and associated ancillary facilities approximately in Section 6, Township 4 South, Range 6 East. This facility may be a Covered Activity through a Minor Amendment to the Plan as long as project design does not appreciably reduce fluvial sand transport capacity on the site.

Table 7-7: Covered Activities – Imperial Irrigation District's Facilities in Conservation Areas

Facility	*Conservation Area Where Located*	*Avoidance/Minimization Measures Required*
Overhead power line "J022"	Coachella Valley Stormwater Channel and Delta	Monitoring and Adaptive Management provision for bird kills
Overhead power line "J023"	Coachella Valley Stormwater Channel and Delta	Monitoring and Adaptive Management provision for bird kills
Overhead power line "K31"	Coachella Valley Stormwater Channel and Delta	Monitoring and Adaptive Management provision for bird kills
Overhead power line "L" Line	Coachella Valley Stormwater Channel and Delta	Monitoring and Adaptive Management provision for bird kills
Overhead power line "P61"	Desert Tortoise and Linkage	Desert tortoise
Overhead power line "N71"	Desert Tortoise and Linkage	Desert tortoise

Table 7-7 (cont.)

Facility	*Conservation Area Where Located*	*Avoidance/Minimization Measures Required*
Overhead power line "CM" Line	Desert Tortoise and Linkage	Desert tortoise
Overhead power line "K67"	Dos Palmas	None[1]
Overhead power line "K" 92 Line	Dos Palmas	None[1]
Overhead power line "KN" & "KS" Lines	Dos Palmas	None[1]
Overhead power line "L" Line	Dos Palmas	None[1]
Overhead power line "N143"	East Indio Hills	None[1]
Overhead power line "N71"	East Indio Hills	None[1]
Overhead power line "CM" Line	East Indio Hills	None[1]
Overhead power line "N71"	Indio Hills/Joshua Tree National Park Linkage	Desert tortoise
Overhead power line "N50"	Indio Hills/Joshua Tree National Park Linkage	Desert tortoise
Overhead power line "CM" Line	Indio Hills/Joshua Tree National Park Linkage	Desert tortoise
Overhead power line "CM" Line	Indio Hills/Joshua Tree National Park Linkage	Desert tortoise
Overhead power line "K67"	Mecca Hills/Orocopia Mountains	Desert tortoise
Overhead power line "L" Line	Mecca Hills/Orocopia Mountains	Desert tortoise
Overhead power line "KN" & "KS" Lines	Mecca Hills/Orocopia Mountains	Desert tortoise
Overhead power line "V124"	Thousand Palms	Burrowing owl, anti-bird perching monitoring and adaptive management
Overhead power line "V125"	Thousand Palms	Burrowing owl, anti-bird perching monitoring and adaptive management
Overhead power line "V126"	Thousand Palms	Burrowing owl, anti-bird perching monitoring and adaptive management
Overhead power line "1008"	Thousand Palms	Burrowing owl, anti-bird perching monitoring and adaptive management
Overhead power line "1012"	Thousand Palms	Burrowing owl, anti-bird perching monitoring and adaptive management
Overhead power line "N50"	Thousand Palms	Burrowing owl, anti-bird perching monitoring and adaptive management

Table 7-7 (cont.)

Facility	*Conservation Area Where Located*	*Avoidance/Minimization Measures Required*
Overhead power line "N50" Circuit Relocation [New Project; see footnote.] ADD FOOTNOTE	Thousand Palms	Burrowing owl, anti-bird perching monitoring and adaptive management
"N51"	Thousand Palms	Burrowing owl, anti-bird perching monitoring and adaptive management
Overhead power line "KN" & "KS" Lines	Thousand Palms	Burrowing owl, anti-bird perching monitoring and adaptive management
Overhead power line "CA" and "CE" lines	Thousand Palms	Burrowing owl, anti-bird perching monitoring and adaptive management
Sky Valley Substation	West Deception Canyon	Desert tortoise
Overhead power line "N50"	West Deception Canyon	Desert tortoise
Overhead power line "N51"	West Deception Canyon	Desert tortoise
Overhead power line "CM" Line	West Deception Canyon	Desert tortoise

[1] Based on the absence of sensitive species, Biological Corridors/Linkages, or Essential Ecological processes that might be impacted by the Covered Activity in the Conservation Area, these projects have no impact requiring specific avoidance and minimization measures. The projects are mitigated through IID's mitigation obligations, as described in Section 6.6.1.

The table includes one new construction project: the Overhead Power Line "N50" Circuit Relocation in the Thousand Palms Conservation Area. This project is described in Section 7.1 of Appendix I. It involves the relocation of an existing line that goes through desert fan palm oasis woodland on the Thousand Palms Preserve. The new alignment will avoid the sensitive habitat and follow Thousand Palms Canyon Road between Avenue 28 and Avenue 24 at which point it will follow Avenue 24 to the west to the Sky Valley Substation.

Applicable avoidance, minimization, and mitigation measures for the above projects are described in Section 4.3 under the relevant Conservation Areas, and in Section 4.4. Within one year of Plan adoption, IID shall develop a maintenance plan, approved by the Wildlife Agencies, for its facilities in Conservation Areas that will minimize impacts to Covered Species and natural communities. See Figure 7-8 for IID's Covered Activities Facilities in Conservation Areas. IID's mitigation obligations are shown in Section 6.6.1.

Table 7-8 lists Riverside County Flood Control and Water Conservation District's existing facilities within Conservation Areas, and Table 7-8a lists Riverside County Flood Control and Water Conservation District's proposed facilities within Conservation Areas ~~and a Special Provisions Area~~ (see Section 4.3.7). Construction of the proposed facilities and maintenance of existing and proposed facilities are Covered Activities under the MSHCP.

Table 7-8: Covered Activities – Riverside County Flood Control and Water Conservation District's Existing Facilities in Conservation Areas

Facility	*Jurisdiction*	*Conservation Area Where Located*	*Avoidance/Minimization Measures Required*
Cottonwood Canyon Channel	Unincorporated	Stubbe & Cottonwood Canyons	None[1]
Garnet Wash Channel	Palm Springs	Upper Mission Creek/Big Morongo Canyon	Fluvial sand transport
Mission Creek Channel (interim)	Desert Hot Springs	Upper Mission Creek/Big Morongo Canyon; Willow Hole	Fluvial sand transport
Mission Creek Wash (Levee U/S of SH62)	Unincorporated	Upper Mission Creek/Big Morongo Canyon	None[1]
Chino Canyon Channel and Levee	Palm Springs	Whitewater Floodplain	None[1]
Chino Canyon Channel and Levee	Palm Springs	Santa Rosa & San Jacinto Mountains	Bighorn sheep
Whitewater River Right Bank Levee	Palm Springs	Whitewater Floodplain	None[1]
Tachevah Creek – Detention Dam	Palm Springs	Santa Rosa & San Jacinto Mountains	Bighorn sheep
Palm Canyon Wash	Palm Springs	Santa Rosa & San Jacinto Mountains	Bighorn sheep
Baristo Wash Channel (interim) – South Branch	Palm Springs	Santa Rosa & San Jacinto Mountains	None[1]
Palm Springs MDP – Line 41 Stg 2	Palm Springs	None[2]	None[2]
Cathedral Canyon Channel - West	Cathedral City	Santa Rosa & San Jacinto Mountains	Bighorn sheep
Cathedral Canyon Channel - East	Cathedral City	Santa Rosa & San Jacinto Mountains	Bighorn sheep
Cabazon Channel	Unincorporated	Cabazon	Fluvial sand transport
San Gorgonio River Levee	Unincorporated	Cabazon	None[1]
Mission Lakes Levee Stg 1	Desert Hot Springs	Upper Mission Creek/Big Morongo Canyon	None[1]
8th Street Levee (interim)	Desert Hot Springs	Upper Mission Creek/Big Morongo Canyon	None[1]

ALERT stations (Cathedral Canyon, Magnesia Springs Canyon, Haystack, Dead Indian Canyon		Santa Rosa & San Jacinto Mountains	Bighorn sheep

[1] Based on the absence of sensitive species, Biological Corridors/Linkages, or Essential Ecological processes that might be impacted by the Covered Activity in the Conservation Area, these projects have no impact requiring specific avoidance and minimization measures. The projects are mitigated through the Local Permittees' mitigation obligations, as described in Section 6.6.1.

[2] The proposed Palm Springs MDP Line 41 Stg 2 project is located outside of the Conservation Area.

Table 7-8a: Covered Activities –Riverside County Flood Control and Water Conservation District's Proposed Facilities in Conservation Areas

Facility	*Jurisdiction*	*Conservation Area*	*Avoidance/Minimization Measures Required*
Devils Garden Channel	Unincorporated	Upper Mission Creek/Big Morongo Canyon (connects to Garnet Wash)	None[1]
Desert Hot Springs MDP Line A	Desert Hot Springs	Upper Mission Creek/Big Morongo Canyon (connects to Morongo Wash)	None[1]
Desert Hot Springs MDP Line D	Desert Hot Springs	Long Canyon (connects to Long Canyon Channel)	None[1]
Palm Springs MDP Line 1	Palm Springs	None[2]	None[2]
Palm Springs MDP Line 2	Palm Springs	Whitewater Floodplain	None[1]
Palm Springs MDP Line 3	Palm Springs	Whitewater Floodplain	None[1]
Palm Springs MDP Line 16B	Palm Springs	Santa Rosa and San Jacinto Mountains	Bighorn sheep
Palm Springs MDP Lateral 16A	Palm Springs	None[2]	None[2]
Palm Springs MDP Lateral 16	Palm Springs	Santa Rosa and San Jacinto Mountains	Bighorn sheep
Palm Springs MDP Lateral 19A	Palm Springs	Santa Rosa and San Jacinto Mountains	Bighorn sheep
Palm Springs MDP Line 19	Palm Springs	Santa Rosa and San Jacinto Mountains	Bighorn sheep
Palm Springs MDP Line 41	Palm Springs	None[2]	None[2]
Long Canyon	Mostly	Long Canyon	Fluvial sand transport

Channel	unincorporated		

Table 7-8a (cont.)

Facility	***Jurisdiction***	***Conservation Area***	***Avoidance/Minimization Measures Required***
Long Canyon Channel	Unincorporated	Willow Hole	Fluvial sand transport
8th Street Levee	Desert Hot Springs	Upper Mission Creek/Big Morongo Canyon	None[1]
Morongo Wash Flood Control Facility	Desert Hot Springs	Upper Mission Creek/Big Morongo Canyon, Willow Hole	Palm Springs pocket mouse, Little San Bernardino Mountains linanthus

[1] These proposed projects are located mostly outside of the Conservation Areas except where they connect into the main system. These proposed projects comply with the avoidance and minimization measures already required for the main system.

[2] The proposed Palm Springs MDP Line 1, Lateral 16A, and Line 41 projects are located outside of the Conservation Area.

Applicable avoidance, minimization, and mitigation measures for the above projects are described in Section 4.3 under the relevant Conservation Areas, and in Section 4.4. The measures apply only to those portions of the facilities located in the Conservation Areas. See Figure 7-9 for County Flood Control's Covered Activities Facilities in Conservation Areas. Maintenance of existing flood control facilities that is subject to an MOU or agreement with CDFG for such activities would be covered pursuant to those MOUs or agreements.

Construction, operation, and maintenance of the Morongo Wash flood control facility (proposed Covered Facility) is anticipated by the Plan and a minimum 1,200 foot wide Morongo Wash Flood Control Corridor will be maintained. These activities will be Permitted through a Minor Amendment with Wildlife Agencies' concurrence if the specified criteria are met:

- The proposed Covered Facility shall adhere to the applicable Conservation Objectives and Required Measures within the applicable Conservation Areas.
- The proposed Covered Facility will extend from Indian Avenue (approximately 0.25 mile north of Mission Lakes Boulevard) to the San Andreas Fault (approximately 0.125 mile north of 20th Avenue). The portion of the proposed Covered Facility from Indian Avenue to Dillon Road is ~~within a Special Provisions Area~~ within the Upper Mission Creek/Big Morongo Canyon Conservation Area. The portion of the proposed Covered Facility from Dillon Road to the San Andreas Fault is within the Willow Hole Conservation Area (see Figure 4-12a~~f~~ for specific limits of the proposed Covered Facility).
- Any extension of the proposed Covered Facility north of Indian Avenue and/or south of the San Andreas Fault would require a Minor Amendment with Wildlife Agencies' concurrence to the Plan.

- A Morongo Wash Flood Control Corridor will be maintained ~~Special Provisions Area is located~~ within the Upper Mission Creek/Big Morongo Canyon Conservation Area (depicted on Figure 4-12a~~f~~), and the proposed Covered Facility shall be subject to the following requirements:

  a. CVCC shall be responsible for ensuring conservation of acreages as described in Section 4.3.7 and identified in Tables 4-42d and 4-42e for the proposed Covered Facility.
  b. The Morongo Wash Flood Control Corridor ~~Special Provisions Area~~ will include a minimum 1,200-foot suitable habitat corridor, plus 300 acres of refugia outside the suitable habitat corridor, configured to be equivalent to about 25 acres of refugia every 0.25 mile. No individual refugium shall be less than 15 acres nor shall any refugia be more than 0.5 mile apart.
  c. A suitable habitat corridor is defined as an area that meets the habitat requirements of Palm Springs pocket mouse (see Section 9.8.3); the suitable habitat corridor shall maintain a natural ephemeral desert wash without habitat impediments.
  d. The proposed Covered Facility may be located within or adjacent to the 1,200-foot habitat corridor, depending on design and maintenance requirements which shall be subject to review as part of the Minor Amendment with Wildlife Agencies' concurrence.
  e. Funding for the minimum 1,200-foot suitable habitat corridor plus refugia shall be shared by the Riverside County Flood Control District and CVCC subject to a mutually acceptable agreement to be entered into between the Riverside County Flood Control District and CVCC.
- The portion of the proposed Covered Facility from Dillon Road to the San Andreas Fault is within the Willow Hole Conservation Area and shall be subject to review as part of the Minor Amendment with Wildlife Agencies' concurrence.

Table 7-9: Covered Activities–Riverside County Transportation Department's Facilities in Conservation Areas

Facility	*General Plan width*[1]	*Maintained*[2]	*Dedicated and Accepted*[3]	*Conservation Area Where Located*	*Avoidance/minimization Measures Required*
Adele Ave		X		Cabazon	None[4]
Agnes St		X		Cabazon	None[4]
Almond St		X		Cabazon	None[4]
Apache Tr.	74-118	X		Cabazon	None[4]
Blanche Ave		X		Cabazon	None[4]
Bonita Ave	118	X		Cabazon	None[4]
Broadway St	118	X		Cabazon	None[4]
Carmen Ave		X		Cabazon	None[4]
Dale Ct		X		Cabazon	None[4]
Date Ave		X		Cabazon	None[4]
Deep Creek Rd	100	X		Cabazon	None[4]
Dolores Ave		X		Cabazon	None[4]
Elm St	74-118	X		Cabazon	None[4]
Esperanza Ave	74	X		Cabazon	None[4]
Hattie Ave		X		Cabazon	None[4]
Helen Ave		X		Cabazon	None[4]
Ida Ave		X		Cabazon	None[4]
Lemon St		X		Cabazon	None[4]
Lois Ave		X		Cabazon	None[4]
Magnolia St	100	X		Cabazon	None[4]
Main St	100	X		Cabazon	None[4]
Maxine Ave		X		Cabazon	None[4]
Orange St		X		Cabazon	None[4]
Pamela Way		X		Cabazon	None[4]
Railroad Ave		X		Cabazon	None[4]
Riza Ave		X		Cabazon	None[4]
Rushmore Ave			X	Cabazon	None[4]

Table 7-9: (cont.) Covered Activities – Riverside County Transportation Department's Facilities in Conservation Areas

Facility	*General Plan width*[1]	*Maintained*[2]	*Dedicated and Accepted*[3]	*Conservation Area Where Located*	*Avoidance/minimization Measures Required*
Seminole Dr	118	X		Cabazon	None[4]
Sunrise Ave		X		Cabazon	None[4]
West View St			X	Cabazon	None[4]
66th Ave.	118			Coachella Valley Stormwater Channel and Delta	None[4]
66[8h] Ave.	118			Coachella Valley Stormwater Channel and Delta	None[4]
70th Ave	100			Coachella Valley Stormwater Channel and Delta	None[4]
Lincoln St	100			Coachella Valley Stormwater Channel and Delta	None[4]
Box Canyon Rd	100		X	Desert Tortoise and Linkage	None[4]
Chiriaco Rd				Desert Tortoise and Linkage	None[4]
Cottonwood Springs Rd				Desert Tortoise and Linkage	None[4]
Dillon Rd	128		X	Desert Tortoise and Linkage	None[4]
Hayfield Rd				Desert Tortoise and Linkage	None[4]
Summit Rd				Desert Tortoise and Linkage	None[4]
Sunny Rock Rd			X	Desert Tortoise and Linkage	None[4]
44th Ave	118			East Indio Hills	None[4]
Dillon Rd	128	X		East Indio Hills	None[4]
Landfill Rd		X		East Indio Hills	None[4]
20th Ave	100-118			Edom Hill	None[4]
Bennett Rd	128			Edom Hill	None[4]
Charles St	118			Edom Hill	None[4]

Table 7-9: (cont.) Covered Activities – Riverside County Transportation Department's Facilities in Conservation Areas

Facility	*General Plan width*[1]	*Maintained*[2]	*Dedicated and Accepted*[3]	*Conservation Area Where Located*	*Avoidance/minimization Measures Required*
Edom Hill Rd	100			Edom Hill	None[4]
Stanton Rd	100			Highway 111/I-10	None[4]
22nd Ave	100			Indio Hills/Joshua Tree National Park Linkage	None[4]
28th Ave			X	Indio Hills/Joshua Tree National Park Linkage	None[4]
30th Ave			X	Indio Hills/Joshua Tree National Park Linkage	None[4]
Desert Charm Rd		X	X	Indio Hills/Joshua Tree National Park Linkage	None[4]
Dillon Rd	128	X		Indio Hills/Joshua Tree National Park Linkage	Fluvial Sand Transport; Wildlife Undercrossing
Fan Hill Rd	100			Indio Hills/Joshua Tree National Park Linkage	None[4]
Happy Valley Dr			X	Indio Hills/Joshua Tree National Park Linkage	None[4]
Holman Way			X	Indio Hills/Joshua Tree National Park Linkage	None[4]
Hot Well Rd			X	Indio Hills/Joshua Tree National Park Linkage	None[4]
Pace Ln			X	Indio Hills/Joshua Tree National Park Linkage	None[4]
Pushawalla Rd		X	X	Indio Hills/Joshua Tree National Park Linkage	None[4]
Sunny Rock Rd			X	Indio Hills/Joshua Tree National Park Linkage	None[4]

Table 7-9: (cont.) Covered Activities – Riverside County Transportation Department's Facilities in Conservation Areas

Facility	*General Plan width*[1]	*Maintained*[2]	*Dedicated and Accepted*[3]	*Conservation Area Where Located*	*Avoidance/minimization Measures Required*
Sunnyslope Rd			X	Indio Hills/Joshua Tree National Park Linkage	None[4]
Tamyram Rd			X	Indio Hills/Joshua Tree National Park Linkage	None[4]
Thousand Palms Canyon Rd	74	X		Indio Hills/Joshua Tree National Park Linkage	None[4]
Western Ave	100			Indio Hills/Joshua Tree National Park Linkage	None[4]
Desert Charm Rd		X		Indio Hills Palms	None[4]
30th Ave			X	Indio Hills Palms	None[4]
Sunnyslope Rd			X	Indio Hills Palms	None[4]
18th Ave	100			Long Canyon	Fluvial Sand Transport
20th Ave		X		Long Canyon	Fluvial Sand Transport
Camino Campanero	100			Long Canyon	Fluvial Sand Transport
Dillon Rd	128			Long Canyon	Fluvial Sand Transport
Hacienda Dr	128			Long Canyon	Fluvial Sand Transport
Long Canyon Rd	118	X		Long Canyon	Fluvial Sand Transport
Mountain View Dr	128	X		Long Canyon	Fluvial Sand Transport
Mountain View Rd	128	X		Long Canyon	Fluvial Sand Transport
Box Canyon Rd	100	X		Mecca Hills/Orocopia Mountains	None[4]
Painted Canyon Rd		X		Mecca Hills/Orocopia Mountains	None[4]
The Bradshaw Tr.		X		Mecca Hills/Orocopia Mountains	None[4]
44th Ave	128			Santa Rosa and San Jacinto Mountains	None[4]
66th Ave	100			Santa Rosa and San Jacinto Mountains	None[4]
77th Ave			X	Santa Rosa and San Jacinto Mountains	None[4]
Avenida Elenita			X	Santa Rosa and San Jacinto Mountains	None[4]
Avenida Encino			X	Santa Rosa and San Jacinto Mountains	None[4]

Table 7-9: (cont.) Covered Activities – Riverside County Transportation Department's Facilities in Conservation Areas

Facility	*General Plan width*[1]	*Maintained*[2]	*Dedicated and Accepted*[3]	*Conservation Area Where Located*	*Avoidance/minimization Measures Required*
Avenida La Cumbre			X	Santa Rosa and San Jacinto Mountains	None[4]
Avenida Los Feliz			X	Santa Rosa and San Jacinto Mountains	None[4]
Avenida Los Pinos			X	Santa Rosa and San Jacinto Mountains	None[4]
Carrizo Rd	100			Santa Rosa and San Jacinto Mountains	None[4]
Esperanza Ave	100			Santa Rosa and San Jacinto Mountains	None[4]
Hidden Palms Rd			X	Santa Rosa and San Jacinto Mountains	None[4]
Jackson St	128			Santa Rosa and San Jacinto Mountains	None[4]
Mesa Tr.			X	Santa Rosa and San Jacinto Mountains	None[4]
Palm Canyon Dr	100			Santa Rosa and San Jacinto Mountains	None[4]
Pinon Dr	100			Santa Rosa and San Jacinto Mountains	None[4]
Rancho Rd	100			Santa Rosa and San Jacinto Mountains	None[4]
Star Shadow Rd			X	Santa Rosa and San Jacinto Mountains	None[4]
Tramway Rd	118			Santa Rosa and San Jacinto Mountains	None[4]
Railroad Ave		X		Snow Creek/Windy Point	None[4]
Snow Creek Rd		X		Snow Creek/Windy Point	None[4]
Boulder Dr			X	Stubbe and Cottonwood Canyons	None[4]
Clay Rd			X	Stubbe and Cottonwood Canyons	None[4]
Cottonwood Rd			X	Stubbe and Cottonwood Canyons	None[4]
Cypress Rd			X	Stubbe and Cottonwood Canyons	None[4]
Lime Rd			X	Stubbe and Cottonwood Canyons	None[4]
Rockview Dr			X	Stubbe and Cottonwood Canyons	None[4]
Tamarack Rd	118	X		Stubbe and Cottonwood Canyons	None[4]
Verbenia Ave				Stubbe and Cottonwood Canyons	None[4]
22nd Ave	100			Thousand Palms	Major Amendment req.
26th Ave	100			Thousand Palms	None[4]
30th Ave	100			Thousand Palms	None[4]
Calle Francisco			X	Thousand Palms	None[4]

Table 7-9: (cont.) Covered Activities – Riverside County Transportation Department's Facilities in Conservation Areas

Facility	*General Plan width*[1]	*Maintained*[2]	*Dedicated and Accepted*[3]	*Conservation Area Where Located*	*Avoidance/minimization Measures Required*
Chase School Rd/ Chocktaw Rd./Vista del Pajaro	128			Thousand Palms	Realign outside Conservation Area
Desert Moon Dr			X	Thousand Palms	None[4]
Diamond Ave	100			Thousand Palms	None[4]
Hot Well Rd			X	Thousand Palms	None[4]
Moon Shadow Dr			X	Thousand Palms	None[4]
Ramon Rd	128	X		Thousand Palms	Wildlife undercrossing if widened to four lanes
Rio Del Sol Rd (See Section 4.3.11.)	74			Thousand Palms	Major Amendment Required
Sky Ridge Rd		X		Thousand Palms	None[4]
Thousand Palms Canyon Rd	74	X		Thousand Palms	Wildlife undercrossing if widened to four lanes
Vista Del Este			X	Thousand Palms	None[4]
Vista Del Jardin			X	Thousand Palms	None[4]
Vista Del Norte			X	Thousand Palms	None[4]
Washington St	128	X		Thousand Palms	Wildlife undercrossing if widened to four lanes
14th Ave	100			Upper Mission Creek/Big Morongo Canyon	None[4]
15th Ave	100			Upper Mission Creek/Big Morongo Canyon	Fluvial sand transport; Wildlife undercrossing if widening to four lanes or wider

Table 7-9: (cont.) Covered Activities – Riverside County Transportation Department's Facilities in Conservation Areas

Facility	*General Plan width*[1]	*Maintained*[2]	*Dedicated and Accepted*[3]	*Conservation Area Where Located*	*Avoidance/minimization Measures Required*
Hacienda Ave	118			Upper Mission Creek/Big Morongo Canyon	Fluvial sand transport; Wildlife undercrossing if widening to four lanes or wider
Indian Ave	110-128	X		Upper Mission Creek/Big Morongo Canyon	Fluvial sand transport; Wildlife undercrossing if widening to four lanes or wider
Mission Creek Rd		X		Upper Mission Creek/Big Morongo Canyon	None[4]
Mission Lakes Blvd.	118			Upper Mission Creek/Big Morongo Canyon	Fluvial sand transport; Wildlife undercrossing if widening to four lanes or wider
Pierson Blvd.	118	X		Upper Mission Creek/Big Morongo Canyon	Fluvial sand transport; Wildlife undercrossing if widening to four lanes or wider
West Dr			X	Upper Mission Creek/Big Morongo Canyon	Fluvial sand transport; Wildlife undercrossing if widening to four lanes or wider
Worsley Rd	74-118	X		Upper Mission Creek/Morongo Cyn.	None[4]
20th Ave	100		X	West Deception Canyon	None[4]
22nd Ave	100	X		West Deception Canyon	None[4]
Aurora Blvd.			X	West Deception Canyon	None[4]
Aurora Rd			X	West Deception Canyon	None[4]

Table 7-9: (cont.) Covered Activities – Riverside County Transportation Department's Facilities in Conservation Areas

Facility	*General Plan width*[1]	*Maintained*[2]	*Dedicated and Accepted*[3]	*Conservation Area Where Located*	*Avoidance/minimization Measures Required*
Dillon Rd	128	X		West Deception Canyon	None[4]
Dock Rd			X	West Deception Canyon	None[4]
Dry Gulch Rd			X	West Deception Canyon	None[4]
Henry Rd			X	West Deception Canyon	None[4]
Hot Springs Rd			X	West Deception Canyon	None[4]
Longvue Rd			X	West Deception Canyon	None[4]
Penny Ln		X		West Deception Canyon	None[4]
Sky Ridge Rd		X		West Deception Canyon	None[4]
Whitewater Canyon Rd		X		Whitewater Canyon	None[4]
Whitewater Cutoff		X		Whitewater Canyon	None[4]
Gene Autry Tr.	118			Whitewater Floodplain	None[4]
Indian Ave	128			Whitewater Floodplain	None[4]
Overture Dr		X		Whitewater Floodplain	None[4]
Salvia Rd	118			Whitewater Floodplain	None[4]
SH-111(Caltrans)	184			Whitewater Floodplain	None[4]
Tipton Rd	100			Whitewater Floodplain	None[4]
16th Ave		X		Willow Hole	Fluvial sand transport; Wildlife undercrossing if widening to four lanes or wider
18th Ave	100		X	Willow Hole	Fluvial sand transport; Wildlife undercrossing if widening to four lanes or wider [4]
20th Ave	74	X		Willow Hole	None[4]
21st Ave		X		Willow Hole	None[4]
Angela Dr		X		Willow Hole	Fluvial sand transport; Wildlife undercrossing if widening to four lanes or wider
Blair Rd			X	Willow Hole	None[4]

Table 7-9: (cont.) Covered Activities – Riverside County Transportation Department's Facilities in Conservation Areas

Facility	***General Plan width[1]***	***Maintained[2]***	***Dedicated and Accepted[3]***	***Conservation Area Where Located***	***Avoidance/minimization Measures Required***
Carol Dr		X		Willow Hole	Fluvial sand transport; Wildlife undercrossing if widening to four lanes or wider
Chico Cir		X		Willow Hole	None[4]
Dillon Rd	128	X		Willow Hole	Fluvial sand transport; Wildlife undercrossing if widening to four lanes or wider
Circle B Dr		X		Willow Hole	None[4]
Date Palm Dr	128			Willow Hole	None[4]
Edom Hill Rd.	100			Willow Hole	None[4]
Little Morongo Rd	118			Willow Hole	None[4]
Mountain View Rd	128			Willow Hole	Wildlife undercrossing if widened to four lanes
Palm Dr	128			Willow Hole	None[4]
Varner Rd	128			Willow Hole	None[4]
Vista Grande Dr		X		Willow Hole	None[4]
West Dr			x	Willow Hole	None[4]
Facility	***Description***			***Conservation Area Where Located***	***Avoidance/minimization Measures Required***
Borrow pit	11 acre borrow pit from which materials may be periodically taken for use in road construction. It is located on Mountain View Road approximately ¼ mile north of Varner Road.			Willow Hole	None[4]

Table 7-9 (cont.)

[1] General Plan roads are those roads from 74' to 184' which appear on the General Plan Circulation Element as planned roads. Most, though not all, General Plan roads exist but are not improved to their ultimate width.

[2] Maintained roads are those that have been accepted into the County's Maintained system. The County is responsible for maintaining them. -Some General Plan roads are also Maintained. Many maintained roads are not General Plan facilities, they are local streets, usually less than 74'. The table shows all three classes of roads so it could be seen that there is overlap between General Plan and Maintained.

[3] Dedicated and Accepted are roads which have been dedicated for public use but that are not maintained by the County. They may be privately maintained or not maintained at all. This category of roads was included in the table because The County considers them most likely to be brought into the maintained system, other than roads built as a part of approved new development, if improved to County standards.

[4] Based on the absence of sensitive species, Biological Corridors/Linkages, or Essential Ecological processes that might be impacted by the Covered Activity in the Conservation Area, these projects have no impact requiring specific avoidance and minimization measures. The projects are mitigated through the Permittees' mitigation obligations, as described in Section 6.6.1.

5 *O&M for newly improved public roads brought into the County's Maintained system is a Covered Activity.*

Applicable avoidance, minimization, and mitigation measures for the above projects are described in Section 4.3 in the relevant Conservation Area subsection, and in Section 4.4. The County Transportation Department shall develop a worker education program to avoid impacts to desert tortoise.

Table 7-10: Covered Activities –Riverside County Waste Resources Management District's Facilities in Conservation Areas

Facility	*Conservation Area Where Located*	*Avoidance/minimization Measures Required*
Edom Hill Landfill well on APN 659-130-004	Edom Hill	Maintain fluvial sand transport and wildlife movement

Required Measure 1 in Section 4.3.10 describes the avoidance, minimization, and mitigation measures for the above project. See Figure 7-10 regarding the location of the above facility.

Table 7-11: Covered Activities –State Parks' Facilities in Conservation Areas

Facility	*Conservation Area Where Located*	*Avoidance/minimization Measures Required*
Maintenance and use of trails in Mt. San Jacinto State Park Wilderness and the existing Aerial Tramway[1]	Santa Rosa and San Jacinto Mountains	None
Maintenance and use of trails in Salton Sea State Recreation Area[1]	Dos Palmas	None
Development and O&M of campground facilities, trails, and trailheads not to exceed 100 acres	Indio Hills/Joshua Tree National Park Linkage	Requires preparation of and consistency with a RMUP
Recreation activities in Indio Hills Palms (unclassified unit): associated with Covered Wagon Tours; trails; signs; and interpretive displays	Thousand Palms; Indio Hills Palms	None

[1] Other than as specifically mentioned, the developed facilities in this State Park facility, including campgrounds, ranger stations, structures, and developed day use areas, are outside the Conservation Area, and are Covered Activities under Section 7.1.

See Section 6.6.2 for a description of State Park's obligations to Plan implementation.

Table 7-12 Covered Activities - City of Desert Hot Springs's Facilities in Conservation Areas[1]

Facility	***Conservation Area Where Located***	***Avoidance/minimization Measures Required***
(a) Indian Avenue (widening and O&M)	Upper Mission Creek/Big Morongo Canyon	Burrowing owl; Desert tortoise; Le Conte's thrasher; Little San Bernardino Mtns. linanthus; fluvial sand transport; Biological Corridor
(a) Mission Lakes Blvd. (widening and O&M)	Upper Mission Creek/Big Morongo Canyon	Burrowing owl; Desert tortoise; Le Conte's thrasher; Little San Bernardino Mtns. linanthus; fluvial sand transport; Biological Corridor
(a) and (b) Little Morongo Road (widening and O&M)	Upper Mission Creek/Big Morongo Canyon	Burrowing owl; Le Conte's thrasher; Little San Bernardino Mtns. linanthus; fluvial sand transport; Biological corridor
(a) Pierson Blvd. (widening and (O&M)	Upper Mission Creek/Big Morongo Canyon	Burrowing owl; Le Conte's thrasher; Little San Bernardino Mtns. linanthus; fluvial sand transport; Biological Corridor
(b) Two Bunch Palms Trail	Upper Mission Creek/Big Morongo Canyon	Burrowing owl; Le Conte's thrasher; Little San Bernardino Mtns. linanthus; fluvial sand transport; Biological Corridor
(b) Hacienda Avenue (widening and O&M)	Upper Mission Creek/Big Morongo Canyon	Burrowing owl; Le Conte's thrasher; Little San Bernardino Mtns. linanthus; fluvial sand transport; Biological Corridor
(b) Cholla Drive (widening and O&M)	Upper Mission Creek/Big Morongo Canyon	Burrowing owl; Le Conte's thrasher; Little San Bernardino Mtns. linanthus; fluvial sand transport; Biological corridor

[1] Table 7-12 only lists projects within the area of the City subject to the Major Amendment. The area included in the Desert Hot Springs I-10 Annexation completed in 2010 is already covered by the CVMSHCP.

Figures 7-6a and 7-6b depict the Covered Activities for Desert Hot Springs (letters correspond to letters in "Facility" column of Table 7-12). Avoidance, minimization, and mitigation measures for the road projects identified in the table are described in Sections 4.3.7 and 4.4. Impacts of the above projects are also mitigated through Permittees' portion of Reserve Assembly and through the Monitoring Program, Management Program, and Adaptive Management.

Figure 7-6a: City of Desert Hot Springs Covered Activities in Conservation Areas

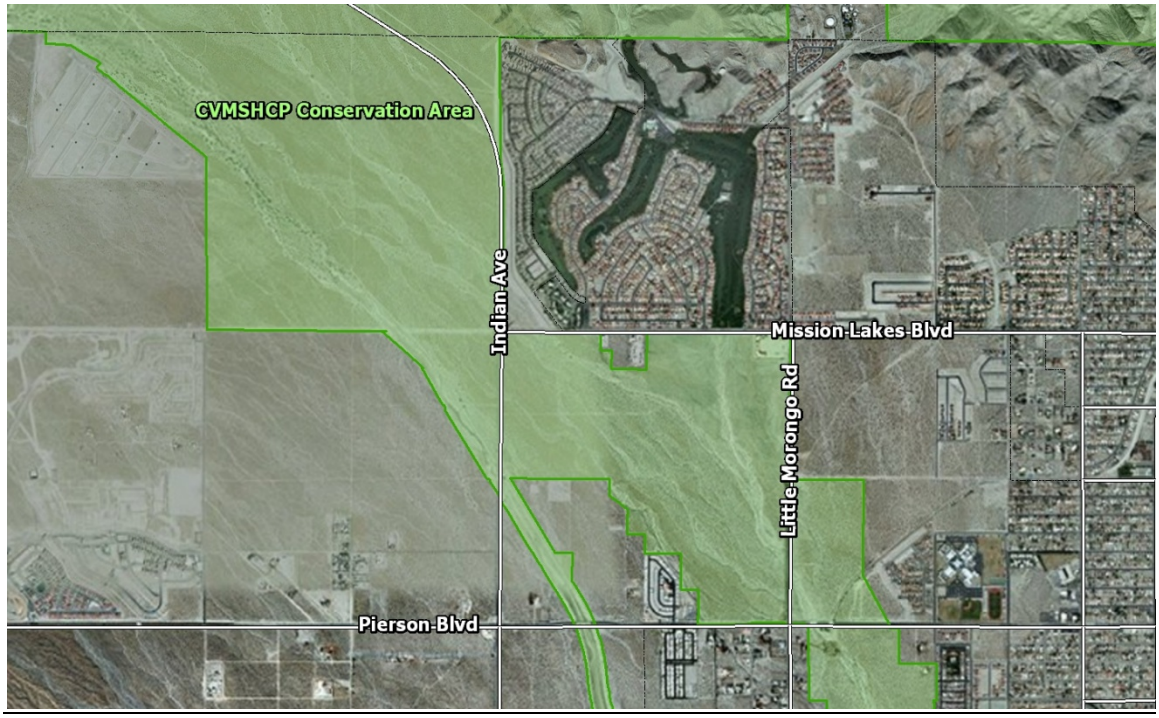


Figure 7-6b: City of Desert Hot Springs Covered Activities in Conservation Areas

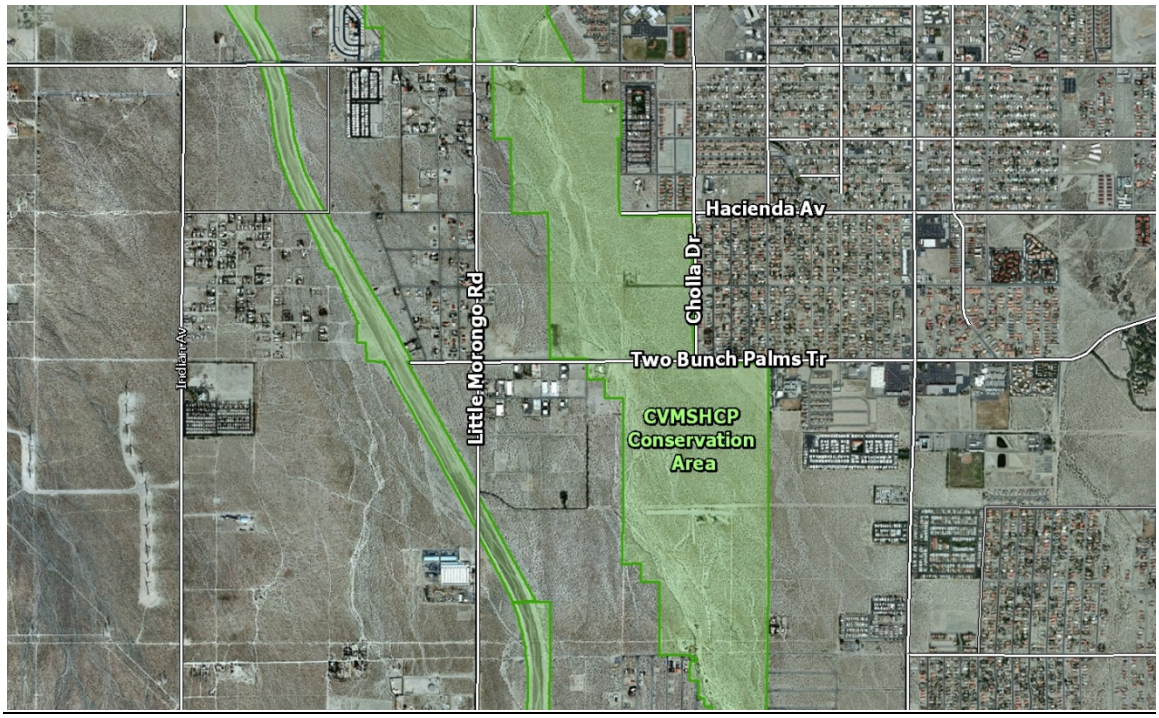


Table 7-13: Covered Activities – Mission Springs Water District's Facilities in Conservation Areas

Facility	***Conservation Area Where Located***	***Avoidance/minimization Measures Required***
(1) 913 / 1070 Pressure Zone ~~-~~ – 2 New Water Transmission~~Two wells and one reservoir. –~~ Lines	Upper Mission Creek/Big Morongo Canyon	Hwy 62 Biological Corridor, Fluvial Sand Transport, Covered Riparian Bird Species, Desert Tortoise, Le Conte's Thrasher, Little San Bernardino Mountains Linanthus, Palm Springs Pocket Mouse
(2) 1240 Pressure Zone – New Water Transmission Line – Hacienda/Mountain View Road to Long Canyon Road	Upper Mission Creek/Big Morongo Canyon	Hwy 62 Biological Corridor, Fluvial Sand Transport, Covered Riparian Bird Species, Desert Tortoise, Le Conte's Thrasher, Little San Bernardino Mountains Linanthus, Palm Springs Pocket Mouse
(3) 1400 Pressure Zone-2 New Wells, 3 Water Transmission Lines-Little Morongo Road	Upper Mission Creek/Big Morongo Canyon	Hwy 62 Biological Corridor, Fluvial Sand Transport, Covered Riparian Bird Species, Desert Tortoise, Le Conte's Thrasher, Little San Bernardino Mountains Linanthus, Palm Springs Pocket Mouse
(4) 1530 Pressure Zone-New Water Transmission Line-Indian Avenue to the north of Mission Lakes Boulevard	Upper Mission Creek/Big Morongo Canyon	Hwy 62 Biological Corridor, Fluvial Sand Transport, Covered Riparian Bird Species, Desert Tortoise, Le Conte's Thrasher, Little San Bernardino Mountains Linanthus, Palm Springs Pocket Mouse
(5) 1700 Pressure Zone-1 Water Storage Reservoir-north of Verbena Drive	Upper Mission Creek/Big Morongo Canyon	Hwy 62 Biological Corridor, Fluvial Sand Transport, Covered Riparian Bird Species, Desert Tortoise, Le Conte's Thrasher, Little San Bernardino Mountains Linanthus, Palm Springs Pocket Mouse
(6) 1875 Pressure Zone-3 Water Storage Reservoirs-	Upper Mission Creek/Big Morongo Canyon	Hwy 62 Biological Corridor, Fluvial Sand Transport, Covered Riparian Bird Species, Desert Tortoise, Le

Facility	***Conservation Area Where Located***	***Avoidance/minimization Measures Required***
		Conte's Thrasher, Little San Bernardino Mountains Linanthus, Palm Springs Pocket Mouse
(7) 2035 Pressure Zone-3 Water Storage Reservoirs, 3 Water Transmission Lines-west of Highway 62, north of Mission Lakes Boulevard	Upper Mission Creek/Big Morongo Canyon	Hwy 62 Biological Corridor, Fluvial Sand Transport, Covered Riparian Bird Species, Desert Tortoise, Le Conte's Thrasher, Little San Bernardino Mountains Linanthus, Palm Springs Pocket Mouse
(8) 2155 Pressure Zone-1 Water Storage Reservoir and one water transmission line -West of Mission Creek Trails project	Upper Mission Creek/Big Morongo Canyon	Hwy 62 Biological Corridor, Fluvial Sand Transport, Covered Riparian Bird Species, Desert Tortoise, Le Conte's Thrasher, Little San Bernardino Mountains Linanthus, Palm Springs Pocket Mouse
(9) New Regional Wastewater Treatment Plant to be located north of 20th Avenue and west of Little Morongo Road	Upper Mission Creek/Big Morongo Canyon	Hwy 62 Biological Corridor, Fluvial Sand Transport, Covered Riparian Bird Species, Desert Tortoise, Le Conte's Thrasher, Little San Bernardino Mountains Linanthus, Palm Springs Pocket Mouse
(10) Network of sewer main lines along Dillon Road to Palm Drive and onto Indian Avenue.	Upper Mission Creek/Big Morongo Canyon	Crissal Thrasher, Covered Riparian Bird Species, Le Conte's Thrasher, Little San Bernardino Mountains Linanthus, Mesquite Hummocks, Palm Springs Pocket Mouse, Fluvial Sand Transport
(11) One sewer trunk line under the 62 freeway down Dillon Road to Diablo, and then to 18th Avenue	Upper Mission Creek/Big Morongo Canyon	Crissal Thrasher, Covered Riparian Bird Species, Le Conte's Thrasher, Little San Bernardino Mountains Linanthus, Mesquite Hummocks, Palm Springs Pocket Mouse, Fluvial Sand Transport
(12) Recycled Water and Purple Pipe – Pipe #1 from the future Regional Wastewater Treatment Plant heads north along Indian	Upper Mission Creek/Big Morongo Canyon	Hwy 62 Biological Corridor, Fluvial Sand Transport, Covered Riparian Bird Species, Desert Tortoise, Le

Facility	***Conservation Area Where Located***	***Avoidance/minimization Measures Required***
Avenue north of Pierson Blvd. and extends to the Mission Lakes Country Club. Pipe #2 from the Horton Wastewater Treatment Plant along Pierson Blvd. crossing the Morongo and Mission Creek Channels heading to the Highland Falls Subdivision.		Conte's Thrasher, Little San Bernardino Mountains Linanthus, Palm Springs Pocket Mouse

[1] The projects are mitigated through MSWD's mitigation obligations, as described in Section 6.6.1.

Applicable avoidance, minimization, and mitigation measures for the above projects are described in Section 4.3 under the relevant Conservation Areas, and in Section 4.4. Within one year of Plan adoption, MSWD shall develop a maintenance plan, approved by the Wildlife Agencies, for its facilities in Conservation Areas that will minimize impacts to Covered Species and natural communities. See Figure 7-8 for MSWD's Covered Activities Facilities in Conservation Areas. MSWD's mitigation obligations are shown in Section 6.6.1.

7.3.1.1 Covered Operation, Maintenance, and Safety Activities within Existing Rights-of-Way or Easements

This section describes the types of activities which may occur in conjunction with the projects delineated in Tables 7-1 through 7-13~~1~~. As indicated in the table, some of these activities are subject to the applicable avoidance and minimization measures described in Section 4.4. Except as otherwise identified in the Section 4.3 subsections on individual Conservation Areas, operation and maintenance activities by Permittees within Conservation Areas that are Covered Activities include, but are not limited to, the following within existing rights-of-way or easements:

IID Communication sites

- Refueling of standby generators as needed (occurs irregularly after power outages)
- Site inspections; maintenance as needed

CVWD, County Flood Control Facilities

- The removal of sand, silt, sediment, debris, rubbish, woody, and herbaceous vegetation in existing flood control facilities in order to maintain design capacity of the facility and or compliance with local fire regulations
- Control of weeds and vegetation by non-chemical means, and control of debris on all access roads and District rights-of- way
- The repair or replacement of constructed flood control facilities, such as channels, basins, drop structures, and levees, as necessary to maintain the structural integrity and hydraulic capacity of the facility.
- For ALERT stations, an annual inspection visit
- For ALERT stations, emergency maintenance to replace batteries or make repairs on transmitters, solar panels, tipping buckets, etc. Emergency access may occur at any time of year via the Dunn Road, notwithstanding bighorn sheep avoidance measures

State and Interstate Facilities, City and County Roads

- Installation and maintenance of signs, including overhead signs
- Installation and maintenance of traffic control devices, such as traffic signals
- Installation and maintenance of guardrails and fences for vehicle and pedestrian safety
- Routine repair, resurfacing, and reconstruction of pavement
- Repair of natural disaster damage and restoration of emergency access
- Grading of shoulders up to 12 feet from the edge of paved or unpaved roadways

- Grading of existing dirt roadways
- Construction, replacement, and repair of curbs, gutters and sidewalks
- Minor widening and realignment for safety purposes that does not add through travel lanes, but may include turn lanes
- Construction and maintenance of berms
- Slope maintenance and slope protection such as rip-rap
- Dust stabilization**,** including application of soil stabilizers and paving of dirt roads
- Construction, repair, replacement, and cleaning out of culverts, drop structures, and down drains
- Bridge maintenance, including deck and railing replacement, column replacement, and reconstruction/placement of check dams
- Ditch clearing and lining
- Tree trimming and weed control by non-chemical means
- Landscape maintenance
- Utility relocation incidental to above activities
- Sand removal

IID Substation Facilities

- Preventive maintenance, including electric test of high voltage equipment, electric test of protection relays and communication system
- Corrective maintenance in case of an unscheduled event, shut down, or emergency; repairs as necessary involving cranes, service trucks, pick-up trucks, etc.
- Routine operational activities, including, but not limited to, KW, KWH, KV, KVAR, KVARH, and temperature readings

IID Overhead/Underground power and communication line Facilities

- Patrol on existing access roads
- Maintenance of existing access roads
- Corrective maintenance/repair of transmission facilities as needed, using existing access road

Waste Management Facilities, including Landfills, Transfer Stations, and Other Solid Waste Related Facilities

- Clean up of waste illegally dumped on parcels in a Conservation Area proximate to a landfill in a manner which is consistent with the Species Conservation Goals and Objectives for the affected Conservation Area. This may include publicly

sponsored activities related to the removal and cleanup of waste on illegal dumpsites.

- On the Edom Hill Landfill well site located on Assessor's Parcel Number 659-130-004 in Section 22, T3S R5E access to, operation and maintenance of the existing well and appurtenant facilities, and any related construction activities, including but not limited to, testing, drilling, operating and maintaining an additional well and water pipelines
- Edom Hill landfill closure

CVWD Water Storage and Transmission Facilities

- Maintain reservoirs by removing interior and exterior coating; caulking joints as needed; repainting exterior roof, shell, and appurtenances; and recoating interior with an approved epoxy system.
- Maintain boosters by providing routine oil changes and obtaining samples; remove, repair, replace, or add booster pump as needed.
- Maintain landscaping around reservoirs (where applicable) by maintaining. irrigation pumps, performing routine repairs on irrigation system, trimming trees and shrubs as needed, and clearing brush from site.
- Maintain hydroelectric generating facility turbine by inspecting, repairing, or replacing turbine components, changing oil, and obtaining samples for analysis Inspect, test, and certify the associated crane.
- Maintain altitude valves by checking water level with valve operation, check function of valves, and rebuild or replace as needed.
- Maintain pipelines by inspecting, repairing, or replacing as needed.
- Maintain sediment basin by inspecting, removing sediment as needed, and making any necessary repairs.

MSWD Water Storage and Transmission Facilities

- Maintain reservoirs by removing interior and exterior coating; caulking joints as needed; repainting exterior roof, shell, and appurtenances; and recoating interior with an approved epoxy system.
- Maintain boosters by providing routine oil changes and obtaining samples; remove, repair, replace, or add booster pump as needed.
- Maintain landscaping around reservoirs (where applicable) by maintaining irrigation pumps, performing routine repairs on irrigation system, trimming trees and shrubs as needed, and clearing brush from site.

- Maintain altitude valves by checking water level with valve operation, check function of valves, and rebuild or replace as needed.

- Maintain pipelines by inspecting, repairing, or replacing as needed.

- Maintain sediment basin for wells by inspecting, removing sediment as needed, and making any necessary repairs.

7.3.2 Allowable Uses

This section describes uses that may occur on non-federal Reserve Lands that are not Covered Activities and which are not precluded by the Plan, and describes Allowable Uses both in and outside the Conservation Areas.

7.3.2.1 Non-Recreation-Related Allowable Uses

The following activities are considered to be compatible with the Species Conservation Goals and Conservation Objectives on non-federal Reserve Lands.

- ***Emergency, safety, and police services.*** Local, state, and federal law enforcement entities will be allowed access to the Reserve Lands as necessary to enforce the law. Medical, rescue, fire fighting operations, and other emergency service providers will be allowed access to Reserve Lands to carry out operations necessary for the health, safety, and welfare of the public. Local law enforcement agencies and other entities such as the National Guard or Immigration and Naturalization Service operating on Reserve Lands are subject to existing state and federal laws. The MSHCP will not create additional permit requirements for these entities beyond those of existing state and federal laws.
- ***Emergency response activities by Permittees required to protect the public health, safety, and welfare***. Such activities by Permittees include emergency response to wildfire, flooding, earthquakes, and other emergency situations. As the MSHCP Reserve System management plan is developed, it will address advance planning, as feasible, with emergency response agencies to facilitate emergency response activities and minimize their impacts. Such planning will not impede or delay critical emergency responses that could put the public's health and safety at risk.

7.3.2.2 Allowable Uses in and outside the Conservation Areas

Pesticide use. Pesticide use on non-Covered Species is an Allowable Use, but any Take of Covered Species resulting from toxicological effects of the use of pesticides pursuant to applicable requirements is not a Covered Activity.

7.3.3 Compatible Activities

This Section describes activities that may occur on non-federal Reserve Lands that are Covered Activities.

7.3.3.1 Emergency Repairs and Reserve Management and Monitoring

- ***Emergency repairs by Permittees of public infrastructure facilities***. Public infrastructure facilities and utilities are currently located in areas anticipated to be included within the MSHCP Reserve System and may be constructed in the future in the MSHCP Reserve System in accordance with the Covered Activities described in this section. From time to time, emergency repairs may be required to these facilities as necessary for the health, safety, and welfare of the public. Such activities are compatible activities within the MSHCP Reserve System. The following procedures will be employed for emergency repairs that occur outside the boundaries of existing cleared areas:
  - The entity initiating the emergency repair will notify designated CVCC staff that a repair is necessary; after-the-fact notification will occur for emergency repairs that must be carried out immediately for the protection of public health and safety.
  - Immediately upon notification, CVCC staff or the Land Manager will conduct a site visit with emergency repair staff to assess the situation and determine if the repair may affect MSHCP resources; recommendations will be made regarding methods for implementing the emergency repair while minimizing environmental impacts, including post-repair restoration efforts; sensitive areas may be flagged in the field to assist in providing direction for repair crews.
  - If necessary, CVCC staff or the Land Manager will conduct onsite monitoring during the repair.
  - Upon completion of the repair, CVCC staff will assess and document onsite conditions and include such documentation in the administrative record of the MSHCP; if warranted, revegetation plans will be prepared for areas disturbed by the repair and CVCC staff or the Land Manager will oversee implementation of such plans.
- ***Reserve management and monitoring.*** Certain activities associated with management on new Reserve Lands or Existing Conservation Lands may result in Take of Covered Species (e.g., fuel modification, fire management, weed control, access control, and habitat enhancement). Moreover, some activities undertaken during monitoring (e.g., capture, relocation to prevent injury or death, trapping, handling, enhancement or propagation, use of recorded vocalizations, marking) likely will result in the Take of Covered Species. Take of Covered Species resulting from management activities is authorized under the MSHCP provided that:

1. Such Take occurs during activities described in the Management Program or in Annual Work Plans approved by the RMOC; and
2. Such Take occurs during activities conducted by the agents or employees of USFWS, CDFG, CVCC, or any person acting under the direct guidance or authority of these entities.

For desert tortoise and Peninsular bighorn sheep, regional consistency and specialized training and handling are required.

Take of Covered Species resulting from monitoring activities is authorized under the MSHCP provided that:

1. Such Take occurs during activities described in the Monitoring Annual Work Plans prepared by the MPA;
2. The person(s) undertaking such activities successfully completed the training program(s) designed by the MPA;
3. The person(s) undertaking such activities carry out their duties in conformance with the protocols and procedures specified in the training; and
4. The activity is occurring consistent with the Monitoring Program.

These provisions are consistent with the USFWS policy as described in the FWS "Habitat Conservation Planning Handbook" (USFWS, 1996).

7.3.3.2 Public Use and Trails Management on Reserve Lands within the Santa Rosa and San Jacinto Mountains Conservation Area

Planning for public use and trails management on Reserve Lands in the Santa Rosa and San Jacinto Mountains Conservation Area involves trails that cross both federal and non-federal land. The MSHCP has been prepared pursuant to Section 10(a) of the ESA to provide Take Authorization for Covered Activities and compatible activities on non-federal lands. The Peninsular bighorn sheep is a California Fully Protected Species and as used with respect to PBS, Take Authorization refers only to disturbance of habitat. The MSHCP does not permit Take of an individual PBS. All Covered Activities of the Plan must avoid actions in violation of Section 4700 of the Fish and Game Code that addresses Fully Protected Species (See IA Section 15.5). Take Authorization on federal lands is provided under the ESA through Section 7. Use of trails on CDFG land is subject to Title 14 CCR. As a result, the Permittees, CDFG, BLM, and USFS have coordinated in the planning process for public use and trails management. The MSHCP, however, can only provide authorization for impacts to Covered Species for those portions of trails and any other compatible uses on non-federal lands. BLM is pursuing a Section 7 consultation for the components of the coordinated plan on federal lands. On other federal lands, the USFS will determine whether public use and trails management will require consultation with USFWS pursuant to Section 7 of the FESA. State of California lands within Magnesia Spring and Carrizo Canyon Ecological Reserves are subject to decisions made by the State.

Impacts to Covered Species associated with the public use and trails management plan ("Trails Plan") described in this section are authorized upon issuance of the Permits. For existing trails in bighorn sheep habitat, this authorization applies only to those trails specifically listed in Section 7.3.3.2.1, Elements 1 and 2.

In order to illustrate the entire public use and trails management plan, the text and maps in this section do not distinguish between trail segments on non-federal and federal lands. The names of all the trails, both on federal and non-federal land, are provided in the lists below for informational purposes to provide context for the reader. Actions that apply only to federal lands are not described in this section. The public use and trails management plan for federal lands within the Reserve System is described and analyzed in the EIR/EIS, along with several alternatives.

7.3.3.2.1 Trails Management Program

The trails management program in the Santa Rosa and San Jacinto Mountains Conservation Area has adopted an Adaptive Management approach with an emphasis on research. The Trails Plan will initially focus on multi-agency scientific data gathering to evaluate the effects of recreational trail use on Peninsular bighorn sheep health, behavior, habitat selection, and long-term population dynamics. The overarching goal of this research program is to obtain empirical data from the Plan Area to guide trails management. The basic research questions relate, in part, to the proximate response of bighorn sheep to recreation disturbance; for example, "*Is there evidence of bighorn sheep avoiding recreational trails? What is the relationship between distance of sheep to disturbance and their response? What is the current distribution of bighorn sheep home ranges relative to trails? If sheep avoid trails, what levels of human use and which trail characteristics (e.g., elevation, viewshed, terrain roughness, visibility, and slope) are associated with trail avoidance?"* Other questions that would require a longer time frame would include: "*What effect does recreation have on persistence of bighorn sheep populations?"* and "*What effect does recreational trail use have on connectivity among bighorn sheep populations?"* The research program is discussed further in Element 2 of the trails management program below.

This research program will be coordinated with monitoring of human trail use, and will be integrated with educational and public awareness efforts, and other trail management prescriptions. The trails management program is composed of eight elements, which are described below. In addition, the public use and trails management plan addresses other public access issues, such as dogs and cross country travel, in Section 7.3.3.2.2. The eight elements, detailed in the following sections, are summarized here: (1) use of existing trails, which will remain open all year, except for manipulation of use levels on some trails may occur as part of the research program; (2) initiation in Plan year 1 of a research program designed to ascertain bighorn sheep response to, and any significant adverse impacts from, recreational trail use in the Santa Rosa and San Jacinto Mountains. This research may include manipulation or limitation of use levels or closures on selected trails as an element of the study design to address specific hypothesis-based research questions; (3) gathering of data on human trail use, primarily

on trails within sensitive bighorn sheep lambing habitat and other trails as appropriate. A year-round mandatory self-issue permit system for selected trails, and other methods as appropriate, will be part of the human use monitoring program. Ongoing monitoring of bighorn sheep populations will be expanded to include regular monitoring of the distribution, abundance, recruitment, survival and cause-specific mortality of bighorn sheep throughout the Plan Area; (4) closure of three trails from June 15 through September 30 to minimize the potential impediments for access to water by bighorn sheep and other wildlife during the hot season; (5) deferral of construction of new trails, pending the results of the initial research program, monitoring of trail use, and monitoring of bighorn sheep populations; (6) implementation of a public awareness and education program; (7) annual review of the effectiveness of the public use and trails management program, including results of monitoring, research, and trail management prescriptions. This annual review will consider prudent management actions, including potential trail closures, in response to scientific data or sheep population declines below identified threshold levels; and (8) rerouting and decommissioning of trails to protect sensitive resource values, pending results of the research program.

Due to specific resource concerns associated with the Art Smith Trail and the Mirage Trail, management actions to benefit Peninsular bighorn sheep recovery were addressed separate from the Trails Plan and have been initiated prior to issuance of the Permits. These actions include rerouting the easternmost segment of the Art Smith Trail to incorporate the southern Schey Trail; restricting access to Dead Indian Canyon and the decommissioned segment of the Art Smith Trail; constructing the Hopalong Cassidy perimeter trail; closing the upper portion of the northern Schey Trail; providing an alternate access to the Mirage Trail; closing the upper Mirage Trail; and implementing an education, signage, and enforcement program to support these actions. Environmental documentation for, and approval of, these actions are separate from the Trails Plan.

A Reserve Management Unit Plan (RMUP) will be prepared within 3 years after Permit issuance (See Section 6.2) for the Santa Rosa and San Jacinto Mountains Conservation Area (Reserve Management Unit 6). This RMUP will include public use and trails management. A sample Memorandum of Understanding is provided in Appendix III to describe potential interim management of the Conservation Area pending approval of the RMUP. This sample MOU among the Wildlife Agencies, BLM, and the CVCC describes the roles and responsibilities of these agencies in implementation of the Trails Plan, including monitoring, enforcement, and research.

(1) Trail Management Program Element 1: Trails Open All Year

The following trails within Essential bighorn sheep Habitat will be available for year-round non-motorized use subject to annual review and modification as described in Element 7 below. As part of the research program, some of the trails listed below may be subject to manipulation of trail use levels--including increases, decreases, or prohibitions of use altogether--to determine the effects of recreational trail use on Peninsular bighorn sheep. Selected trails that will be the initial focus of the research program are listed in Element 2 below.

- ***West of Palm Canyon***
  - -- Pacific Crest National Scenic Trail
  - -- North Lykken Trail
  - -- Skyline Trail
  - -- Museum Trail
  - -- South Lykken Trail
  - -- Picnic Table Trail

- ***South Palm Springs***
  - -- Araby Trail
  - -- Shannon Trail
  - -- Berns Trail
  - -- Garstin Trail
  - -- Henderson Trail
  - -- Alexander Trail
  - -- Goat Trails
  - -- Eagle Canyon Trail (not including portions of trail on Indian Reservation land)
  - -- Wild Horse Trail
  - -- Clara Burgess Trail
  - -- Fern Canyon Trail
  - -- Vandeventer Trail
  - -- Hahn Buena Vista Trail
  - -- Dry Wash Trail
  - -- Dunn Road (Note: A portion of this trail is currently closed to public access where it crosses private lands in Section 5, T5S R5E.)
  - -- Dry Wash to Vandeventer Trail connector
  - -- Thielman Trail
  - -- Palm Canyon Trail
  - -- Indian Potrero Trail
  - -- Potrero Canyon Trail

- ***Cathedral City / Rancho Mirage***
  - -- Cathedral Canyon Trail

- -- Bighorn Overlook Trail
- -- Mirage ("Bump and Grind") Trail below its intersection with the new perimeter trail (Hopalong Cassidy Trail) that connects with the Homme-Adams Park/Cahuilla Hills Park trail system.

- ***Palm Desert / Indian Wells***
  - -- Art Smith Trail from the Art Smith Trailhead to the Hopalong Cassidy Trail
  - -- Hopalong Cassidy Trail
  - -- Eisenhower Mountain Trail (access through *The Living Desert*)

- ***La Quinta***
  - -- Bear Creek Canyon Trail north of its intersection with the Bear Creek Oasis Trail
  - -- La Quinta Cove to Lake Cahuilla Trail (includes the Morrow Trail and a portion of the Boo Hoff Trail)
  - -- Guadalupe Trail
  - -- Boo Hoff Trail

- ***Southern Santa Rosa Mountains***
  - -- Cactus Spring Trail
  - -- Martinez Canyon Trail
- ***U.S. Forest Service lands***
  - -- The use of trails on Forest Service lands is subject to existing regulations, policies, and land management plans.
- ***Perimeter and other new trails***
  - -- Once constructed, any perimeter trails approved by the Plan will be compatible activities.

Figure 7-11 depicts Peninsular bighorn sheep habitat, the existing trails open all year, new and perimeter trails to be deferred under the Plan, and trails addressed separate from the Plan. Figure 7-12 depicts trails with special management prescriptions, including trails that are subject to the self-issue permit program, that are also the focus of the research program, as described in Element 3, and trails subject to the hot season closure described in Element 4. Figure 7-15 depicts the anticipated changes (reroutes, new trail construction, trail closures) to the trails from the Art Smith trailhead in Palm Desert to the lower Mirage Trail in Rancho Mirage. As previously indicated, these specific management actions to benefit Peninsular bighorn sheep recovery are addressed separate from the Trails Plan and will be initiated prior to issuance of the Permits.

(2) Trails Management Program Element 2: Research Program

A focused research program to evaluate the effects of recreational trail use on Peninsular bighorn sheep within Essential bighorn sheep Habitat in the Santa Rosa and San Jacinto Mountains will be initiated during Plan implementation in year one, if this program has not already been initiated. This research will address the proximate response of bighorn sheep to recreation disturbance as well as broader questions about the population-level effects and impacts to long-term persistence of bighorn sheep. A separate research program focusing on the effects of recreational trail use on captive bighorn sheep is also proposed.

This research program may require manipulation of use levels on trails. Manipulation could include increases, decreases, or prohibitions of use altogether on one or more trails, while simultaneously monitoring responses of bighorn sheep. Manipulated trail use will be based on a research study design focused on addressing specific research questions related to the impacts of trail use on Peninsular bighorn sheep (see Section 8.5.1). The research study design will determine which trails, if any, would be subject to manipulation of use levels. Data gathered from this research program will be used as the basis for future trails management decisions. Implementation of the research program will be coordinated with the Trails Management Subcommittee.

Upon completion of the research program, study results and management recommendations will be integrated into a revised public use and trails management plan and implemented by Plan Year 10 using best available science, professional judgment, and wildlife management principles where study results may be less than definitive. This process will include a review of the status of the species at that time, evaluation of the scientific literature, and other available data. The initial trails research will be carried out during an approximately five year period. The implementation of the trails research program will be initiated in Plan year one with development of a problem analysis and request for proposals. Field research may not actually begin until Plan year two. Some elements of the research may not require five years to complete. It is anticipated that interim feedback from the bighorn sheep and trails research will also be available via annual reports which will be provided to the various management committees and the CVCC for their use. The research results in their entirety will be available for review and use by the Trails Management Subcommittee, RMOC, CVCC, and other entities by no later than year nine of Plan implementation; this schedule incorporates the time necessary for complete data analysis and final report preparation. The research results will be incorporated in the trails management program. At that time, re-initiation of the Section 7 consultation with BLM will occur for federal lands in coordination with the Trails Plan. Depending on future sheep population fluctuations, research results, and management needs, subsequent research will be provided throughout Plan implementation as part of the Monitoring Program, Management Program and Adaptive Management if needed.

This research program will be carried out through a contract (or contracts), solicited by a Request for Proposals (RFP) to qualified research institutions or scientists.

The roles and responsibilities of participating agencies are outlined in Section 8.5.1. Funding for this research is outlined in Section 8.8.2. Development of the RFP, review of proposals, and selection of researchers would be by qualified representatives from the Wildlife Agencies, CVCC, BLM, and outside objective reviewers. The outside reviewers will be approved by the other members of this group. All contracted research on recreational trail use must be based on research proposals that conform to the Scientific Principles.

As part of the refinement of the research program and development of the RFP, a problem analysis will be prepared. Additional description of the research program is provided in Section 8.5.1.

The trails or trail segments listed below will be subject to the self issue permit system, except as noted (*Trails shown in italics are not subject to the self-issue permit system described in Element 3 below).* These trails will also be the initial focus of the research program; this list of trails may be adjusted as the research study design is developed:

San Jacinto Mountains

- West of Palm Canyon
  - -- North Lykken Trail north of Desert Riders Park
  - -- Skyline Trail

Santa Rosa Mountains

- ***South Palm Springs***
  - -- Clara Burgess Trail
  - -- Hahn Buena Vista Trail
  - -- Lower Dunn Road from the second BLM gate in Section 5, T5S R5E, to the Road's intersection with the Dry Wash Trail. (Note: A portion of this trail is currently closed to public access where it crosses private lands in Section 5, T5S R5E.)
- ***Cathedral City/Rancho Mirage***
  - -- Cathedral Canyon Trail south of the intersection of the trail's two legs that originate in Cathedral City Cove
- ***Palm Desert/Indian Wells***
  - -- Art Smith Trail west of its intersection with the proposed Hopalong Cassidy Trail
- ***La Quinta***
  - -- Bear Creek Canyon Trail south of its intersection with the Bear Creek Oasis Trail

- -- Bear Creek Oasis Trail
- -- Guadalupe Trail
- -- Boo Hoff Trail except for segments included in the La Quinta Cove to Lake Cahuilla Trail, segments north of its intersection with a secondary trail in the center of Section 24 (T6S R6E), and segments from Lake Cahuilla south to the eastern boundary of the Santa Rosa Wilderness

(3) Trail Management Program Element 3: Monitoring of Trail Use and Peninsular Bighorn Sheep Population

The Monitoring Program for the Plan will focus on further evaluation of the use of recreational trails by hikers, equestrians, and mountain bikers as it relates to habitat use by bighorn sheep. Among questions the Monitoring Program will address is, "*What are current levels of human use on recreational trails in bighorn sheep habitat year round with an emphasis on lambing season?"* The intent of this effort is to increase the currently available data and information on the levels of use on various trails using a statistically valid protocol, within the first two years of Plan implementation if this monitoring has not already been conducted or where this additional monitoring appears warranted. Compliance with the mandatory self-issue permit system, hot season closures, and other trails management prescriptions will also be assessed as part of the Monitoring Program. This monitoring effort will involve statistically valid methods to assess human use levels (See Section 8.8.2).

A mandatory self-issue permit system will be implemented on the trails or trail segments listed in Element 2 to provide data for the human use monitoring program. These self-issue permits will be required of all trail users on a year-round basis. They will be designed to be as user-friendly as possible and will not be limited in number. One permit per group will fulfill the permit requirement; however, the number of individuals in the group must be recorded in the appropriate location on the permit, and the group must remain together throughout the duration of the activity on the trail(s) subject to the permit requirement. If it is anticipated that the group will separate into subgroups along the trail, a separate permit must be obtained by each subgroup. The permits will likely be available at trailhead kiosks but may also be available online and at other convenient locations, as appropriate. The permits will provide an opportunity to educate trail users about trail use rules, conservation of bighorn sheep, and safety recommendations for desert hiking. Failure to have a permit in possession when using the applicable trails may result in issuance of a citation.

To date, CDFG has been conducting ongoing population surveys of Peninsular bighorn sheep on a biannual basis in cooperation with the Bighorn Institute. Population level monitoring of bighorn sheep for the Plan will increase in resolution for the first seven to nine years of Plan implementation or until the revised public use and trails management plan is implemented to obtain data on the distribution, abundance, recruitment, survival, and cause-specific mortality of bighorn sheep in the Plan Area. Intensive monitoring will continue until the results from the research described in Element 2 are complete and the trails management program is revised to incorporate the results and recommendations from the research. Monitoring of bighorn sheep will be a

cooperative effort involving CDFG, USFWS, BLM, CVCC, and other partners, with funding provided primarily by CDFG, to the extent possible, and CVCC. This more intensive monitoring during the initial research phase is necessary for the Trails Management Subcommittee's annual review of bighorn sheep data (see Trails Plan Element 7). Ongoing annual monitoring is also provided for in the Monitoring Program. All data used in decisions regarding the public use and trails management plan will be available to the CVCC and appropriate committees, including the Trails Management Subcommittee.

The Monitoring Program is outlined in Section 8.4.7.1.1.

(4) Trails Management Program Element 4: Hot Season Trail Closures

Three trails will be closed to recreational activities during the hot season to minimize the potential impediments for access to water by bighorn sheep and other wildlife. These trails will be closed from June 15 through September 30, as follows (Figure 7-12):

- Art Smith Trail west of its intersection with the Hopalong Cassidy Trail.
- Bear Creek Canyon Trail south of its intersection with the Bear Creek Oasis Trail
- Bear Creek Oasis Trail

Carrizo Canyon and Magnesia Canyon are within CDFG Ecological Reserves and are closed to public access from June 15 through September 30, in accordance with the California Code of Regulations.

Compliance with the hot season closures will be evaluated as part of the monitoring described in Element 3.

(5) Trails Management Program Element 5: Construction of New Trails

Construction and use of new perimeter trails described in this section will be a Covered Activity unless research results indicate that the proposed trails would adversely affect bighorn sheep. Current analysis indicates that these perimeter trails will not substantially impact Peninsular bighorn sheep populations, nor result in Take. Additional research will be conducted through Element 2 (described above) to further analyze impacts to Peninsular bighorn sheep from recreational trail use, thereby confirming and expanding upon previous impact assessments. Proposals to construct perimeter trails and other new trails will be deferred until the initial phase of the monitoring and research program has been completed. This deferral will ensure that trail conditions (e.g., use levels) are as consistent as possible once the research and monitoring programs are initiated. Once the research is completed, perimeter trails may be constructed unless the research results indicate that perimeter trails will substantially impact Peninsular bighorn sheep. Subsequent CEQA and/or NEPA analysis of these trails will also be required.

As noted above, due to resource concerns, construction of the following new trails was addressed separate from the Trails Plan and has been initiated. Figure 7-15 illustrates these changes to the existing trail system. They are briefly described as follows:

- Art Smith Trail reroute: A reroute of the easternmost segment of the existing Art Smith Trail. This reroute from the Art Smith Trailhead parking lot off Highway 74 avoids a bighorn sheep ewe subgroup in the Dead Indian Canyon area.
- Hopalong Cassidy Trail: A new perimeter trail connecting the Art Smith Trail reroute with the Homme-Adams Park/Cahuilla Hills Park trail complex, and then continuing in a northerly direction to join the existing Mirage Trail.
- Desert Crossing Trail: A connector trail from the Desert Crossing shopping center to the existing Mirage Trail.

In conjunction with rerouting the Art Smith Trail, the Dead Indian Canyon Trail to the oasis is closed from January 1 through September 30.

New Perimeter Trails

New perimeter trails were proposed to provide alternative hiking opportunities and thereby reduce trail usage in more sensitive bighorn sheep habitat areas. Appropriateness of perimeter trails will be determined upon completion of the research program described in Element 2. If research results show that recreational trail use would not adversely impact bighorn sheep health, behavior, demography, and population sustainability and connectivity, construction of these perimeter trails could be initiated as soon as feasible, depending on funding availability and acquisition of easements or other authorizations, and completion of applicable NEPA and CEQA requirements. Actions on certain lands cannot begin until easements or other authorizations from landowners are acquired. Actions regarding trails on BLM lands are not a Covered Activity under the MSHCP; BLM will undertake its own approval process for trails on lands it administers. Construction of new trails on CDFG lands requires authorization from CDFG.

As described below, new perimeter trail alignments have been identified and are shown in Figures 7-11 and 7-14, including alignments of trails that were addressed separate from the Trails Plan. Once constructed, these trails will be available for use by all means of non-motorized conveyance (e.g., on foot, bicycle, horse), unless restrictions on a particular use are deemed necessary.

Future proposals for new trails on Reserve Lands in the Santa Rosa and San Jacinto Mountains Conservation Area, other than the identified trails described herein, will be addressed on a case-by-case basis, subject to existing regulations, policies, and land management plans. Such future trail proposals will require a Minor Amendment to the Plan with Wildlife Agencies' concurrence.

General guidelines for development of perimeter trails are as follows:

- Perimeter trails will generally run parallel to and not rise more than 200 feet above the toe of slope, except where necessary to avoid residential or other developed areas or topographically inaccessible terrain.
- Perimeter trails will not be constructed within 1/4 mile of wildlife water sources.
- Perimeter trails will incorporate topographic variability where possible.
- Perimeter trails will be available for year-round use.
- Construction of perimeter trails will be allowed from July 1 through December 31 only.

Identified perimeter trails, listed from west to east, are as follows:

- Garstin to Thielman Link Trail: Trail along the western flank of the Murray Hill complex of trails linking the Garstin Trail with the Thielman Trail.
- Cathedral City Cove: Trail along the eastern, southern, and western flanks of Cathedral City Cove, except for a segment of the trail in Section 33, T4S R5E. This perimeter trail will utilize segments of the lower Cathedral Canyon Trail.
- West La Quinta Cove: Trail to summit of isolated prominence in Section 1, T6S R6E, northwest of La Quinta Cove. This trail would connect with the proposed new Palm Desert to La Quinta Connector Trail.
- East La Quinta Cove: Trail on the western flank of the Coral Reef Mountains starting from the flood control basin access gate at the south end of La Quinta Cove. Although a specific trail alignment has been identified, development of a new reservoir by the Coachella Valley Water District will require some modification to the identified trail alignment. CVWD has agreed to cooperate in determination of this alignment.
- Trails should not deviate more than 50 feet from the original alignment. Specific alignments are on file with CVAG.

Perimeter Trail Corridors

Specific alignments for these perimeter trails have not been ascertained. Perimeter trail corridors are identified in which new trails may be constructed after NEPA and CEQA requirements are met, and the appropriate authorizations are secured. These corridors are as follows:

- Pacific Crest National Scenic Trail at Snow Creek to the northern boundary of Section 4, T4S R4E (lands owned by the Agua Caliente Band of Cahuilla Indians)
- Southern boundary of Section 4, T4S R4E to the northern terminus of the North Lykken Trail
- Terminus of one of the Goat Trails at Rimrock Shopping Center to the new perimeter trail encompassing Cathedral City Cove, including the northwest segment of the perimeter trail flanking Cathedral City Cove in Section 33, T4S R5E

- Cathedral City Cove to Rancho Mirage (not shown in Figure 7-14). This perimeter trail corridor is not within bighorn sheep Habitat as a result of the fence installed by the City of Rancho Mirage.
- Northeast flank of the Coral Reef Mountains in an area known as "Silver Rock Ranch." This trail is proposed by the City of La Quinta as part of development of a public golf course project on the adjacent flat lands.
- Western flank of the Coral Reef Mountains starting from the flood control basin access gate at the south end of La Quinta Cove (pending coordination with CVWD). This corridor is to provide adequate area to realign the East La Quinta Cove Perimeter Trail.
- East side of the Santa Rosa Wilderness from the southern terminus of the proposed trail through Coral Mountain Regional Park to the road providing access to Martinez Canyon (the road would be used as a trail for access to the Canyon)
- Southern boundary of the proposed Travertine project in La Quinta in the vicinity of the Martinez rock slide then north along the boundary between BLM land in Section 32 and Travertine land in Section 33 (T6S R7E), then connecting to the Boo Hoff Trail.
- The proposed corridors for perimeter trails are shown in Figure 7-14.

Palm Desert to La Quinta Connector Trail

An alignment for a trail connecting the interpretive loop trail south of the Santa Rosa and San Jacinto Mountains National Monument Visitor Center with the northwest portion of La Quinta Cove has been identified and is known as the Palm Desert to La Quinta Connector Trail. Portions of the preferred alignment traverse areas used by wild sheep. Therefore, the portion of the Palm Desert to La Quinta Connector Trail between the Visitor Center and the *Living Desert* will be a Covered Activity when the research program evaluating the effects of recreational trail use on wild sheep in the Conservation Area and a subsequent research program evaluating the effects of this portion of the Connector Trail on captive sheep at the Bighorn Institute have been completed. When research is pursued on the captive sheep at the Bighorn Institute, the permission of the Bighorn Institute will be obtained prior to the study being initiated. If impacts to wild and/or captive breeding populations would result as determined through the research programs and Feasible mitigation measures cannot be implemented to reduce impacts, then all or a portion of the preferred alignment of the Connector Trail will not be constructed. If research results are less than definitive, then wildlife management principals, professional judgment, and the best available science will be used to assess impacts and develop mitigation measures. Mitigation measures will be considered that will reduce potential adverse impacts to levels that are less than significant. Subsequent CEQA and/or NEPA analysis of the Connector Trail will be conducted.

Depending on the results of the research, construction of the connector trail and alternative access trail could be initiated as soon as feasible, depending on funding availability and acquisition of easements or other authorizations, and completion of applicable NEPA and CEQA requirements.

A trail beginning on Portola Avenue in Palm Desert just north of *The Living Desert* and connecting with the Palm Desert to La Quinta Connector Trail is under consideration. Because a specific alignment for this trail near *The Living Desert* has not been fully analyzed in the EIR/EIS, a preliminary trail alignment as well as the corridor in which this trail may be constructed is identified. (See Figure 7-13.) This trail would be available for use by all means of non-motorized conveyance (e.g., on foot, bicycle, horse), unless restrictions on a particular use are deemed necessary. Limits on the use of this trail by equestrians may be necessary pending coordination with *The Living Desert*.

Figure 7-13 depicts the proposed Palm Desert to La Quinta Connector Trail as well as the alignment and corridor for the trail near *The Living Desert*.

Trailheads

Trailheads are defined as locations where individuals commence their use of a trail or network of trails, and often transfer from motorized to non-motorized conveyance (e.g., arrive by car to begin travel on foot, horse, or bicycle). Intersections of trails in the backcountry are generally not considered to be trailheads. Existing trailhead facilities would be used whenever possible; improvements to these facilities may be undertaken to meet the minimum requirements identified below, upon separate approval by the applicable jurisdiction.

Minimum Facilities for Trailheads:

- Parking availability commensurate with anticipated levels of use.
- Signs that explain the rules for trail use and applicable restrictions, if any.

Trail registers, kiosks, and interpretive information may be provided as determined on a case-by-case basis.

(6) Trail Management Program Element 6: Public Awareness and Education Program

A public awareness and education program will be developed and implemented by CVCC and BLM in consultation with the Trails Management Subcommittee and the Monument Advisory Committee, with the following objectives:

1. To inform the public about bighorn sheep ecology and conservation issues.
2. To encourage trail users to comply with the Trails Management Program to limit potential impacts to bighorn sheep.

Existing educational materials may be used or modified as appropriate. BLM and the Santa Rosa and San Jacinto Mountains National Monument already provide information to trail users about measures to benefit bighorn sheep conservation. The program will include information about Peninsular bighorn sheep ecology and behavior in the Santa Rosa and San Jacinto Mountains, as well as the overall conservation program for this species. It will include information about the importance of and timeline for the monitoring and research programs to assess human trail use levels and examine bighorn sheep response to recreational trail use. Information will include the specific elements of the public use and trails management program including trails open all year, trails that are subject to the mandatory self-issue permit, trails that are closed during the hot season, and approved dog use areas. As new perimeter trails are completed, information about the availability of these trails will be provided to the public in as many outlets as possible to encourage the use of these trails as alternatives that avoid sensitive bighorn sheep habitat. The public awareness and education program information will be provided in a variety of ways including contact with rangers and other personnel, maps, signage and kiosks at trailheads, brochures and written information, postings to both the CVMSHCP and Santa Rosa and San Jacinto Mountains National Monument websites as well as others, and news releases to the local media.

(7) Trail Management Program Element 7: Review of Trails Program

The Trails Management Subcommittee will annually review effectiveness of the overall public use and trails management program. Annual review will include progress reports and recommendations from the researcher(s) working on bighorn sheep within the Plan Area; an assessment of bighorn sheep population trends; recreational trail use data; compliance with the hot season closures, mandatory self-issue permits, and other trail management prescriptions; and other new data acquired.

Until such time as the initial phase of the monitoring and research program is completed [see Trails Management Program Elements (2) and (3) above], the annual review will consider the best information available to evaluate the public use and trails management program and any effects on the Peninsular bighorn sheep. Best information available will include, but is not limited to, Peninsular bighorn sheep demographic data, results from ongoing agency monitoring programs, and interim results of the monitoring and research program.

The Subcommittee will make recommendations to both the RMOC and the Santa Rosa and San Jacinto Mountains National Monument Advisory Committee regarding modifications to the public use and trails management program. The RMOC will make recommendations to CVCC for the portions of trails on non-federal land. The Monument Advisory Committee will make recommendations to BLM and USFS regarding trails on federal land. See Section 6.3 for additional information regarding the Trails Management Subcommittee.

As described on pages 67-110 of the Recovery Plan (USFWS 2000), a variety of approaches are being used to recover bighorn sheep in the Peninsular Ranges. These approaches include but are not limited to: protecting, restoring and acquiring habitat; removing non-native vegetation; managing fire to restore habitat; maintaining existing water sources and developing additional water where necessary; developing bighorn crossing areas over highways or other barriers where necessary to maintain or improve habitat connectivity; constructing fencing to exclude bighorn sheep from urban areas; reducing or eliminating detrimental human activities within bighorn habitat; and if the number of ewes in any recovery region drops below 15 and mountain lion predation is known to be a cause of death within that area, removal of mountain lions.

In accord with Recovery Task 1.2.2., if in the year under review, the number of ewes within a ewe group (defined by Rubin et al. 1998 as groups of ewes having overlapping 100% minimum convex polygon home ranges) or subgroup (a group of ewes with overlapping 90% fixed-kernel home ranges, e.g., the Dead Indian Canyon/Carrizo Canyon ewe subgroup) drops below 15, the Trails Management Subcommittee and researchers shall meet and review all data regarding the decline and the causes thereof. Management actions needed to address the decline may include but are not limited to trail rerouting, adjustments in use levels, enforcement actions, and trail closures.

If data indicate that a ewe group or subgroup population has dropped to five or fewer ewes, immediate action to close trails shall be taken. The Wildlife Agencies, BLM, a representative of the CVCC, and researchers will meet and confer as soon as possible, but in not more than thirty days, to review the data and to identify appropriate measures to be taken regarding trail use in the area that may affect the ewe group or subgroup. Actions may include long-term trail closure, trail rerouting, or other measures deemed appropriate. Trails associated with the various identified ewe groups and subgroups are delineated in Table 7-14~~2~~. The delineation of ewe groups and subgroups and associated trails is subject to review and modification as data warrant.

It is noted that the Dead Indian Canyon subgroup has, as of May 2005, fewer than five ewes. To avoid or minimize trail use impacts to this subgroup, management actions are being addressed separate from the Trails Plan and will be initiated prior to issuance of the Permits. As described in Element 5, these actions include rerouting the easternmost segment of the Art Smith Trail as depicted in Figure 7-15, and restricting access to Dead Indian Canyon and the decommissioned segment of the Art Smith Trail. The rerouted portion of the Art Smith Trail is not subject to closure at this time although the Dead Indian Canyon subgroup has fewer than five ewes. The research program will monitor the subgroup and trail use to assess whether use of the rerouted trail has any impacts on the subgroup. If there is evidence of a decline in the number of ewes in the subgroup, the meet and confer process described above will be used to determine appropriate actions.

It is expected that over time as the sheep population increases, new ewe subgroups may form. These ewe subgroups will be monitored to determine what, if any, management actions may be necessary to ensure their survival. Table 7-15~~3~~ provides

adult population estimates for the ewe groups in the four recovery regions from 2000 through 2004.

Table 7-~~12~~14: Ewe Groups and Subgroups and Associated Trails in the Santa Rosa and San Jacinto Mountains Conservation Area as of June 2005

Ewe group or subgroup	*Associated trails*
Recovery Region 1	North Lykken, Skyline, Museum, South Lykken
Recovery Region 2a	Garstin, Wild Horse, Clara Burgess, Goat, Eagle Canyon, Cathedral Canyon, Dunn Road, Hahn Buena Vista, Mirage, Art Smith
Recovery Region 2b	Art Smith, Carrizo Canyon, Schey
Recovery Region 3	Bear Creek Canyon, Bear Creek Oasis, Guadalupe, Boo Hoff,
Recovery Region 4	Martinez Canyon, Cactus Spring

Table 7-15~~3~~: Adult Population Estimates for PBS Ewe Groups and Subgroups in the Santa Rosa and San Jacinto Mountains Conservation Area

Year	*Recovery Region 1 – San Jacinto Mountains*	*Recovery Region 2a – Bradley/Magnesia/Cathedral Canyons*	*Recovery Region 2b– Carrizo/Dead Indian Canyons*	*Recovery Region 3 – La Quinta Area*	*Recovery Region 4 – Martinez Canyon*
2006	26*	53	5	163	n/a
2004	32*	57	4	234**	234**
2003	25	44*	3	87	100
2002	24*	35	3	115	84
2001	31	41	4	57	96
2000	26	27	3	53	51

* An asterisk denotes the population was augmented with captive-reared bighorn sheep from Bighorn Institute.

** In 2004, separate population estimates for Recovery Regions 3 and 4 were not available and the estimate is for both regions combined.

For more information about management of trails and public use, see Section 8.4.6.2.

(8) Trails Management Program Element 8: Rerouting and Decommissioning of Trails

Trail Rerouting. As with construction of new trails, proposals to reroute trails will be deferred until the initial five-year phase of the monitoring and research program has been completed. This deferral will ensure that trail conditions (e.g., use levels) are as consistent as possible once the research and monitoring programs are initiated. The construction and use of trail reroutes described in this section would be a Covered Activity pending the results of the research program. Rerouting, and associated decommissioning, of trails would occur following approval of a specific project by the appropriate project lead agency and completion of NEPA and CEQA requirements. Actions on certain lands cannot begin until easements or other authorizations from landowners are acquired. Actions regarding trails on BLM lands are not a Covered Activity under the MSHCP; BLM will undertake its own approval process for rerouting trails on lands it administers. Actions regarding the rerouting of trails on CDFG lands require authorization from CDFG.

Rerouting of a portion of the Art Smith Trail and closure of a portion of the Mirage Trail has been addressed separate from the Trails Plan and will be initiated prior to issuance of the Permits. The alignment of the reroute is described under Element 5 and illustrated in Figure 7-15.

Trails will be rerouted to protect sensitive resource values (e.g., cultural resources, wildlife habitat, soils) where feasible. “Feasible” trail reroutes are those that can be accomplished without extraordinary expenditures or efforts, i.e., the benefits derived are commensurate with the expenditure of funds and/or the level of effort. Reroutes are assumed to replace, not augment, trails or trail segments.

Identification of trails to be rerouted to protect bighorn sheep will be based on habitat use patterns, home ranges, and distribution of bighorn sheep and other available research. Proposals regarding specific reroutes will be considered on a case-by-case basis. Outside Essential bighorn sheep Habitat, proposals for trail reroutes will also be addressed on a case-by-case basis.

Trails will be rerouted around existing wildlife water sources, where feasible, to prevent disturbance to wildlife during the hot season. Construction of trail reroutes within Essential bighorn sheep Habitat is allowed from October 1 through December 31 only.

Trails to be rerouted are as follows:

-- Segments of the Goat Trails if construction of the Palm Hills project occurs. Trail rerouting in this area would avoid bighorn sheep Habitat in the Eagle Canyon area.

-- Rerouting a portion of the Guadalupe Trail to avoid desert slender salamander habitat will be proposed, if meaningful and feasible, upon locating salamander populations and determining levels of trail use.

-- If a North Lykken Tribal trail is Permitted through a Tribal HCP, the existing North Lykken in Tachevah Canyon will be decommissioned.

-- Rerouting the portion of the Art Smith Trail where it crosses Cat Canyon adjacent to a yearlong water source; rerouting the trail would be proposed if a less environmentally damaging location is identified.

Trail Decommission and Removal. Trails may be decommissioned and removed if their use is determined to cause adverse impacts to resource values, including visual resources where multiple trails occur in close proximity to one another (e.g., "braided" trails). Measures to mitigate adverse impacts will be considered as an alternative to trail removal. Recommendations for decommissioning and removing trails will be made by the Trails Management Subcommittee to the RMOC and the Monument Advisory Committee. On lands for non-Permittees, final approval for trail decommissions and removal rests with the entity having jurisdiction over the applicable lands. Decommission and removal of trails would occur following approval of the project by the appropriate project lead agency and completion of NEPA and CEQA requirements. Trail removal in Essential bighorn sheep Habitat will be allowed from October 1 through December 31 only. Approval of a trail reroute by the appropriate project lead agency will include approval for decommission and removal of the associated trail or trail segment, unless restrictions on the use of the associated trail or trail segment is deemed more appropriate than removal. Once approved, removal shall occur within three years.

Except as noted below, recommendations regarding the decommission and removal of trails to minimize potential adverse impacts to Peninsular bighorn sheep will be deferred until the initial phase of the monitoring and research program has been completed [see Trails Management Program Elements (2) and (3)].

Prior to making recommendations for decommissioning and removing trails in the Santa Rosa and San Jacinto Mountains Conservation Area, an inventory of all trails in the Conservation Area will occur. This inventory will be completed within one year of Permit issuance. Trails not listed as approved in the Trails Plan are unauthorized. The Trails Management Subcommittee will evaluate whether unauthorized trails will be decommissioned and removed.

Decommission and removal of the following trails and trail segments are being addressed separate from the Trails Plan, as part of the rerouting of the Art Smith and Mirage Trails and construction of the Hopalong Cassidy Trail described in Element 5:

-- The lower portion of the Art Smith Trail in Dead Indian Canyon, as shown in Figure 7-15.

-- The portion of the northern Schey Trail not incorporated in the Hopalong Cassidy Trail, as shown in Figure 7-15. Decommission and removal of this trail segment would occur upon completion of the Hopalong Cassidy perimeter trail.

The following trails to be decommissioned and removed will be considered by the Trails Management Subcommittee:

-- A spur trail in Section 9, T4S R4E that extends in a westerly direction from the North Lykken Trail.

-- A spur trail in Section 14, T6S R6E that extends in a westerly direction from the southwest corner of La Quinta Cove.

-- Redundant trails in the Murray Hill Complex with particular emphasis on redundant trails in the Murray Hill/Eagle Canyon/Goat Trails area.

-- Trails in the Coral Reef Mountains north of the La Quinta Cove to Lake Cahuilla Trail.

-- The western leg of the Cathedral Canyon Trail from the toe of slope to its intersection with the new perimeter trail encompassing Cathedral City Cove upon completion of the perimeter trail.

The following trails and trail segments would be decommissioned and removed as a result of decisions of the California Department of Fish and Game, separate from the MSHCP, to facilitate management of the Magnesia Spring Ecological Reserve:

-- A segment of the Mirage ("Bump and Grind") Trail above its intersection with the new perimeter trail (Hopalong Cassidy Trail) that will connect with the Homme-Adams Park/Cahuilla Hills Park trail system. Decommission and removal of this trail segment will occur upon completion of the perimeter trail.

-- Spur trails that extend towards Magnesia Canyon and Ramon Peak from the Mirage Trail.

-- Other trails in the Ecological Reserve upon completion of the trails inventory and identification of potential adverse impacts.

-- The portion of the Art Smith Trail crossing Cat Canyon conflicts with a yearlong water source; rerouting the trail downhill would be proposed if a less environmentally damaging location is identified.

Removal of these trails shall be completed within nine years of Permit issuance. The location of these trails is shown in Figure 7-15.

All trails on Reserve Lands not recognized in the Trails Plan will be prioritized by the Trails Management Subcommittee for decommission and removal by the appropriate Plan Participant, subject to NEPA and CEQA requirements and any other applicable regulations.

7.3.3.2.2 Other Public Access Issues and Uses on Reserve Lands in the Santa Rosa and San Jacinto Mountains Conservation Area

Because Reserve Lands in the Santa Rosa and San Jacinto Mountains Conservation Area provide Essential Habitat for Peninsular bighorn sheep, the Plan must address other recreational activities on non-federal lands. See Section 2.12 in the EIR/EIS for how these recreational activities are addressed on federal lands. The following apply to non-federal lands within Essential bighorn sheep Habitat on Reserve Lands in the Santa Rosa and San Jacinto Mountains Conservation Area.

- ***Cross-Country Travel***

  -- Cross-country travel is prohibited from January 1 through September 30, and allowed from October 1 through December 31.

  -- During the period when cross-country travel is prohibited, individuals may venture no more than 50 feet from centerline of trails on either side for purposes of resting, nature study, or other similar activities; this use does not constitute cross-country travel.

  -- Holders of permits issued for research and extended study are exempt from the cross-country prohibition.

  -- Bicycles are prohibited year-round from traveling cross-country; travel by such conveyance is restricted to authorized trails.

- ***Camping***

  -- Camping is prohibited from January 1 through September 30, and allowed from October 1 through December 31.

  -- Camping is prohibited within 1/4 mile of water sources.

-- Campers must obtain a permit for camping where and when camping is allowed. The Permittees, CVCC, CDFG, and BLM will develop a system for administering these permits.

-- Carrizo Canyon Ecological Reserve and Magnesia Spring Ecological Reserve are closed to camping (California Code of Regulations, Title 14 Section 430).

- ***Dogs***

-- Dogs are allowed in designated areas only. An educational kiosk will be installed at each designated dog walking area. It will include information about basic bighorn sheep ecology and behavior, as well as the potential threats to bighorn sheep due to the presence of dogs. The boundaries of dog walking areas will be clearly signed. The following area is approved for entry with dogs:

- West of Cathedral City Cove in the wash from Dunn Road to the northern boundary of Section 5, T5S R5E.

Upon construction of the Garstin to Thielman Link Trail, east of the Andreas Hills residential community, a dog use area would be established that incorporates only the lower segments of the Garstin Trail, the link trail itself, and the lower segment of the Thielman Trail.

Note: Additional designated dog areas are located at Homme-Adams Park/Cahuilla Hills Park in the City of Palm Desert, and south of La Quinta Cove to the flood control levee in Section 13, T6S R6E. The latter area is outside Essential Habitat, and is not within the Santa Rosa and San Jacinto Mountains Conservation Area.

Designated dog areas are depicted in Figure 7-16.

-- For designated dog areas incorporating trails (i.e., the Andreas Hills area in Palm Springs and the Homme-Adams Park/Cahuilla Hills Park loop), the applicable jurisdiction will establish a dog permit program whereupon individuals accompanied by dogs on trails are required to obtain a permit that specifies the conditions of use. Conditions of use shall include, but not be limited to, controlling animals to ensure they do not freely roam. Permits will be self-issued and available at each designated dog walking area.

-- Dogs must be leashed (maximum length of 10 feet), except on City of Palm Desert lands at Homme-Adams Park/Cahuilla Hills Park where dogs may be under voice control in accordance with a local ordinance.

-- Dogs are not allowed in Carrizo Canyon Ecological Reserve and Magnesia Spring Ecological Reserve (California Code of Regulations, Title 14 Section 430).

-- Picking up and properly disposing of a dog's fecal matter is required at all locations; fecal collection bags will be provided at each site.

-- Permittees will encourage the establishment of oversight committees comprised of local residents to implement an outreach effort alerting trail users of the dog restrictions and to monitor compliance.

-- Use restrictions will be enforced by the appropriate jurisdiction. Compliance with and enforcement of these restrictions will be addressed by the Trails Management Subcommittee. If non-compliance is a recurring problem that is not effectively controlled by the appropriate jurisdiction(s) for more than 2 years, dog use areas may be decommissioned.

-- Persons requiring accompaniment by a companion animal (e.g., seeing-eye dog), and those using dogs to facilitate search and rescue or law enforcement operations are exempt from the prohibition.

-- The prohibition does not apply to dogs inside a motor vehicle.

-- Working dogs may be permitted with no leash required, pursuant to an authorization for their use.

➢ ***Bicycle Restrictions***

Certain trails, or segments thereof, are closed year-round to bicycles, consistent with existing laws, regulations, and local ordinances. These trails are depicted in Figure 7-16 and identified below:

-- *Existing closures (these closures are not modified by the Trails Plan)*

(a) Trails, or segments thereof, in designated wilderness:

- Bear Creek Canyon Trail segment
- Bear Creek Oasis Trail segment
- Boo Hoff Trail segment
- Guadalupe Trail (entire trail)
- Cactus Spring Trail (entire trail)
- Martinez Canyon Trail segment
- All U.S. Forest Service trails within (and leading to) designated wilderness

(b) Pacific Crest National Scenic Trail

(c) Bicycles are not allowed in Carrizo Canyon Ecological Reserve and Magnesia Spring Ecological Reserve (California Code of Regulations, Title 14 Section 430).

-- *Additional closures consistent with current closures*

(a) Closures consistent with the existing bicycle prohibition on Tribal lands to preclude bicycle access to Tribal facilities at the Trading Post in Palm Canyon:

- Fern Canyon Trail west of its intersection with the Wild Horse Trail
- Vandeventer Trail west of the intersection with the connector trail to the Dry Wash Trail

(b) Closures consistent with the existing bicycle prohibition on City of Palm Springs lands due to potential terrain-related user conflicts; these closures would apply to trails in their entirety, not City lands only:

- Araby Trail
- Shannon Trail
- Garstin Trail
- Berns Trail
- Henderson Trail
- South Lykken Trail
- Picnic Table Trail (located east of the South Lykken Trail)

➢ ***Pack Stock***

-- Pack stock is limited to horses, mules, and burros.

➢ ***Noncommercial, Noncompetitive Organized Group Activities***

-- Noncommercial, noncompetitive organized group activities are subject to the mandatory self-issue permit system described under Element 3.

-- Except as required under in accordance with Element 3, a permit is not required for noncommercial, noncompetitive organized group activities on BLM-managed lands in the Santa Rosa and San Jacinto Mountains National Monument when the primary purpose of the activity is hiking, running, bicycling, or horseback riding. If the primary purpose of the activity on BLM-managed lands is other than hiking, running, bicycling, or horseback riding, a representative of the group must contact the BLM to determine whether a permit is required. Upon completion of the research program, including the issuance of management recommendations, permit requirements for noncommercial, noncompetitive organized group activities may be modified as appropriate to support recovery of Peninsular bighorn sheep.

-- Organized group events on state lands are subject to California Code of Regulations, Title 14, Section 550.

- ***Non-Motorized Commercial Recreation Activities***
  - -- Non-motorized commercial recreation activities may be allowed, except on selected trails when manipulations of use under the research program or hot season closures are in effect (see Elements 2 and Element 4). CVCC in conjunction with CDFG, BLM, and USFWS shall develop a permit system for commercial activities on non-federal lands in the Santa Rosa and San Jacinto Mountains Conservation Area. In developing this permit system, consistency with requirements for commercial recreation use permits on federal lands will occur to the extent practicable.
- ***Competitive Recreation Events***
  - -- Competitive recreation events on or off trails, including the use of developed trailheads in association with a competitive event, are prohibited.
  - -- Competitive events using paved roads or developed sites except for developed trailheads may be allowed. CVCC in conjunction with CDFG, BLM, and USFWS shall develop a permit system for such activities. In developing this permit system, consistency with requirements for competitive recreation use permits on federal lands will occur to the extent Feasible.
- ***Motorized-Vehicle Use of Trails***
  - -- Motorized vehicles are prohibited on all trails, except as specifically approved for trail maintenance and construction projects.
  - -- Use of motorized vehicles for trail maintenance and construction projects in designated wilderness is generally prohibited; exceptions to the prohibition must be in conformance with existing laws and regulations.
  - -- Motorized-vehicle use of trails may only be authorized where and when limitations on public uses are not in effect (see Section 7.3.3.2.1).

7.3.3.2.3 Existing Trails outside the Santa Rosa and San Jacinto Mountains Conservation Area

Trails on Reserve Lands outside the Santa Rosa and San Jacinto Mountains Conservation Area have been established primarily in association with existing parks, preserves, and wilderness areas. These trails are considered as compatible activities under the Plan and are as follows:

- -- A system of trails on the Thousand Palms Preserve
- -- The Pacific Crest National Scenic Trail traversing Reserve Lands in the Snow Creek/Windy Point and Stubbe and Cottonwood Canyons Conservation Areas
- -- Trails on non-federal lands within Dos Palmas Preserve/ACEC

7.3.4 Conditionally Compatible Uses

The uses described in this section are considered conditionally compatible with the Species Conservation Goals and Objectives and the Conservation Area Conservation Objectives subject to specific guidelines and criteria. (See Section 7.3.4.2.) All the uses described in this section pertain to Reserve Lands outside the Santa Rosa and San Jacinto Mountains Conservation Area, Allowable Uses in which are described in Section 7.3.3.2.

Although the main goal of the MSHCP Reserve System is to protect biological resources, another primary objective is to provide recreational and educational opportunities, while providing adequate protection for the biological resources. Public access is an important part of the MSHCP because it gives the public an opportunity to experience and appreciate the natural environment that is being protected. By increasing awareness and appreciation for the natural resources within the MSHCP Reserve System, local residents and visitors can learn the importance of and practice environmental stewardship.

7.3.4.1 Covered Public Access Activities

The conditionally compatible public access uses on Reserve Lands consist of trails, facilities, and passive recreational activities. The primary public access component on Reserve Lands will be trails.

In addition to the trails, trailheads, and interpretive facilities on Reserve Lands, passive recreational activities will also be Allowable Uses on Reserve Lands. These include passive recreation activities that do not adversely impact Reserve Lands and cause minimal disturbance to biological resources. Passive recreation includes hiking, bird watching, photography, and under specified locations identified in the following guidelines, mountain biking, horseback riding, picnicking, scientific research, and hunting. Other activities associated with public access and recreation that will be Allowable Uses include signs and barriers.

7.3.4.2 Guidelines for Public Access and Recreation on Reserve Lands

Excessive or uncontrolled access on Reserve Lands can result in habitat degradation and disruption of breeding and other critical wildlife functions at certain times of the year. In order to provide sufficient protection for natural and biological resources on Reserve Lands, the following policies and guidelines have been developed to regulate the covered public access activities described above. These guidelines are separated into two categories: (1) Siting and Design and (2) Operations and Maintenance.

- **Criteria for the Siting and Design of Trails and Facilities**

The construction of trails and facilities will impact biological resources on Reserve Lands. Therefore, the following guidelines address ways to avoid and minimize

impacts from the placement and design of these trails and facilities on MSHCP Reserve System natural resources.

1. Trails and facilities will be sited and designed to be consistent with Conservation Goals and Objectives.
2. Trails and facilities will be located in the least sensitive portions of Reserve Lands to avoid or minimize impacts to habitat occupied by Covered Species.
3. Trails and facilities will be designed to discourage and prevent intrusion into adjacent environmentally sensitive areas.

Trails

4. Whenever possible, trail alignments on Reserve Lands will use existing dirt roads.
5. Trails will be kept along the edges of large sensitive areas of habitat such as riparian areas.
6. The type, width, and intensity of trail uses will be consistent with protection of the resources being traversed.
7. Water breaks will be installed on steep trails to prevent accelerated runoff and erosion.
8. Dog-friendly trails will be located in or along the edges of areas that possess relatively low habitat value.

Interpretive Facilities

9. Interpretive facilities such as kiosks and interpretive panels may be constructed in appropriate locations to display and interpret the natural resources. Exhibits will emphasize the need to conserve natural resources in the MSHCP Reserve System.

Trailheads

10. Trail access points to Reserve Lands (e.g., parking lots and staging areas) that are consistent with Species Conservation Goals and Objectives and Conservation Area Conservation Objectives will be identified.
11. Entry controls and signage at trailhead sites will be used to encourage proper resource usage.
12. In most cases, trailheads will be sited at the edge of the resource area.

- **Guidelines for Public Use and Maintenance**

1. Passive recreation will include:
   - bird watching

- hiking, equestrian, and mountain bike uses on designated trails
- photography
- picnicking in designated areas
- scientific research
- hunting

2. Off-highway vehicle use is prohibited on Reserve Lands.
3. Adverse effects of passive recreation such as trampling vegetation and erosion will be minimized.
4. Motorized vehicular access by the public on Reserve Lands will be prohibited except as necessary by emergency personnel or for operations and maintenance activities.
5. As appropriate, daily and seasonal limits on trail use will be established. When necessary, trails will be closed on a temporary basis to minimize disruption of nesting and other wildlife functions for Covered Species, or if public access has resulted in, or is expected to result in, significant negative impacts to sensitive species. Passive recreational uses will be limited or restricted in critical wildlife areas during breeding season, as determined appropriate.
6. Public access may be restricted within and adjacent to wetlands, riparian areas, restoration areas, and sensitive wildlife Habitat (e.g., during the breeding season) at the discretion of the RMUC.
7. In the event that public access policies and other policies conflict, the conflict will be resolved in the manner most protective of the biological resources on Reserve Lands.
8. Fencing or other barriers will be used to restrict access to sensitive areas when required to protect the biological resources.
9. Education and outreach will be used to increase public awareness and appreciation for Habitat and wildlife values. Public access information packets and guides will be developed for users of Reserve Lands.
10. Reserve Lands will be patrolled on a regular basis in order to ensure that visitors stay on trails and observe all other rules and guidelines established to protect the natural resources on site.
11. Feeding of all wildlife will be prohibited.
12. Trails, facilities, signs and barriers will be maintained as needed to discourage and prevent intrusion into adjacent environmentally sensitive areas.

Hiking

13. Hikers must stay on designated trails and must not stray into adjacent areas to prevent trampling of vegetation and erosion.

Equestrian Use

14. Equestrian use will be limited to designated trails.
15. Following heavy rains, the use of equestrian trails will be prohibited for appropriate periods to avoid trail damage and impacts to adjacent Habitat.

Mountain Biking

16. Mountain bike trails will be limited to areas with low susceptibility to erosion and excluded from wetlands and other sensitive areas.
17. If use becomes heavy and problematic, an access control system will be developed and permits may be required.
18. Mountain bike trails will be constructed wider than foot trails to prevent trail edge disturbance and on grades no greater than 25 percent.

Litter and Trash Control Measures

19. Litter control measures will be implemented on Reserve Lands.
20. Closed garbage cans and recycling bins will be provided at trailheads and access points.
21. Litter and trash will be collected and removed on a regular basis. Garbage cans and recycling bins will be maintained appropriately.
22. Penalties will be imposed for littering and dumping on Reserve Lands.
23. Permanent storage of materials (e.g., hazardous and toxic materials) on Reserve Lands will be prohibited.
24. Wildlife Corridor undercrossings will be kept free of all debris, trash, and other obstructions.

Pets

25. Pets will be leashed at all times.

Signage

26. An adequate number of signs will be provided at appropriate locations to clearly identify public access to Reserve Lands.

7.3.4.3 Review Process for Approving Public Access and Recreation on Reserve Lands

For trails and facilities not addressed in an RMUP, an amendment to the RMUP would be required.

7.4 Participating Special Entity

Any public service provider, such as a utility company or a public district, including, but not limited to, a school, water, or irrigation district, that operates facilities and/or owns land within the Plan Area may request Take Authorization for its activities from CVCC pursuant to the Permits as a Participating Special Entity. Such activities must be consistent with the terms and requirements of the Permits, the Plan, and the IA. The process for submitting an application, review by CVCC and the Wildlife Agencies, and granting of Take Authorization is delineated in Section 11.7 of the IA. Participating Special Entities shall contribute to Plan implementation through payment of a fee or other appropriate mechanism based on the type of proposed activity.

8.0 MSHCP RESERVE SYSTEM MANAGEMENT & MONITORING PROGRAM

This section describes a framework for the implementation of a Management Program to provide for the Conservation of species and natural communities and a Monitoring Program to assess the condition of species and natural communities in the MSHCP Reserve System. The framework Management Program will include ongoing management responsibilities and Adaptive Management. This framework is adaptive and subject to modification as system stressors change and as new information on how better to manage the MSHCP Reserve System to achieve the species and Habitat goals becomes available. The Monitoring Program will be implemented in phases starting with the collection of baseline data that will be used to evaluate conceptual monitoring strategies followed by implementation of long-term species and natural communities monitoring. The Monitoring Program will thereafter be adaptive to incorporate new protocols and techniques as appropriate. The goals in making future modifications to the Monitoring Program will be to improve efficiency and increase the reliability of the data. The Monitoring Program data will be used to both determine if the Plan is meeting its Conservation Objectives and identify the need for and the success of Adaptive Management of the Reserve Lands. This section also includes a program implementation schedule, an estimated annual workload summary, and a cost analysis.

8.1 Introduction and Purpose

The general Conservation approach for the MSHCP Reserve System is to conserve Core Habitat Areas, Other Conserved Habitat, Essential Ecological Processes, and Biological Corridors and Linkages in a size and configuration that will provide for the Conservation of Covered Species and Natural Communities. This Conservation approach requires achieving specific Conservation Goals and Conservation Objectives for Conservation Areas (Section 4), Covered Species (Section 9), and natural communities (Section 10). The CVCC will track the extent to which the Plan is achieving compliance with Conservation Objectives (Section 4) as they relate to acreage goals. Evaluation of Generalized Conservation Objectives that apply to all Covered Species will be evaluated through the Monitoring Program. An example is:

> *Conserve Core Habitat and associated Essential Ecological Processes for "Covered Species A" allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused disturbance, and edge effects to Core Habitat by conserving contiguous Habitat and effective Linkages between patches of Core Habitat (from Section 4.3).*

In this example, the Monitoring Program would be evaluating population fluctuations, functionality of linkages, impacts of human disturbance (including impacts from edge effects), and if Essential Ecological Processes are being maintained.

The Monitoring Program will provide feedback on the success of achieving the Conservation Objectives by monitoring at multiple levels, including landscape, natural community, and species levels. The landscape level monitoring components are designed to detect large-scale changes and potential threats to the integrity of Essential Ecological Processes and Biological Corridors and Linkages. The natural community level monitoring components are designed to detect changes in key Habitat variables related to the Covered Species in Conservation Areas. The species level monitoring focuses on detecting changes in the distribution and abundance of the Covered Species. Each monitoring level is designed to be adaptive so that when better technologies, protocols, or metrics are identified the process allows and encourages their adoption. The levels are also designed to be contextually interactive, so that each level can be meaningfully compared with the others in both space and time.

The Monitoring and Management Programs are designed to: (1) determine if the Plan is achieving its Conservation Goals for the Covered Species and conserved natural communities; (2) specify the primary components of MSHCP Reserve System management; and (3) determine how Adaptive Management strategies will be used and how effective they are to address changes in Habitat condition, natural communities, and/or species status. These changes may be the result of anthropogenic and/or natural forces. The Management and Monitoring Programs focus on identifying changes in identified natural communities and Covered Species condition (numbers, distribution, etc.) and what factors may be causing the identified changes. The data gathered will help identify the thresholds that would trigger when Adaptive Management actions are appropriate and test their efficacy.

8.1.1 Goals and Objectives: Monitoring Program

The Monitoring Program will provide scientifically reliable data on: (1) the status of Covered Species; (2) spatial and temporal dynamics (amplitude and magnitude) of ecosystem components for the Covered plant and animal Species and natural communities; (3) the threats to these species and natural communities; and (4) the results of research on the management of Covered Species. The Monitoring Program will:

1. Establish baseline information on the status of Covered Species and natural communities. Review of the data, literature, historical records, and other data sources may be used to develop hypotheses and models about factors affecting distribution and population size.
    - Use a tiered approach incorporating monitoring questions at different levels, including individual species (populations and metapopulations), natural communities (including Habitat quality for Covered Species), and landscapes (including multiple natural communities) as models indicate there is a biological relationship.
    - Describe the spatial and temporal variation (amplitude and magnitude) in populations of Covered Species.
    - Identify likely threats to each species or natural community. Threats may be identified according to species assemblages and/or based on Habitat affinities (e.g. aeolian sand Habitat assemblage).
    - Gather data on various measurable environmental factors identified in the conceptual models as having a measurable effect on Covered Species.

- Develop and refine models describing species distributions relative to Habitat quality and other parameters with data. Model refinement may include analysis of causal factors related to temporal and spatial annual population fluctuations and the amplitude of those fluctuations.
- Evaluate the extent to which integration of individual species/population and landscape/Habitat quality monitoring can occur.
- Develop monitoring protocols to stay current with accepted methodology as technologies and analytic tools improve. The Plan includes an analysis of monitoring data and a process for changing protocols to address changing needs.
- Identify, develop, and evaluate the extent to which, management practices and policies are sustaining the plant and animal species and natural communities covered under the Plan. This includes the collection and analysis of scientifically reliable data to enable Conservation Area managers to identify threats and to assess the effectiveness of management actions.
- Establish thresholds for changing or modifying management and identify appropriate responses or management practices for statistically and biologically significant changes in populations, communities, and ecological processes.
- Identify, as part of ongoing monitoring efforts, any diseases that may be adversely affecting Covered Species. This information will be shared with the Wildlife Agencies to assist the Wildlife Agencies in developing appropriate responses to disease issues and for identifying appropriate Adaptive Management responses.

2. To ensure all data are collected and stored in a manner that provides open access, authorized release, and communication and transfer to members of the public, local jurisdictions, and state and federal agencies. Transfer of information and data is necessary for policy making, communicating, and implementing all aspects of the Monitoring and Management Programs.
   - Utilize a system for the input, management, storage, accessibility, release, and transfer or communication of monitoring data. Identify who is responsible for data management tasks, including storage, analysis, and transfer. Identify the process for access to and communication of data.

The detailed monitoring protocols will be developed during the first two years of implementation and will be modified based on the baseline data collected during the first baseline phase of monitoring and thereafter as appropriate. Specific descriptions of the potential Monitoring Program for each natural community assemblage and the integration of monitoring and management are presented in Section 8.4.

8.1.2 Goals and Objectives: Management Program

The Management Program will incorporate Adaptive Management, which includes an integrated multidisciplinary approach to addressing management practices, evaluating

management actions, and assessing threats using appropriate experimental approaches at species, community, and landscape levels. The Management Program will:

- Develop a reserve management plan within 3 years of permit issuance and evaluate existing management activities. This plan will delineate cost estimates, staffing needs, and schedules for implementation.
- Use available data to structure a range of alternative response models to address a given threat or stressor affecting a Covered Species or natural community and evaluate these models.
- Incorporate a research component that will be funded and implemented by this Plan. Research needs will evolve over time. Research needs will be revealed by the same process used to evaluate monitoring and management protocols and results, incorporating empirical data and recognition of knowledge gaps.
- Provide a process for implementing Adaptive Management actions, and a means to evaluate the efficacy of these actions.
- Establish an evaluation subcommittee composed at least in part of managers and scientists.

8.2 Management of the MSHCP Reserve System

8.2.1 General Overview

The management of the Reserve Lands will integrate management of Existing and Additional Conservation Lands. The goal of the Management Program is to implement management actions and prescriptions that ensure Conservation of the Covered Species and Natural Communities within the Plan Area. The Management Program will include ongoing Management and Adaptive Management. This section describes the current management of Existing Conservation Lands, new or changed management actions for both Existing and Additional Conservation Lands and the Adaptive Management framework for these lands. The design of Adaptive Management strategies will include the use of conceptual models. Additional discussion of management for Covered Species and Natural Communities is included in Section 8.4.

8.2.2 Organizational Structure

Section 6.0 describes the organizational structure for Plan implementation, including the implementation of the Management Program. Responsibilities for specific activities associated with reserve management are divided amongst the Reserve Management Oversight Committee (Section 6.1.3), the Land Manager (Section 6.1.5), and the Reserve Management Unit Committees (Section 6.1.4). The specific responsibilities of each of these entities are detailed in the identified sections. Their responsibilities include facilitating consistent and continuing

exchange of information among all individuals and committees involved in reserve management and monitoring.

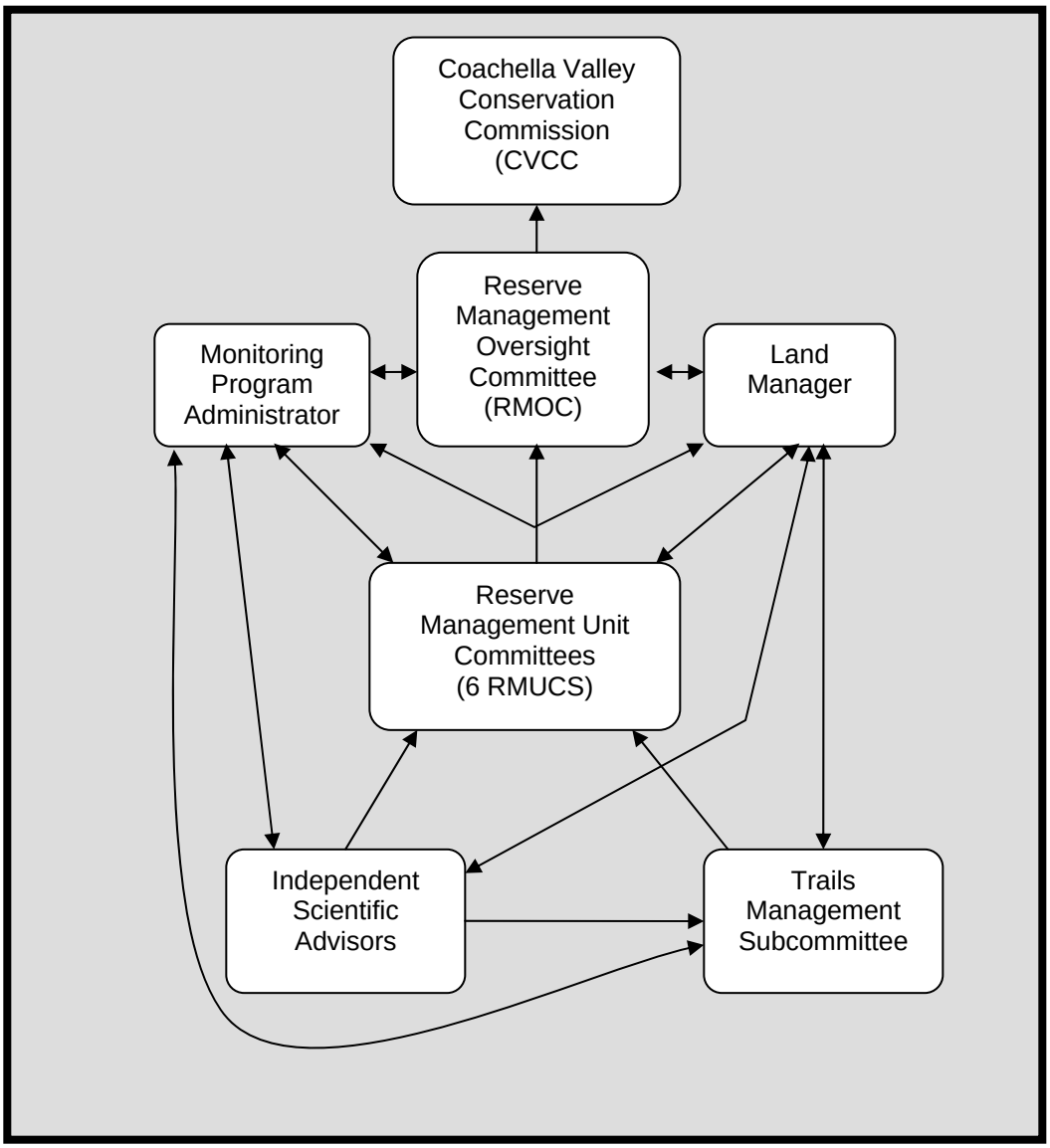
The Monitoring Program Administrator (MPA) (Section 6.1.6) is responsible for coordinating with reserve managers to facilitate the exchange of Monitoring Program data. Likewise, the Land Manager has the responsibility to facilitate the exchange of information regarding all completed and proposed management and Adaptive Management actions. Annual reports are prepared by the Land Manager and MPA and require review by the CVCC, RMOC, and appropriate RMUCs. Section 8.7 describes the elements of the annual reports and the process for review and evaluation of these reports. The organizational structure also provides for input and recommendations from Independent Science Advisors on specific issues concerning scientific aspects of the Plan. Figure 8-1 illustrates the Management Program Implementation process.

The Plan establishes Reserve Management Units (RMUs) to ensure the coordinated management necessary to achieve the Conservation Goals and Objectives. RMUs encompass one or more Conservation Areas, based on Habitat/natural community patterns, land ownership, and similar management needs. Within the RMUs, management obligations under the Plan may vary depending on land ownership or administrating agency. Either a single agency (e.g., the National Park Service for Joshua Tree National Park Conservation Area) or a group of agencies will oversee these RMUs, working together as a Reserve Management Unit Committee (RMUC).

Within three years of Permit issuance the Reserve Management Unit Committees, Reserve Managers, and the Land Manager will develop Reserve Management Unit Plans (RMUPs). The elements of the RMUP are described in Section 6.2. The RMUPs will include ongoing management measures and Adaptive Management actions, schedules, and responsibilities for implementation. The RMUP will include recommendations for public access and uses based on assessment of compatibility with resource protection objectives.

Pursuant to the Monitoring, Management, and Adaptive Management measures to be implemented under the Plan, the Land Manager and RMUCs, in coordination with the Monitoring Program Administrator (MPA), will prepare annual work plans for management and adaptive management priorities, actions, and funding to be conducted on an annual basis (see Sections 6.1.4 and 6.1.5). The MPA, in coordination with the Land Manager, RMUCs, and RMOC, will prepare a three- to five-year projected work plan and budget, as described in Section 6.1.6. The first annual work plans will be prepared within six months of Permit issuance. The RMOC, which includes the Wildlife Agencies, will provide review and oversight of these plans and then submit the plans to the CVCC for budget approval. The Reserve Management Unit plans will provide specific on-the-ground guidance for the Reserve Manager, MPA, and cooperating agencies. The first Reserve Management Unit plans shall be prepared, reviewed, and approved within three years of Permit issuance. The elements of this plan are described in Section 6.2. As needed, or every 5 years, the RMOC may empanel a group of Independent Science Advisors (ISAs), which will, in coordination with the MPA, provide scientific expertise and recommendations on specific reserve management and monitoring issues.

Figure 8-1: Organizational Structure and Decision Process for Monitoring and Management Programs



This framework follows the adaptive resource management approach (Holling 1978, Walters 1986, Kendall 2001) which involves development of objectives, conceptual models of system dynamics, a Monitoring Program, and changes to management based on monitoring results. This approach emphasizes a collaborative decision-making effort bringing together biologists, biometricians and modelers, resource land managers, and research scientists (Walters 1986, Kendall 2001). In practice, monitoring, ongoing management, and Adaptive Management are interrelated and therefore integrated in this Plan. All management actions have impacts and will be modified, based on monitoring results and regular evaluation. The essence of Adaptive Management is the integration of design, management, and monitoring (Salafsy et al. 2001, Salafsy et al. 2002) to test assumptions systematically in order to adapt and learn.

8.2.3 Current Management of Existing Conservation Lands

Management plans already in place on Existing Conservation Lands will serve as the basis for the management programs for Reserve Lands; these plans will be reviewed for their appropriateness. Current management programs and plans on lands administered by state and federal agencies, Local Permittees, and various non-profit Conservation entities are described below in the context of the six Reserve Management Units designated (See Section 6.1.4) by the Plan. Figure 8-2 depicts the Reserve Management Units and illustrates the extent of Existing Conservation Lands within these units. Figure 8-3 shows the location and boundaries of individual Existing Conservation Lands that occur within these Reserve Management Units, as listed in Tables 8-1 through 8-6. As part of the Plan implementation, land management agencies will coordinate to bring their management programs into conformance with the goals of the Plan for Covered Species and Natural Communities.

Reserve Management Unit 1

This unit consists of Conservation Areas from Cabazon to the East Indio Hills and includes all the aeolian sand natural communities. Table 8-1 identifies the Existing Conservation Lands to be managed as part of this unit and the current organization responsible for its management. The RMUC will consist of the Land Manager, BLM, CDFG, USFWS, USFS, and State Parks, TNC, and CNLM. The USFWS shall be included in the membership of all RMUCs with responsibility over the Conservation Areas in Reserve Management Unit 1 if the boundaries of Unit 1 are changed in the future. The following Conservation Areas are included:

- Cabazon
- Stubbe and Cottonwood Canyons
- Whitewater Canyon
- Snow Creek/Windy Point
- Highway 111/I-10

- Whitewater Floodplain
- Upper Mission Creek - Big Morongo Canyon
- Mission Creek / Morongo Wash
- Willow Hole
- Long Canyon
- Edom Hill
- Thousand Palms
- West Deception Canyon
- Indio Hills/Joshua Tree National Park Linkage
- Indio Hills Palms
- East Indio Hills

The Existing Conservation Lands within this Reserve Management Unit are described below:

Big Morongo Canyon Preserve/Area of Critical Environmental Concern (ACEC). The Big Morongo Canyon Preserve/ACEC is located in the mountains north of the City of Desert Hot Springs. It is situated about equally in the Plan area and in adjacent San Bernardino County. The portion in the Plan area is within the Upper Mission Creek/Big Morongo Canyon Conservation Area. In 1998, the California Desert Conservation Area (CDCA) Plan was amended to expand the ACEC boundary to encompass 29,000 acres to minimize Habitat fragmentation and maintain wildlife corridor links between the San Gorgonio Wilderness to the west and Joshua Tree National Park to the east. The portion of this ACEC in the Plan area includes 13,797 acres, including 9,975 acres federal and 3,822 acres private. Biological resource values in the portion of the ACEC within the Plan area include riparian woodlands, desert dry wash woodland, Habitat for the triple-ribbed milkvetch, Little San Bernardino Mountains linanthus, riparian birds, and possibly desert tortoise. Management objectives and prescriptions include Habitat enhancement, including tamarisk removal, and resource protection through controlling access to appropriate areas. In the BLM CDCA Plan, these lands are classified as Class "L", Limited. The existing Management Plan focuses on riparian bird species and the desert bighorn sheep, and does not include specific management prescriptions for desert tortoise and triple-ribbed milkvetch. The Habitat for these species is protected within the ACEC by the overall management regime.

Table 8-1: Management Entities for Existing Conservation Lands in Reserve Management Unit 1

EXISTING CONSERVATION LANDS	MSHCP CONSERVATION AREAS	MANAGEMENT ENTITY
Oasis de Los Osos Reserve	Snow Creek/Windy Point	❖ University of California Natural Reserve System
Big Morongo Canyon Preserve/ACEC	Upper Mission Creek/Big Morongo Canyon	❖ Bureau of Land Management
Coachella Valley Preserve System ❖ Whitewater Floodplain Preserve	Whitewater Floodplain	❖ Bureau of Land Management ❖ Coachella Valley Water District
❖ Willow Hole/Edom Hill Preserve/ACEC	Willow Hole Edom Hill	❖ Bureau of Land Management ❖ Center for Natural Lands Management ❖ Coachella Valley Mountains Conservancy
❖ Thousand Palms Preserve ❖ Coachella Valley Ecological Reserve	Thousand Palms	❖ Bureau of Land Management ❖ California Dept. of Fish and Game ❖ California State Parks ❖ Center for Natural Lands Management ❖ The Nature Conservancy ❖ US Fish and Wildlife Service
Indio Hills Palms State Park (managed as part of Thousand Palms Preserve)	Indio Hills Palms	❖ California State Parks
Mission Creek Preserve	Upper Mission Creek/Big Morongo Canyon	❖ Wildlands Conservancy
San Gorgonio Wilderness	Cabazon Stubbe and Cottonwood Canyons Whitewater Canyon Upper Mission Creek/Big Morongo Canyon	❖ Bureau of Land Management ❖ US Forest Service
Sky Valley Ecological Reserve	Indio Hills/Joshua Tree National Park Linkage	❖ California Dept. of Fish And Game
Whitewater Canyon ACEC	Whitewater Canyon	❖ Bureau of Land Management

Coachella Valley Preserve System. The 1985 Coachella Valley Fringe-toed Lizard Habitat Conservation Plan established the Coachella Valley Preserve System. The preserve system consists of the Thousand Palms Preserve (within the Thousand Palms Conservation

Area), the Willow Hole-Edom Hill Preserve/ACEC, described separately below (within the Willow Hole and the Edom Hill Conservation Areas), and the Whitewater Floodplain Preserve (within the Whitewater Floodplain Conservation Area). The Thousand Palms Preserve is situated in and immediately south of the central portion of the Indio Hills. It consists of 17,651 acres of BLM, USFWS, CDFG, State Parks, and Center for Natural Lands Management lands. This includes the Coachella Valley Ecological Reserve lands owned by CDFG. A small amount of private land is slated for acquisition pursuant to the HCP. The Willow Hole-Edom Hill Preserve (a large portion of which is a BLM ACEC of the same name) is located at the west end of the Indio Hills and is 2,027 acres in size. Ownership is approximately 1,869 acres BLM, 117 acres Coachella Valley Mountains Conservancy, and 41 acres private land. The Whitewater Floodplain Preserve is located south of Interstate 10 and east of Indian Avenue, and is 1,316 acres of BLM and Coachella Valley Water District land. The preserves are managed to protect and enhance the Habitat of the endangered Coachella Valley fringe-toed lizard. Other species that also occur on the preserves include the Palm Springs ground squirrel, Palm Springs pocket mouse, flat-tailed horned lizard, burrowing owl, Crissal thrasher, least Bell's vireo, southwestern willow flycatcher, yellow warbler, yellow-breasted chat, giant sand-treader cricket, and Coachella Valley milkvetch. Primary management actions range from control of exotic species and limiting public access to compatible scientific, educational, and recreational uses. An extensive and successful tamarisk eradication program has been completed.

Indio Hills Palms (State Parks). This is a 5,758-acre unit of the State Park System in the Indio Hills. The State Park property includes 3,467 acres acquired in the Fan Hill area in 2004. It is managed as part of the Coachella Valley Fringe-toed Lizard Preserve by the Preserve Management Committee, of which State Parks is a member agency. There are several desert fan palm oases within the State Parks property; control of tamarisk shall be undertaken.

Mission Creek Preserve. The Wildlands Conservancy owns a portion of the Mission Creek watershed, adjacent to BLM lands, in the Upper Mission Creek/Big Morongo Canyon Conservation Area. The Wildlands Conservancy manages these lands as the Mission Creek Preserve. Coordination shall occur with the Wildlands Conservancy to achieve Covered Species Conservation Objectives. The Preserve is available for recreational trail use, environmental education, and access to the BLM lands in the San Gorgonio Wilderness Area. The lands within this Preserve are shown generally as Existing Conservation Lands in Figure 8-2; the Preserve boundary is not shown in Figure 8-3.

San Gorgonio Wilderness (BLM). This Wilderness Area includes portions of the Cabazon, Stubbe and Cottonwood Canyon, Whitewater Canyon, and Upper Mission Creek/Big Morongo Canyon Conservation Areas. The BLM portion of the San Gorgonio Wilderness is located in the mountains north of the San Gorgonio Pass area. Much of wilderness is outside the Plan area boundaries. The portion within the Plan area includes approximately 17,232 acres. Ownership is approximately 16,935 acres federal and approximately 297 acres private. Biological resource values include a high level of biodiversity due to the confluence of Mojave Desert, Sonoran Desert, montane, and coastal influences. This wilderness area includes riparian woodlands and Habitat for least Bell's vireo,

southwestern willow flycatcher, and arroyo toad. The terrain is rugged and steeply dissected, with the ecotone providing Habitat for Nelson's bighorn sheep, black bear, golden eagle, prairie falcon, red-tailed hawk, numerous songbirds, and desert tortoise in outlying areas. Visitor use includes day hiking, hunting, and backpacking along the Pacific Crest Trail. The area is managed as Class "C" in the California Desert Conservation Area Plan. The area is managed under the provisions of the 1964 Wilderness Act, the 1994 California Desert Protection Act, and all applicable laws, regulations, and policy.

Whitewater Canyon ACEC. The Whitewater Canyon ACEC is located in the San Bernardino Mountains north of the San Gorgonio Pass, including the Whitewater River canyon. About 29% of the ACEC is situated in San Bernardino County. The portion in the Plan area encompasses approximately 12,448 acres of which approximately 11,622 acres are federal and approximately 826 acres are private. Approximately 75% of the ACEC is within the San Gorgonio Wilderness. The ACEC lands are classified as Class "L," Limited, in the CDCA Plan. Biological resource values in the portion of the ACEC within the Plan area include riparian woodlands, mesquite thickets, a desert fan palm oasis, and Habitat for arroyo toad, and, at least in migration, least Bell's vireo, southwestern willow flycatcher, and other riparian species. Management objectives and prescriptions include Habitat enhancement and protection through controlling access to appropriate areas and monitoring the effectiveness of the Management Program.

Willow Hole - Edom Hill Preserve/ACEC. The Willow Hole-Edom Hill Preserve/ACEC is located in the western Coachella Valley at the west end of the Indio Hills. It consists of two disjunct areas: Willow Hole and Edom Hill, which are two to three miles apart. The ACEC is 2,027 acres in size. Ownership is approximately 1,869 acres federal, 41 acres private, and 117 acres of state lands. The Willow Hole-Edom Hill Preserve/ACEC is also a preserve unit under the Coachella Valley Fringe-toed Lizard Habitat Conservation Plan. The BLM ACEC lands are classified as Class "L," Limited, in the CDCA Plan. Biological resource values include mesquite hummocks, desert fan palm oasis woodland, and Habitat for the Coachella Valley fringe-toed lizard, Coachella Valley milkvetch, Coachella Valley round-tailed ground squirrel, Palm Springs pocket mouse, burrowing owl, Crissal thrasher, and the Coachella Valley giant sand treader cricket. Migrating birds such as the least Bell's vireo, southwestern willow flycatcher, yellow-breasted chat, and the yellow warbler occur at Willow Hole as well. Management objectives and prescriptions include Habitat protection through land acquisition and control of deleterious activities such as off-highway vehicle use. Perimeter fencing limits OHV access.

Sky Valley Ecological Reserve. This reserve is located in the Indio Hills/Joshua Tree National Park Linkage Conservation Area. This reserve consists of approximately 1,763 acres and is managed by CDFG. Biological resource value includes a critical wildlife linkage between Joshua Tree National Park and the existing Coachella Valley Fringe-toed Lizard Preserve, habitat for the desert tortoise, and a movement corridor for species such as coyote, bobcat, and gray fox. Coordination shall occur with CDFG to achieve Covered Species Conservation Objectives.

Reserve Management Unit 2

This unit consists of the Joshua Tree National Park Conservation Area. The RMUC consists of the National Park Service and the Land Manager. Table 8-2 identifies the Existing Conservation Lands to be managed as part of this unit.

Table 8-2: Management Entities for Existing Conservation Lands in Reserve Management Unit 2

EXISTING CONSERVATION AREA	PLAN CONSERVATION AREAS	MANAGEMENT ENTITY
Joshua Tree National Park	Joshua Tree National Park	❖ National Park Service ❖ Wildlands Conservancy (for transfer to NPS)

Joshua Tree National Park. The National Park Service manages Joshua Tree National Park. The Plan area boundary runs along the ridgeline of the Little San Bernardino Mountains to include the southern portion of the National Park. The entire Park comprises approximately 795,000 acres, of which approximately 180,541 acres are in the Plan area. Approximately 11,300 of these acres are, however, private inholdings, leaving 161,300 acres owned and managed by the National Park Service. This portion of the Park includes the transition zone between the Sonoran and Mojave deserts and contains diverse natural communities such as Mojave mixed woody scrub, blackbrush scrub, Mojavean pinyon and juniper woodland, desert dry wash woodland, and desert fan palm oasis woodland. The area provides Habitat for desert tortoise, Le Conte's thrasher, and, at least in migration, such riparian species as least Bell's vireo and yellow warbler. More than ninety-five percent of the lands in the pre-1994 California Desert Protection Act (CDPA) boundaries of the national park are designated wilderness and managed in accordance with the 1964 Wilderness Act to protect and maintain the area in its natural state. The approximately 64,350 acres within the Plan area that the 1994 CDPA added to the park are not wilderness; they are managed for backcountry, non-motorized recreation except on a few designated routes of travel on dirt roads. Approximately 27,000 roadless acres of the addition are recommended for study to determine suitability for wilderness designation. Approximately 33,141 acres of the addition area were privately owned in 1994; the other lands were owned by BLM or the State of California. Acquisition of the private lands from willing sellers has begun, principally by the nonprofit Wildlands Conservancy. To date, approximately 9,300 acres have been acquired. Title to these lands has been, or likely will be, conveyed to the federal government. The National Park lands are adequately managed and protected for the Conservation of the species and natural communities included in the Plan. Three plans have been adopted that are relevant to the portion of the Park within the Plan area. The Land Protection Plan, approved in November 1996, recommends that the National Park Service acquire all lands within the Park boundaries except for certain tracts of land owned by Metropolitan Water District. As mentioned above, the Land Protection Plan proposes acquisition of over 30,000 acres of private lands within the MSHCP/NCCP Plan area. Management related plans include:

1. Joshua Tree National Park General Management Plan. The management goals for the Park are to "manage land and wilderness to preserve them unimpaired for future generations, participate cooperatively in the preservation of ecological units that extend beyond the park boundary, and facilitate cooperative planning throughout the California Desert ecosystem with other public agencies and communities."

2. Backcountry and Wilderness Management Plan. The General Management Plan did not address the land added to the Park by the California Desert Protection Act in 1994. The added land is primarily adjacent to backcountry and wilderness areas and largely undeveloped. The Backcountry and Wilderness Management Plan, which amends the General Management Plan, minimizes disturbance to resources and ensures their preservation unimpaired while affording the public a broad spectrum of recreational enjoyment. The Backcountry and Wilderness Management Plan proposes 2,980 acres of additions to existing wilderness areas within the Plan area and establishes a Wilderness Study Area on approximately 27,000 acres in the Cottonwood Mountains, which is also within the Plan area. These areas will be managed as wilderness until Congress determines whether to designate them wilderness. Small scattered tracts along the Park boundary, totaling less than 500 acres, are designated Special Use Zone to reflect ownership by Metropolitan Water District and rights granted it by Congress in conjunction with the Colorado River Aqueduct. The remainder of the area added to the Park is designated as a Backcountry Transition Subzone, which is zoned for the Conservation of natural resources and processes, even though it is not designated as wilderness. Three dirt roads with a connecting link between two of them, totaling 24.5 miles are open to registered motor vehicles that are legal to operate on public roads in California. The roads are not open to off-highway vehicles. A bicycle trail is also designated. The Plan also implements the Desert Tortoise Recovery Plan, adopting all the management recommendations in the recovery plan for this area, except for fencing Park roads.

Reserve Management Unit 3

This unit consists of the following Conservation Areas in the eastern portion of the Plan area:

- Desert Tortoise and Linkage
- Mecca Hills/Orocopia Mountains Wilderness.

The RMUC for this unit will consist of the Land Manager and BLM.

Table 8-3: Management Entities for Existing Conservation Lands in Reserve Management Unit 3

EXISTING CONSERVATION LANDS	MSHCP CONSERVATION AREAS	MANAGEMENT ENTITY
Mecca Hills Wilderness	Mecca Hills/Orocopia Mountains	❖ Bureau of Land Management
Orocopia Mountains Wilderness	Mecca Hills/Orocopia Mountains	❖ Bureau of Land Management
Chuckwalla Bench ACEC	Mecca Hills/Orocopia Mountains	❖ Bureau of Land Management
BLM Multiple Use Lands (CDCA)	Desert Tortoise and Linkage	❖ Bureau of Land Management

BLM Lands Managed within the California Desert Conservation Area. There are many sections of BLM land in the Desert Tortoise and Linkage Conservation Area. These are multiple use lands. However, these lands are also part of a Desert Wildlife Management Area (DWMA) as designated by the Northern and Eastern Colorado Desert Coordinated Management Plan, approved on December 19, 2002. The DWMA was established in this area to ensure Conservation of desert tortoise Habitat. In addition to desert tortoise Habitat, this area provides extensive areas of desert dry wash woodland, Le Conte's thrasher Habitat, and important Biological Corridor and Linkage areas associated with numerous culverts and under crossings under the I-10 freeway. These Biological Corridors provide an important link from Joshua Tree National Park to the Mecca Hills and Orocopia Mountains to the south. With implementation of the MSHCP, these BLM lands will be managed as part of the Conservation Area.

Mecca Hills Wilderness. The Mecca Hills are located in the northeast portion of the Plan area and encompass 28,544 acres. Ownership is approximately 24,755 federal acres, approximately 2,952 privately owned acres, and approximately 837 acres of state lands. Biological resource values include creosote bush scrub and desert dry wash woodland, two desert fan palm oases, and Habitat supporting Mecca aster and Orocopia sage. Desert tortoises have been observed within the wilderness and surrounding area. This wilderness is known for its striking and colorful faulted and folded geologic formations, resulting from mineralization and activity along the San Andreas Fault. Mazes of small, narrow, steep-walled canyons attract local as well as international visitors. Day hiking is the most popular activity, with commercial jeep touring to the wilderness boundary contributing additional visitor days. The area is managed as Class "C" in the California Desert Conservation Area Plan. The area is managed under the provisions of the 1964 Wilderness Act, the 1994 California Desert Protection Act, and all applicable laws, regulation, and policy. Wilderness management plans have not yet been initiated for wilderness areas designated in the 1994 California Desert Protection Act. The Mecca Hills Wilderness is also addressed in the Northern and Eastern Colorado Desert Coordinated Management Plan (NECO Plan). The Plan is coordinating with the NECO Plan, and the two plans will be consistent.

Orocopia Mountains Wilderness. The Orocopia Mountains are located in the northeast portion of the Plan area, east of and contiguous with the Mecca Hills wilderness. This wilderness encompasses approximately 53,503 acres. Ownership is approximately 42,214 acres federal, approximately 10,014 acres private, and approximately 1,275 acres state lands. Biological resource values include the creosote bush scrub and desert dry wash woodland natural communities and Habitat supporting the Mecca aster and Orocopia sage. Desert tortoises have been observed within the wilderness and surrounding area. This wilderness is comprised of a diverse and varied mountain landform, with open valleys cut by steep and dissected ridges. Visitor use includes hiking, backpacking, and hunting. The area is managed under the provisions of the 1964 Wilderness Act, the 1994 California Desert Protection Act, and all applicable laws, regulations, and policy. Wilderness management plans have not yet been initiated for wilderness areas designated in the 1994 California Desert Protection Act. The Orocopia Mountains wilderness is also addressed in the Northern and Eastern Colorado Desert Coordinated Management Plan (NECO Plan). The Plan is coordinating with the NECO Plan and the two plans will be consistent.

Chuckwalla Bench ACEC. The Chuckwalla Bench was nominated as an Area of Critical Environmental Concern (ACEC) in the California Desert Conservation Plan (CDCA) in 1980. The Chuckwalla Bench Management Plan and Environmental Assessment were signed in September of 1984. The Chuckwalla Bench ACEC includes 12,067 acres. Ownership is approximately 6,745 acres federal, 5,320 acres private, and 2 acres owned by the State Lands Commission. The area was designated as an ACEC for its exceptional desert tortoise densities, the highest in the Sonoran Desert; it is also notable as a rich representative of Sonoran Desert vegetation with a full compliment of wildlife and plant species including several rare plants. Extensive stands of desert dry wash woodland occur within this ACEC. These values could not be adequately managed in small parcels. The ACEC boundary was drawn to include the entire Chuckwalla Bench area so that it could be managed as a system. Management objectives and prescriptions include tamarisk eradication, provision of wildlife water sources, and removal of abandoned mine shafts, after surveys for use of these shafts by bats. Habitat protection would be accomplished through control of vehicle and public access in the ACEC, additional land acquisition and land exchanges, cooperative agreements with private landowners and adjacent military lands, monitoring of species and vegetation, and educating visitors about avoiding impacts to desert tortoise and other sensitive resources.

Reserve Management Unit 4

This unit consists of the Dos Palmas Conservation Area. The following table shows Existing Conservation Lands within this RMU and the management entities involved in current management. The RMUC will consist of the Land Manager, BLM, CDFG, State Parks, and CNLM.

Table 8-4: Management Entities for Existing Conservation Lands in Reserve Management Unit 4

EXISTING CONSERVATION LANDS	MSHCP CONSERVATION AREA	MANAGEMENT ENTITY
Dos Palmas ACEC	Dos Palmas	❖ Bureau of Land Management ❖ Center for Natural Lands Management
Oasis Springs Ecological Reserve	Dos Palmas	❖ California Department of Fish and Game
Salton Sea State Recreation Area	Dos Palmas	❖ California State Parks

Dos Palmas Preserve/ACEC. In 1980, the California Desert Conservation Area Plan designated 2,503 non-contiguous acres as the Salt Creek Desert Pupfish/Rail Habitat ACEC to protect washes, seeps, and springs, which provide Habitat for the federally listed desert pupfish, Yuma clapper rail, and other species. This ACEC was expanded to 4,288 acres in 1984. In 1998, the CDCA Plan was amended again to expand the ACEC to 14,419 acres and to rename the ACEC as the Dos Palmas ACEC. These lands are classified as Class "L," Limited in the CDCA Plan. The Dos Palmas Preserve/ACEC is located in the extreme eastern portion of the Coachella Valley, just south of the Orocopia Mountains. Ownership is approximately 7,078 acres federal, 5,606 acres private, 1,027 acres state and approximately 800 acres belong to the Center for Natural Lands Management. Biological resource values include desert fan palm oasis woodland, desert dry wash woodland, mesquite bosque, stabilized desert sand fields, desert saltbush scrub, desert sink scrub, and freshwater marsh. The area provides Habitat for the desert pupfish, Yuma clapper rail, California black rail, flat-tailed horned lizard, southern yellow bat, and the Palm Springs pocket mouse. Management objectives and prescriptions include Habitat enhancement, including tamarisk removal and creation of additional pupfish Habitat, and Habitat protection through additional land acquisition, cooperative agreements with private landowners, species monitoring, and controlling access to appropriate areas. The existing Management Plan focuses on protecting the entire Dos Palmas ecosystem, thereby providing generally for the Conservation of the species and natural communities included in the Plan that occur at Dos Palmas.

Oasis Springs Ecological Reserve (CDFG). This 494-acre ecological reserve, all in state ownership, is located east of the Salton Sea near Salt Creek. It was designated in 1984 to protect desert pupfish Habitat in three ponds fed by artesian wells. The reserve is within the boundaries of the Dos Palmas Preserve/ACEC. A Management Plan was prepared in 1992. Management recommendations include protecting and enhancing the existing aquatic Habitat and enhancing other Habitats to increase biological diversity.

Salton Sea State Recreation Area. The State Recreation Area is a unit of the State park system and as such, its primary purpose is the protection and enhancement of the natural resources, including Habitat for the Yuma clapper rail and desert pupfish. There is also the potential for flat-tailed horned lizard, several bat species, and Orocopia sage to occur on these

state lands. A great variety of waterfowl, shorebirds, raptors, and other water related birds use the area. Consistent with the protection of these resources, the State Recreation Area also provides recreation and interpretive/ education opportunities, including camping and fishing facilities. Management activities include a non-native species eradication program.

Reserve Management Unit 5

This unit consists of the Coachella Valley Stormwater Channel and Delta Conservation Area. The only existing Conservation lands within this Conservation Area are BLM lands without a specific management designation. The remaining lands are either Coachella Valley Water District or private. The RMUC consists of the Land Manager and BLM.

Table 8-5: Management Entities for Existing Conservation Lands in Reserve Management Unit 5

EXISTING CONSERVATION LANDS	MSHCP CONSERVATION AREA	MANAGEMENT ENTITY
BLM Multiple Use Lands (CDCA)	Coachella Valley Stormwater Channel and Delta	❖ Bureau of Land Management

BLM Lands Managed within the California Desert Conservation Area. There are scattered parcels of BLM land in the Coachella Valley Stormwater Channel and Delta Conservation Area totaling approximately 389 acres. These are multiple use lands. With implementation of the MSHCP, these lands will be managed as part of the Conservation Area.

Reserve Management Unit 6

This unit consists of the Santa Rosa and San Jacinto Mountains Conservation Area. The RMUC consists of the Land Manager, BLM, CDFG, State Parks, CVMC, UCNRS, USFS, and the Chair of Trails Advisory Subcommittee to the Monument Advisory Committee.

Carrizo Canyon Ecological Reserve (CDFG). This ecological reserve is located in the Santa Rosa Mountains, adjacent to Highway 74, and is within the Santa Rosa Mountains Wildlife Management Plan area. It consists of approximately 1,040 acres, all in state ownership. The California Fish and Game Commission designated this reserve following the listing of the Peninsular bighorn sheep as a rare species in 1972. The primary purpose of the reserve is to protect vital bighorn water sources and a lambing area. A draft Wildlife Management Plan was prepared in 1977. The draft plan emphasized controlling vehicular access and regulating human use of the reserve to ensure compatibility with bighorn sheep use. This plan was adopted jointly by CDFG and BLM in 1980.

Garner Management Area (USFS). The Garner Management Area encompasses 22,350 acres south of the San Jacinto Wilderness. Less than 1,000 acres are within the Plan area, the remainder is on the side of the ridgeline outside the Plan area. The portion within the

Plan area is exceptionally rugged and is all publicly owned. The Pacific Crest Trail is located on the ridgeline, which forms the boundary of the Plan area. The lands within this management area are shown generally as Existing Conservation Lands in Figure 8-2; the boundary of this area is not included in Figure 8-3.

Hidden Palms Ecological Reserve (CDFG). This ecological reserve is located in the Santa Rosa Mountains adjacent to Highway 74, and is within the Santa Rosa Mountains Wildlife Management Plan area. It consists of approximately 156 acres, all in state ownership. The California Fish and Game Commission designated the reserve in 1974 to protect the only confirmed Habitat of the desert slender salamander, a state and federally listed endangered species. Secondarily, the reserve provides Habitat for the Peninsular bighorn sheep. An Operations and Maintenance Schedule/Plan was developed in 1988. The management objectives articulated in the plan include ensuring the long-term stability of water supply and water quality to Hidden Palms Canyon; protecting the reserve from intrusion by hikers, campers, vandals, or collectors; and ensuring the survival of the sensitive plants and palm oasis woodland Habitats in the reserve and its watershed. This plan was adopted by CDFG and BLM in 1980.

Magnesia Spring Ecological Reserve (CDFG). This ecological reserve is located in the Santa Rosa Mountains immediately south of Rancho Mirage. It consists of approximately 1,167 acres, all in state ownership. The California Fish and Game Commission designated the reserve following the listing of the Peninsular bighorn sheep as a rare species in 1972. The primary purpose of the reserve is to protect and rehabilitate Habitat and a vital water source for bighorn sheep. The reserve also provides potential Habitat for seven bat species. An Interim Management Plan was prepared in 1989. Recreational use of the area is to be regulated to avoid impacts to the bighorn sheep.

Mount San Jacinto State Park (State Parks). This state park lies in the high elevations of the San Jacinto Mountains. The federal San Jacinto Wilderness area managed by the U.S. Forest Service is located both north and south of the State Park. Approximately 9,700 acres of the State Park are within the Plan area. Of this acreage, approximately 7,006 acres are designated as wilderness. The remainder is not classified as wilderness because of the presence of the Palm Springs Aerial Tramway facilities. The portion of the wilderness in the Plan area includes the high peaks of the San Jacinto Mountains, including 10,802-foot San Jacinto Peak, and some of the steepest, most rugged terrain in the continental United States. The northern escarpment plunges nearly two miles in steep cliffs and ridges to the San Gorgonio Pass below. Snowmelt infiltrating into the permeable soils at the higher elevations is an important source of water for springs at lower elevations. Runoff is also an important source of water for Snow Creek, Falls Creek, Willow Creek, and Tamarack Creek within the Plan area. Natural communities found within the State Park include Westside ponderosa pine forest, Southern California subalpine forest, Sierran mixed coniferous forest, black oak forest, interior live oak chaparral, and southern sycamore-alder riparian woodland. The Peninsular bighorn sheep may occasionally utilize the lower portions of the State Park. Only the lower portions of the State Park are included in the Santa Rosa and San Jacinto Mountains Conservation Area. There is potential for the California red-legged frog and the mountain yellow-legged frog to occur in the Park. The wilderness is among the most frequently visited

wilderness areas in the nation because of its accessibility by the tram and via hiking trails from the Idyllwild area.

In 1985, the Resources Agency approved the Mount San Jacinto Wilderness Management Plan. Its focal point is maintaining opportunities for wilderness solitude and protecting natural resources. A wilderness permit system is enforced to manage the number of visitors to maintain a use rate within the carrying capacity of the area's natural resources. Camping is allowed only in designated zones or campgrounds. No open wood fires are permitted. Resources are monitored for impacts and overuse, and facilities are relocated and use areas closed as needed to alleviate impacts. Restoration activities are also undertaken as feasible. A new general management plan for the park is currently being prepared.

Oasis de los Osos (UCNRS). This is a 160-acre site at the base of the San Jacinto Mountains west of Palm Springs. It contains southern sycamore-alder riparian woodlands, interior live oak chaparral, semi-desert chaparral, and Sonoran creosote bush scrub. A year round stream and waterfall attract some unauthorized trespass but the area receives relatively little use. University Natural Reserve system staff occasionally monitor the reserve but there is no on-site management presence.

Table 8-6: Management Entities for Existing Conservation Lands in Reserve Management Unit 6

EXISTING CONSERVATION LANDS	MSHCP CONSERVATION AREAS	MANAGEMENT ENTITY
BLM Wilderness Areas ❖ Santa Rosa Mountains Wilderness Area	Santa Rosa and San Jacinto Mountains	❖ Bureau of Land Management
USFS Wilderness Areas ❖ San Jacinto Wilderness Area ❖ Santa Rosa Wilderness Area	Santa Rosa and San Jacinto Mountains	❖ US Forest Service
USFS Special Management Areas ❖ Garner Management Area ❖ Pyramid Peak Planning Area ❖ Pinyon Management Area	Santa Rosa and San Jacinto Mountains	❖ US Forest Service
Santa Rosa and San Jacinto Mountains National Monument	Santa Rosa and San Jacinto Mountains	❖ Bureau of Land Management ❖ US Forest Service ❖ Cooperative Management involves Agua Caliente Band of Cahuilla Indians, CDFG, California State Parks, local cities, CVMC
State Ecological Reserves ❖ Carrizo Canyon Ecological Reserve ❖ Hidden Palms Ecological Reserve ❖ Magnesia Spring Ecological Reserve	Santa Rosa and San Jacinto Mountains	❖ California Department of Fish and Game
Santa Rosa Mountains Wildlife Area	Santa Rosa and San Jacinto Mountains	❖ California Department of Fish and Game
Fish and Game District 4D (Game Refuge)	Santa Rosa and San Jacinto Mountains	❖ California Department of Fish and Game
Mount San Jacinto State Park/State Park Wilderness	Santa Rosa and San Jacinto Mountains	❖ California State Parks
University of California (UC) Philip Boyd Deep Canyon Desert Research Center	Santa Rosa and San Jacinto Mountains	❖ University of California Natural Reserve System
Rancho Mirage Conservation Easement	Santa Rosa and San Jacinto Mountains	❖ City of Rancho Mirage ❖ Coachella Valley Mountains Conservancy

Philip L. Boyd Deep Canyon Desert Research Center (UCNRS). Deep Canyon, as the Research Center is known locally, is located in the Santa Rosa Mountains, south of Palm Desert and east of Highway 74. It consists of 6,175 acres, all state owned. Cooperative use agreements on adjacent federal land cover an additional 10,400 acres. Biological resources include riparian woodland, desert dry wash woodland, Sonoran mixed woody and succulent scrub, and peninsular juniper woodland and scrub, and Habitat for Peninsular bighorn sheep and various bat species. Deep Canyon is open only to qualified users for teaching and research purposes.

Pyramid Peak Planning Area (USFS). The Pyramid Peak Management Area is located east of the Garner Management Area and northwest of the Pinyon Management Area. It covers 18,450 acres; the U.S. Forest Service manages approximately 15,390 acres, and approximately 3,060 acres are private. The entire Pyramid Peak Planning Area is within the Plan area, and forms part of the watershed of Palm Canyon. Biological resources include semi-desert chaparral, redshank chaparral, scrub oak chaparral, interior live oak chaparral, peninsular juniper woodland and scrub, and a small area of Habitat for the peninsular bighorn sheep. The Pacific Crest Trail traverses the western edge of the planning area. One grazing allotment occurs within the management area. Management systems and techniques, including fencing and water developments, are applied as needed to obtain relatively uniform livestock distribution and plant use and to maintain plant vigor. No attempt is made to maximize livestock forage production. Much of the area is highly rugged terrain and relatively inaccessible. The area was previously proposed for wilderness designation, but it was not so designated. Management emphasizes non-motorized recreation, range, and wildlife. Pursuant to a settlement agreement, the Forest Service has already agreed to eliminate cattle grazing in bighorn sheep Habitat. The lands within this planning area are shown generally as Existing Conservation Lands in Figure 8-2; the boundary of this area is not included in Figure 8-3.

Pinyon Management Area (USFS). The Pinyon Management Area is located west of the Santa Rosa Wilderness. It covers 24,870 acres, of which the U.S. Forest Service manages approximately 12,850 acres, and approximately 12,020 acres are private. All of it is within the Plan area. Biological resources include semi-desert chaparral, redshank chaparral, peninsular juniper woodland and scrub, and Habitat for the gray vireo and, in part, for the peninsular bighorn sheep. Rural residential communities, including Pinyon Flats, occupy a portion of the area. There are some mining claims in the area and a Forest Service campground. Highway 74 traverses the management area. Primary public use of Forest Service lands is for dispersed recreation. There are four management emphasis zones in this planning area: "watershed" applies to 6 0% of the area, "wildlife" to 15%, "custodial" (managed to protect existing facilities and resources, including wildlife) to 15%, and "recreation" to 10%. Prescribed burning and other treatments will be used on approximately 20% of the chaparral to enhance wildlife Habitat and range conditions. Under the Plan, the Forest Service will need to adopt management prescriptions to address the Conservation of the gray vireo and its Habitat. Pursuant to a settlement agreement, the Forest Service has already agreed to eliminate cattle grazing in bighorn sheep Habitat. The lands within this management area are shown generally as Existing Conservation Lands in Figure 8-2; the boundary of this area is not included in Figure 8-3.

Rancho Mirage Conservation Easement. These existing Conservation lands include approximately 1,200 acres owned by the City of Rancho Mirage with a Conservation easement held by the Coachella Valley Mountains Conservancy. The lands within this Conservation easement are shown generally as Existing Conservation Lands in Figure 8-2; the boundary of this area is not included in Figure 8-3.

San Jacinto Wilderness (USFS). The San Jacinto Wilderness is in the San Jacinto Mountains southwest of the Coachella Valley and comprises 32,850 acres, of which approximately 28,558 acres are estimated to be in the Plan area. This wilderness is split into two units, one north, and one south of the Mt. San Jacinto Wilderness State Park. Ownership is approximately 27,078 acres federal, 637 acres water district (Desert Water Agency), and 843 acres of private lands. The northern unit is made up largely of the escarpment of San Jacinto Peak, some of the steepest and most rugged terrain in the nation. The southern unit includes the rugged headwaters of Andreas and Murray canyons and other desert canyons emanating from the ridgeline of the San Jacinto Mountains. The ridgeline is also known as the "Desert Divide" and forms the boundary of the Plan in this area. The Pacific Crest Trail follows the ridgeline through much of the wilderness, eventually descending in the Snow Creek area to cross under Interstate 10 to the San Bernardino Mountains. With the exception of a small amount of potential Habitat for the riparian birds, the San Jacinto Wilderness does not provide Habitat for the Covered Species. Biological resources include diverse natural communities. Management direction is to maintain long-term health and vigor, species diversity, and watershed stability, based on the regenerative potential of vegetation. Wilderness status provides access only for equestrians and pedestrians. There are no adopted fire management objectives for this area, nor is there a separate wilderness management plan. Under the San Bernardino National Forest Land and Resource Management Plan, wilderness is managed to provide for recreation opportunities, while maintaining wilderness resource values at a near pristine level.

Santa Rosa Mountains Wildlife Area (CDFG). In addition to the three ecological reserves in the Santa Rosa Mountains described above, the Department of Fish and Game also owns and manages approximately 24,880 acres of lands in the Santa Rosa Mountains as part of the Santa Rosa Mountains Wildlife Area. The Fish and Game Commission can establish regulations for the management of these lands.

Fish and Game District 4D. Lands from Palm Canyon east to La Quinta are designated as Fish and Game District 4D (Game Refuge). This includes all lands, public and private, within a described area from approximately the corner of Highway 111 and Highway 74 west to Palm Canyon, south along Palm Canyon to Omstott Creek, then southeast to Highway 74, south to include much of Horsethief Canyon, then north to Washington Avenue (old Marshall Street) in La Quinta, continuing north to Highway 111 and west to Highway 74. The game refuge was designated by the state legislature. It is illegal to take or possess any bird or mammal, or to be in possession of weaponry, such as firearms and bow and arrows, within the refuge, except under a permit or specific authorization. Thus, functionally, the refuge provides Habitat protection for all wildlife species on state lands within the game refuge.

Santa Rosa Wilderness (BLM). The BLM managed Santa Rosa Wilderness is located in the mountains south of the Coachella Valley. A portion of the wilderness is outside the Plan area. The portion within the Plan area encompasses approximately 68,216 acres, ownership of which is approximately 44,427 acres federal, approximately 8,886 acres private, and approximately 14,903 acres state lands. Resource values include Habitat for peninsular bighorn sheep, possibly for the desert slender salamander, and for many bat species. The steep, rugged wilderness contains diverse Habitats that range from creosote bush scrub to desert fan palm oasis woodland to pinyon-juniper woodland and mixed conifer forest; these Habitats support mountain lion, bobcat, gray fox, coyote, ringtail, great horned owl, prairie falcon, and golden eagle. Visitor use includes day hiking on the Boo Hoff Trail and backpacking on the Cactus Springs Trail, which enters the adjacent U.S. Forest Service's Santa Rosa wilderness (See management discussion under San Gorgonio Wilderness, above). The area is managed under the provisions of the 1964 Wilderness Act, the 1994 California Desert Protection Act, and all applicable laws, regulations, and policy. Wilderness management plans have not yet been initiated for wilderness areas designated in the 1994 California Desert Protection Act. The wilderness is also included in the Santa Rosa and San Jacinto Mountains National Monument designated in October 2000. The area will continue to be managed as wilderness under the national monument designation.

Santa Rosa Wilderness (USFS). The Santa Rosa Wilderness lies in the Santa Rosa Mountains south of the Coachella Valley. The wilderness is 20,160 acres in extent, all but a few hundred acres of which are in the Plan area. Ownership is 19,313 acres federal and approximately 237 acres private lands. Biological resource values include diverse natural communities such as Sonoran mixed woody and succulent scrub, peninsular juniper woodland and scrub, and Jeffrey pine forest. They also include Habitat for the peninsular bighorn sheep and gray vireo. The wilderness also includes the upper portion of the Deep Canyon watershed (see Section 2.5.7). To the north, east, and south, this wilderness is contiguous with the BLM Santa Rosa Mountains Wilderness. Public use is generally centered on the Cactus Springs Trail. Management direction is generally the same as for the San Jacinto Wilderness except that appropriate areas of the Santa Rosa Wilderness are to be managed for protection of the peninsular bighorn sheep in coordination with CDFG and BLM. There are no adopted fire management objectives for this area, nor is there a separate wilderness management plan. Under the San Bernardino National Forest Land and Resource Management Plan, wilderness is managed to provide for recreation opportunities, while maintaining wilderness resource values at a near pristine level. Under the Plan, the Forest Service will need to adopt management prescriptions to address the Conservation of the gray vireo and its Habitat. Pursuant to a settlement agreement, the Forest Service has already agreed to eliminate cattle grazing in bighorn sheep Habitat.

Santa Rosa and San Jacinto Mountains National Monument (BLM/USFS). This new national monument includes BLM and U.S. Forest Service lands in the Santa Rosa and San Jacinto Mountains. Much of the area south of Highway 74 is also within the Santa Rosa Mountains Wilderness. The Santa Rosa and San Jacinto Mountains National Monument includes a total of 150,800 acres of federal land, including 86,400 acres of BLM land and 64,400 acres of National Forest land. Also included within the boundary, but not affected by the federal designation, are 31,400 acres of Agua Caliente Band of Cahuilla Indians land, 43,000 acres of state lands (California State Parks, University of California, California

Department of Fish and Game, Coachella Valley Mountains Conservancy), and 55,200 acres of private land. The U.S. Forest Service and the BLM are partners in the management of this national monument, including the preparation of a management plan within three years, to ensure protection of the resource values that the Monument was created to protect. The draft Monument Plan was released in March 2003 and a final plan was issued in October 2003. The BLM lands are classified as Class "L," Limited, in the CDCA Plan. A citizen's advisory committee, the Monument Advisory Committee (MAC) is involved to help guide management of the monument. As part of their implementation responsibilities under the Plan, BLM and the U.S. Forest Service would ensure consistency between the national monument management plan and the Coachella Valley Multiple Species Habitat Conservation Plan/Natural Communities Conservation Plan.

8.2.4 Proposed Management

The implementation of management actions for Reserve Lands will integrate management of Existing Conservation Lands with Additional Conservation Lands. This section describes a framework for development of proposed management prescriptions, a process for their evaluation, and implementation of Adaptive Management actions on Reserve Lands. Management actions are subject to the Adaptive Management approach in that they will be evaluated and modified based on feedback from the Monitoring Program. However, some general management actions, or ongoing management actions, have already been identified as necessary for the integrity of the ecosystems, and the Covered Species and natural communities they protect and will be included in the Reserve Management Unit Plans. These ongoing management actions are described below. Section 8.4 includes specific discussion of management of natural communities.

The Reserve Land Manager, the public or private land management agency, and/or the Reserve Management Unit Committees with input from the Reserve Management Oversight Committee, will initiate proposed management actions that are identified on the Reserve Lands. While each agency with land ownership within the Conservation Areas will have ultimate responsibility for managing its land, implementation of the Plan will reinforce the existing close coordination and cooperation in management of reserve areas. This coordinated management approach also incorporates feedback from the Monitoring Program.

8.2.4.1 General Ongoing Management

Within the Reserve Lands, ongoing management actions will include:

1. Control of Habitat disturbance from unauthorized OHV use or vehicle trespass by installation of signage, fencing, and gates; patrolling; law enforcement; installation of barriers.
2. Prevention of Habitat disturbance from unauthorized dumping, including removal of non-organic debris and installation of barriers, gates, and fences.

3. Control of disturbance from sand and gravel mining, road widening, illegal berming, and drainage diversions that may in the future, affect the structure and function of wash and canyon Habitats.

4. Control of non-native or invasive species.

    a. Control of tamarisk. Tamarisk is an exotic pest plant that competes with native species and reduces the Habitat value for Covered Species including Peninsular bighorn sheep, least Bell's vireo, and other riparian birds. A program to control tamarisk has already been implemented in many areas on Existing Conservation Lands (Thousand Palms Preserve, Dos Palmas Preserve/ACEC, Carrizo Canyon Ecological Reserve, and Deep Canyon Desert Research Center in the Santa Rosa and San Jacinto Mountains Conservation Area). This invasive species control project is considered ongoing management because the need for tamarisk eradication and the techniques to accomplish it have already been determined.

    b. Control of cowbirds in riparian areas. Surveys done for the Monitoring Program in spring 2003 determined that cowbirds are present in all areas where riparian birds nest. Methodologies for cowbird control are well established and will be implemented in riparian Habitat areas when needed.

    c. Control of bullfrogs, crayfish, and exotic fish species that may adversely impact rail, arroyo toad, and pupfish.

        (1) For the pupfish, measures identified in Section 9.4.1.2 shall be implemented to control exotic fish species.

        (2) If control of crayfish in Yuma clapper rail habitat within Conservation Areas is necessary for any reason, the establishment of other suitable prey for the Yuma clapper rail shall be evaluated by the CVCC, CDFG, and the USFWS consistent with Section 9.7.1.2.

    d. Control of other species that may adversely impact Covered Species or natural communities.

5. Ensure the compatibility of activities, and any restrictions on those activities, allowed within Conservation Areas with the Conservation of species, Habitats, natural communities, and their associated ecological functions.

6. Maintain active and intact hydrological regimes in Conservation Areas to retain sand transport systems, other Essential Ecological Processes, and Habitat features for Covered Species and natural communities.

7. Maintain and manage wetland Habitats, which provide Habitat for riparian birds and other Covered Species on Reserve Lands, to ensure no net loss, including for the remaining acreage of the natural communities where disturbance is authorized by the Plan. This applies to mesquite hummocks, marsh, and riparian natural communities.

8. Only utilize pesticides or other toxic chemicals when absolutely necessary to carryout management actions identified in the Management Plans or as part of an Adaptive Management action.

9. Restrict human access to unoccupied Habitat during the emergence period for Covered insect Species and during the breeding and nesting season for other species.
10. Grazing should only be used as a response to an Adaptive Management plan.
11. Prevent poaching or illegal collection of Covered Species and other desert organisms including reptile and cactus species.
12. To the extent activities are under Plan authority, maintain water levels, water quality, and proper functioning condition of seeps, springs, marshes, and wetlands.
13. Conserved populations of Covered Species shall be protected from edge effects, from OHV impacts, and from any activities that may result in disturbance to them.
14. If the USFWS or CDFG provides written notice to the CVCC or Local Permittee that Peninsular bighorn sheep are using artificial sources of food or water in unfenced areas of existing urban Development within or near a Conservation Area, the CVCC (unless otherwise agreed to by the applicable Local Permittee) shall cause to be constructed a barrier to sheep access to cure the problem within 2 years of such notice. The location of this barrier (i.e., an 8-foot fence or functional equivalent) shall be determined by CVCC based on its ability to obtain permission/access to the necessary lands. If placement of a barrier must occur on other public lands (e.g., BLM, CDFG), CVCC will coordinate with these other agencies as appropriate.
15. Should a bighorn sheep subgroup population (as determined by the recovery team) drop below five or fewer ewes due to unknown cause-specific mortality, a temporary moratorium on all non-emergency discretionary Covered Activities will be instituted in the subgroup area. The RMOC will review data and determine appropriate follow-up management action.

These management activities will be implemented on Reserve Lands and the RMOC will work with the federal land managers in the Plan Area to implement similar measures on their lands. These management actions will be evaluated to determine their efficacy for helping meet the Conservation goals for Covered Species. Ongoing management activities such as Habitat perimeter fencing and signing may need to be evaluated through the Monitoring Program.

An initial baseline assessment of newly acquired lands will be undertaken within the first three years of their addition to the MSHCP Reserve System. The baseline assessment will include a general characterization of existing Habitat conditions, species presence and diversity, presence of threats, and general identification of management issues. The assessment will be included in the Monitoring Program database and provided to the RMOC. Existing baseline data will be used for the Existing Conservation Lands and will be augmented by new data collected in the Monitoring Program.

8.2.4.2 Management Contingency Fund

The CVCC will establish a $5 million dollar management contingency fund as a subset of the Monitoring and Management Program budgets. The purpose of this fund is to

provide the ability to address immediate and/or large-scale Monitoring and Management Program needs on Permittee lands. As described in Section 6.6.3, state and federal agencies are responsible for addressing these contingencies on their lands. The management contingency fund will be established within the first ten years. This fund shall be used when monitoring results and/or other information indicate that corrective actions to address these management priorities are needed to achieve the goals and objectives for Covered Species. The process for determining specific expenditures from this fund will involve identification of needs, a work plan with actions necessary to address them, and a budget by the Land Manager and the appropriate RMUC(s). These recommendations will be reviewed by the RMOC. The RMOC will make recommendations to the CVCC; a decision will by made by the CVCC with concurrence from the Wildlife Agencies. These actions will be designed, implemented, monitored, and revised based on the best available science and an Adaptive Management approach. Management needs to be addressed by use of this Fund are those that are impacting the sand dependent Covered Species, in particular Coachella Valley fringe-toed lizard, Coachella Valley milkvetch, flat-tailed horned lizard, and Coachella Valley round-tailed ground squirrel.

8.2.4.3 Adaptive Management

Adaptive management was pioneered by Holling (1978) and has since become both a popular and controversial (Johnson 1999) component of Conservation strategies. In its simplest form, Adaptive Management is "learning by doing" (Walters and Holling 1990). More specifically, Adaptive Management is the application of the scientific method to management strategies. It requires the development of management objectives and a formal recognition of uncertainties surrounding management decisions. A key element of Adaptive Management is the establishment of testable hypotheses linked to the conservation strategies and their biological objectives (USFWS, HCP Handbook 1996). The hypotheses are tested with the commencement of the management options, results are quantified and analyzed, and uncertainty reduced. Hypotheses are restated, and the process repeated until goals are met or uncertainty reduced sufficiently. The Plan will utilize Adaptive Management strategies as applicable throughout the Reserve System.

Adaptive Management can range from an experimental approach which involves monitoring response of identified factors to a treatment where a control area is also evaluated to a broader view where monitoring is conducted within the context of hypothesis testing (Walters and Holling 1990, Holling 1999, Johnson 1999) to determine the effect of management. Hypotheses are proposed based on insights derived from conceptual models.

The Management Program will address management uncertainty, including the following issues:

1. Management action as indicated by the results of the Monitoring Program in regard to unanticipated changes in the needs of individual species or groups of species, or natural communities, or processes including fluvial and aeolian transport and sorting of sand.
2. Reserve and species management techniques and actions.

3. Enhancement of the Conservation values of lands in the MSHCP Reserve System.
4. Management actions to address Changed Circumstances as described in Section 6.8.3.

Figure 8-4 illustrates the integration of the Monitoring and Management Programs, including Adaptive Management. Linking the Monitoring Program with Adaptive Management actions will inform reserve managers of the status of Covered Species, natural communities, and Essential Ecological Processes, as well as the effectiveness of management actions, in a manner that provides data to allow informed management actions and decisions. Existing information about Covered Species life history and natural community and ecosystem function, together with current understanding of likely responses to management actions and pressures (i.e. stressors, causes of change) will be used extensively in designing the initial Management Program for each Conservation Area. For example, the impacts of unrestricted off-highway vehicles have been sufficiently identified (Lukenbach and Bury 1983) and the means for restricting vehicle trespass have been identified and evaluated. Identified off-highway vehicle control measures will be incorporated into the Reserve Management Unit Plans. These measures will still be evaluated to determine the response of Covered Species and natural communities from their implementation.

In this example, the need for additional knowledge is relatively low compared to the known severity of impacts and therefore management actions would be initiated without delay. This end of the Adaptive Management spectrum is sometimes referred to as "passive adaptive management" (Walters and Holling 1990). Other ongoing management actions might also fit under this description.

Where "new" information is required or desired about the nature of a threat, "active adaptive management" (Walters and Holling 1990) may be appropriate. Management activities about which there is uncertainty regarding application or outcomes should be designed as experiments to increase understanding of the system and the effectiveness of management (Atkinson et al. 2004). In this scenario, clear hypotheses are developed and tested to determine if the null hypothesis should be rejected. When the viability of natural communities and Covered Species are threatened, Adaptive Management actions must be implemented to eliminate or control those perturbations. For previously untested active management strategies, an experimental approach will be used. Control of an invasive species, or other management actions, may have non-target impacts and so need to be developed carefully with a rigorous experimental design. For instance, not all exotic organisms have a negative impact on natural systems. Alternatively, exotic ant infestations appear to have negative impacts that cross several trophic levels (Suarez et al. 1998).

Figure 8-5 depicts the Adaptive Management process. The first step in the development of an Adaptive Management approach is to explicitly state the Conservation Goals and Objective to be achieved. Next, uncertainty in ecological system function is captured as hypotheses, which may be stated as either mathematical or conceptual models, using best available information and Monitoring Program results. Conceptual models can help identify and develop hypotheses about potential stressors, knowledge gaps, or other sources of uncertainty. Using models, predictions can be made about how each stressor or management option will impact the Covered Species, natural communities, and associated ecological

processes. Each model is evaluated to identify a conservation strategy, followed by an implementation approach involving management actions and monitoring. Monitoring measures change in response to management actions. Once data are collected, and the findings are analyzed, the model can be updated incorporating the new data. If the Conservation Objectives were not obtained by the Adaptive Management action(s) the process becomes iterative. Models with little empirical support may be excluded from future consideration, and new models may be added as ecological learning occurs.

An active Adaptive Management strategy utilizes an experimental approach to address the need for new knowledge about the nature of a threat, or the affect of a variable, or a new active management strategy or to reduce uncertainty about an ecological question. Active Adaptive Management strategies need to be considered carefully. Within a multiple species Conservation strategy, Habitat manipulations that are designed to enhance a particular species could easily have detrimental impacts to other species; these impacts may include direct interactions among species. For example, there is substantial overlap between the various aeolian sand species, and in a natural, dynamic site, species will select the areas most favorable for meeting their ecological requirements. However, if reserve managers (or natural stochastic processes) manage for a static system which does not provide for variability in the aeolian Habitat certain species may thrive while others do not. Adaptive Management objectives will be carefully crafted such that the individual species objectives for sympatric species are jointly considered.

Another caution about the use of a manipulative, experimental approach is that these results may not represent the cause and response in natural complex habitat conditions. Altering an arguably natural habitat to one that requires anthropogenic input and control could include the loss of the "natural" character of that habitat and be costly to maintain. When the viability of Habitats and species are threatened, Adaptive Management actions must be implemented to eliminate or control those perturbations.

Ultimately, the acquisition of sufficient ecological knowledge to understand critical pathways and processes and the implementation of actions based on that information are necessary to ensure the Conservation of the Covered Species and natural communities in the Plan Area. This knowledge will be gained through passive or active Adaptive Management and the Monitoring Program. Adaptive Management treats management actions as experiments and utilizes a monitoring strategy to evaluate the actions thereby allowing a Management Program to proceed without complete knowledge of the species or processes. In this way, management actions will increase the knowledge base and result in providing for the Conservation of the Covered Species. A conceptual model of the Adaptive Management approach is shown in Figure 8-5. Specific Adaptive Management issues are described in Section 8.4.

8.2.5 Ecosystem Models

Conceptual models state what is currently believed about the components and natural functioning of a system, beneficial variables, and how it responds to perturbations (Woodward et al. 1999, Hardesty et al. 2000). Here the use of a conceptual model approach is

applied to the ecosystems within the MSHCP Reserve System. A model will always be imperfect, although it will improve as additional information on how the system works becomes available. Even without further refinements, models provide a basis for discussion and critique by other ecologists familiar with a system (Salafsy et al. 2002, Kendall 2001). Conceptual models provide a basis to develop hypotheses about the assumptions regarding the relative importance of various processes, and/or threats which may affect Covered Species and their Conservation. In this manner, the conceptual models evolve and help inform the Monitoring and Management Programs.

By monitoring multiple species simultaneously, a better understanding of how individual species react to the same management actions is obtained. Models that will be utilized will strike a balance between being sufficiently complex to capture the hypothesized dynamics of a community while not being too complex to understand what factors are important to understanding the system. The models in the Plan (preliminary conceptual models are presented in the discussions of community level monitoring and management in Section 8.4.) are stress-response models except for the two process models (e.g. sand processes). In the stress-response scenario, stressors, or threats, are generally aligned along the left tier of the model. The central tier generally represents Habitat responses, while the right side tier contains responses of the Covered Species. Models will ultimately incorporate beneficial variables.

The Adaptive Management approach requires a close linkage between the Monitoring and Management Programs. Linking changes in species and Habitat metrics with potential causative agents is essential in helping managers formulate management options for their implementation. These data will also stimulate research, which will feed back into improving the accuracy of the conceptual ecosystem models and improving the efficacy of the Monitoring and Management Programs.

Figure 8-4: Integration of the Monitoring Program and the Management Program

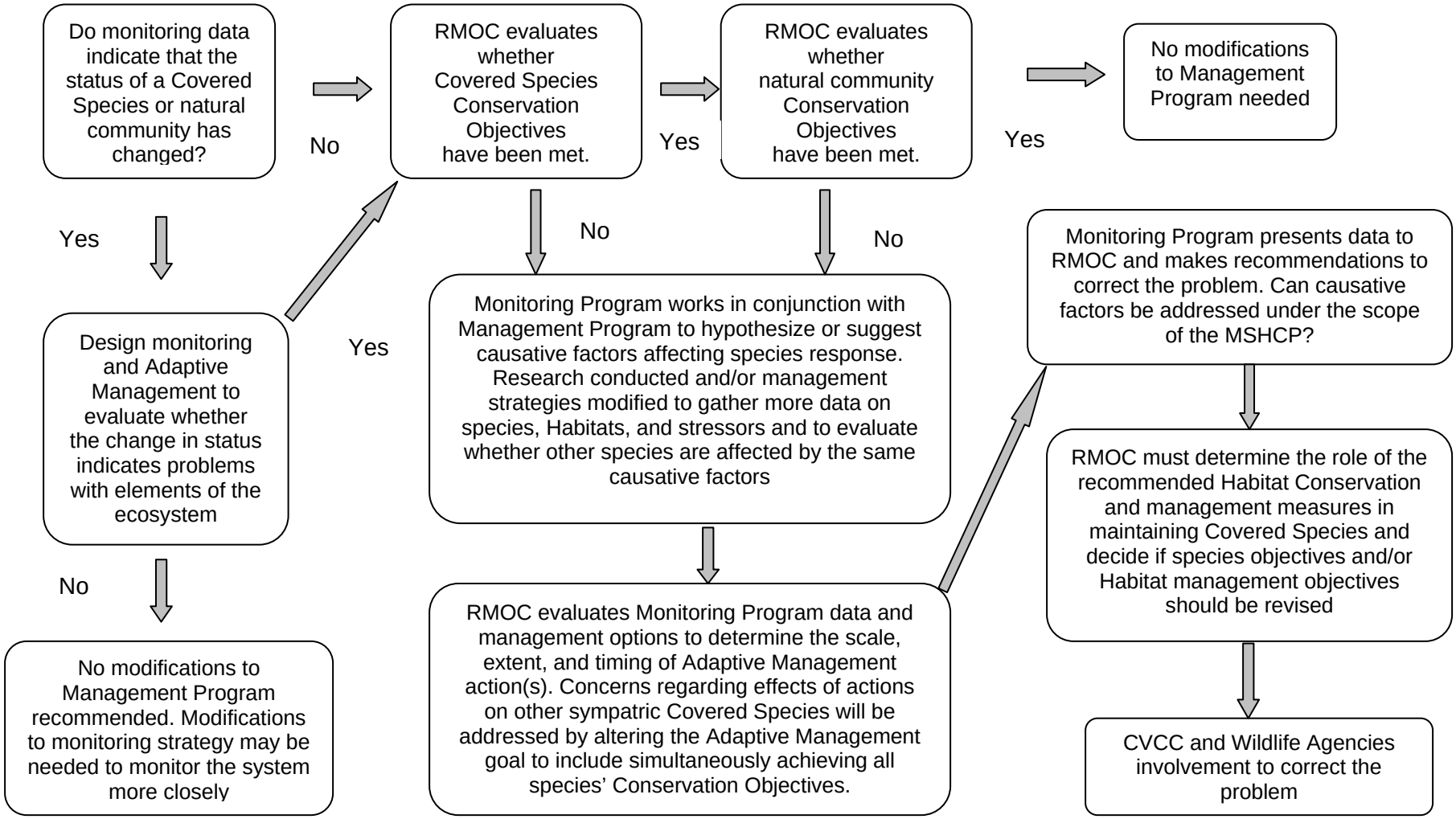
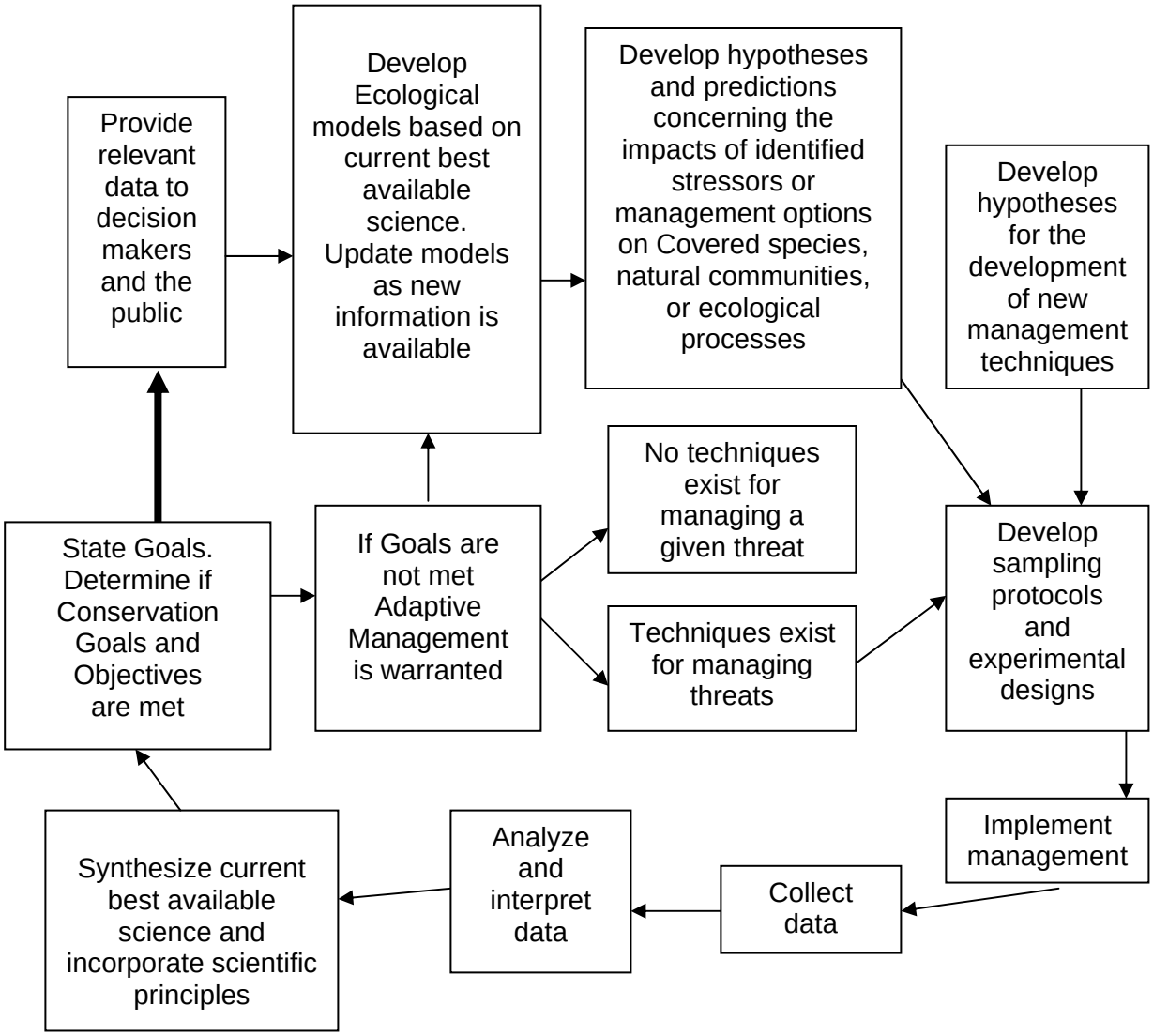


Figure 8-5: Adaptive Management Conceptual Model

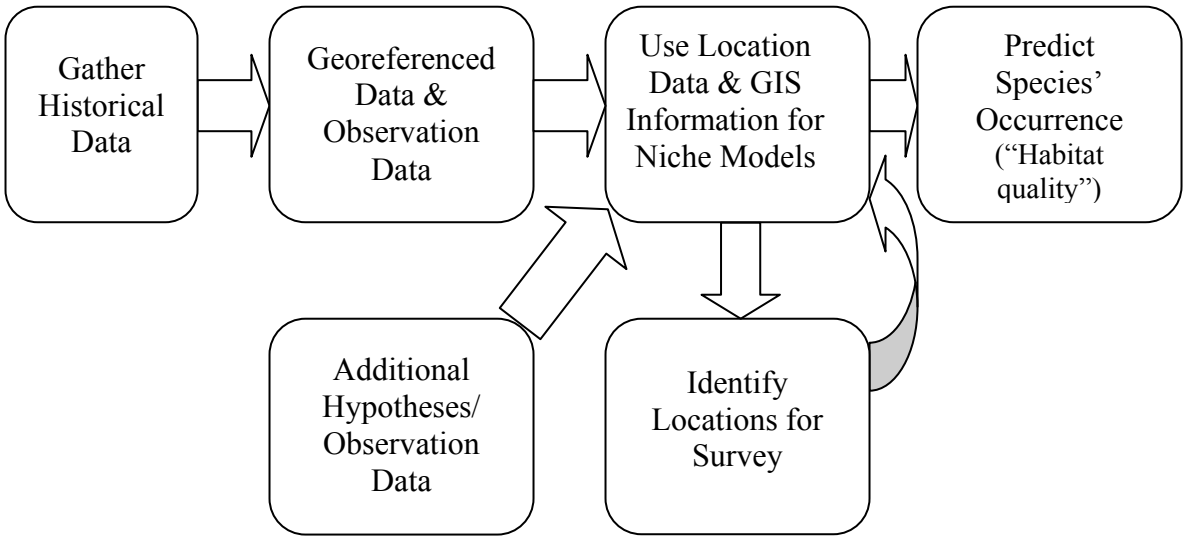


8.2.5.1 Habitat/Niche Models

Niche modeling will involve the development of models to predict species' population distributions and occupancy, and assess trends. This process involves developing GIS-based models based on Habitat associations of the Covered Species (see papers in Scott et al. 2002). These models will be used to predict the likelihood of a species' occurrence (i.e., estimate "Habitat quality") for any point within the Plan area. Models will be developed that are based on *a priori* hypotheses about causal relationships between the organism and variables in the landscape. For GIS-based models, the variables that can be used are those that can be supported by biological theory and are generally those that can be generated directly or

calculated from GIS layers, which may include vegetation/natural communities, soils, elevation, and other Habitat or niche elements. The intent is also to be able to integrate a wider variety of threats to species or communities of interest. The general process for development of niche models is illustrated in Figure 8-6. More detail on the methodologies being tested for niche models is provided in Section 8.0 of Appendix I.

Figure 8-6: Development of Niche Models from Baseline Survey Data and GIS Habitat Parameters



8.3 Monitoring for the MSHCP Reserve System

The Monitoring Program details will be added as additional baseline information is collected and will occur utilizing the organizational structure for Plan implementation, which is summarized here and described in detail in Section 6.0. The Monitoring Program Administrator, selected by the CVCC, shall be responsible for implementation of the Monitoring Program with oversight from the CVCC and the Reserve Management Oversight Committee (RMOC) (See Section 6.1.3 and 6.1.6). The Monitoring Program Administrator will coordinate with the Land Manager (See Section 6.1.5), and the Reserve Management Unit Committees (RMUC) in evaluation and interpretation of the monitoring data and identification of future monitoring needs. Coordination between the Monitoring Program and land managers will occur through both direct contacts between the individuals of the programs and through the RMUCs and RMOC. The elements of the annual reports prepared by the Monitoring Program Administrator are described in Section 8.7. The involvement of Independent Science Advisors will also be available to provide input relevant to scientific issues for the Monitoring Program.

8.3.1 Current Monitoring on Existing Conservation Lands

Monitoring efforts have been ongoing on some of the existing Conservation lands, in some cases for many years. These monitoring efforts contribute to the base of knowledge used to develop this Monitoring Program. Table 8-7 summarizes the monitoring efforts that were initiated prior to the development of this Plan by various land management entities and their cooperative partners. Table 8-8 describes monitoring efforts initiated in spring 2002, to evaluate protocols to be used in the implementation of this Monitoring Program. The 2002-2005 effort involved University of California Riverside, Center for Conservation Biology, and CVAG, and was funded by an NCCP Local Assistance grant from CDFG.

Table 8-7: Current Monitoring on Existing Conservation Lands

COVERED SPECIES **CONSERVATION AREA**	**CURRENT MONITORING**	**PARTICIPATING ENTITIES**
CV Fringe-toed Lizard [1] ❖ Whitewater Floodplain	Annual Monitoring since 1985 of marked individuals on 2.5 ha plot; 2 x per week, March – Oct.	❖ University of California Natural Reserve System
CV Fringe-toed Lizard *CV Milkvetch* *CV Round-tailed ground squirrel* ❖ Whitewater Floodplain ❖ Willow Hole ❖ Thousand Palms ❖ Snow Creek	Annual Monitoring since 1986 of 3 species along 1000 m x 10 m belt transects; 6 visits to each site from May to June, again from September to October. Two transects at Thousand Palms, 1 each at Whitewater Floodplain and Willow Hole 2002 Estimation of proportion of modeled Habitat in Thousand Palms, Whitewater Floodplain, Willow Hole, and Snow Creek occupied by CV ground squirrel	❖ Center for Natural Lands Management (Nature Conservancy prior to 1997) with assistance from: ❖ Bureau of Land Management ❖ Calif. Dept. of Fish & Game ❖ Calif. State Parks ❖ USFWS ❖ Volunteers
Desert Pupfish ❖ Coachella Valley Stormwater Channel & Delta ❖ Dos Palmas	Annual monitoring of pupfish in CVWD drains Annual monitoring of pupfish in Dos Palmas ponds	❖ California Dept. of Fish and Game
California Black Rail *Yuma Clapper Rail* ❖ Coachella Valley Stormwater Channel & Delta ❖ Dos Palmas	Monitoring of presence and distribution	❖ California Dept. of Fish and Game
Peninsular Bighorn Sheep ❖ Santa Rosa & San Jacinto Mountains	Helicopter surveys (abundance, distribution, lamb/ewe ratios) Monitor water sources, presence of water sources, guzzlers 30% of Northern Santa Rosa ewe group is radio collared. CDFG does monthly telemetry flights plus 2 times weekly relocation on ground – survivorship, reproduction If mortality occurs, retrieval to determine cause of death	❖ California Dept. of Fish and Game (approx. every other year) ❖ Bighorn Institute [1]

[1] This monitoring activity will continue independently of and at no cost to the Plan.

Table 8-8: Initial Monitoring on Existing Conservation Lands to Evaluate Protocols for MSHCP Monitoring Program

COVERED SPECIES CONSERVATION AREA	CURRENT MONITORING	PARTICIPATING ENTITIES
TRANSECT SAMPLING		
CV Fringe-toed Lizard *CV Giant Sand-treader Cricket* *CV Jerusalem Cricket* *CV Milkvetch* *CV Round-tailed ground squirrel* *Flat-tailed Horned Lizard* ❖ Snow Creek/Windy Point ❖ Whitewater Floodplain ❖ Willow Hole ❖ Thousand Palms	Test monitoring in 2003 of 6 species along 100 m x 10 m belt transects; 6 visits to each site from May to June, again from September to October. Ongoing monitoring of these transects for all species (2003 – 2007)	❖ Center for Natural Lands Management (field surveys) ❖ California Dept. of Fish and Game (funding) ❖ University of California Riverside, Center for Conservation Biology (design and field surveys) ❖ Volunteers (field surveys)
Palm Springs Pocket Mouse ❖ Snow Creek/Windy Point ❖ Whitewater Floodplain ❖ Willow Hole ❖ Thousand Palms	Trapping along transects in appropriate Habitat during summer 2003, 2006/2007	❖ University of California Riverside, Center for Conservation Biology ❖ California Dept. of Fish and Game (funding)
Riparian Birds ❖ Upper Mission Creek ❖ Whitewater Canyon ❖ Willow Hole ❖ Santa Rosa & San Jacinto Mountains (Chino Cyn) ❖ Thousand Palms (incl. Pushawalla Cyn) ❖ Dos Palmas ❖ Coachella Valley Stormwater Channel	April to July 2003 Point counts in appropriate Habitat (presence/absence) to refine distribution models, Habitat parameters Quantify threats as potential correlates of distribution (brown-headed cowbirds)	❖ University of California Riverside, Center for Conservation Biology ❖ California Dept. of Fish and Game (funding) ❖ Center for Natural Lands Management (field surveys)
INDIVIDUAL SPECIES SAMPLING (2002-2007)		
Coachella Valley Milkvetch ❖ Snow Creek/Windy Point ❖ Whitewater Floodplain ❖ Willow Hole ❖ Thousand Palms	March to September 2003-2007 Revisit known occurrences to determine if species is extant at site, if suitable Habitat remains.	❖ University of California Riverside, Center for Conservation Biology ❖ California Dept. of Fish and Game (funding)
Triple-ribbed Milkvetch *Little San Bernardino Mountains Linanthus* ❖ Whitewater Canyon ❖ Upper Mission Creek/Big Morongo Canyon ❖ Mission Creek/Morongo	Characterize plant community for distribution modeling and invasive species impacts	❖ University of California Riverside, Center for Conservation Biology ❖ California Dept. of Fish and Game(funding)
Crissal Thrasher *Le Conte's Thrasher* ❖ Willow Hole ❖ Thousand Palms ❖ Desert Tortoise & Linkage ❖ Dos Palmas ❖ Coachella Valley Stormwater Ch.	April to June 2003-2007. Baseline surveys to refine distribution models, determine Habitat correlates, revisit known occurrences Test different sampling strategies for detection of Le Conte's thrasher	❖ University of California Riverside, Center for Conservation Biology ❖ California Dept. of Fish and Game (funding)

TABLE 8-8 (CONT.)

COVERED SPECIES **CONSERVATION AREA**	**CURRENT MONITORING**	**PARTICIPATING ENTITIES**
CV Jerusalem Cricket ❖ Cabazon ❖ Snow Creek/Windy Point ❖ Hwy 111/I-10 ❖ Whitewater Canyon ❖ Whitewater Floodplain ❖ Willow Hole	December to April 2002-2007. Live trapping to extend and refine knowledge of species range and biology, test different sampling designs.	❖ University of California Riverside, Center for Conservation Biology ❖ California Dept. of Fish and Game (funding)

8.3.2 Scientific Principles

The "Five Point Policy Guidance" (FR 65, 106, page 35242, June 1, 2000) states: "In order to obtain meaningful information, the applicant and the Services should structure the monitoring and standards so that we can compare the results from one reporting period to another period or compare different areas, and the monitoring protocol responds to the question(s) asked." In addition, it states that, "The monitoring program will be based on sound science."

The Monitoring Program will employ a set of scientific principles that will establish the standard for collection, analysis, and interpretation of data generated in this program. These principles will ensure a program that is scientifically rigorous, question-based, and with the strongest inference possible. These principles will also ensure that monitoring efforts efficiently provide data that are relevant and enable valid comparisons between populations separated by distance and time.

1. Define the question. Monitoring strategies will be designed to address specific hypotheses. Conceptual, statistical, and spatially explicit models will define those hypotheses.
2. Define the area, also known as the target population, and create a sampling frame to which the statistical inference will be made.
3. Develop and state the assumptions in the hypotheses and models *a priori* to collecting monitoring data or conducting manipulations such as experiments and adaptive management.
4. When designing an experiment or using adaptive management, randomly select the units, randomize the allocation of treatments to the units, and use controls.
5. Use probability-based sampling to allocate sampling effort and incorporate spatial variation in the data. Using probability-based sampling allows unbiased inferences to the larger area (Morrison et al. 2001, Atkinson et al. 2004).
6. Replicate in space and time the number of sites surveyed during monitoring (e.g. survey sampling) and those receiving a treatment/management action.

7. Adjust the sensitivity of the data to reflect true changes in the resource being sampled. Adjust counts, measures of species richness, and patch occupancy (i.e., presence/absence) with an estimate of detection probability, such as those described by Lancia et al. (1994), Yoccoz et al. (2001), and Pollock et al. (2002)
8. Describe the methods and the assumptions of the methods used to collect and analyze data.

Useful insight and recommendations for the development of sampling designs are provided in Atkinson et al. (2004).

8.3.3 Baseline Phase of Monitoring Program

Initially the Monitoring Program will gather baseline data for all Covered Species. This task is large and complex, given the ecology of the Covered Species and the complexity of their Habitats. Sampling designs and implementation will be consistent with the Scientific Principles. With few exceptions, additional knowledge about effective sampling methods, site-specific distributions, and species' natural history parameters is needed to design proven monitoring protocols for the Covered Species. The Plan area has highly variable climates, large fluctuations in plant productivity, and subsequently large fluctuations in animal species' populations. The primary objective of the baseline phase will be to conduct baseline surveys and to develop and test methods and protocols. *A priori* hypotheses about the factors affecting the distribution of species can be tested during the surveys. The baseline phase will test methods to aggregate these species in a manner that increases monitoring efficiency. The baseline phase will also be used to assess the potential for integration of monitoring for species, natural communities, and ecological processes. Even after the baseline phase is completed, protocols will undoubtedly evolve with improved technologies. Some of the initial hypotheses utilized in the development of the Monitoring Program are included in Section 8.4 for each of the natural community assemblages. The baseline phase will be conducted during the first five years.

Baseline monitoring will also attempt to distinguish between natural fluctuations in population size and those with anthropogenic causes. Identifying thresholds for management actions without the ability to separate the effects of natural fluctuations from anthropogenic threats can be problematic.

An additional objective during this first phase will be to determine if certain Covered Species, Habitat level variables, or landscape metrics can serve as effective surrogates, umbrella species, or other indicators, for species groups or associations within natural community assemblages. This would be determined by analyzing data that test the assumption that there is a predictable mathematical relationship between the indicator and the variables of interest (i.e., Covered Species). Partially or completely meeting this objective could significantly reduce monitoring costs without losing critical information necessary to manage and protect the species and communities included in the MSHCP Reserve System.

8.3.4 Monitoring at Multiple Scales

The body of scientific literature on ecological monitoring is largely focused on individual species. More recently, several authors have addressed the challenges of monitoring multiple species (Atkinson 2004, Barrows et al. 2005). Williams et al. (2002) provided several examples of how to estimate species richness and manage for competing species requirements. The intent here is to create a system that is flexible enough to adjust to each species situation, but is formal enough to allow evaluations of entire preserves -- an ecosystem approach. The following sections describe the general parameters of a hierarchical approach involving landscape, natural community, and species-level monitoring.

Threat monitoring is woven into the framework at all levels of monitoring. Threats operate at different and often multiple scales concurrently, including landscapes, natural communities, and in the case of diseases, at the level of individual species. Known threats are identified in the conceptual models; potential new threats will be identified as scientists evaluate monitoring data, recent literature, and report their field observations from the Plan area. During field surveys, biologists will identify opportunities for enhancement of variables that benefit species, for example availability of food or roost sites.

8.3.4.1 Species Level Monitoring

Species-level monitoring will provide data on the extent to which Conservation Goals for species are being met. Species monitoring will involve tracking Covered Species and invasive species that may pose a threat to Covered Species. It will also involve collecting information on the ecology of species to better manage them and increase the probability of Conservation. This monitoring needs to sample in both space and time, to address both distribution and trends in Covered Species. It also tracks species responses to resource fluctuations and the level at which threats are affecting species.

Monitoring will serve to test hypotheses regarding mechanisms controlling the distribution of species, groups of species, and as a means to track the response of resources to management actions and experiments. Monitoring needs to provide scientifically defensible estimates of status and trends in Covered Species and Natural Communities and determine whether they are being sustained by management practices. This integration of monitoring results and management actions is an essential element of Adaptive Management. In addition to species monitoring, this Monitoring Program will select and test Habitat metrics based on models that predict how specific variables will affect the system. By focusing on variables that concomitantly affect species, species assemblages, and natural communities, monitoring data can be placed within an environmental context. That context then allows the identification and testing of hypotheses explaining population trends, and so can direct management actions if necessary.

Specific protocols and sampling design to monitor Covered Species will be developed during the baseline phase and will conform to the scientific principles. Feedback from the evaluation of the general sampling approaches described herein will be incorporated in this process. While all aspects of the eventual protocols have yet to be determined, the following

descriptions outline general methodologies to track species. Section 8.4 provides more information on species-level monitoring for a given natural community or species assemblage.

The precise methodology for assessing the status of a Covered Species (or species group) at a sampling point will be tailored to that species. Some potential techniques have been developed during spring 2003 with input from specialists for each taxon (ornithologists, herpetologists, mammalogists, botanists). Sample units ("points") involve for example, auditory or visual counts, small grids of traps, short transects, and will differ in size. Monitoring surveys for any Covered Species or species group will consist of a network of sample units distributed throughout the Plan Area. These sample units will be distributed using probability based sampling and stratified by Habitat or vegetation type where appropriate. For some species of very limited distribution, such as narrow endemics, a stratified random approach may not adequately sample the individuals present so another probability-based sampling distributions scheme will be used.

One part of the evaluation process to be carried out in the baseline phase of monitoring will focus on the appropriate metric to use in describing species occurrence and distribution. Initial efforts will focus on the potential to use presence or absence, which can be expressed as the proportion of Habitats occupied. The potential for use of presence absence is further described below in the discussion of the occupancy approach. Other metrics, including estimates of abundance and measures of demographic characteristics may be used for individual species and will be evaluated.

Detection Probability. For a variety of well-documented reasons, the number of individuals observed or captured at points in a survey area invariably underestimates the number of individuals actually present. Thus, it is necessary to also estimate "detectability," the probability that the Covered Species will be observed at a point if it is, in fact, present. Multiple protocols will be evaluated for detectability of the target species during the baseline phase. Explorations of these techniques may suggest that different approaches may be more appropriate for different taxa. The sampling design will provide for comparison of two or more protocols so that detection probability of a given species can be compared.

One major concern will be sufficiency of observations. Some of the Covered Species may be so uncommon as to generate an insufficient number of observations to apply some of these techniques successfully. Sample sizes and survey effort may have to be rather large for some species or confidence intervals will be very wide. Further discussion of detection probability is provided in Section 8.0 of Appendix I.

Several sampling approaches will be evaluated during the baseline phase for their applicability to the Monitoring Program. These approaches may include an occupancy approach, based on determination of presence or absence, a population estimation approach, methods for trend detection, and appropriate statistical analysis techniques. Additional discussion of these approaches is provided in Section 8.0 of Appendix I. These are not the only approaches that might ultimately be assessed in this process. The focus of the assessment process is to identify indicators that are measurable, precise, consistent, and sensitive to the

phenomena being tracked (Margoluis and Salafsky 1998). The evaluation process will also identify methods that are feasible, efficient, cost-effective, and provide the appropriate information.

8.3.4.2 Landscape Level Monitoring

Landscape-level monitoring focuses on geographically large areas with Essential Ecological Processes and coarse-scale Conservation targets. Landscapes are defined at a scale that includes multiple ecosystems, natural communities, and/or where there is a transfer of energy, or movement of nutrients or materials between those units. Landscape monitoring includes regional weather, Essential Ecological Processes, and groundwater levels. This monitoring focuses on processes that affect the condition and dynamics of landscapes that models predict will affect Covered Species and natural communities.

Landscape level monitoring may explore large-scale changes, such as the relationship between areas occupied by exotic grasses and historical fire sites. Desert ecosystems have only recently been subject to perturbations that were virtually unknown in the past. As an example, they are subject to increasing exotic plant invasion, which then facilitates the spread of fire, an ecological perturbation not previously typical of deserts. Because of indirect effects on the environment of carbon dioxide precipitation and nitrogen oxide deposition from air pollution, urban development can have impacts hundreds of miles away (E. Allen, pers. comm.). Some possible approaches to landscape level monitoring are discussed briefly below.

Remote Sensing. Landscape level monitoring calls for assessing Habitat conditions over larger areas than can be surveyed with regularity. Remote sensing may provide a means of distinguishing native vegetation from exotic grasses in remotely sensed images of the Plan area. One remote sensing technique that bears further investigation for this program is to assess leaf area index (LAI) using satellite imagery. Satellite imagery data is improving in resolution and quality rapidly. Specific features, such as sand dune edges, can be resolved at sample intervals limited only by the numbers of images acquired.

The occurrence of species and species associations may be illuminated by linking satellite imagery to site-specific field data and creating polygons with particular attributes. These include particular vegetation associations, vegetation density, soil types, and sand compaction values, among others. The Habitat polygons can be analyzed in terms of size, spatial distribution, and temporal dynamics. When combined with site-specific field data on the occurrence and abundance of species, analyses at multiple scales can be conducted. Through such analyses the scale that provides the greatest sensitivity and predictive power for identifying when and where species are likely to occur and how the dynamics of changing Habitat characteristics affect species occurrences and abundance (Li, 2002) can be determined.

Climatic Processes. Variation through both time and space due to large-scale climatic processes and climate change is the dominant feature of the biota in the ecosystems of the Coachella Valley. Variation in space will be addressed through sampling across the area of inference, described under species-level monitoring, and perhaps stratifying sampling across

community or substrate type(s). However, variation through time is just as crucial. Although temperature is relatively predictable, precipitation can vary by almost an order of magnitude. Variation at this scale exists in the desert and comprises the El Nino-Southern Oscillation (ENSO) phenomena and the Pacific Decadal Oscillation (PDO).

Tracking of these large-scale processes will be integrated into the Monitoring Program. The effect of climate on Covered Species over time can be tested. For example, the effect of weather on patch occupancy can be estimated. Populations of both plants and animals are probably synchronized with these large-scale climate drivers (Post and Forchhammer 2002). Plant responses are direct and indirect. Direct, in that many of the sensitive species are water-limited annuals requiring average or above average precipitation to germinate and set seed. However, with high precipitation, exotic annual grasses also are highly productive, often out-competing native species (Eliason and Allen 1997) and providing fuel for fires in lowland areas (Fenn et al. 2003). Drought has some advantages in that grass competition can be curtailed, but seed production and annual plant germination can also be reduced.

8.3.4.3 Natural Community Level Monitoring

Natural community-level monitoring focuses on the local-scale threats to natural communities and Habitats, such as non-native invasive species. It also addresses quantification of variables that are or may be important to the distribution and abundance of individual Covered Species.

Natural Community level monitoring will involve two primary elements. The first of these is refinement and update of the natural communities map and the species distribution models originally developed in the reserve design process for the Plan. The refinement of the current natural communities (vegetation) map will better describe the occurrence and distribution of both natural communities and the Covered Species that depend on them. It is discussed below in Section 8.3.4.3.1. The provision to update and remap Natural Communities or Covered Species models shall not be implemented in any way that would increase the amount of Take or reduce the amount of Conservation specified by the Plan for Covered Species or Natural Communities. The refinement of species distribution and Habitat models is described separately in Section 8.2.5.1. The second element for natural communities monitoring is the evaluation and development of a "Rapid Assessment" of several natural community-level characteristics and trends (e.g. CNPS 2003). The following sections describe the framework for these elements of the overall program.

8.3.4.3.1 Natural Community Map and Description

The natural community (vegetation) map created for the Plan will be used as the initial baseline for a revised and updated map. The natural communities map will be updated to bring it into conformance with the classification system of the Manual of California Vegetation (MCV) (Sawyer and Keeler-Wolf 1995) and unpublished updates. This system has replaced the Holland (1986) vegetation classification system that was in use when the natural communities map was originally developed. This effort will use the Vegetation Rapid Assessment Protocol developed by the California Native Plant Society (CNPS 2003) and a

releve protocol which has already been used to describe over 200 vegetation "plots" (Mueller-Dombois and Ellenberg 1974, CNPS 2003).

Stands of vegetation will be identified and delineated with high-resolution aerial photographs and satellite imagery. On-site ground-truthing will be completed to determine vegetation composition of the delineated stands. Vegetation types can then be classified using ordination, multivariate analyses, and associated data analysis methods (Sawyer and Keeler-Wolf 1995) for assessing and classifying vegetation to create a more detailed natural communities map. All locations are georeferenced for follow-up vegetation and Habitat description. Standard techniques for sampling percent cover and biomass of herbs, and percent cover along line transects for shrubs can be used (Mueller-Dombois & Ellenberg 1974) to assess vegetation change, coupled with vegetation mapping activities. Power analyses are used to determine adequate sample size. The releve approach can be used to detect infrequent species. Biomass of herbaceous vegetation will also be sampled to detect yearly variation and fuel load that might promote fire.

8.3.4.3.2 Assessing Natural Community Changes and Trends

One objective of the natural community monitoring is to develop and test models that propose a causal relationship between characteristics of natural communities and Covered Species. Quantitative characterizations of communities will be obtained that can be used to detect both natural and anthropogenic changes in community structure in time and space. Several approaches to natural community change detection will be tested in the baseline phase. This may include a rapid assessment approach. One element of this effort will be a quantitative means of assessing invasion by exotic species. Baseline descriptions of presence and relative cover of invasive species can be used to track changes in their status. Re-sampling and gathering more data on the same sites used in the vegetation mapping effort will enable greater accuracy in determining how communities change over time, and will establish confidence intervals for the vegetation mapping data.

Trend Detection. Once data are gathered from field surveys for a given species, they can be used to describe and analyze trends. Data collected during the baseline phase will be used to test the various hypotheses and models for trend analyses. Clearly, surveys cannot be undertaken on an arbitrary 5, 7, 8, or 10-year periodicity if trends are to be determined. Understanding the relationships between climate and biota and between sensitive plants, exotic invaders, and animals of concern is going to be crucial for developing accurate monitoring protocols. One goal is to begin to understand relationships between climactic variables and metapopulation dynamics to generate an appropriate sampling periodicity. Further discussion of the formulation of trend analysis is included in Section 8.0 of Appendix I.

8.4 Integration of the Management and Monitoring Programs

The Monitoring Program and the Adaptive Management component of the Management Program must be integrally linked. The analyses of species and natural community monitoring data (and information regarding on-going preserve management issues) will be used to identify if and where Adaptive Management actions should be considered. When Adaptive Management actions are implemented, the Monitoring Program will need to evaluate the species and/or natural community's response.

Linking the Monitoring Program with the implementation of Adaptive Management actions will require:

- The use of data from the Monitoring Program to update Adaptive Management models and the implementation of actions suggested by the monitoring data. Use available data to structure a range of alternative response models to address a given threat or stressor affecting a Covered Species or natural community and evaluation of the models.
- The implementation of actions suggested by the Monitoring Program data and Adaptive Management models.
- Development of cost estimates and schedules for implementation of Adaptive Management actions and monitoring results.
- A program implementation structure, that includes both Monitoring Program Administrator and staff and Land Managers, which helps identify potential Adaptive Management options and associated monitoring to determine their effectiveness, and evaluates the Adaptive Management action for further use or modification.

The following sections describe an integrated approach to monitoring and management for the Covered Species and Natural Communities that addresses threats and concerns identified to date. This integrated approach will ultimately depend on the results during the baseline phase and so is subject to change. The intent is that information on species and natural community distributions and factors that influence distribution from the early baseline sampling will be the basis for exploring other questions including scale and relationships. Each section presents an initial conceptual model that has been developed for these ecosystems.

These sections describe how under this monitoring and management framework species covered under the Plan will be treated as affiliated with six natural community/Habitat assemblages that are grouped due to similar natural processes and threat regimes. The broad Habitat associations include aeolian sand, alluvial fan and wash, riparian, marsh, alkali flat and playa, and mountain, each of which includes one or more of the 27 natural communities included in the Plan area. Within each of these Habitat associations, monitoring and management protocols are provided at several scales: (1) landscape, (2) natural

community/Habitat, and (3) species. In many cases, these protocols involve measurements at multiple trophic levels. A process is proposed for evaluating monitoring results, for modifying monitoring protocols to provide more insightful data, and for recommending management actions. A variety of approaches will be evaluated to monitor landscapes, natural communities, and species, during the baseline phase and on an ongoing basis.

The multiple scales designed into the framework should provide biologists and managers sufficient information to identify:

1. Natural patterns and fluctuations within the typical dynamics of this Habitat assemblage.
2. The occurrence and extent of perceived threats within a time frame to enable managers to respond with appropriate management tools.
3. The range of impacts that ecological variables, including stressors or threats, have on site-specific Habitat characteristics and species assemblages, across trophic levels.
4. The scope of impacts that variables, including threats, have on the distribution of Covered Species across a landscape that includes multiple Conservation sites, each with different physical attributes (climate, sand delivery sources and conduits, vegetation patterns).
5. Success or failures in the implementation of management action aimed at controlling threats.

8.4.1 Aeolian Sand Communities: Sand Dunes and Sand Fields

Sand Dunes and Sand Fields: Natural Communities

- Active Desert Dunes
- Stabilized and Partially Stabilized Desert Dunes
- Active Desert Sand Fields
- Ephemeral Desert Sand Fields
- Stabilized and Partially Stabilized Desert Sand Fields
- Stabilized Shielded Desert Sand Fields
- Mesquite Hummocks

Associated Covered Species:

- Coachella Valley fringe-toed lizard *(Uma inornata)*
- Coachella Valley giant sand treader cricket *(Macrobaenetes valgum)*
- Coachella Valley Jerusalem cricket *(Stenopelmatus cahuilaensis)*

- Coachella Valley milkvetch *(Astragalus lentiginosus* var. *coachellae)*
- Coachella Valley round-tailed ground squirrel *(Spermophilus tereticaudus chlorus)*
- Flat-tailed horned lizard *(Phrynosoma mcallii*)
- Palm Springs pocket mouse *(Perognathus longimembris bangsi)*

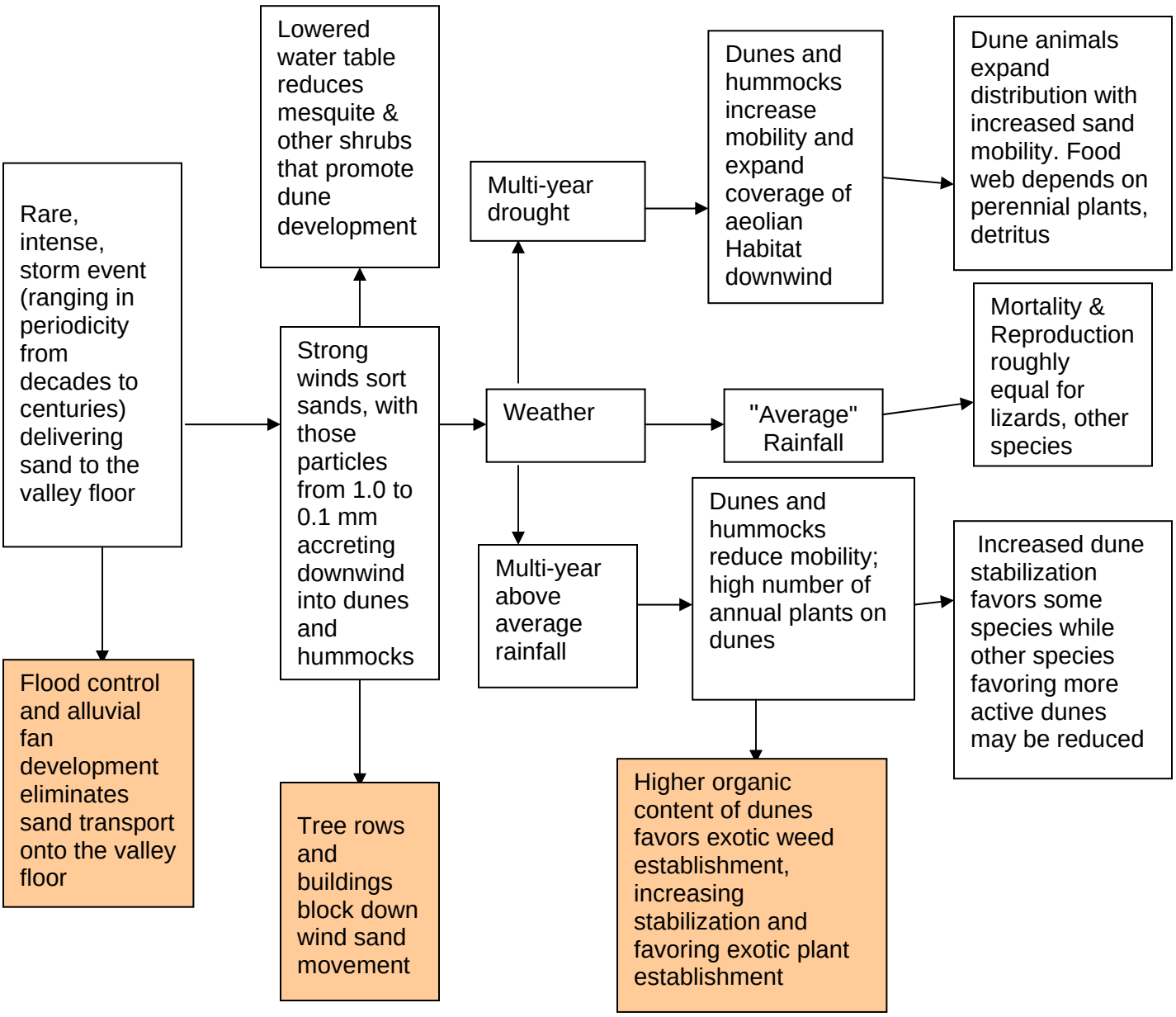
8.4.1.1 Background and Models

Covered Species associated with the aeolian (wind-blown) sand community are listed above. Le Conte's thrasher (*Toxostoma leconti*) occasionally inhabits this community as well, but it is discussed in the alluvial fan and wash community section.

These sandy substrate natural communities are extremely dynamic in terms of spatial mobility and tendency to change from active to stabilized and back (Lancaster 1995). These changes can be caused by local and regional weather patterns, as well as anthropogenic modifications. A general model of the processes that create and maintain these Habitats is depicted in Figure 8-7. Each of the Covered Species utilizes the Habitat in unique ways, thus local Habitat shifts that favor one of these species do not necessarily favor another. Rather, the temporal and spatial dynamics create a matrix of microhabitats that supports each of the Covered Species simultaneously. Any process which favors Habitat homogeneity over heterogeneity, will have a skewed effect on the community. Notwithstanding these differences, the constituent species can still be subject to a common set of threats that can have an impact on most community members, although the degree of sensitivity and response can vary between them. Figure 8-7 also depicts known threats and the resultant impacts.

The threats model in Figure 8-8 reveals that natural stochasticity (randomness) of weather events, long-term climatic trends, and anthropogenic stresses can have similar impacts. For instance, a prolonged period without an intense storm resulting in no new sand erosion and deposition can produce impacts to the fringe-toed lizard populations that are similar in appearance to those caused by an up-wind or up-stream barrier to sediment transport. The difference, however, is in the permanence of the condition. A storm will eventually occur and bring new sands, creating new Habitat on the valley floor if the sand transport corridors are not blocked (e.g., a flood control dam or golf course). Another example could be that a dense bloom of native desert annual plants, or a dense growth of Saharan grass (*Schismus barbatus)*, Saharan mustard (*Brassica tournefortii)*, and tumbleweed (*Salsola tragus)* tend to enhance the stabilization of sand dunes already moving toward a stabilized state. However, the stabilizing effect of the native annuals lasts only for a season or two, whereas the exotics, especially the grasses, produce impacts that can last much longer. Monitoring efforts need to be able to: (1) assess the impacts of stressors on the Covered Species; (2) determine if the impacts and effects are likely to be short-term or permanent; and (3) evaluate methods for reversing or ameliorating the impacts.

Figure 8-7: Aeolian Community Sand Process Model



1. Figure 8-8 indicates that the primary threats to the aeolian community are: (1) OHV trespass and (2) various factors (including exotic plant infestation, loss of mesquite to anchor dunes in some areas) which contribute to the loss or stabilization of active aeolian sands. The shaded boxes along the left side of Figure 8-8 include causative factors or threats. They are sources of perturbation at which management actions will be directed.

   Among management actions are:

- The elimination of OHV trespass
- The protection of wind and sand deposition corridors
- The control of invasive species
- To maintain or increase groundwater levels so that mesquite hummocks can be maintained in extent and can regenerate.

Of these threats, exotic plant impacts are the least understood, and the tools for their control are not yet widely developed. Thus, the relationships of exotic species to Covered Species' abundances, to stabilization rates, and to changes in native vegetation merit an Adaptive Management approach and research prior to implementation of large-scale control efforts.

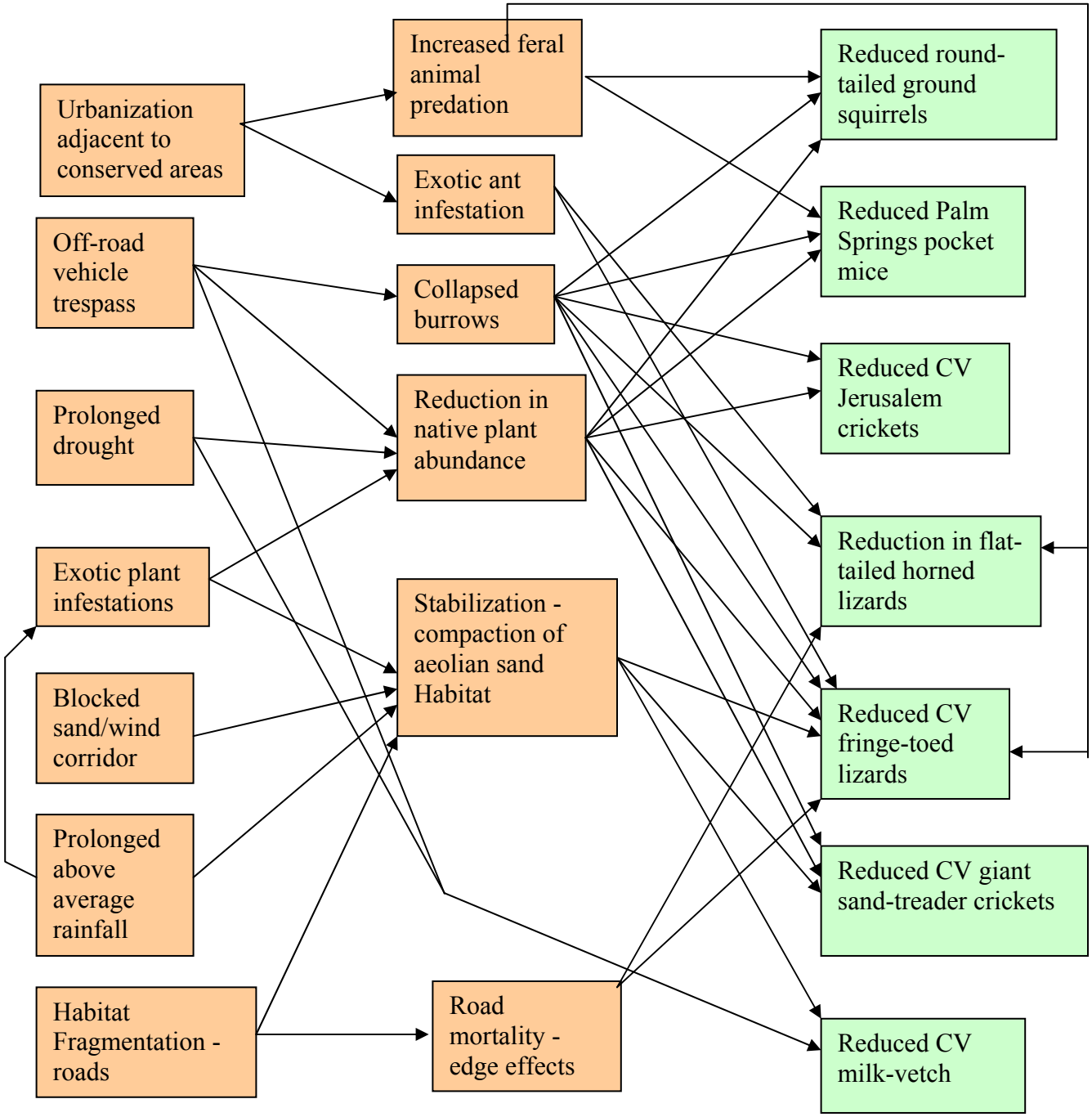
8.4.1.2 Management: Aeolian Sand Communities

Ongoing Management. Based on conceptual threats model and past research, OHV trespass should be eliminated from all areas designated to protect the Covered Species associated with sandy Habitats. This can be accomplished through both fencing and signing property boundaries, and by active and frequent patrolling by law enforcement officers. Protecting sand transport corridors through acquisition is an important Conservation objective for the Plan. Once acquired, removal of any anthropogenic structures that could block sand movement such as exotic tree rows will be a management priority.

Ongoing management will ensure that continuous Habitat is protected to provide for other Essential Ecological Processes, including but not limited to dispersal mechanisms, movement of pollinators, seed dispersal, and mycorrhizal relationships for plant species and soil characteristics for insects.

Current management of the Coachella Valley Preserve system sites includes very restricted human access to the most sensitive Habitat areas, including the active sand dunes. Opportunities for the public to visit and learn about the ecology of the preserve sand dunes are provided on an annual basis at the Thousand Palms Preserve with scheduled tours accompanied by a preserve manager.

Figure 8-8: Aeolian Sand Habitat Threats Model



Adaptive Management. The Habitat Threats Model presented in Figure 8-8 identifies known threats in the aeolian sand Habitats. The impacts of these threats on Covered Species and natural communities and the potential management responses will be addressed through monitoring and Adaptive Management.

Stabilization and sand depletion of the aeolian sand Habitats are clearly important stressors to the viability of the associated Covered Species (Figure 8-8). Stabilization and sand depletion can be caused by both natural process stochasticity, and by anthropogenic perturbation. Dissecting out causal factors for stabilization and sand depletion will be accomplished through landscape-level and Habitat-level monitoring.

In a non-fragmented landscape, local population declines may be less critical because if overall Habitat diversity has been maintained causes for local declines are unlikely to be of equal strength across the entire species range. Once favorable habitat conditions return the species would likely re-invade those habitats from refugia in nearby habitat areas.

In a fragmented landscape such as the Coachella Valley, local extirpations can increase the risk of overall extinction by reducing the number of protected populations. The evolutionary forces at work during a natural population decline are processes that are desirable to maintain. These benefits may be lost either if managers react too quickly and natural selection has not had an opportunity to operate, or if they react too late and the species becomes extirpated. Determining the time to act will be a challenge. Atkinson et al. (2004) address the challenges of determining the thresholds for management action (See page 38-39) but emphasize the opportunity to take advantage of extreme circumstances (e.g., extreme drought, 500-year flood events) to learn more about system function.

Additional tools for reducing sand depletion and stabilization could include hauling sand lost from the downwind side of the preserves back into the upwind sand corridor. Sand fencing to reduce the rate of sand loss on the downwind side of the preserves may also be effective. Prior to implementing such a management tool, careful evaluation and consultation with the Wildlife Agencies is necessary. Initially, a determination of the effectiveness of experimental drift fences in creating expanded blowsand hummocks, particularly in the Whitewater Floodplain Conservation Area, would have to be made. This analysis will include determination of a trigger for when installation of drift fences to create blowsand hummocks is necessary. Then monitoring should determine the use of the created Habitat by blowsand-dependent species, especially the Coachella Valley fringe-toed lizard. In areas where there is a deep layer of stabilized sand at the upwind portion of a preserve, it may be destabilized and activated by physically removing vegetation and surface crusts. This should only be employed experimentally, on a relatively small scale since the impacts to other aeolian species, such as the flat-tailed horned lizard and the Palm Springs pocket mouse, are not known, and might be negative.

Maintenance of the natural sand transport processes is the preferred means of securing aeolian sand Habitats. When a natural sand deposition event occurs (e.g. after a large storm), active sand fields (sand hummocks) will likely be the primary natural community that is created. Historically, mesquite clusters occurred in the Thousand Palms Preserve and

appeared to serve as structures for larger sand dune development. Those mesquite clusters have largely disappeared or are highly degraded, perhaps due in part to lowered water tables. Data gathered by USFWS (Ball et al. *in Press*) and UCR (UCR 2005) indicate Coachella Valley round-tailed ground squirrels occur at higher densities in mesquite hummocks. Mesquite hummocks could be restored in this area (see below). The fringe-toed lizard does not require large dunes, nor do any of the sand-associated Covered Species; active sand fields and hummocks are of at least equal Habitat value. The structural diversity provided by larger dunes may have value to other, non-covered, aeolian sand obligate species.

Invasive Species. Invasive species infestations are an additional potential cause for stabilization of aeolian sand. Where invasive annual vegetation is identified as a possible stressor, then a focused research effort will need to be undertaken to determine control methods, as no methods beyond hand removal exist today. The cause and effect dynamics, duration of effects, and control methodologies all need further research before management actions can or should occur. A couple of consecutive wet years can result in profusion of exotic invasive annual plants and cause increased stabilization, especially along the margins of the active dunes and in the hummock areas. A couple years of drought can apparently erase that stabilization trajectory and activate previously stabilized areas. The seed production of the exotics may actually enhance harvester ant populations, which are food for both the fringe-toed and flat-tailed horned lizards. If exotic vegetation is implicated in long-term stabilization, research will be initiated to develop effective control methods.

Feral Animals. Feral dogs currently occur on all preserve sites, but the impact, if any, they have on the Covered Species is unknown. They could be detrimental to Palm Springs pocket mice. If dogs are suspected as a threat to any species' population viability, experimental dog proof fencing, much like that used in Australia to control dingoes, could be employed in targeted areas to determine if it results in a positive response by the pocket mice. Such fencing would also limit coyote access, and if used widely could disrupt natural predator-prey relationships. For this reason, such fencing should only be used with extreme caution, and other alternatives would have to be considered.

Road Mortality. Several of the aeolian sand species, in particular the flat-tailed horned lizards, are probably impacted negatively by road mortality. The Thousand Palms Preserve is likely large enough to be self buffered from this stressor to the extent that it could contribute to reduced population viability. If, however, monitoring shows mortality of Covered Species on Washington Street, Ramon Road, and Thousand Palms Road, low, relatively fine (one-cm^2 holes) mesh wire could be attached to the lower portions of the preserve's perimeter fence to prevent lizard movement onto roads. This fencing would likely accumulate sand and if installed, would need to be maintained (cleaned) regularly.

Habitat Enhancement and Restoration. The potential for mesquite hummock restoration and enhancement will be evaluated through monitoring and Adaptive Management. The potential for creation or enhancement of mesquite hummock Habitat will be considered in the context of Conservation Objectives for all Covered Species and natural communities. This evaluation will consider results from other areas where mesquite restoration has been attempted in terms of the potential for success. Water requirements, the

source of water to support mesquite restoration or enhancement, and the relationship with groundwater levels will be addressed in this evaluation. Adding supplemental water at the surface would create the potential for invasive weeds and non-native ants to become established. These invasive plants and non-native ants are threats to the aeolian sand communities. Subsurface supplemental water will be evaluated. The impacts to other natural communities and species will also be evaluated.

Restoration by CVWD**.** In conjunction with its WRP recharge facility, CVWD will remove tamarisk from the site in the East Indio Hills Conservation Area. In addition, if a study undertaken by the CVCC demonstrates the feasibility of mesquite restoration, CVWD will restore and enhance mesquite and Coachella Valley round-tailed ground squirrel Habitat on site in the East Indio Hills Conservation Area, pursuant to Required Measure 2 in Section 4.3.20. Within two years of Plan approval, a plan detailing the location, water requirements, and monitoring and management responsibilities, including funding, for this restoration effort shall be provided to the Wildlife Agencies for review and approval. If deemed appropriate in the context of Conservation Objectives, the Habitat will be established within three years of approval of this restoration plan by the Wildlife Agencies.

CVWD will enhance and manage Coachella Valley round-tailed ground squirrel Habitat on land it owns in the East Indio Hills Conservation Area to mitigate and provide for the Conservation of impacts to this species from CVWD's operation and management activities in the Coachella Valley Stormwater Channel and Delta Conservation Area. (See Section 4.3.16 for additional details).

Restoration by CVCC. CVCC will undertake additional mesquite hummocks restoration in the East Indio Hills Conservation Area, pursuant to Required Measure 3 in Section 4.3.20, to ensure a total of 40 acres of mesquite Habitat is created. If 80% of the mesquite hummocks natural community in the south half of Section 17, T5S, R8E, is not conserved under the Plan, CVCC shall ensure the establishment of an additional 40 acres (80 acres total) of mesquite hummocks in this Conservation Area if Feasible. To the extent Feasible, the acreage to be established by CVCC will be sited on the CVWD land where CVWD establishes its required mesquite habitat. To the extent that the CVWD site does not accommodate the CVCC-required acres of mesquite hummocks restoration, CVCC will seek to establish the remaining requirement elsewhere in this Conservation Area. If establishment of the full acreage is not Feasible in this Conservation Area, establishment of acreage needed to reach the required total may occur in other appropriate Conservation Areas, proximate to Coachella Valley round-tailed ground squirrel habitat.

Restoration by MSWD**.** To improve the water available to mesquite hummocks, MSWD will provide funds to CVCC to be used for the removal of non-native tamarisk from the Willow Hole Conservation Area in the amount of $100,000 to cover the costs of tamarisk removal from approximately 30 acres of conservation lands. CVCC will ensure that removal of tamarisk occurs on lands controlled by CVCC or other public or private conservation lands. MSWD will also contribute $20,000 to the cost of a study being conducted by CVCC of the feasibility of mesquite restoration and development of a mesquite restoration plan. MSWD will contribute to and participate in CVCC's research evaluating the relationship between

mesquite hummocks and groundwater for the mesquite hummock areas within their district boundary. If the study undertaken by the CVCC demonstrates the decline of mesquite hummock areas in the Willow Hole Conservation Area, MSWD will work with CVCC, the Wildlife Agencies, and other relevant Permittees to identify and implement a plan to enhance, restore, and maintain the mesquite hummocks natural community and to address changed circumstances, identified in the CVMSHCP, that affect this natural community as a part of their CVMSHCP implementation activities.

8.4.1.3 Monitoring: Aeolian Sand Communities

The monitoring programs already in place for species associated with the aeolian sand communities are described in Table 8-7. The following sections describe general monitoring approaches for landscape, natural community, and species level monitoring on existing and newly acquired lands under Plan implementation.

8.4.1.3.1 Landscape Level Monitoring

Key Monitoring Objectives:

- Collect data on environmental variables (e.g., local, regional, and global weather patterns) identified in the conceptual models
- Develop and test conceptual models about how changes to the landscape impact Covered Species
- Determine and quantify changes in Habitat that may affect Covered Species
- Determine the annual or periodic rate of sand deposition or depletion within sand transport areas
- Assess landscape connectivity between preserves through hypothesis testing
- Identify distribution and cover of aeolian sand natural communities
- Relate changes in Habitat to changes in annual weather patterns

Weather. As a first step in the Monitoring Program, the apparent sensitivity of the aeolian sand community to rainfall argues strongly for gathering detailed weather records at sites characterizing the wide range of conditions found in the Coachella Valley. Only after development of a sufficient baseline data set showing how the various Covered Species and their Habitats respond to natural resource levels induced by weather patterns, is it possible to identify population trajectories that are outside of natural patterns, and are thus cause for concern. For instance, Barrows (2000) found significant east-west differences in the dune beetle communities of the Coachella Valley. The differences correlated, in part, with a substantial gradient in rainfall between the eastern and western extremes of the valley (i.e. double rainfall amounts in the west). This gradient is strongest between the Windy Point area and the Thousand Palms Preserve, and was reflected in dramatic differences in the dune arthropod community in the respective extremes. Between the Thousand Palms Preserve and

lands further east within the Coachella Valley, there appears to be little or no difference in either rainfall or dune arthropod species composition.

Rainfall appears related to fringe-toed lizard reproductive patterns as well. Even though fringe-toed lizard numbers have at times over the past 15 years dropped to nearly non-detectable levels in drought years, lizard numbers have always rebounded during average to above average rainfall years. Only through a thorough understanding of regional weather conditions and patterns can large spatial scale conclusions be drawn regarding the relative importance of either anthropogenic or natural causes of changes in abundance of Covered Species.

In addition to existing weather monitoring stations, an additional two stations will be established within or adjacent to core Habitat areas to record precipitation, wind, and temperature.

Areal Extent of Habitat: Information on the distribution and extent of natural communities may be used to: (1) determine and quantify the ebb and flow of the extent of this dynamic sand dune Habitat and use as a covariate when testing hypotheses about the effects on Covered Species; (2) assess future changes in landscape connectivity; and (3) evaluate the edge effects of changing proximity to human activities. Digital satellite imagery is extremely useful in distinguishing and quantifying different levels of stabilization within the dune and hummock Habitat matrix.

As an example of the application of this approach, using satellite imagery of the Coachella Valley Preserve area, Habitat was divided into 10 categories based on reflectance values. Four of the created categories dealt specifically with aeolian Habitat and appeared to make separations consistent with both particle size and compaction (C. Barrows, pers. comm.); the other six were upland Habitats or areas of dense vegetation. Both of these variables have bearing on the relative abundances of the dune-associated species. Additionally, by having the GIS program "choose" the categories, the choices are without observer biases and are more likely to be repeatable and comparable to future images. This process is further described in Section 8.0 of Appendix I.

Due to the dynamics of this Habitat, new digital images will be acquired and analyzed every five years. In this way, the extent of Habitat gains and losses through time can be analyzed. Of highest priority is the quantity and distribution of the active aeolian Habitat, a type clearly and accurately discerned by this kind of analysis. When active aeolian Habitat is in decline, the images can be used to help develop a hypothesis about the cause of that decline, and to evaluate the success of remedial management actions that may be taken.

Groundwater: It has long been recognized that the honey mesquite that form mesquite hummocks grow in distinctive hydrologic environments where the water table is near the surface. However, hydrologic conditions and the health of the mesquite hummocks are subject to change from both natural and human-induced processes. If natural and human-induced impacts on this resource are to be mitigated, the relationship between hydrologic conditions and the health and reproduction of the native mesquite hummocks need to be quantified.

CVWD monitors groundwater and has data at well sites including the Conservation Areas. Monitoring will involve evaluating the health of the mesquite (plant characteristics) in the Willow Hole, Thousand Palms, East Indio Hills, and Dos Palmas Conservation Areas, and its relationship to hydrologic/groundwater conditions in the Coachella Valley. As described in Section 6.6.1, MSWD will provide data as available on water levels in the Willow Hole Conservation Area, specifically for the "fault dunes" and associated mesquite hummocks west of Palm Drive, and funds to be used for water monitoring wells or other means of gathering data on groundwater levels related to mesquite hummocks.

8.4.1.3.2 Natural Community Level Monitoring

Key Monitoring Objectives:

- Estimate distribution and abundance of exotic invasive plants
- Estimate live perennial shrub abundance and distribution
- Ground-truth the spatial extent of Habitats as shown in the satellite imagery and aerial photography
- Develop and evaluate models about relationships between changes in vegetation, landscape level variables, and responses by covered species
- Confirm variables or characteristics the GIS analysis used to separate the categories of reflectance types within the aeolian system
- Evaluate relationships between groundwater and mesquite hummocks

This monitoring level focuses on measurable variables that describe the sand associated natural communities and identified threats to them. Habitat variables (and threats) that appear, based on the conceptual model in Figure 8-8, to have relevance to the dune species include sand compaction, native ant numbers, live perennial shrub abundance, and exotic weed abundance.

Monitoring will address the following issues:

1. Describe the characteristics of each Habitat category as defined by the GIS analysis.
2. Provide direct measurement of Habitat dynamics and trends over time. The transects are to be placed in areas likely to (1) capture the range of microhabitats within a Habitat type and (2) capture the characteristics of Habitats in areas where they are relevant to protection issues or concerns.
3. Provide data that are directly comparable to species-specific monitoring locations.

One example of a protocol to monitor Habitat variables is a series of transects/plots within each of the Conservation units. In the baseline phase, transects will be established according to the Scientific Principles.

Transects will be sampled yearly to obtain quantitative information on perennial plant communities, annual plant communities, ground dwelling arthropods and vertebrates, and to characterize sand compaction. Some of the sampling effort is directed at non-Covered Species and communities in order to track changes likely to affect Covered Species. For example, pitfall trapping of arthropods may be a simple and efficient technique to track change. The most common captures in these pitfalls are tenebrionid beetles and ants. Monitoring ant species as indicators of environmental conditions is becoming increasingly common worldwide (Bisevac and Majer 1999, Read and Anderson 2000). In California, exotic ants such as Argentine ants *(Linepithema humile*), (Suarez et al. 1998) and fire ants (*Solenopsis invicta*) are potentially serious threats to native ants and the wildlife species that depend on them for food. Here in the Coachella Valley, native harvester ants of the genera *Pogonomymex* and *Messor* are important granivores and detritivores. They are also critical foods for both the Coachella Valley fringe-toed lizard (Barrows and Fisher in prep) and the flat-tailed horned lizard. The ants' trophic relationships as well as ease in sampling make them good candidates to be bioindicators of ecosystem conditions including changes in soil characteristics and seed abundance. In addition, the influence of exotic plant species infestations on harvester ants, and other dune arthropods, is unknown and deserves further analysis. Monitoring ant species should illuminate this relationship.

The focus of arthropod sampling is to enumerate temporal changes in ant abundance; however, many of the other arthropods captured in the pitfalls can be valuable indicators of aeolian Habitat quality (Barrows 2000). For instance, tenebrionid beetles such as *Asidina confluens, Batulius setosus, Cheriodes californica, Cryptoglossa laevis,* and *Triorophus laevis* (in the eastern portions of the valley), and *Batulius setosus*, *Edrotes barrowsi*, and *Chilometopon brachystomum* (in the western valley) are all sensitive to levels of aeolian sand activity (all preferring active dunes and hummocks). Members of other coleopteran families such as Ptinidae (*Niptus ventriculus)* and Dermestidae (*Novelis picta*) can also be useful indicators of aeolian sand Habitat in this region (Andrews et al. 1979). These arthropods, being largely detritivores, as well as many being prey for fringe-toed lizards (Barrows and Fisher, in prep.) form a potentially important trophic level/species assemblage monitoring target. These species can accentuate the level of monitoring above that obtained strictly from only ant data. Adding the sand treader cricket, and perhaps the Jerusalem cricket (see below), provides an efficient and information rich database. The abundance of each of these arthropod species, across the east-west moisture cline within the Coachella Valley, could result in statistical problems when each species is compared individually. However, when examined as a biologically defensible species assemblage, or community, sample sizes will be ample to meet statistical requirements.

The relationship between mesquite hummocks and groundwater will be evaluated through the Monitoring Program. The objectives of this research will include, (1) to monitor the plant characteristics and hydrologic conditions of mesquite hummocks in the Coachella Valley; (2) to determine the source(s) of water utilized by the mesquite; and (3) to relate vegetation health and reproduction to varying hydrologic conditions in the Coachella Valley. The study will involve compiling existing vegetation and hydrologic data as GIS layers, coordination with CVWD on ground-water level data they collect from existing wells, and monitoring plant characteristics and hydrologic conditions at the sites including Willow Hole,

Thousand Palms, East Indio Hills, Indio Hills Palms, and Dos Palmas Conservation Areas. Additional support and information in the Willow Hole Conservation Area will be provided by MSWD. The water-level trends from these sites can be compared to precipitation and pumping trends to help determine the natural and/or human-induced impacts on the groundwater system. The GIS will be updated on an annual basis with the data collected by other agencies during this study. These data will be used in conjunction with the hydrologic data to determine if there is a correlation between the health of the mesquite and the hydrologic properties at the site (depth to water and soil moisture). Persistence of the mesquite trees will be monitored to determine if there is a relationship between water-table depth, soil moisture, and reproduction.

8.4.1.3.3 Species Level Monitoring

Key Monitoring Objectives:

- Estimate the distribution or population size of Covered Species to describe status
- Estimate adult survivorship, age structure for some Covered Species
- Develop and evaluate ecological models that propose relationships between biotic and abiotic variables and Covered Species
- Learn more about the ecology of Covered Species
- Identify and evaluate potential threats to Covered Species
- Develop effective and efficient non-lethal sampling protocols

The proposed Monitoring Program provides the ingredients to develop and test hypotheses relating to changes in the abundances of the Covered Species and then to direct appropriate management actions and evaluate the results. These data also provide context for observed species fluctuations so that appropriate management actions can be taken. Species-level monitoring will address when changes in Habitat variables approach critical levels, and identify whether species respond to the management of the Habitat variables in the predicted fashion.

Initially baseline data will be collected on species, including the Coachella Valley fringe-toed lizard, flat-tailed horned lizard, Palm Springs pocket mouse, Coachella Valley round-tailed ground squirrel, Coachella Valley giant sand treader cricket, Coachella Valley Jerusalem cricket, and Coachella Valley milkvetch. The precise protocols to be used for these species will be developed during this baseline phase. Replicated sampling will be used. In addition to presence or absence, relative abundance and other metrics will be recorded, depending on the species (e.g. percentage in flower/fruit for plants). The survey interval and frequency will initially be determined based on feedback from the spring 2003 and 2004 results. Based on the information gathered during the baseline phase, the level of ongoing monitoring appropriate for each of the Covered Species will be determined. However, ongoing monitoring may change over time in response to Adaptive Management needs, changes in technology, or other circumstances.

Within 5 years of Permit issuance, the CVCC shall use a methodology consistent with Section 8.3.2 to estimate the size of the Coachella Valley fringe-toed lizard population within the four designated Core Habitat areas. Sampling shall be designed and implemented according to the Scientific Principles identified in Section 8.3.2. Likewise, within 5 years of Permit issuance, CVCC shall also use a methodology to estimate the size of the flat-tailed horned lizard population within the Thousand Palms Conservation Area. The methodology shall be the mark-recapture protocol adopted by the Flat-tailed Horned Lizard Interagency Coordinating Committee or another methodology consistent with Section 8.3.2 of the Plan. The frequency of population size estimation for both species in the Coachella Valley Preserve shall be based on information needs to establish the status of the species over a variety of environmental conditions. Population estimates as part of the monitoring program shall be linked to the question-based, hypothesis testing approach described in Section 8.2.4.3 and illustrated in Figure 8-4. Thresholds for management action will be identified through this hypothesis-based adaptive management approach. Demographic responses to stressors will be identified and assessed, and management actions will be taken to eliminate potential threats and stressors that are amenable to management action.

Within the Desert Tortoise and Linkage Conservation Area, the CVCC and Caltrans shall coordinate with the USFWS, CDFG, and BLM to identify appropriate areas within the Reserve System to install desert tortoise fencing. This coordination does not obligate CVCC to install fencing.

The sensitivity of the Covered Species to invasive weeds is not well understood. As shown in Figure 8-8, the impact of weeds could be identified as either a reduction in native ant abundance or an increase in the stabilization of the aeolian sands. Since both stabilization and ant abundance are to be measured directly and simultaneously with exotic species abundance, monitoring should provide an adequate indication if management actions are necessary to control the weeds.

Monitoring will be subject to regular evaluation and adaptive changes. These evaluations need to examine appropriate sampling efforts required for adequate accuracy and precision of monitoring as defined by management needs (e.g. Covered Species), as well as defining their efficacy in providing insights for the development and testing of hypotheses regarding changes in the conceptual model.

8.4.2 Alluvial Fan and Wash Communities

Desert Scrub Natural Communities:

- Sonoran Creosote Bush Scrub
- Sonoran Mixed Woody and Succulent Scrub
- Mojave Mixed Woody Scrub

Desert Dry Wash Woodland and Mesquite Natural Communities

- Desert Dry Wash Woodland

- Mesquite Bosque

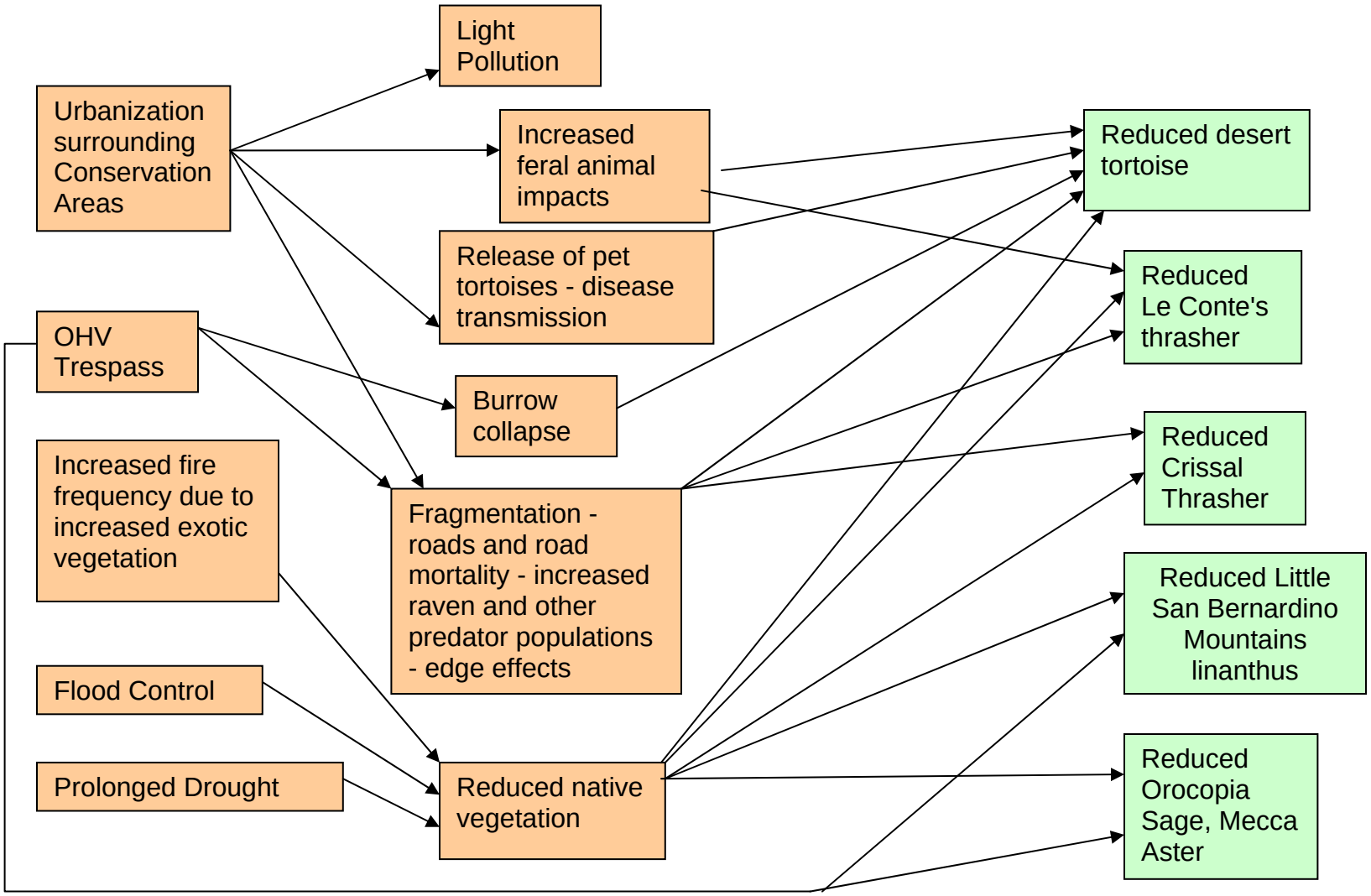
Associated Covered Species

- Burrowing owl (*Athene cunicularia*)
- Crissal thrasher (*Toxostoma crissale)*
- Desert tortoise *(Gopherus agassizii)*
- Le Conte's thrasher (*Toxostoma lecontei)*
- Little San Bernardino Mountains linanthus (*Linanthus maculatus*)
- Mecca aster *(Xylorhiza cognata)*
- Orocopia sage (*Salvia greatae*)

8.4.2.1 Background and Models

Species associated with alluvial fans and washes that are covered by the Plan are listed above. It is somewhat misleading to assume that these species are an assemblage or community, because they rarely occur sympatrically. However, they all do occur on the alluvial fans and associated washes, and are susceptible to many of the same threats or stressors. Figure 8-9 is a conceptual model of the threats in alluvial fan and wash Habitats.

Figure 8-9: Alluvial Fan and Wash Habitat Threats Model



Generally, alluvial fans are less dynamic than aeolian Habitats, but the associated washes are subject to periodic flooding events. Flooding events are not only important to the species living there, but also serve as critical transport for sediment for the aeolian sand Habitats. The apparent higher level of stability has made alluvial fans the preferred area for urban development, the source of many threats to the species living there.

Threats on the alluvial fans and within washes include OHV damage to plants and animal burrows and increased fire frequency due to weed proliferation. For instance, repeated fires on the lower alluvial fan, north of Interstate 10 and near Highway 62, appear to have altered the dominant plant cover, removing much of the creosote bush and replacing it with the native brittlebush (*Encelia farinosa),* non-native filaree (*Erodium sp.),* mustard (*Brassica sp.),* and non-native invasive grasses. The impacts of these changes on the Covered Species of plants and animals have not been quantified.

Another stress comes from the urban interface where rodents, reptiles, and ground (or near ground) nesting birds suffer increased predation and harassment from feral pets. Common raven populations have increased dramatically primarily because of supplemental food resources at landfills and road kills. Ravens have been implicated in reduced survivorship of hatchling tortoises throughout the California deserts. Desert tortoises are also vulnerable to an upper respiratory virus (URDS), as well as a fungus that causes shell necrosis. Both of these diseases can eventually be fatal. The original cause of the disease outbreak is not fully understood, but it is believed that URDS was spread between wild populations by the release of infected captive tortoises.

8.4.2.2 Management: Alluvial Fan and Wash Communities

Ongoing Management. Based on conceptual threats model and past research, OHV trespass should be eliminated from all areas designated to protect the desert tortoise and other Covered Species associated with alluvial fans and washes. This can be accomplished through both fencing and signing property boundaries, and by active and frequent patrolling. These areas probably do not attract significant pedestrian or equestrian traffic, but if such access is desired it will be restricted to a specific trail system and carefully controlled. Other threats that could pose a problem for Covered Species and natural communities include illegal vehicle travel within washes, sand and gravel mining, illegal berming and drainage diversion. The potential impacts of these threats will be controlled and managed.

Ongoing management will ensure that continuous Habitat is protected to provide for Essential Ecological Processes including but not limited to dispersal mechanisms; movement of pollinators, seed dispersal, and mycorrhizal relationships for plant species, and soil characteristics for insect species.

Management of lands within the Mission Creek drainage will require coordination with the Wildlands Conservancy with respect to their lands in the Mission Creek Preserve.

Adaptive Management. If weeds are identified as a limiting factor in any species' distribution, Adaptive Management research will be initiated to examine causal relationships and control mechanisms. Successful control strategies will then be implemented.

In desert dry wash woodland communities, hydrological regimes are an important component of the maintenance of these areas. To ensure maintenance of the Habitat for Covered Species including Little San Bernardino Mountains linanthus, the potential for periodic and unpredictable flooding to rework stream channels and channel sediments, and create shallow terraces along the wash bottom must be maintained. More data are needed to evaluate the significance of these processes.

An evaluation of the impacts of road mortality and the need for tortoise-proof fencing along roads, including Dillon Road if this road is widened, will be completed.

8.4.2.3 Monitoring: Alluvial Fan and Wash Communities

The following objectives will guide the development of monitoring protocols for landscapes, natural communities, and species in the various alluvial fan and wash associated Habitats.

8.4.2.3.1 Landscape Level Monitoring

Key Monitoring Objectives:

- Collect data on environmental variables (e.g., local, regional, and global weather patterns) identified in the conceptual models
- Develop and test conceptual models about how changes to the landscape impact Covered Species
- Determine and quantify changes in Habitat that may affect Covered Species
- Assess landscape connectivity between preserves through hypothesis testing
- Relate changes in Habitat to changes in annual weather patterns

Since the alluvial fans are less dynamic than aeolian Habitats, a less frequent landscape monitoring regime may be possible. By identifying the areal extent of exotic species invasions and/or natural ground cover loss, and identifying OHV trouble spots, satellite imagery should prove useful in defining where management actions are needed, and could help refine individual species models. After an initial satellite image is purchased, new images would be obtained about every five years.

Annual weather fluctuations will have an overriding affect on the annual distribution, abundance, and reproduction of alluvial fan and wash species. Understanding weather effects are essential to understanding background variation in the system, which eventually could lead to distinguishing anthropogenic stressors from this natural variation. The two permanent, continuously recording weather stations established for the aeolian community monitoring,

supplemented by additional weather data from airports and existing stations, should be sufficient for describing the weather variation across the Coachella Valley's alluvial fans and washes.

8.4.2.3.2 Natural Community Level Monitoring

Key Monitoring Objectives:

- Estimate distribution and abundance of exotic invasive plants
- Estimate live perennial shrub abundance and distribution
- Ground-truth the spatial extent of Habitats as shown in the satellite imagery and aerial photography
- Develop and evaluate models about relationships between changes in vegetation, landscape level variables, and responses by covered species

The increased abundance of non-native invasive annual plants (with one result being an increased fire frequency) appears to be the most important stressor affecting the species living on the alluvial fans and in associated washes (See Figure 8-9). These causes tend to decrease native shrub cover, and potentially decrease native annual production through various types of competition (e.g. moisture depletion, interference competition, etc.). Analysis of the multi-band satellite images will be used to evaluate these variables.

More precise data on the abundance and species composition of exotic invasive weeds will be obtained by collecting information along transects much the same way as was described within the Habitat and Natural Community Level Monitoring section for the aeolian sand Habitat. These transects will be distributed on alluvial Habitats within the preserve areas established by the Plan where sensitive species or species associations are known to occur, according to the scientific principles and accepted sampling design guidelines. In this Habitat, sand compaction is not believed to be an informative metric, and so will not be measured. There are no data to indicate that ants or other ground invertebrates in this community are indicators of the condition of the overall Habitat or serve as direct links to the Covered Species. Until those links are established, invertebrates will be sampled as a pilot investigation only, and then continued or discontinued based on the utility of those data.

8.4.2.3.3 Species Level Monitoring

Key Monitoring Objectives:

- Estimate the distribution or population size of Covered Species to describe status
- Estimate adult survivorship, age structure for some Covered Species (e.g. desert tortoise)
- Develop and evaluate ecological models that propose relationships between biotic and abiotic variables and Covered Species

- Learn more about the ecology of Covered Species
- Identify and evaluate potential threats to Covered Species
- Develop effective and efficient non-lethal sampling protocols

Initially baseline data will be collected on all of the species, including the desert tortoise, Le Conte's thrasher, crissal thrasher, burrowing owl, Little San Bernardino Mountains linanthus, Mecca aster, and the Orocopia sage. The precise protocols to be used for these species will be developed during the baseline phase. Very little is known about a number of these species in the Plan area. In spring 2003, surveys focused on both crissal and Le Conte's thrashers were initiated to visit known locations for these species, describe Habitat correlates, and begin to test and refine species distribution models. Tests to evaluate different sampling strategies for detection of Le Conte's thrasher were initiated.

Surveys will also be completed for Little San Bernardino Mountains linanthus, Mecca aster, Orocopia sage, and burrowing owl, to better describe their distribution and refine the species distribution models. Each species will likely be surveyed along transects or within plots, using replicated sampling. In addition to presence or absence, relative abundance and other metrics will be recorded, depending on the species. For example, for the plant species characterization of the associate plant community and assessment of the presence of invasive species will be completed. For burrowing owl, some means to track reproductive success will be tested. The survey interval and frequency will be determined based on feedback from the spring 2003 results. Based on the information gathered during the baseline phase, the level of ongoing monitoring appropriate for each of the Covered Species will be determined. However, ongoing monitoring may change over time in response to Adaptive Management needs, changes in technology, or other circumstances.

Biologists from the Bureau of Land Management will monitor desert tortoises, as their most dense population is restricted to BLM administered lands at the so-called Mesa site. Data will be collected on abundance, age class distribution (size), and sex ratios at the Mesa site.

In the Indio Hills/Joshua Tree National Park Linkage Conservation Area the movement of species other than Covered Species is important to maintain Habitat connectivity and ecosystem function between the Thousand Palms Conservation Area and the Joshua Tree National Park Conservation Area. A monitoring program following the Scientific Principles will determine the use of this area by desert bighorn sheep, coyotes, and other wildlife. Data will be used to address the need for measures to ensure that wildlife can cross Dillon Road, which could include lowering of speed limits, directed fencing along the roadside, underpass construction, or signage.

Taken together, the proposed program provides the ingredients to develop and test hypotheses relating to changes in the abundances of the Covered Species and then to direct appropriate management actions. These data also provide context for observed species fluctuations so that appropriate management actions can be taken.

8.4.3 Riparian and Desert Fan Palm Communities

Riparian and Desert Fan Palm Natural Communities

- Arrowweed Scrub
- Desert Fan Palm Oasis Woodland
- Southern Arroyo Willow Riparian Forest
- Sonoran Cottonwood-Willow Riparian Forest
- Southern Sycamore-Alder Riparian Woodland

Associated Covered Species

- Arroyo toad (*Bufo microscaphus californicus)*
- Least Bell's vireo (*Vireo bellii pusillus)*
- Southern yellow bat (*Lasiurus xanthinus)*
- Southwestern willow flycatcher (*Empidonax extimus traillii)*
- Summer tanager (*Piranga rubra)*
- Triple-ribbed milkvetch (*Astragalus tricarinatus)*
- Yellow-breasted chat (*Icteria virens)*
- Yellow warbler (*Dendroica petechia brewsteri)*

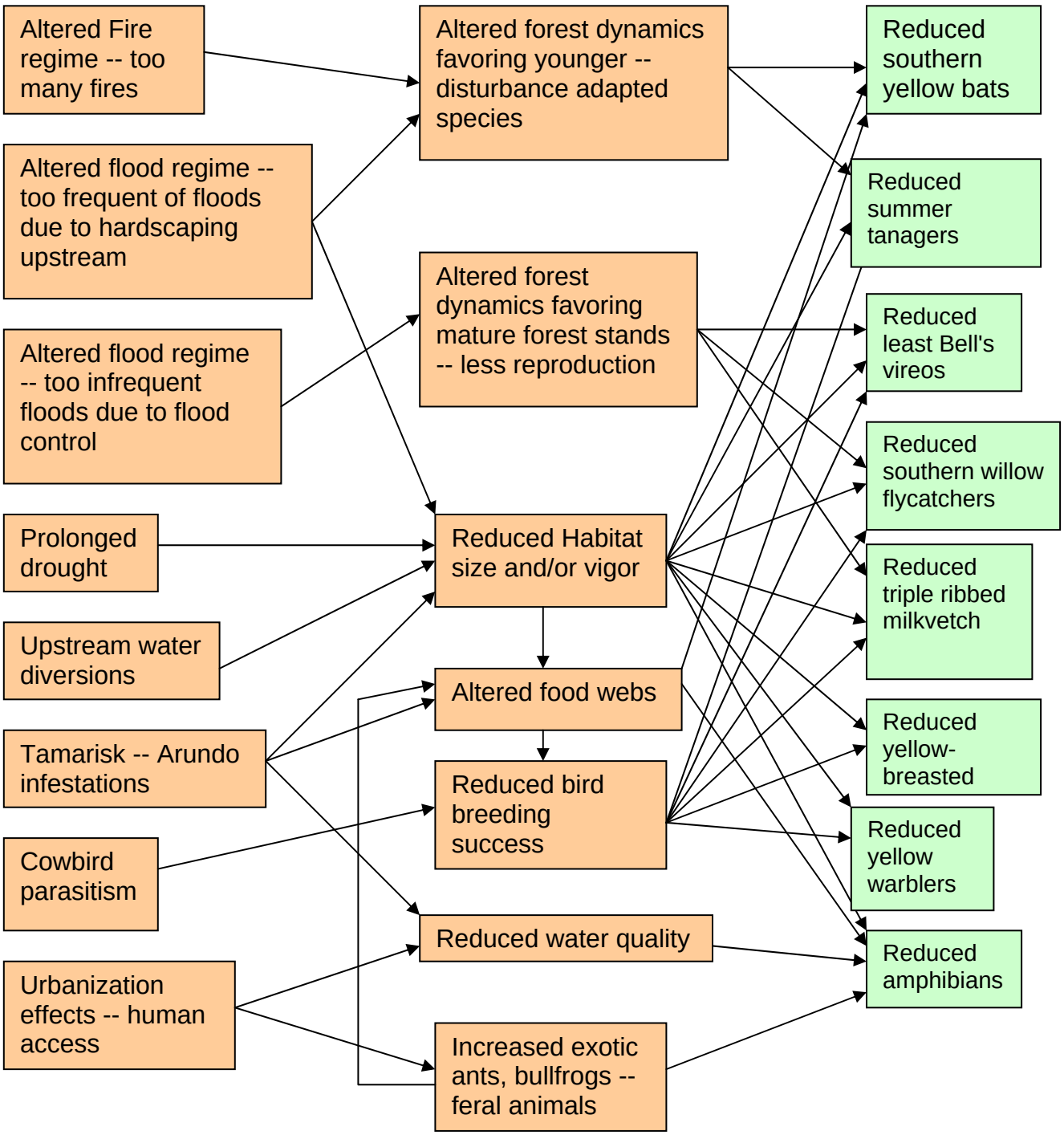
8.4.3.1 Background and Models

The riparian communities within the Plan area include the natural communities listed above. Proposed Covered Species associated with these communities are also listed above. Representative locations for these communities include Chino Canyon, Oasis de Los Osos (San Jacinto Mountains), the Whitewater River, Mission Creek, Cottonwood Creek and Stubbe Canyons (San Bernardino Mountains), Willow Hole oasis, Thousand Palms oasis (Indio Hills), the Coachella Valley Stormwater Channel and Delta area, Dos Palmas oasis, Andreas oasis, Salt Creek (Dos Palmas ACEC), and Hidden Palms as well as numerous other palm oases in the Santa Rosa Mountains. These riparian communities are generally linear, discrete, widely separated Habitats within a matrix of highly arid communities, which are inhospitable for these Covered Species.

Numerous potential threats affect these communities and the associated species Figure 8-10 is a preliminary conceptual model of threats in riparian Habitats. Many of the stressors are rooted in altered hydrologic regimes. These regimes have increasingly altered seasonality, flow frequency, volume, and purity (lack of pollutants) of water. Tamarisk, or salt cedar, (*Tamarix ramosissima)* has reduced surface water availability and increased soil salinity, dramatically altering the quality of riparian Habitats throughout the Coachella Valley and southwestern deserts (Lovich 1996, Barrows 1993). Potential threats from exotic species such

as bullfrogs (*Rana catesbeiana*), cowbirds (*Molothrus ater)*, and Argentine ants (*Linepithema humile*) have most likely reduced native species viability or presence. Riparian communities are generally believed to be among the most biologically diverse and productive communities, and are subject to very real and severe threats. Because of the already introduced threats to these diverse areas, a monitoring and Adaptive Management approach is essential to insuring their continued viability.

Figure 8-10: Riparian Habitat Threats Model



In the vicinity of the Salton Sea, riparian management and restoration activities will be coordinated with the State of California Resources Agency.

8.4.3.2 Management: Riparian and Desert Fan Palm Communities

Ongoing Management. Management of some of the riparian areas where they occur within Existing Conservation Lands has focused on removal of tamarisk. For example, at the Thousand Palms Preserve and at Dos Palmas, ongoing efforts to remove tamarisk have been very successful. Other threats that could pose a problem for Covered Species and natural communities include illegal vehicle travel within washes, sand and gravel mining, illegal berming and drainage diversion. The potential impacts of these threats will be controlled and managed.

CVWD will establish permanent riparian Habitat including at least 44 acres of Sonoran cottonwood-willow riparian forest in this Conservation Area to replace the Habitat that is periodically altered by flood control maintenance activities. The 44 acres address impacts to 37 acres of Sonoran cottonwood-willow riparian forest and 46 acres (at a 1:7 ratio) of primarily tamarisk scrub interspersed with occasional cottonwoods and willows. This Habitat will provide for the Conservation of this natural community and the riparian birds covered by the Plan. Within two years of Permit issuance, a plan detailing the location, water supply, and monitoring and management responsibilities, including funding, shall be prepared by CVWD and submitted to the Wildlife Agencies for review and approval. The Habitat will be established within three years of approval by the Wildlife Agencies.

Management of lands within the Mission Creek drainage will require coordination with the Wildlands Conservancy with respect to their lands in the Mission Creek Preserve.

Adaptive Management. Adaptive Management in the riparian systems will focus on identification of threats and development of a Monitoring Program to address the management questions related to these threats. Threats are discussed in the section below. Some of the issues that have been identified to be addressed through Adaptive Management include:

1. Evaluation of the hydrological regimes that are important in riparian systems. In particular, hydrologic studies in the Salt Creek area are needed to determine if the water sources for Salt Creek are adequately protected or if additional water sources may be needed. Water sources could include canal water or existing wells.
2. Steps to enhance and restore riparian Habitat in the lower portion of the Whitewater River, if monitoring shows declines in the numbers of riparian species. Determine the potential need for additional cover to enhance the Biological Corridor, especially under the Interstate 10 bridge.

Adaptive management for desert fan palm oases will likewise focus on identification of threats and development of a Monitoring Program to address the management questions related to these threats. Issues that have been identified to be addressed through Adaptive Management include:

1. If the groundwater monitoring of wells north and south of the faultline shows substantial declines related to surface water levels at the desert fan palm oases, determine appropriate measures, which may include water conservation, restrictions on additional water use, or surface flow alterations above the oasis, that could remediate the water supply to the oasis to baseline levels.

8.4.3.3 Monitoring: Riparian and Desert Fan Palm Communities

The following objectives will guide the development of monitoring protocols for landscapes, natural communities, and species in the various riparian Habitats.

8.4.3.3.1 Landscape Level Monitoring:

Key Monitoring Objectives:

- Collect data on environmental variables (e.g., local, regional, and global weather patterns) identified in the conceptual models
- Develop and test conceptual models about how changes to the landscape impact Covered Species
- Determine and quantify changes in Habitat that may affect Covered Species
- Assess landscape connectivity between preserves through hypothesis testing
- Relate changes in Habitat to changes in annual weather patterns

To monitor the long-term ebbs and flows of these communities, digital satellite imagery will be used to evaluate the aerial extent of riparian vegetation at each site, thus allowing change detection over time. Satellite or aerial imagery will also be used to identify potential compromises to hydrologic processes (e.g. upstream developments, new well locations, etc.). There is also potential to use satellite imagery to identify exotic species infestations, such as tamarisk, but this use has not been fully explored and tested. Although the riparian communities are dynamic in response to flood events, the rarity of these events probably warrants satellite images are taken no more frequently than every five years.

USGS gauging stations exist in Mission Creek, Deep Canyon, Salt Creek (Dos Palmas), and on the Whitewater River. Data from these stations, coupled with the two weather stations described for aeolian community monitoring, will provide information on the flood processes that affect the riparian communities. These data are collected continuously.

8.4.3.3.2 Natural Community Level Monitoring

Key Monitoring Objectives:

- Estimate distribution and abundance of exotic invasive plants
- Estimate live perennial shrub distribution and abundance

- Ground-truth the spatial extent of Habitats as shown in the satellite imagery and aerial photography
- Relate changes in vegetation to landscape-level monitoring variables
- Develop and evaluate modeled relationships between changes in vegetation, landscape level variables, and responses by Covered Species.
- Track changes in ground water levels from wells and surface water in the vicinity of fan palm oases.

To assist in monitoring ground water levels, shallow wells within these communities can be easily installed. These wells can be placed relatively inexpensively by forcing or digging 2" - 3" perforated PVC pipe into the ground until it is well within the groundwater level, with the pipe capped to prevent foreign material from falling in. Groundwater levels can then be easily measured by inserting a probe and measuring the distance from ground level to the wet mark on the probe. It is proposed to install at least two such monitoring wells at each monitoring site, one at the up-stream end of the Habitat, and the other at or near the down-stream end. The wells will be made as inconspicuous as possible to avoid vandalism, and could require a locking collar should this occur. The locations will be mapped with a GPS unit for easy location. Additionally, a water sample will be collected for testing for pollutants, with testing completed by a contracted water quality laboratory. Groundwater levels and water quality samples should be taken at each monitoring location once a year, during species monitoring surveys.

Exotic species infestations constitute a significant threat to these Habitats. Tamarisk (*Tamarix ramosissima)* is the most obvious of these weed species, but several other exotic invaders are possible (e.g. fountain grass (*Pennisetum setaceum)*, giant reed (*Arundo donax))*. A straightforward method of identifying exotic infestations is to conduct Covered Species monitoring by biologists familiar with the native and potential non-native flora. Exotic species and their general abundance will be recorded on field data forms and reported to land managers for removal or control. Efforts to control tamarisk have targeted the Dos Palmas area, which is heavily infested with tamarisk, except in areas where eradication was successful (See Section 8.4.3.2). Tamarisk control has also been underway since the 1990s in the numerous un-named palm oases in the Santa Rosa Mountains, many of which are important bighorn sheep watering holes, but is not complete. Initial control efforts and removal of tamarisk must be followed up with ongoing treatment. As a result, every 3-5 years, each palm oases will be visited, and weed control programs implemented as needed.

Exotic infestations are not limited to plants. Brown-headed cowbirds (native to portions of North America, but not California) pose a potential threat to the reproductive success of riparian nesting birds because they are nest parasites. In some areas, controlling cowbirds can have an immediate benefit to the reproductive success of nesting birds. However, in other areas, especially where natural nest predation is relatively high, controlling cowbirds may have no measurable effect (Gerald Braden, pers. comm.). Before a cowbird control effort is initiated, baseline parasitism rates versus reproductive success of the Covered Species should be determined. While conducting breeding bird surveys, qualified biologists will investigate all active nests to determine if cowbird eggs or nestlings are present. The

presence and abundance of cowbirds will be noted during all bird surveys. If cowbirds appear to be a threat, cowbird traps will be built and placed in targeted areas.

Exotic ants, especially Argentine ants and fire ants, can reduce reproductive success in riparian birds by direct predation on nestlings, and possibly by disrupting natural food webs. The presence or absence of these ants will be monitored. Managers need to keep abreast of innovative tools for ant control that may be developed elsewhere. Monitoring for these ants will involve placing baited tube vials at each monitoring site, flush to the ground, and checking their contents during bird surveys. The vials will be narrow enough to exclude vertebrates and will only be left open for a few days at a time.

Bullfrogs, other non-native frogs (e.g. African clawed frogs), and non-native fish have the potential to prey on and kill off native amphibians. During amphibian surveys, qualified biologists need to search for these exotic species, noting them on data sheets, and reporting them immediately to land managers. Temporary de-watering, seining, electro-shocking, and "hunting" with spears and guns are all potential tools to control and remove these exotics.

8.4.3.3.3 Species Level Monitoring

Key Monitoring Objectives:

- Estimate the distribution or population size of Covered Species to describe status
- Develop and evaluate ecological models that propose relationships between biotic and abiotic variables and Covered Species
- Learn more about the ecology of Covered Species
- Identify and evaluate potential threats to Covered Species
- Develop effective and efficient non-lethal sampling protocols

The landscape and Habitat level techniques described here are likely to be the most useful in implementing an Adaptive Management plan, because management tools act directly on these variables, and generally not on the Covered Species. Species-level evaluations will be performed to identify when changes in Habitat variables approach critical levels, and to insure that the species respond to the management of the Habitat variables in the predicted fashion.

Initially baseline data will be collected on all of these species, including the arroyo toad, least Bell's vireo, yellow warbler, yellow-breasted chat, southwestern willow flycatcher, summer tanager, southern yellow bat, and the triple-ribbed milkvetch. For the riparian birds, an example of the monitoring approach currently being evaluated is described in Appendix I. The precise protocols to be used for all of these riparian species will be developed during the baseline phase. Very little is known about a number of these species in the Plan area. In the spring of 2003, surveys focused on the Covered riparian bird Species. During surveys for these species, data will be collected on Habitat variables, possible causal factors of species

distributions, and species distribution models. These surveys will also gather baseline data on ant populations to track invasive species impacts.

Surveys will also be completed for triple-ribbed milkvetch and arroyo toad. In addition to presence or absence, relative abundance and other metrics will be recorded, depending on the species. For example, for the milkvetch, characterization of the associated plant community and assessment of invasive species impacts will be completed. The survey interval and frequency will be determined based on feedback from the spring 2003 results. Based on the information gathered during the baseline phase, the level of ongoing monitoring appropriate for each of the Covered Species will be determined. However, ongoing monitoring may change over time in response to Adaptive Management needs, changes in technology, or other circumstances.

Taken together, the proposed program provides the ingredients to develop and test hypotheses relating to changes in the abundances of the Covered Species and then to direct appropriate management actions. These data also provide context for observed species fluctuations so that appropriate management actions can be taken.

8.4.4 Saltbush Scrub and Alkali Flats Communities

Natural Communities

- Desert Saltbush Scrub
- Desert Sink Scrub

8.4.4.1 Background and Models

The desert saltbush scrub and desert sink scrub natural communities are not well known in the Plan Area. The model will be developed during the baseline phase.

8.4.4.2 Management: Saltbush Scrub and Alkali Flats Communities

Ongoing Management. Desert saltbush scrub and desert sink scrub communities are present in the Dos Palmas and Coachella Valley Stormwater Channel and Delta Conservation Areas. Management has not focused on the ecology of these natural communities. Management issues and questions will be identified during Plan implementation.

Adaptive Management. Adaptive Management in the desert saltbush scrub and desert sink scrub natural communities will focus on identification of threats and development of the monitoring questions to address the management issues related to these threats. Threats are discussed in the section below. Adaptive Management will focus on reduction of uncertainty about the ecology and management of this community and its associated Covered Species. The Monitoring Program will be used to address the management questions related to those threats.

8.4.4.3 Monitoring: Saltbush Scrub and Alkali Flats Communities

The following questions will guide the development of monitoring protocols at the landscape, natural community, and species level in these natural communities.

8.4.4.3.1 Landscape Level Monitoring

Key Monitoring Objectives:

- Conduct studies to understand the Essential Ecological Processes in these natural communities

8.4.4.3.2 Natural Community Level Monitoring:

Key Monitoring Objectives:

- Estimate distribution and abundance of exotic invasive plants
- Estimate live perennial shrub distribution and abundance
- Ground-truth the spatial extent of Habitats as shown in the satellite imagery and aerial photography
- Develop and evaluate modeled relationships between changes in vegetation, landscape level variables, and responses by Covered Species

8.4.4.3.3 Species Level Monitoring

Key Monitoring Objectives:

- Estimate the distribution or population size of Covered Species to describe status
- Compare distribution of flat-tailed horned lizard in saltbush scrub and desert sink scrub compared to other natural communities
- Develop and evaluate ecological models that propose relationships between biotic and abiotic variables and Covered Species
- Learn more about the ecology of Covered Species
- Identify and evaluate potential threats to Covered Species

8.4.5 Marsh Communities

Marsh Natural Communities

- Cismontane Alkali Marsh
- Coastal and Valley Freshwater Marsh

Associated Covered Species

- California black rail (*Laterallus jamaicensis)*
- Desert pupfish, (*Cyprinodon macularis)*
- Yuma clapper rail, (*Rallus longirostris yumanensis)*

8.4.5.1 Background and Models

The Plan area includes significant marsh and estuary Habitat at Dos Palmas and the north end of the Salton Sea. Covered Species within these marsh Habitats are listed in Section 8.4.5. Beyond these three species, this community supports significant populations of other marsh-nesting birds.

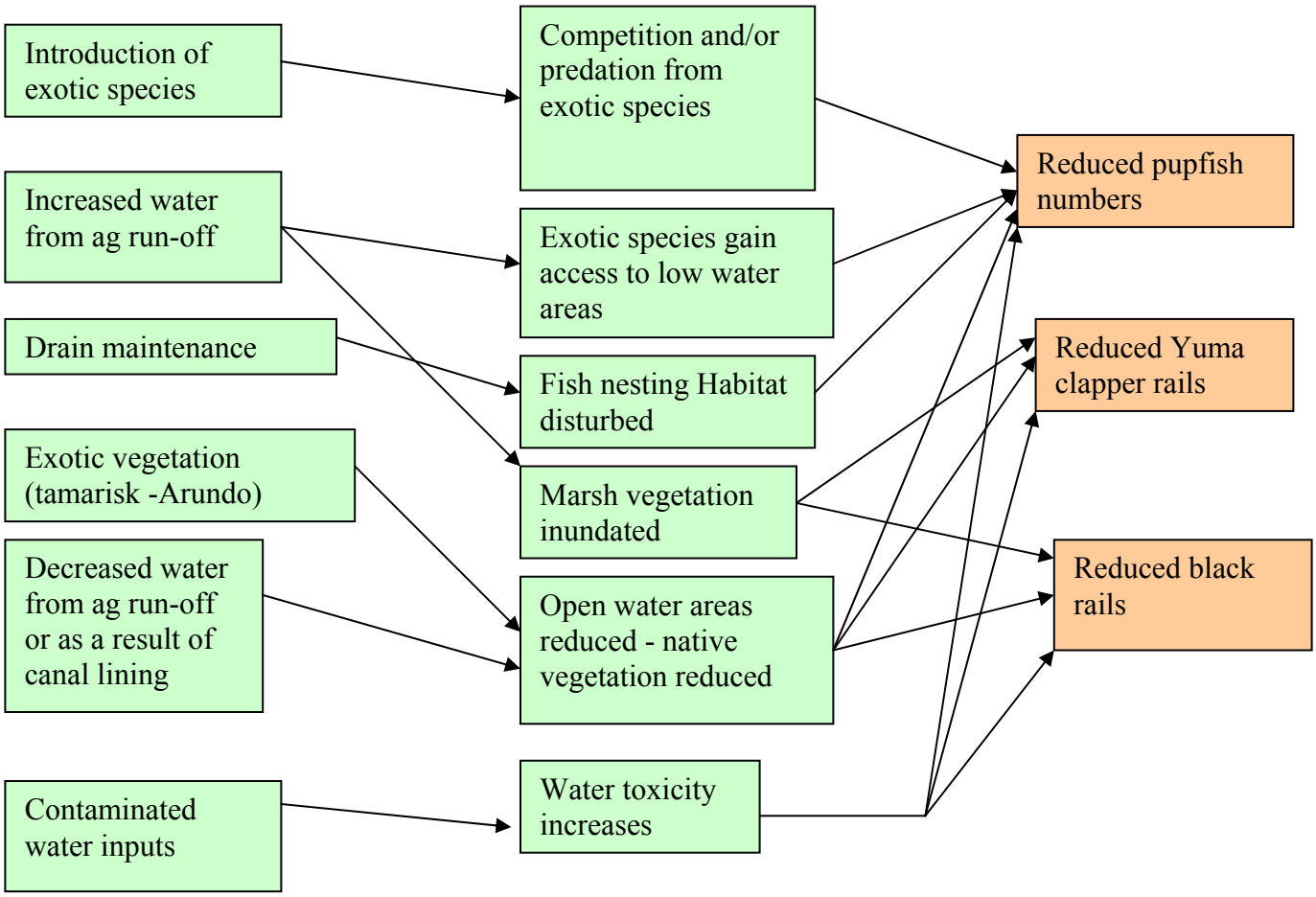
The primary threats to this community, shown in the conceptual model in Figure 8-11, include changes in water availability, water quality, and the infestation of exotic species of plants and fish. These threats can be particularly acute due to the partially anthropogenic character of both the Salton Sea and Dos Palmas. The level of the Salton Sea is maintained primarily by agricultural run-off. The immediate issue with the Salton Sea is the increasing salinity. Current efforts to stabilize and/or reduce salinity will have unknown effects on water levels, and the results are far from assured. The wetlands at Dos Palmas are partially enhanced by leakage along sections of the Coachella Canal. To provide additional water to the Los Angeles region, the canal will be lined, and the majority of this leakage will be stopped. The planning and regulatory processes for the canal-lining project stipulate that there would be no net loss of wetland Habitats. The priority for public safety and human water requirements however, means that reserve managers will not be able to control fully the water inputs to either of these systems.

In the vicinity of the Salton Sea, marsh community management and restoration activities will be coordinated with the State of California Resources Agency.

8.4.5.2 Management: Marsh Communities

Ongoing Management. The control of tamarisk is one of the tools land managers will have to improve water availability and Habitat quality. During all species level monitoring, the location of any tamarisk plants will be noted and mapped. Those locations will be provided to appropriate management officials. However, extremely dense vegetation can reduce open water Habitat for the pupfish. Models for pupfish ecology can identify vegetation characteristics that could be management targets because of their proposed affect on the fish. The challenge is establishing a target of vegetation density, above which management actions will be required. Experienced pupfish biologists generally have a gestalt of knowing Habitat that is too dense when they see it, but quantifying those levels is a more elusive matter. This problem will need to be addressed during early baseline monitoring. One straightforward way to undertake this would be to let the Covered Species' abundances dictate when vegetation density exceeds acceptable limits. However, the Habitat limits for a pupfish are very different from those for a rail. For instance, at the created marsh Habitat of Dos Palmas, separate areas

Figure 8-11: Marsh Habitat Threats Model



are managed for pupfish and for rails, allowing very different management treatments without Covered Species conflicts.

The Coachella Valley Water District (CVWD) will establish 66 acres of permanent Habitat for the California black rail and Yuma clapper rail in this Conservation Area to replace the 41 acres of Habitat in the Coachella Valley Stormwater Channel and the 25 acres of Habitat in the drains that is periodically altered by flood control and drain maintenance activities. CVWD will ensure that the water used to support the managed marsh Habitat is irrigation water from the Lower Colorado River (LCR) or is other water with the same selenium concentration as water from the LCR or that meets an EPA selenium standard for protection of aquatic life that has received a No Jeopardy determination from the USFWS, whichever is greatest. Within two years of Permit issuance, a plan detailing the location, water supply, and monitoring and management responsibilities, including funding, shall be prepared by CVWD and submitted to the Wildlife Agencies for review and approval. The Habitat will be established within three years of approval by the Wildlife Agencies of this plan. As part of its Water Management Plan, CVWD will conduct monitoring of selenium concentrations in the drains and the Coachella Valley Stormwater Channel. This monitoring will allow CVWD to determine if additional measures are warranted to reduce rail exposure to selenium.

CVWD will establish at least 25 acres of managed replacement Habitat for desert pupfish, on a 1:1 ratio at a site or sites to be determined with input from the Wildlife Agencies. The pond or ponds will use irrigation water from the LCR or other water with the same or better water quality as water from the LCR. For selenium concentrations the water can either be water from the LCR, or water that meets an EPA selenium standard for protection of aquatic life that has received a No Jeopardy determination from USFWS, whichever is greatest. It is estimated that approximately 325 acre-ft/yr of water would be required to maintain 25 acres of replacement Habitat, replacing evaporation and maintaining appropriate flow-through rate. Ongoing maintenance and adjustments will be required, including vegetation control and dike and bank maintenance, to achieve desired Habitat characteristics. This Habitat will replace the 25 acres of Habitat that is periodically altered by maintenance activities in drains and flood control channels that contain pupfish Habitat. CVWD, in coordination with IID, will also develop a study to evaluate the potential effect of routine drain maintenance on pupfish occupying the drains to determine the feasibility of modifying maintenance practices to avoid or minimize potential Take. The study will include methods of surveying for pupfish, effects of the direction in which drains are cleaned (upstream or downstream), the manner in which the drains are cleaned (one side at a time or both sides at a time), and the timing of sediment and vegetation removal. The study proposal will be prepared and submitted to the Wildlife Agencies within two years of Permit issuance. The study will be initiated in the field season immediately following approval by the Wildlife Agencies. If the findings indicate that modification of the maintenance practices would significantly minimize impacts to pupfish, CVWD will modify its maintenance practices. Within 5 years of Permit issuance, CVCC shall develop, submit for review and approval by the Wildlife Agencies, and implement a management strategy with the goal of sustaining healthy populations of desert pupfish in the Plan Area in perpetuity.

Adaptive Management. Management options for the pupfish could include the control of invasive vegetation, which should improve water availability. However, some cover should be maintained for moderating temperatures and predator avoidance, if it is determined to be necessary. If no native cover is available, native sedges, rushes and screwbean mesquite may be planted and established before any (and all) salt cedar/tamarisk is removed. Removal of all tamarisk at once should be evaluated in terms of the potential for increased flows that may impact pupfish. If monitoring identifies them as a threat, control and management of exotic or invasive species will be implemented, in coordination with implementation of the recovery plan. If exotic fish are detected, placement of fish barriers and/or seining out remaining exotic fish may be necessary. Temporarily de-watering infected reaches may also be an option. The presence and potential impacts of Asian tapeworm, a potential pupfish parasite, will be addressed in the Monitoring and Management Program.

Management for the rail species will also address invasive species. If monitoring data indicate a threat, management will address control of invasive species, including plant species such as tamarisk and animal species such as non-native ants, brown-headed cowbirds, bullfrogs, crayfish, and other species that threaten rail Habitat. Crayfish are an exotic species that has become an important component of the diet for Yuma clapper rail in the Salton Sea basin (C. Roberts, pers. comm.); if monitoring indicates that control of crayfish is necessary, the need to establish other suitable prey for the Yuma clapper rail shall be evaluated.

Water quality and water supply issues shall also be addressed. Other threats within the Plan Area include groundwater pumping, dewatering, water diversion, drain maintenance activities, OHV use, contaminants, the lining of the Coachella Canal, and fluctuations of the Salton Sea.

8.4.5.3 Monitoring: Marsh Communities

The following objectives will guide the development of monitoring protocols for landscapes, natural communities, and species in the various marsh Habitats.

8.4.5.3.1 Landscape Level Monitoring:

Key Monitoring Objectives:

- Describe local, regional, and global weather patterns that may affect these communities
- Determine and quantify changes in Habitat that may affect Covered Species
- Assess changes in Habitat connectivity
- Identify distribution of and quality of marsh natural communities
- Relate changes in Habitat to changes in annual weather patterns

In conjunction with coverage of the aeolian systems, satellite imagery will be obtained to evaluate the areal extent and condition of the marsh vegetation. It is hoped that the relative extent of exotic vegetation, primarily tamarisk (salt cedar), versus native vegetation types can be determined.

8.4.5.3.2 Natural Community Level Monitoring:

Key Monitoring Objectives:

- Estimate distribution and abundance of exotic invasive plants
- Estimate live perennial shrub distribution and abundance
- Ground-truth the spatial extent of Habitats as shown in the satellite imagery and aerial photography
- Develop and evaluate modeled relationships between changes in vegetation, landscape level variables, and responses by Covered Species

Water levels and quality will be a focus for natural community and Habitat level monitoring. Currently there is a USGS gauging station on Salt Creek, which drains the Dos Palmas basin, and the outflow is currently measured from the primary artesian well at Dos Palmas. Additionally, water flow from the weir below all the 'natural' springs of the upper Dos Palmas oases will be monitored. While the USGS station monitors continuously, the other two water monitoring stations will be monitored monthly. Although water quality at Dos Palmas is not likely to be an issue, nevertheless, an annual water quality evaluation will occur.

At the Salton Sea, water quality and levels are already extensively monitored. Because of the intense focus on, and measurement of, these variables by a myriad of state and local agencies, no additional efforts will be required. CVWD monitors the elevation of the Salton Sea. The State Park and Imperial Irrigation District monitor water levels weekly, and Riverside County monitors water contaminants. Through monitoring and Adaptive Management, hydrologic studies for the Salt Creek area will be completed to determine if the water sources for the black rail, Yuma clapper rail, and desert pupfish Habitat are adequately protected or if additional water sources may be needed.

The CVWD will be responsible for the design and implementation of a Monitoring Program to track the success of the marsh Habitat they will create as a required measure. This Monitoring Program will be developed in coordination with the monitoring and management team for the Plan.

8.4.5.3.3 Species Level Monitoring

Key Monitoring Objectives:

- Determine if the populations of Covered Species are being sustained and restored.

- Further delimit species distribution
- Develop and evaluate ecological models that propose relationships between biotic and abiotic variables and Covered Species
- Learn more about the ecology of the rails
- Identify and evaluate potential threats to Covered Species
- Develop effective and efficient non-lethal sampling protocols

The landscape and Habitat level techniques described here are likely to be the most useful in implementing an Adaptive Management approach, because management tools act directly on these variables, and generally not on the Covered Species. Species-level evaluations will be performed to identify when changes in Habitat variables approach critical levels, and to insure that the species respond to the management of the Habitat variables in the predicted fashion.

Initially baseline data will be collected on all of these species, including the Yuma clapper rail, the California black rail, and the desert pupfish. The precise protocols to be used for these species will be developed during this baseline phase. In addition to presence or absence, abundance and other metrics will be estimated, depending on the species. The survey interval and frequency will be determined based on feedback from the spring 2003 results. Based on the information gathered during the baseline phase, the level of ongoing monitoring appropriate for each of the Covered Species will be determined. However, ongoing monitoring may change over time in response to Adaptive Management needs, changes in technology, or other circumstances.

The CVCC shall implement the following survey and handling methods to minimize impacts to the desert pupfish within the Plan Area:

a. Surveys for desert pupfish shall include the use of wire minnow traps with or without bait. In the event a new Wildlife Agency protocol is developed, this condition shall be replaced subject to review and approval by CVCC.

b. Minnow traps shall be set during daylight hours only and shall be checked for the presence of desert pupfish at least every 3 hours. No overnight trapping shall be allowed.

c. Handling of desert pupfish during surveys shall only involve taking length measurements to assess size and age class of individuals and shall require minimal exposure out of water. Any pupfish exhibiting signs of physiological stress shall be released immediately at the point of capture to minimize the potential for injury associated with such stress.

8.4.6 Desert Scrub, Chaparral, Woodland, and Forest Communities in Mountainous Areas

Chaparral Natural Communities

- Chamise Chaparral
- Redshank Chaparral
- Interior Live Oak Chaparral
- Semi-desert Chaparral

Desert Scrub Natural Communities

- Sonoran Creosote Bush Scrub on mountain slopes
- Sonoran Mixed Woody and Succulent Scrub on mountain slopes

Pinyon and Juniper Woodland Natural Communities

- Mojavean Pinyon and Juniper Woodland
- Peninsular Juniper Woodland and Scrub

Associated Covered Species

- Desert tortoise *(Gopherus agassizii)*
- Gray vireo (*Vireo vicinior)*
- Peninsular bighorn sheep *(Ovis canadensis)*

8.4.6.1 Background and Models

The Covered Species and natural communities associated with mountainous areas are listed above. Since the vast majority of montane communities, and the Habitat for the gray vireo, are in public ownership (primarily U.S. Forest Service and BLM), development is not a significant threat. Altered fire frequency and magnitude, however, remain stressors to these Habitats. Compared to the fire patterns today, historical fires were most likely more frequent but of relatively small size and intensity. The resultant historical pattern of plant communities was probably much more of a mosaic of stand ages and species composition. Fires today are arguably more infrequent and often tend to be larger and more intense. This leaves an even-aged, less diverse stand of vegetation in post-fire periods. While there is a greater awareness by land managers that fire is a natural component of the ecosystem, shifting to a more "natural" fire pattern is highly complicated by human dwellings within fire zones and by many decades of understory build up of fuels causing fires to grow into destructive conflagrations. Long-term impacts of altered fire patterns are difficult to predict and are only now beginning to be understood by land managers. However, what is clear is that very large

and intense fires could eliminate the majority of the Habitat for the Covered Species for many years, potentially resulting in their local extirpation.

The Peninsular bighorn sheep occurs in mountainous lands and on alluvial fans and washes associated with the Santa Rosa and San Jacinto Mountains Conservation Area. This species occurs in desert scrub areas, alluvial fans and washes, and to a lesser extent in the Peninsular juniper woodland and scrub community. The bighorn sheep are not known to use chaparral areas.

The primary human activities in the montane zone are hiking, hunting, mountain biking, and horseback riding. As long as these activities are restricted to designated trails, there is probably little stress to the natural communities. Figure 8-12 depicts the threats model for this assemblage.

8.4.6.2 Management: Desert Scrub, Chaparral, Woodland, and Forest Communities

Ongoing Management. Ongoing management actions will address control of exotic invasive species. Tamarisk control efforts are already underway through a coordinated effort involving CDFG, BLM, and CVMC to remove tamarisk from the canyons in the Santa Rosa Mountains. Other exotic species for which control efforts have not been coordinated include fountain grass (*Pennisetum setaceum*); methods to control this species will be researched, evaluated, and implemented as appropriate.

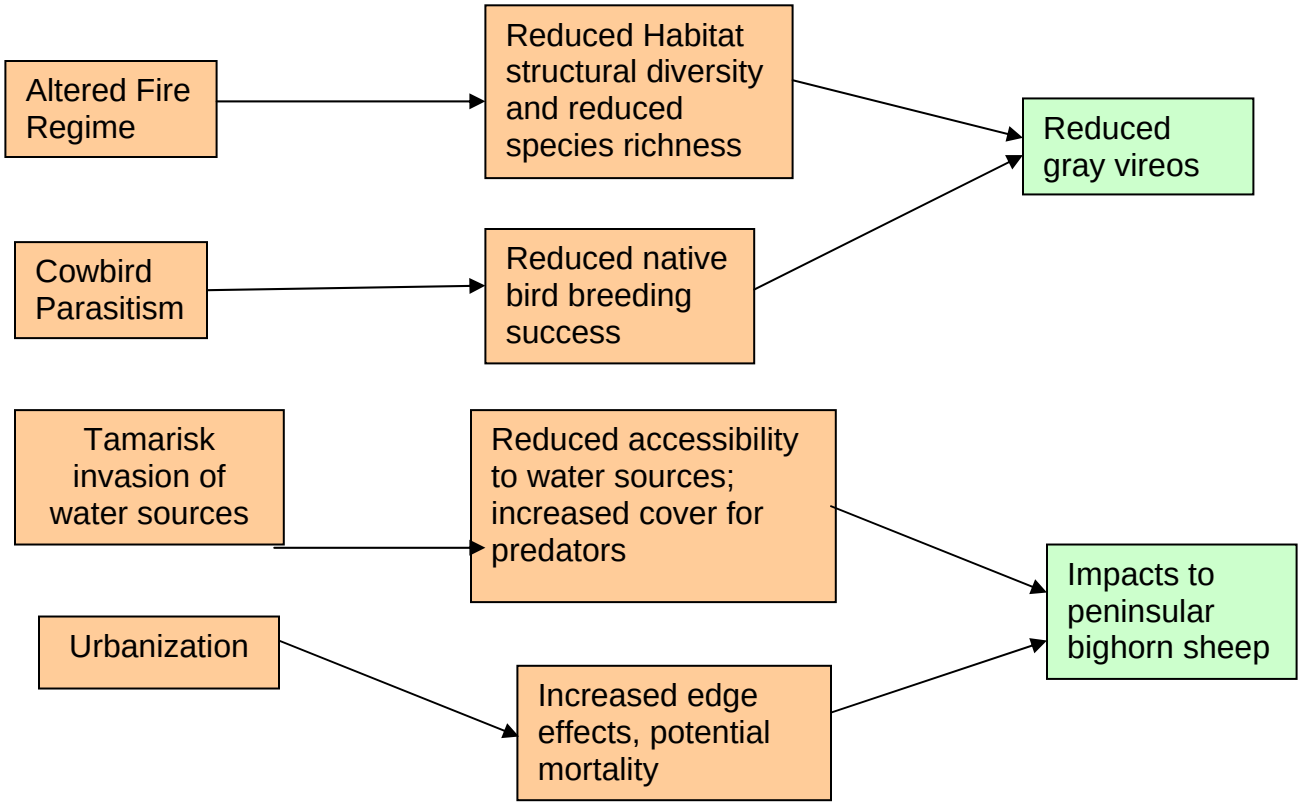
Where necessary, develop fire management guidelines within conserved areas to protect populations from fires and disturbances associated with fire suppression. Fire management is primarily an issue in the western, more mesic, portion of the Plan area where alien annual grasses may facilitate the spread of fire.

Adaptive Management. Land managers should be made aware of vireo nesting Habitats to help guide the implementation of prescribed fires and/or for fighting wildfires. If brown-headed cowbird parasitism is suspected, cowbird eggs shall be removed, the embryo killed, and the egg returned to the vireo nests. If cowbird parasitism is confirmed, cowbird trapping shall be implemented.

Appropriate management prescriptions for pinyon-juniper woodland and chaparral Habitats will be developed. Consideration should be given to the use of prescribed fire and/or standards for controlling wildfires to maintain or restore gray vireo Habitat.

Management of Trails and Public Use. An element of the Management Program in the Santa Rosa and San Jacinto Mountains Conservation Area will involve Adaptive Management of recreational activities including trail use. Specific objectives have been developed for management of recreational use. These objectives focus on the design and management of recreational activities to: (1) support predictable use patterns by trail users; (2) preserve the opportunity for bighorn sheep to access water sources and to move across the

Figure 8-12: Desert Scrub, Chaparral, and Mountain Habitats Threats Model



landscape; (3) provide opportunities for recreation that are compatible with conservation of bighorn sheep populations; (4) evaluate effectiveness of the trails program and recommend modifications to management actions if necessary. These objectives are fully described in Section 2.0 of the EIR/EIS for this Plan.

The Trails Plan will initially focus on multi-agency scientific data gathering to evaluate the effects of recreational trail use on Peninsular bighorn sheep health, habitat selection, and long-term population dynamics. The trails management program is composed of eight elements, which are described briefly below. In addition, the public use and trails management plan addresses other public access issues, and is fully described in Section 7.3.3.2.2. The eight elements, detailed in the following sections, are summarized here: (1) use of existing trails, which will remain open all year; (2) initiation in Plan year 1 of a research program designed to ascertain bighorn sheep response to, and any significant adverse impacts from, recreational trail use in the Santa Rosa and San Jacinto Mountains. This research may include manipulation or limitation of use levels or closures on selected trails as an element of the study design to address specific hypothesis-based research questions; (3) gathering of data on human trail use, primarily on trails within sensitive bighorn sheep lambing habitat and other trails as appropriate. A year-round mandatory self-issue permit system for selected trails will be part of the human use monitoring program. Ongoing monitoring of bighorn sheep

populations will be expanded to include regular monitoring of the distribution, abundance, recruitment, survival and cause-specific mortality of bighorn sheep throughout the plan area; (4) closure of three trails from June 15 through September 30 to minimize the potential impediments for access to water by bighorn sheep and other wildlife during the hot season; (5) deferral of construction of new trails, pending the results of the initial research program, monitoring of trail use, and monitoring of bighorn sheep populations; (6) implementation of a public awareness and education program; (7) annual review of the effectiveness of the public use and trails management program, including results of monitoring, research, and trail management prescriptions. This annual review will consider prudent management actions, including potential trail closures, in response to scientific data or sheep population declines below identified threshold levels; and (8) rerouting and decommissioning of trails to protect sensitive resource values, pending results of the 5-year research program.

An enforcement program will be implemented to ensure compliance with the self-issue permit program and other trail management prescriptions, described in Section 7.3.3.2.1 for selected trails in the Santa Rosa and San Jacinto Mountains Conservation Area. Enforcement personnel will have the ability to issue citations to those using trails subject to the unlimited permit program who do not have a permit. If monitoring shows continued violations of the permit requirement, the enforcement program will be evaluated and modified as needed to achieve greater compliance.

The Trails Management Subcommittee, the membership and responsibilities of which are described in Section 6.3, will annually review effectiveness of the overall trails management program, including progress reports and recommendations from the researcher(s) working on bighorn sheep within the Plan Area; an assessment of bighorn sheep population trends; recreational trail use data; compliance with the hot season closures, mandatory self-issue permits, and other trail management prescriptions; and other new data acquired. The Subcommittee will make recommendations to the RMOC (for portions of trails on non-federal land) and the Santa Rosa and San Jacinto Mountains National Monument Advisory Committee (for portions of trails on federal land) regarding modifications to the trails management program. The trails monitoring program and the research program will provide data for the trails management program. The RMOC shall meet annually, or more often as needed, with the Trails Management Subcommittee to review the results of the trails monitoring program and other relevant data, and shall advise the RMOC and the CVCC regarding any issues identified through monitoring and research.

Another specific element of the trails management program will involve trails to be rerouted and trails to be decommissioned and removed. Section 7.4.1.4.7 lists and describes trails to be decommissioned and removed because they are redundant or because they impact sensitive resource values. The Trails Management Subcommittee will coordinate with the RMUC for the Santa Rosa and San Jacinto Mountains Conservation Area/Reserve Management Unit #6, and the RMOC to implement these changes.

8.4.6.3 Monitoring: Desert Scrub, Chaparral, Woodland, and Forest Communities

The following protocols will be used to monitor landscapes, natural communities, and species in the various chaparral, woodland, and forest Habitats.

8.4.6.3.1 Landscape Level Monitoring

Key Monitoring Objectives:

- Describe local, regional, and global weather patterns that may affect these communities
- Determine and quantify changes in Habitat that may affect Covered Species
- Assess changes in landscape connectivity
- Relate changes in Habitat to changes in annual weather patterns

Satellite images will be taken in conjunction with those for the aeolian community. These images, combined with known locations for the gray vireo, could be used to develop improved species-Habitat models. These models in turn could focus searches in Habitat likely to support this species, and eventually determine the areal extent of its distribution. Fire patterns and recovery can also be tracked over time using this technology.

8.4.6.3.2 Natural Community Level Monitoring:

Key Monitoring Objectives:

- Estimate distribution and abundance of exotic invasive plants
- Estimate live perennial shrub distribution and abundance
- Ground-truth the spatial extent of Habitats as shown in the satellite imagery and aerial photography
- Develop and evaluate models about relationships between changes in vegetation, landscape level variables, and responses by covered species

Exotic species are not currently believed to be a significant threat to these communities. However, biologists will record any infestations that do occur. The perimeter areal extent of the chaparral edge will be delineated with GPS mapping each time new images are obtained. Additionally, permanent on-site digital photo documentation points will be established and monitored. Signs of disturbance from recreational uses will be assessed annually, and if problems are apparent, fencing along trails may be required.

8.4.6.3.3 Species Level Monitoring

Key Monitoring Objectives:

- Determine if the populations of Covered Species are being sustained and restored.
- Estimate adult survivorship, age structure, for some Covered Species (e.g. desert tortoise, bighorn sheep)
- Further delimit species distribution
- Develop and evaluate ecological models that propose relationships between biotic and abiotic variables and Covered Species
- Learn more about the ecology of Covered Species
- Identify and evaluate potential threats to Covered Species
- Develop effective and efficient non-lethal sampling protocols

The landscape and Habitat level techniques described here are likely to be the most useful in implementing an Adaptive Management approach, because management tools act directly on these variables, and generally not on the Covered Species. Species-level evaluations will be performed to identify when changes in Habitat variables approach critical levels, and to insure that the species respond to the management of the Habitat variables in the predicted fashion.

Initially, baseline data will be collected for species-level monitoring. For the gray vireo, an initial focus will be to determine the occurrence of this species in the Conservation Areas. At the present time its status as an extant species in this area is not known. The precise protocols to be used for will be developed during this baseline phase. In addition to presence or absence, relative abundance and other metrics will be recorded, depending on the species. The survey interval and frequency will be determined based on feedback from the spring 2003 results. Based on the information gathered during the baseline phase, the level of ongoing monitoring appropriate for each of the Covered Species will be determined. However, ongoing monitoring may change over time in response to Adaptive Management needs, changes in technology, or other circumstances.

Section 8.4.7 describes monitoring related to recreational activities and trails.

8.4.7 Focused Monitoring Questions

Several elements of the Plan require specific focus to address questions through the Monitoring Program. These monitoring questions require a sampling design that is developed to address these specific questions.

8.4.7.1 Monitoring the Effects of Public Access and Use

8.4.7.1.1 Relationship between Peninsular Bighorn Sheep and Recreational Trails

The focus of this element of the Monitoring Program will be to evaluate the use of recreational trails by hikers, equestrians, and mountain bikers as it relates to Habitat use by bighorn sheep, as described in Section 7.3.3.2.1 of the Plan. The intent for this effort is to monitor trail use to determine the levels of use of various trails in coordination with a research program, which is described in Section 8.5.1. Trail use levels and compliance with a mandatory self-issue permit system, hot season closures, and other trails management prescriptions will be assessed as part of the Monitoring Program. The effects of recreational trail use on Peninsular bighorn sheep will be assessed through the research program.

Biologists and statisticians from CDFG and USFWS have worked with CVAG and BLM to develop a preliminary sampling protocol to assess trail use. The preliminary sampling design would involve sampling personnel who would walk the trails, counting trail users. The level of sampling effort required for this program has been calculated to meet the 99% confidence interval. Four individual trail monitors are needed to collect data with an adequate sample size. Sampling is designed to address use levels on trails subject to the permit system. Trail monitoring will incorporate additional sampling of other trails as appropriate.

A mandatory self-issue permit system will be implemented on the trails or trail segments listed in Element 2, except the Eagle Canyon Trail and Goat Trails, to provide data for the human use monitoring program. These self-issue permits will be required of all trail users on a year-round basis. They will be designed to be as user-friendly as possible and will not be limited in number. The self-issue permit program is described in Section 7.3.3.2.1 under Element 3. Compliance with this program will be assessed as part of the Monitoring Program. The permits will provide an opportunity to educate trail users about trail use rules, conservation of bighorn sheep, and safety recommendations for desert hiking. Failure to have a permit in possession when using the applicable trails may result in issuance of a citation.

To date, CDFG has been conducting ongoing population monitoring of Peninsular bighorn sheep on a biannual basis in cooperation with the Bighorn Institute. Population level monitoring of bighorn sheep for the Plan will continue as a cooperative effort involving CDFG, USFWS, BLM, CVCC, and other partners, as described in Section 7.3.3.2.1 under Element 3. The Monitoring Program provides for an increased level of bighorn sheep monitoring, to be conducted on an annual basis.

8.4.7.1.2 Monitoring Other Effects of Public Access and Use

The Plan provides for public access and use of public land in the Conservation Areas consistent with Conservation Goals and Conservation Objectives. In addition to the trail monitoring described in Section 8.4.7.1.1, approved public uses will be monitored to ensure that compliance with any conditions is achieved, and the use does not result in significant adverse impacts over time. Specific recreation issues may include new trail development, trail rerouting, trail removal, cross-country travel, camping, entry with dogs, the use of pack stock,

the Murray Hill facilities, and organized group activities. This monitoring will feed back to the Management Program to assess levels of use and determine the need for altering management to protect and preserve resource values.

8.4.7.2 Assessing Biological Corridors and Linkages

The presence of a functional Biological Corridor and Linkage system is a key element of the Conservation Plan for the MSHCP Reserve System. Designated Biological Corridors at freeway undercrossings, bridges, and culverts have been identified as "pinch points" that provide connectivity between Conservation Areas. Larger, contiguous Habitat areas are designated as Linkages between Core Habitat areas. Specific Conservation Objectives target Biological Corridors and Linkages within Conservation Areas to ensure connectivity for Covered Species (See Section 4.3).

The Monitoring Program will gather data on the use and effectiveness of Biological Corridor and Linkage areas. Monitoring will assess the levels of use of freeway undercrossings and culverts by small mammals and reptiles that are Covered Species as well as larger animals including coyotes, mountains lions, and fox. Methods used to inventory and monitor use and effectiveness include track surveys, remote camera stations, road-kill reports, and radio collar transmitters. The long-term monitoring of species distribution changes that will be accomplished in the Monitoring Program will also provide data to assess the use of Linkage areas.

There are five culverts under Palm Drive within the Willow Hole Conservation Area. These culverts are 36" diameter corrugated steel that allow Big Morongo Wash to pass under Palm Drive. They are approximately 15 to 20 feet apart. The effectiveness of these culverts as a Biological Corridor will be evaluated through monitoring. If wildlife experience substantial road kill on Palm Drive, wing fences directing small animals into the culverts will be constructed (See also Section 8.5.3).

8.4.7.3 Assessing Impacts to Covered Bird Species from Overhead Power Lines

An element of the Monitoring Program will address the potential for impacts to bird species as a result of overhead power lines approved as Covered Activities (See Table 7-7). Through monitoring and associated Adaptive Management, the impacts will be assessed and necessary actions will be implemented. This may include actions to reduce or eliminate bird perching on overhead power lines. Within one year of Plan adoption, IID shall develop a maintenance plan approved by the Wildlife Agencies, for its facilities in Conservation Areas that will minimize impacts to Covered Species and natural communities.

8.4.7.4 Burrowing Owl Relocation Protocols

Measures for avoidance, minimization and mitigation of impacts to burrowing owls are described in Section 4.4.

Determination of the appropriate method of relocation, such as eviction/passive relocation or active relocation, shall be based on the specific site conditions (e.g., distance to nearest suitable habitat and presence of burrows within that habitat) in coordination with the Wildlife Agencies. Active relocation and eviction/passive relocation require the preservation and maintenance of suitable burrowing owl habitat determined through coordination with the Wildlife Agencies.

8.5 Research: Targeted Monitoring and Management Studies

8.5.1 Research on Effects of Recreation on Peninsular Bighorn Sheep

Implementation of the Plan will include a focused research program to evaluate the effects of recreational trail use on Peninsular bighorn sheep health, behavior, habitat selection, and long-term population dynamics. The overarching goal of this research program is to obtain empirical data from the Plan Area to guide trails management. Although many studies have been conducted on the impacts of recreation on bighorn sheep and other ungulates, the responses of bighorn sheep to recreational impacts is variable and not well understood. The Plan will implement an adaptive approach to trails management whereby information is gathered through management policies that are treated as experiments. Bighorn sheep biologists from CDFG, USFWS, and BLM developed a framework for this research, with input from other knowledgeable scientists. The basic questions relate to the proximate response of bighorn sheep to recreation disturbance, for example, *Is there evidence of bighorn sheep avoiding recreational trails*? The broader questions address the population-level impacts, for example, *What effect does recreation have on persistence of bighorn sheep populations?* It is unlikely that there are clear, black and white answers. There are many existing perturbations in the environment and there may be many confounding factors as well. The research will be designed to minimize impacts to bighorn sheep as a result of research activities. This section discusses the basic questions that should be addressed through this research program. The funding plan anticipates the initial field research will be completed during an approximately five-year period. The implementation of the trails research program will be initiated in Plan year one with development of a problem analysis and request for proposals. Field research may not actually begin until Plan year two. Some elements of the research may not require five years to complete. It is anticipated that interim feedback from the bighorn sheep and trails research will also be available via annual reports which will be provided to the various management committees and the CVCC for their use. The research results in their entirety will be available for review and use by the Trails Management Subcommittee, RMOC, CVCC, and other entities by no later than approximately year seven of Plan implementation; this schedule incorporates the time necessary for complete data analysis and final report preparation. The research results will be incorporated in the trails management program.

This research will be carried out through contracts, solicited by a Request for Proposals (RFP) to qualified research institutions or scientists. Funding for this research is outlined in Section 8.8.3. Development of the RFP, review of proposals, and selection of researchers would be by qualified representatives from the Wildlife Agencies, CVCC, BLM, and outside objective reviewers. The other members of this group will approve the outside reviewers. As part of the refinement of the research program and development of the RFP, a problem analysis will be prepared.

The recommended criteria for selection of the scientists and investigators chosen to study these questions include:

1. It is critical that the investigator develop specific hypotheses with rigorous rejection criteria. Even then, the results may contain some predictions, in terms of the anticipated future, long-term effects that recreation may have on bighorn sheep.
2. Investigator(s) shall be objective, with a proven record of accomplishment of carrying out rigorous scientific investigations.
3. Investigator(s) should be affiliated with a qualified research institution or have other scientific credentials.
    a. One scenario would be for an MS candidate(s) to investigate the site-specific effects of recreation on bighorn sheep and a Ph.D. candidate to coordinate all research projects and develop models to evaluate the long-term effects of recreation on bighorn sheep population dynamics.
4. Investigator(s) must have the flexibility to apply treatments to trails and areas (i.e., open or close trail(s) to test response by sheep).

Research Questions.

The following are sample questions that could be incorporated into the research design. The researcher(s) would have the flexibility to refine these questions, and pose additional questions if appropriate, based on direct observations and measurements. These questions can be addressed in part through modeling exercises, using empirical data collected to answer questions related to proximate response. The trails that will initially be the focus of the research program are listed in Section 7.3.3.2.1. Site-specific questions will be related to variables such as topography, size of Habitat patch, juxtaposition of Habitat with trail(s), etc.

1. What is the proximate response of bighorn sheep to recreation disturbance?
    - What are the immediate behavioral responses of bighorn sheep to hikers, bikers, and equestrians and what factors influence bighorn sheep responses (e.g., topography, visibility, proximity to escape terrain, elevation of the disturbance relative to the location of the sheep, season, sheep group size, frequency of disturbance, duration and magnitude of disturbance, type of disturbance, distance from disturbance, etc.)?

- What is the relationship between distance of sheep to disturbance and their response?
- How can GPS collars be used to collect information on active and inactive periods?

2. What are the effects on energy budgets through alteration of foraging efficiency, rumination schedules, and activity schedules?
   - Does human disturbance result in changes to the activity budget such that it is different from what it is without disturbance?
   - Is decreased nutrient intake an issue? Does the animal spend more time looking around and less time feeding?
   - Develop a bioenergetics model. The effects that can be measured are going to be indices of levels of energy acquisition and activity (i.e., energy expenditure). Population level effects would have to be inferred from indices.
3. Is there a change in distribution in the absence of concomitant changes in density (e.g., sheep might move to area that is less safe (terrain) and be more vulnerable to predation, even though the new area provides adequate nutritional resources)?
   - Address adaptive mortality, such that an animal that lives in a riskier place has higher probability of predation than one living in a safer place. Could be both individual and population level – primarily through adaptive mortality (mortality increased as result of move)
   - How does movement by sheep from place with high quality forage to place with lower quality forage affect/change nutrient acquisition? If sheep move from area that provides ideal forage to an area that is adequate in terms of forage, we would expect no population level consequence. If sheep move to areas that are not adequate (moving to areas with lower carrying capacity) we would expect to see effects on recruitment of lambs and ultimately a decreased population.
   - The research design should incorporate controls unless a robust method with greater inference is used. The southern Santa Rosa Mountains south of Guadalupe Canyon may provide control areas where recreational use is very low.
4. Is bighorn sheep use of suitable Habitat lacking or significantly reduced near areas of trail use?
   - To what extent are sheep avoiding areas with trails that are receiving human use? This analysis could use existing location data points (depending on geographic bias of data). It could also be addressed with a quantitative survey of sheep droppings or radio-telemetered sheep to determine if their density is lower near trails relative to equivalent Habitat without trails.

The research program may involve the development of a predictive model to quantify the cumulative impacts of recreation on bighorn sheep. This model would address the cumulative impacts of recreation on the long-term viability of bighorn sheep (determine whether human disturbance alters the energy budget, predation risk, nutritional plane, or

habitat use and connectivity of bighorn sheep, and model the demographic consequences of such changes).

This research program may require manipulation of use levels on trails. Manipulation could include increases, decreases, or prohibitions of use altogether on one or more trails, while simultaneously monitoring responses of bighorn sheep. Manipulated trail use will be based on a research study design focused on addressing specific research questions related to the impacts of trail use on Peninsular bighorn sheep. The research study design will determine which trails, if any, would be subject to manipulation of use levels. Data gathered from this research program will be used as the basis for future trails management decisions. Implementation of the research program will be coordinated with the Trails Management Subcommittee. In addition, an interim memorandum of understanding has been added as Appendix III which delineates the roles and responsibilities of the responsible agencies in implementation of the Trails Plan.

Upon completion of the research program, study results and management recommendations will be integrated into a revised public use and trails management program, using best available science, professional judgment, and wildlife management principles where study results may be less than definitive. If, by Plan Year 3, a fully funded research program, including a research plan and associated field research, has not been initiated, management action will be taken to ensure protection of lambs and ewes during the lambing season. Results from the research shall be integrated into a revised trails plan that will be implemented by Plan Year 10. If the revised trails plan is not implemented by Plan Year 10, management action will be taken to ensure protection of lambs and ewes during the lambing season.

8.5.2 Burrowing Owl Interim Conservation Strategy

Implementation of the Plan will include an interim management strategy for burrowing owls. The Plan will implement an adaptive approach to burrowing owl management whereby information is gathered through the Monitoring Program. This information will be used as the basis for development of a long-term conservation strategy for burrowing owls during the first 6 years post Permit issuance.

First 3 Years Post Permit Issuance. During the first 3 years post Permit issuance, CVCC shall implement an interim conservation strategy for burrowing owls, subject to approval of the Wildlife Agencies. This interim strategy shall involve:

a. Systematic surveys of appropriate habitat within the Conservation Areas, where access is provided, using a protocol developed through the Monitoring Program with Wildlife Agencies' concurrence to determine the distribution and abundance of burrowing owls within the Conservation Areas.
b. Management actions to be taken to eliminate potential threats and stressors to burrowing owls and to sustain the burrowing owl population. These actions may include:

1. Installation of artificial burrows in Conservation Areas where appropriate to attract and retain burrowing owls
2. Installation of artificial perches in Conservation Areas where appropriate to attract and retain burrowing owls
3. Other actions as necessary to maintain a minimum of 16 pairs of burrowing owls within the Conservation Areas until data are gathered to identify a minimum number of occupied sites and carrying capacities for those sites.

Within 6 Years Post Permit Issuance. During the first 6 years post Permit issuance, research and monitoring will focus on gathering data to address specific questions through the hypothesis-based adaptive management approach. Information from the interim conservation strategy that occurs in the first 3 years shall be evaluated to guide the subsequent 3 years post Permit issuance. The data gathered during the first 6 years, together with other pertinent scientific information, will be used to develop a long-term conservation strategy for burrowing owls.

a. The Monitoring Program shall address the following questions:
   1. Territory and home range size for burrowing owl pairs in the Conservation Areas
   2. Source population for burrowing owl dispersal/immigration into Conservation Areas
   3. Reproductive success and recruitment of known burrowing owl pairs in Conservation Areas
   4. Analysis of historic and current observations of burrowing owls within the Plan Area to ascertain past and present distribution and habitat use
   5. Other questions as identified in the Adaptive Management process.

b. The long-term conservation strategy developed from the data gathered during the first 6 years post Permit issuance will be implemented. Other information obtained through the Monitoring Program and Adaptive Management may result in alterations to the long-term conservation strategy through the life of the Permit.

c. The applicable Permittees shall require that relocation of burrowing owls consistent with Section 4.4 be implemented for all Covered Activities.

8.5.3 Other Research Questions

Use of Biological Corridors and Linkages. In addition to the monitoring data that will be collected on use of biological corridors and linkages, research is needed to evaluate the size and design of effective freeway undercrossings or bridges to act as corridors. Plan Conservation Objectives require the installation of culverts or underpasses, which will act as effective corridors when roads are widened. Information is needed on the size and character of these potential future corridors. This information need is best addressed through a targeted research program.

Focused Research on Individual Covered Species. Research on individual Covered Species will be carried out as research needs are identified through the Monitoring and Management Programs. Some potential research topics for Covered Species are listed in Section 9.0 under individual species.

8.6 Data Storage and Analysis

To enable managers and wildlife agencies to evaluate the efficacy of Conservation measures, it is essential that sufficiently robust monitoring data be collected. However, these efforts will be wasted if the data are not analyzed, evaluated, and stored in a manner that allows easy retrieval and understanding by all stakeholders. Commonly observed failures of management and monitoring plans are inadequate resources designated for long-term implementation, and insufficient care given to the analysis and evaluation of collected data. Some suggest that data management, analysis, and evaluation require an additional 30% to 50% of the time above that devoted to the collection of those data (National Park Service, Vital Signs Monitoring). The monitoring protocols above include time for data management totaling nearly 40% of the time devoted to data collection. Whether this will be sufficient or not will be part of the annual adaptive evaluation of this program.

8.6.1 Data Management

Data management will be the responsibility of two full-time database managers, with oversight from the Biological Monitoring Program Administrator. Data management will require a team who understand the questions the data are designed to answer, the nature and constraints of the raw data, and the proper analysis techniques to answer the intended questions. Careful data formatting, management, and analysis are critical steps in this process. Formatting depends on the specific form in which the data are collected. The data management system must be flexible to accept different data forms, must have adequate metadata to allow different managers and investigators to ascertain how and where the data were collected, and must have long-term storage and retrieval capacity. A commitment to maintaining the data for the duration of the MSHCP is required. More detail can be found in the excellent overview by Michener and Brunt (2000). Examples are the LTER data (www.lternet.edu), and the UCR Center for Conservation Biology (www.ccb.ucr.edu). A data management system will include the following:

- The investigator (location and time of sample, methods, etc) provides appropriate metadata.
- Data entry follows standards to ensure consistency
- The data management system is compatible with systems used by other Plan participants (e.g. Access)
- Backups are prepared on a regular basis
- A highly redundant architecture
- Fully managed backup with offsite storage

- A secure and environmentally controlled location where the computer equipment is housed
- Around-the-clock data management and maintenance.
- Ultimately, data will be housed through the BIOS system of CDFG and at the CEED system at the San Diego Supercomputer Center at UCSD.

With the long period for the Plan, the database system used for the Monitoring Program will change as new technologies evolve. While the software may change, the system will always be one with many built in safeguards. The data from the Monitoring Program needs to be available so that it can be used by different agencies that use different computer systems. It also needs to be adaptable to new database programs that may develop in the future. The database management system that will ultimately be used may include elements of existing systems. Among the current database systems with which it should be compatible are CDFG's Biogeographic Information and Observation System (BIOS).

8.6.1.1 Database Consolidation

One element of data management is the consolidation of existing databases for use in the various aspects of the program including the Habitat/niche modeling process. Data on occurrences of Covered species from all accessible sources including published literature, museum records, other existing databases (e.g. CNDDB) has been and will continue to be brought together into a master database with a unique ID which is georeferenced with assigned coordinates and a maximum error estimate. This effort has used UC Berkeley's MaNIS (Mammal Networked Information System (MaNIS)) system as a standardized means to georeference museum and other historical records.

8.6.1.2 Data Handling and Storage

The methods used to handle data, from collection to analysis, are critical to the value of the data over time. Collection of data will follow standard protocols, with training for field personnel involved in recording, compiling, and entering data. Likewise, data entry and analysis will be standardized. Standard practices will be adopted to ensure efficient and consistent data handling:

1. During the planning stages for each project, all MSHCP data collectors (reserve monitors, Reserve Managers etc.) will meet to discuss data collection protocols to ensure scientific validity and consistency through time. Field data forms used by various reserve monitors will be standardized.
2. As data are processed, all versions of a data set will be archived, from raw data to a fully checked and verified form. The methods and steps used to process data will be described. The primary purpose of this practice is to make it possible to recover from data mishandling during manipulation of the original source data. It also makes it possible to verify data processing methodologies at a later date should it become necessary.

3. Metadata will accompany all data generated by this project. The current standard is the Federal Geographic Data Committee (FGDC) Metadata Standard. Any future standard will be agreed upon by the RMOC.

The responsibility for storing the official record associated with MSCHP compliance will rest with CVAG. The Monitoring Program Administrator will be responsible for compiling the data generated from the Monitoring Program. Copies of these data will be provided to the appropriate parties, including CDFG, USFWS, and BLM. A process of "mirroring," maintaining identical copies of entire file systems on computer servers in different locations, will be followed. The mirrored file systems will create redundancy and will place the entire data set closer to those who use it most.

8.6.1.3 Data Availability

The availability of data, including whether data will be accessible to the public, will be addressed by a standard data policy within one year of Permit issuance. This policy will be adopted by the RMOC in coordination with the Monitoring Program Administrator. The intent is to make data from the Plan as available to the public as possible. The standard data policy will address consideration as to whether there are any data that are not made available to the public (e.g. some information may be proprietary). Data used for management decisions will be considered public information and will be made available to the public. With this in mind, the following practices will be followed:

1. CVCC will be the designated single point of contact for available data.
2. Metadata will accompany all datasets that are made public.

8.6.2 Data Compilation and Analysis

Data compilation and analysis will be the responsibility of the Monitoring Program Administrator. Once data are compiled, the database management personnel will be responsible for organization and storage. Data analysis will be handled by the data analysis and database management staff (see Section 8.8.2, Personnel for Monitoring Program) in conjunction with the Monitoring Program Administrator. The analysis may involve nested integration of the monitoring levels (landscape, Habitat, and species) to provide the robust power intended by the monitoring protocol design.

8.7 Program Reporting and Evaluation

Annual monitoring reports that summarize the results of each year's monitoring efforts will be provided to the Reserve Management Oversight Committee, the Reserve Management Unit Committees, and the Land Manager. The Monitoring Program Administrator will be responsible for preparing and distributing these reports. The Biological Monitoring Report will include, at a minimum, the following:

1. Objectives for the Monitoring Program for that year
2. Effects on Covered Species and Natural Communities
3. Location of sampling sites
4. Methods for data collection and variables measured
5. Frequency, timing, and duration of sampling for the variables
6. Description of the data analysis in terms of what, how, and by whom
7. Results of data analysis
8. Evaluation of progress toward achieving measurable biological goals and objectives
9. Suggested changes/feedback for Adaptive Management
10. Cause-and-effect relationships
11. A review of land use adjacency implementation compliance
12. The priorities for the next year.

The Monitoring Program Administrator will be responsible for reviewing the annual reports working in cooperation initially with the program biologists, the Land Manager and RMUCs. The MPA, Land Manager, and the respective RMUCs will evaluate the results of annual monitoring, and will address relevant questions including the following:

1. Are the protocols providing data with sufficient resolution to detect significant changes? If not, what alternatives are available? Proposals for changes shall be considered, discussed, modified per the discussion, and agreement on an implementation strategy reached.
2. Do any of the data collected with respect to species or natural communities indicate early signs of decline or degradation (independent of natural fluctuations in resources) in response to the changed occurrence of known threats? If so, are data that are more precise required? How should the monitoring design be modified to acquire data that are more precise?
3. What are the appropriate management responses and ways to implement them? If no management responses are readily available, proposals and funding for research to develop and test potential management tools should be recommended.

4. Do monitoring data indicate management actions have been effective? What are the appropriate measures of success in response to a management action? Is the design and placement of monitoring stations sufficiently sensitive to measure management effects when they occur? If the management tools are ineffective, propose and fund research to develop and test new tools.
5. Are data analyses sufficient to answer the questions above? Is the nested integration of data on landscape, natural community, and species level monitoring occurring? Does it provide the desired level of resolution and understanding? If not, review procedures, and if necessary, fund training for data analysts and lead biologists on appropriate data analysis tools.

This annual monitoring report review and evaluation will result in an analysis of the results and a series of recommendations. The results of the initial review process will be presented to the Reserve Management Oversight Committee.

To ensure consistency across land ownership boundaries, the Monitoring Program Administrator will develop annual work plans for monitoring the entire MSHCP Reserve System and will be responsible for coordinating the monitoring efforts. The Monitoring Program Administrator will submit annual work plans to the RMOC in the last quarter of each year. The work plans for the following year will include a description of proposed monitoring efforts, survey protocols, schedule for fieldwork, and an estimated budget that details personnel and equipment needs and other expenses. The estimated budget will include the identification of in-lieu or contracted services to implement the Monitoring Program. To facilitate early cost planning, the Program Administrator will also provide to the RMOC on an annual basis a 3-5 year projected schedule and estimate of cost for implementing the Monitoring Program.

8.8 Work Plan, Schedule, and Program Costs

Implementation of the Monitoring Program will be phased. As previously noted, this program begins with a framework for monitoring that will be tested and evaluated during a baseline phase, the initial five years of Plan implementation. The information gathered during the baseline phase, will determine the level of ongoing monitoring appropriate for each of the Covered Species and natural communities. The framework is designed to provide for maximum flexibility in this initial phase during which sampling protocols for long-term monitoring will be developed and tested. Once this baseline phase is concluded, a long-term Monitoring Program will be implemented. Monitoring protocols evaluated and refined during the baseline phase will be identified and described in this Monitoring Program. Protocols used during the baseline phase described in this framework may not ultimately be used in the long-term Monitoring Program. Likewise, ongoing monitoring may change over time in response to Adaptive Management needs, changes in technology, or other circumstances.

Baseline Phase - The Baseline Phase has a spatial focus with the goal of better describing where species and natural communities occur and what the correlates of their distribution are. The Baseline Phase will begin in Year One of Plan implementation. Once adequate data are

gathered, the baseline phase will involve using distributional data to pursue questions of spatial and temporal scale, and to identify important ecological relationships. The Plan's five-year baseline sampling shall be designed and implemented according to the Scientific Principles identified in Section 8.3.2.

Years 1 to 5

- Install markers for transects, sample points, plots, or other sample units in Existing Conservation Lands
- Conduct field surveys of Covered Species and natural communities to assess distribution and abundance
- Collect data on Habitat parameters associated with each Covered Species for Habitat/niche models.
- Update Natural Communities/Vegetation Map and GIS Layers
- Conduct Habitat monitoring through assessment of vegetation, vertebrate, and invertebrate communities
- Obtain satellite imagery and other remote sensing tools to track landscape-level parameters
- Establish weather monitoring stations
- Evaluate data for development of long-term monitoring protocols, intervals for monitoring
- Develop, evaluate, and refine Covered Species Habitat/niche models
- Continue field surveys of Covered Species and natural communities
- Determine extent to which biotic and abiotic factors may be used as potential indicators or monitoring surrogates

Long-term Monitoring Phase - The long-term implementation of the Monitoring Program will commence with the completion of the baseline phase. The focus of this phase is to measure the effectiveness of Conservation strategy for conserving and restoring covered populations and communities, and to identify current and potential threats.

Years 6 to 10 (ongoing)

- Initiate monitoring of Covered Species using protocols developed in baseline phase. The sampling interval will vary depending on the species or natural community being sampled.
- Continue to evaluate and modify protocols as necessary
- Reduce uncertainty in ecological knowledge, and the response of the system to management actions, through surveys, experiments, and Adaptive Management
- Conserve, enhance, and recover populations of Covered Species as appropriate.

Lands within the MSHCP Reserve System already under Conservation ownership, called Existing Conservation Lands (See Section 8.2.3) will be the initial focus of monitoring activities during the baseline phase. As new lands are added to the MSHCP Reserve System, they will be subject to the same data gathering process and phased implementation. Field surveys on these lands to determine occurrence and distribution of Covered Species will be initiated the first season after acquisition. Within two years, they will be fully incorporated into the Monitoring Program. If this occurs during the Baseline Phase, these new Reserve Lands will be subject to the same protocols and methodologies as are currently in use in the Monitoring and Management Program. If these lands are added during the long-term monitoring phase, they will be subject to protocols established for the long-term Monitoring Program.

8.8.1 Personnel for Management Program

Personnel for the Management Program include a full-time Land Manager who will be responsible for oversight and management of the Permittee lands in the MSHCP Reserve System. The program includes a full-time Assistant Land Manager to assist the Land Manager, beginning in year one. Three additional Assistant Land Managers phased in from years seven through 23 are also included in the budget. These assistant reserve managers are added as new lands are acquired. A part-time administrative assistant is also included; this position increases as additional staff is added to the MSHCP Reserve System Management Program. The estimated costs for the Management Program for the 75 years of the permit are shown in Table 8-9. The personnel costs given in Table 8-9 include all costs associated with a full-time ranger, including vehicle, insurance, equipment, as well as salary and benefits.

Land Manager. One permanent, full-time, senior level (1 PY) Land Manager will be responsible for oversight and coordination of all Management Programs on the Permittee Lands, in coordination with the other Existing Conservation Lands. The Land Manager will work with the management committees, Monitoring Program Administrator, and scientific advisors as needed to ensure integration of the Management and Monitoring Programs.

Assistant Land Managers. The Assistant Land Managers (4 PY) will assist the Land Manager in implementation of the Management Program, including on the ground management activities and projects. There will ultimately be four assistant managers, phased in as acres are added to the MSHCP Reserve System. Assistant Land Managers would be involved in maintenance activities such as fencing and Habitat maintenance and restoration projects.

Ranger-Warden. The Management Program will provide for two full-time (2 PY) ranger-wardens to implement the patrolling and law enforcement functions in the Management Program. The ranger-wardens will be fully trained law enforcement personnel. Coordination with other law enforcement personnel in federal, state, and local agencies will also be required.

e 8-9: CVMSHCP Management Program Budget – 75 year (3.29% inflation factor)

CVMSHCP Management Program Budget - 75 year (3.29% inflation factor)

ne 30	Base Salary	PY Salary [1]	2008 Year 1	2009 Year 2	2010 Year 3	2011 Year 4	2012 Year 5
nd Manager	$ 82,000	90,200	$ 90,200	$ 93,200	$ 96,300	$ 99,500	$ 102,800
ve Manager (4)[2]	68,300	75,130	$ 75,100	$ 77,600	$ 80,200	$ 82,800	$ 85,500
den (2)	80,000	88,000	$ 176,000	$ 181,800	$ 187,800	$ 194,000	$ 200,400
abor (contract)	36,000	39,600	$ 39,600	$ 40,900	$ 42,200	$ 43,600	$ 45,000
stant (0.25-0.5)[2]	39,700	43,670	$ 13,895	$ 14,400	$ 14,900	$ 15,400	$ 15,900
el Subtotal			$ 394,795	$ 407,900	$ 421,400	$ 435,300	$ 449,600
r - Subtotal			4.25	4.25	4.25	4.25	4.25
ost Without Inflation			394,795	395,000	395,000	395,000	395,000
nd Supplies							
ion & Maintenance			$ 25,000	$ 25,800	$ 26,600	$ 27,500	$ 28,400
tenance and Rest.			$ 9,700	$ 4,000	$ 4,100	$ 4,200	$ 4,300
nent and Supplies			$ 61,300	$ 13,900	$ 14,400	$ 14,900	$ 15,400
ment			$ 44,600	$ 39,900	$ 41,200	$ 42,600	$ 44,000
ation Services			$ 9,000	$ 5,700	$ 5,900	$ 6,100	$ 6,300
uipment Subtotal			$ 149,600	$ 89,300	$ 92,200	$ 95,300	$ 98,400
tal - Estimated Cost			$ 544,395	$ 497,200	$ 513,600	$ 530,600	$ 548,000
0% Contingency			$ 54,440	$ 49,720	$ 51,360	$ 53,060	$ 54,800
trative Overhead (10%)			$ 54,440	$ 49,720	$ 51,360	$ 53,060	$ 54,800
l - Estimated Cost			$ 653,274	$ 596,640	$ 616,320	$ 636,720	$ 657,600

des benefits, worker' compensation, 10% administrative overhead

are phased in as the number of acres acquired increases

a Valley Mountain Conservancy; MuniFinancial.

Table 8-9: CVMSHCP Management Program Budget – 75 year (3.29% inflation factor) (*cont.*)

2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15
$ 106,200	$ 109,700	$ 113,300	$ 117,000	$ 120,800	$ 124,800	$ 128,900	$ 133,100	$ 137,500	$ 142,000
$ 88,300	$ 167,600	$ 173,100	$ 178,300	$ 183,600	$ 189,100	$ 194,800	$ 200,600	$ 206,600	$ 286,200
$ 207,000	$ 213,800	$ 220,800	$ 228,100	$ 235,600	$ 243,400	$ 251,400	$ 259,700	$ 268,200	$ 277,000
$ 46,500	$ 48,000	$ 49,600	$ 51,200	$ 52,900	$ 54,600	$ 56,400	$ 58,300	$ 60,200	$ 62,200
$ 16,400	$ 26,900	$ 27,800	$ 28,700	$ 29,600	$ 30,600	$ 31,600	$ 32,600	$ 33,700	$ 34,800
$ 464,400	$ 566,000	$ 584,600	$ 603,300	$ 622,500	$ 642,500	$ 663,100	$ 684,300	$ 706,200	$ 802,200
4.25	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	6.5
395,000	468,000	468,000	468,000	468,000	468,000	468,000	468,000	468,000	517,000
$ 29,300	$ 30,300	$ 31,300	$ 32,300	$ 33,400	$ 34,500	$ 35,600	$ 36,800	$ 38,000	$ 39,300
$ 4,400	$ 4,500	$ 4,600	$ 4,800	$ 5,000	$ 5,200	$ 5,400	$ 5,600	$ 5,800	$ 6,000
$ 15,900	$ 16,400	$ 16,900	$ 17,500	$ 18,100	$ 18,700	$ 19,300	$ 19,900	$ 20,600	$ 21,300
$ 45,400	$ 46,900	$ 48,400	$ 50,000	$ 51,600	$ 53,300	$ 55,100	$ 56,900	$ 58,800	$ 60,700
$ 6,500	$ 6,700	$ 6,900	$ 7,100	$ 7,300	$ 7,500	$ 7,700	$ 8,000	$ 8,300	$ 8,600
$ 101,500	$ 104,800	$ 108,100	$ 111,700	$ 115,400	$ 119,200	$ 123,100	$ 127,200	$ 131,500	$ 135,900
$ 565,900	$ 670,800	$ 692,700	$ 715,000	$ 737,900	$ 761,700	$ 786,200	$ 811,500	$ 837,700	$ 938,100
$ 56,590	$ 67,080	$ 69,270	$ 71,500	$ 73,790	$ 76,170	$ 78,620	$ 81,150	$ 83,770	$ 93,810
$ 56,590	$ 67,080	$ 69,270	$ 71,500	$ 73,790	$ 76,170	$ 78,620	$ 81,150	$ 83,770	$ 93,810
$ 679,080	$ 804,960	$ 831,240	$ 858,000	$ 885,480	$ 914,040	$ 943,440	$ 973,800	$ 1,005,240	$ 1,125,720

Table 8-9: CVMSHCP Management Program Budget – 75 year (3.29% inflation factor) (*cont.*)

2023 Year 16	2024 Year 17	2025 Year 18	2026 Year 19	2027 Year 20	2028 Year 21	2029 Year 22	2030 Year 23	2031 Year 24
$ 146,700	$ 151,500	$ 156,500	$ 161,600	$ 166,900	$ 172,400	$ 178,100	$ 184,000	$ 190,100
$ 294,800	$ 303,600	$ 312,700	$ 322,100	$ 331,800	$ 341,800	$ 352,100	$ 440,000	$ 453,200
$ 286,100	$ 295,500	$ 305,200	$ 315,200	$ 325,600	$ 336,300	$ 347,400	$ 358,800	$ 370,600
$ 32,100	$ 33,200	$ 34,300	$ 35,400	$ 36,600	$ 37,800	$ 39,000	$ 40,300	$ 41,600
$ 35,900	$ 37,100	$ 38,300	$ 39,600	$ 40,900	$ 42,200	$ 43,600	$ 45,000	$ 46,500
$ 795,600	$ 820,900	$ 847,000	$ 873,900	$ 901,800	$ 930,500	$ 960,200	$ 1,068,100	$ 1,102,000
6.5	6.5	6.5	6.5	6.5	6.5	6.5	7.5	7.5
498,000	498,000	498,000	498,000	498,000	498,000	498,000	498,000	538,000
$ 40,600	$ 41,900	$ 43,300	$ 44,700	$ 46,200	$ 47,700	$ 49,300	$ 50,900	$ 52,600
$ 6,200	$ 6,400	$ 6,600	$ 6,800	$ 7,000	$ 7,200	$ 7,400	$ 7,600	$ 7,900
$ 22,000	$ 22,700	$ 23,400	$ 24,200	$ 25,000	$ 25,800	$ 26,600	$ 27,500	$ 28,400
$ 62,700	$ 64,800	$ 66,900	$ 69,100	$ 71,400	$ 73,700	$ 76,100	$ 78,600	$ 81,200
$ 8,900	$ 9,200	$ 9,500	$ 9,800	$ 10,100	$ 10,400	$ 10,700	$ 11,100	$ 11,500
$ 140,400	$ 145,000	$ 149,700	$ 154,600	$ 159,700	$ 164,800	$ 170,100	$ 175,700	$ 181,600
$ 936,000	$ 965,900	$ 996,700	$ 1,028,500	$ 1,061,500	$ 1,095,300	$ 1,130,300	$ 1,243,800	$ 1,283,600
$ 93,600	$ 96,590	$ 99,670	$ 102,850	$ 106,150	$ 109,530	$ 113,030	$ 124,380	$ 128,360
$ 93,600	$ 96,590	$ 99,670	$ 102,850	$ 106,150	$ 109,530	$ 113,030	$ 124,380	$ 128,360
$ 1,123,200	$ 1,159,080	$ 1,196,040	$ 1,234,200	$ 1,273,800	$ 1,314,360	$ 1,356,360	$ 1,492,560	$ 1,540,320

Table 8-9: CVMSHCP Management Program Budget – 75 year (3.29% inflation factor) (*cont.*)

2032	2033	2034	2035	2036	2037	2038	2039	2040
Year 25	Year 26	Year 27	Year 28	Year 29	Year 30	Year 31	Year 32	Year 33
$ 196,400	$ 202,900	$ 209,600	$ 216,500	$ 223,600	$ 231,000	$ 238,600	$ 246,400	$ 254,500
$ 466,800	$ 480,800	$ 495,200	$ 510,100	$ 525,400	$ 541,200	$ 557,400	$ 574,100	$ 591,300
$ 382,800	$ 395,400	$ 408,400	$ 421,800	$ 435,700	$ 450,000	$ 464,800	$ 480,100	$ 495,900
$ 43,000	$ 44,400	$ 45,900	$ 47,400	$ 49,000	$ 50,600	$ 52,300	$ 54,000	$ 55,800
$ 48,000	$ 49,600	$ 51,200	$ 52,900	$ 54,600	$ 56,400	$ 58,300	$ 60,200	$ 62,200
$ 1,137,000	$ 1,173,100	$ 1,210,300	$ 1,248,700	$ 1,288,300	$ 1,329,200	$ 1,371,400	$ 1,414,800	$ 1,459,700
7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
538,000	538,000	538,000	538,000	538,000	538,000	538,000	538,000	538,000
$ 54,300	$ 56,100	$ 57,900	$ 59,800	$ 61,800	$ 63,800	$ 65,900	$ 68,100	$ 70,300
$ 8,200	$ 8,500	$ 8,800	$ 9,100	$ 9,400	$ 9,700	$ 10,000	$ 10,300	$ 10,600
$ 29,300	$ 30,300	$ 31,300	$ 32,300	$ 33,400	$ 34,500	$ 35,600	$ 36,800	$ 38,000
$ 83,900	$ 86,700	$ 89,600	$ 92,500	$ 95,500	$ 98,600	$ 101,800	$ 105,100	$ 108,600
$ 11,900	$ 12,300	$ 12,700	$ 13,100	$ 13,500	$ 13,900	$ 14,400	$ 14,900	$ 15,400
$ 187,600	$ 193,900	$ 200,300	$ 206,800	$ 213,600	$ 220,500	$ 227,700	$ 235,200	$ 242,900
$ 1,324,600	$ 1,367,000	$ 1,410,600	$ 1,455,500	$ 1,501,900	$ 1,549,700	$ 1,599,100	$ 1,650,000	$ 1,702,600
$ 132,460	$ 136,700	$ 141,060	$ 145,550	$ 150,190	$ 154,970	$ 159,910	$ 165,000	$ 170,260
$ 132,460	$ 136,700	$ 141,060	$ 145,550	$ 150,190	$ 154,970	$ 159,910	$ 165,000	$ 170,260
$ 1,589,520	$ 1,640,400	$ 1,692,720	$ 1,746,600	$ 1,802,280	$ 1,859,640	$ 1,918,920	$ 1,980,000	$ 2,043,120

Table 8-9: CVMSHCP Management Program Budget – 75 year (3.29% inflation factor) (*cont.*)

2041 Year 34	2042 Year 35	2043 Year 36	2044 Year 37	2045 Year 38	2046 Year 39	2047 Year 40	2048 Year 41	2049 Year 42
$ 262,900	$ 271,500	$ 280,400	$ 289,600	$ 299,100	$ 308,900	$ 319,100	$ 329,600	$ 340,400
$ 609,000	$ 627,300	$ 646,100	$ 665,500	$ 685,500	$ 706,100	$ 727,300	$ 749,100	$ 771,600
$ 512,200	$ 529,100	$ 546,500	$ 564,500	$ 583,100	$ 602,300	$ 622,100	$ 642,600	$ 663,700
$ 57,600	$ 59,500	$ 61,500	$ 63,500	$ 65,600	$ 67,800	$ 70,000	$ 72,300	$ 74,700
$ 64,200	$ 66,300	$ 68,500	$ 70,800	$ 73,100	$ 75,500	$ 78,000	$ 80,600	$ 83,300
$ 1,505,900	$ 1,553,700	$ 1,603,000	$ 1,653,900	$ 1,706,400	$ 1,760,600	$ 1,816,500	$ 1,874,200	$ 1,933,700
7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
538,000	538,000	538,000	538,000	538,000	538,000	538,000	538,000	538,000
$ 72,600	$ 75,000	$ 77,500	$ 80,000	$ 82,600	$ 85,300	$ 88,100	$ 91,000	$ 94,000
$ 10,900	$ 11,300	$ 11,700	$ 12,100	$ 12,500	$ 12,900	$ 13,300	$ 13,700	$ 14,200
$ 39,300	$ 40,600	$ 41,900	$ 43,300	$ 44,700	$ 46,200	$ 47,700	$ 49,300	$ 50,900
$ 112,200	$ 115,900	$ 119,700	$ 123,600	$ 127,700	$ 131,900	$ 136,200	$ 140,700	$ 145,300
$ 15,900	$ 16,400	$ 16,900	$ 17,500	$ 18,100	$ 18,700	$ 19,300	$ 19,900	$ 20,600
$ 250,900	$ 259,200	$ 267,700	$ 276,500	$ 285,600	$ 295,000	$ 304,600	$ 314,600	$ 325,000
$ 1,756,800	$ 1,812,900	$ 1,870,700	$ 1,930,400	$ 1,992,000	$ 2,055,600	$ 2,121,100	$ 2,188,800	$ 2,258,700
$ 175,680	$ 181,290	$ 187,070	$ 193,040	$ 199,200	$ 205,560	$ 212,110	$ 218,880	$ 225,870
$ 175,680	$ 181,290	$ 187,070	$ 193,040	$ 199,200	$ 205,560	$ 212,110	$ 218,880	$ 225,870
$ 2,108,160	$ 2,175,480	$ 2,244,840	$ 2,316,480	$ 2,390,400	$ 2,466,720	$ 2,545,320	$ 2,626,560	$ 2,710,440

Table 8-9: CVMSHCP Management Program Budget – 75 year (3.29% inflation factor) (*cont.*)

2050	2051	2052	2053	2054	2055	2056	2057	2058
Year 43	Year 44	Year 45	Year 46	Year 47	Year 48	Year 49	Year 50	Year 51
$ 351,600	$ 363,200	$ 375,100	$ 387,400	$ 400,100	$ 413,300	$ 426,900	$ 440,900	$ 455,400
$ 794,700	$ 818,500	$ 843,100	$ 868,400	$ 894,500	$ 921,300	$ 948,900	$ 977,400	$ 1,006,700
$ 685,500	$ 708,100	$ 731,400	$ 755,500	$ 780,400	$ 806,100	$ 832,600	$ 860,000	$ 888,300
$ 77,200	$ 79,700	$ 82,300	$ 85,000	$ 87,800	$ 90,700	$ 93,700	$ 96,800	$ 100,000
$ 86,000	$ 88,800	$ 91,700	$ 94,700	$ 97,800	$ 101,000	$ 104,300	$ 107,700	$ 111,200
$ 1,995,000	$ 2,058,300	$ 2,123,600	$ 2,191,000	$ 2,260,600	$ 2,332,400	$ 2,406,400	$ 2,482,800	$ 2,561,600
7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
538,000	538,000	538,000	538,000	538,000	538,000	538,000	538,000	538,000
$ 97,100	$ 100,300	$ 103,600	$ 107,000	$ 110,500	$ 114,100	$ 117,900	$ 121,800	$ 125,800
$ 14,700	$ 15,200	$ 15,700	$ 16,200	$ 16,700	$ 17,200	$ 17,800	$ 18,400	$ 19,000
$ 52,600	$ 54,300	$ 56,100	$ 57,900	$ 59,800	$ 61,800	$ 63,800	$ 65,900	$ 68,100
$ 150,100	$ 155,000	$ 160,100	$ 165,400	$ 170,800	$ 176,400	$ 182,200	$ 188,200	$ 194,400
$ 21,300	$ 22,000	$ 22,700	$ 23,400	$ 24,200	$ 25,000	$ 25,800	$ 26,600	$ 27,500
$ 335,800	$ 346,800	$ 358,200	$ 369,900	$ 382,000	$ 394,500	$ 407,500	$ 420,900	$ 434,800
$ 2,330,800	$ 2,405,100	$ 2,481,800	$ 2,560,900	$ 2,642,600	$ 2,726,900	$ 2,813,900	$ 2,903,700	$ 2,996,400
$ 233,080	$ 240,510	$ 248,180	$ 256,090	$ 264,260	$ 272,690	$ 281,390	$ 290,370	$ 299,640
$ 233,080	$ 240,510	$ 248,180	$ 256,090	$ 264,260	$ 272,690	$ 281,390	$ 290,370	$ 299,640
$ 2,796,960	$ 2,886,120	$ 2,978,160	$ 3,073,080	$ 3,171,120	$ 3,272,280	$ 3,376,680	$ 3,484,440	$ 3,595,680

Table 8-9: CVMSHCP Management Program Budget – 75 year (3.29% inflation factor) (*cont.*)

2059 Year 52	2060 Year 53	2061 Year 54	2062 Year 55	2063 Year 56	2064 Year 57	2065 Year 58	2066 Year 59	2067 Year 60
$ 470,400	$ 485,900	$ 501,900	$ 518,400	$ 535,500	$ 553,100	$ 571,300	$ 590,100	$ 609,500
$ 1,036,900	$ 1,068,000	$ 1,100,000	$ 1,133,000	$ 1,167,000	$ 1,202,000	$ 1,238,100	$ 1,275,200	$ 1,313,500
$ 917,500	$ 947,700	$ 978,900	$ 1,011,100	$ 1,044,400	$ 1,078,800	$ 1,114,300	$ 1,151,000	$ 1,188,900
$ 103,300	$ 106,700	$ 110,200	$ 113,800	$ 117,500	$ 121,400	$ 125,400	$ 129,500	$ 133,800
$ 114,900	$ 118,700	$ 122,600	$ 126,600	$ 130,800	$ 135,100	$ 139,500	$ 144,100	$ 148,800
$ 2,643,000	$ 2,727,000	$ 2,813,600	$ 2,902,900	$ 2,995,200	$ 3,090,400	$ 3,188,600	$ 3,289,900	$ 3,394,500
7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
538,000	538,000	538,000	538,000	538,000	538,000	538,000	538,000	538,000
$ 129,900	$ 134,200	$ 138,600	$ 143,200	$ 147,900	$ 152,800	$ 157,800	$ 163,000	$ 168,400
$ 19,600	$ 20,200	$ 20,900	$ 21,600	$ 22,300	$ 23,000	$ 23,800	$ 24,600	$ 25,400
$ 70,300	$ 72,600	$ 75,000	$ 77,500	$ 80,000	$ 82,600	$ 85,300	$ 88,100	$ 91,000
$ 200,800	$ 207,400	$ 214,200	$ 221,200	$ 228,500	$ 236,000	$ 243,800	$ 251,800	$ 260,100
$ 28,400	$ 29,300	$ 30,300	$ 31,300	$ 32,300	$ 33,400	$ 34,500	$ 35,600	$ 36,800
$ 449,000	$ 463,700	$ 479,000	$ 494,800	$ 511,000	$ 527,800	$ 545,200	$ 563,100	$ 581,700
$ 3,092,000	$ 3,190,700	$ 3,292,600	$ 3,397,700	$ 3,506,200	$ 3,618,200	$ 3,733,800	$ 3,853,000	$ 3,976,200
$ 309,200	$ 319,070	$ 329,260	$ 339,770	$ 350,620	$ 361,820	$ 373,380	$ 385,300	$ 397,620
$ 309,200	$ 319,070	$ 329,260	$ 339,770	$ 350,620	$ 361,820	$ 373,380	$ 385,300	$ 397,620
$ 3,710,400	$ 3,828,840	$ 3,951,120	$ 4,077,240	$ 4,207,440	$ 4,341,840	$ 4,480,560	$ 4,623,600	$ 4,771,440

Table 8-9: CVMSHCP Management Program Budget – 75 year (3.29% inflation factor) (*cont.*)

2068 Year 61	2069 Year 62	2070 Year 63	2071 Year 64	2072 Year 65	2073 Year 66	2074 Year 67	2075 Year 68	2076 Year 69
$ 629,600	$ 650,300	$ 671,700	$ 693,800	$ 716,600	$ 740,200	$ 764,600	$ 789,800	$ 815,800
$ 1,352,900	$ 1,393,500	$ 1,435,300	$ 1,478,400	$ 1,522,800	$ 1,568,500	$ 1,615,600	$ 1,664,100	$ 1,714,000
$ 1,228,000	$ 1,268,400	$ 1,310,100	$ 1,353,200	$ 1,397,700	$ 1,443,700	$ 1,491,200	$ 1,540,300	$ 1,591,000
$ 138,200	$ 142,700	$ 147,400	$ 152,200	$ 157,200	$ 162,400	$ 167,700	$ 173,200	$ 178,900
$ 153,700	$ 158,800	$ 164,000	$ 169,400	$ 175,000	$ 180,800	$ 186,700	$ 192,800	$ 199,100
$ 3,502,400	$ 3,613,700	$ 3,728,500	$ 3,847,000	$ 3,969,300	$ 4,095,600	$ 4,225,800	$ 4,360,200	$ 4,498,800
7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
538,000	538,000	538,000	538,000	538,000	538,000	538,000	538,000	538,000
$ 173,900	$ 179,600	$ 185,500	$ 191,600	$ 197,900	$ 204,400	$ 211,100	$ 218,000	$ 225,200
$ 26,200	$ 27,100	$ 28,000	$ 28,900	$ 29,900	$ 30,900	$ 31,900	$ 32,900	$ 34,000
$ 94,000	$ 97,100	$ 100,300	$ 103,600	$ 107,000	$ 110,500	$ 114,100	$ 117,900	$ 121,800
$ 268,700	$ 277,500	$ 286,600	$ 296,000	$ 305,700	$ 315,800	$ 326,200	$ 336,900	$ 348,000
$ 38,000	$ 39,300	$ 40,600	$ 41,900	$ 43,300	$ 44,700	$ 46,200	$ 47,700	$ 49,300
$ 600,800	$ 620,600	$ 641,000	$ 662,000	$ 683,800	$ 706,300	$ 729,500	$ 753,400	$ 778,300
$ 4,103,200	$ 4,234,300	$ 4,369,500	$ 4,509,000	$ 4,653,100	$ 4,801,900	$ 4,955,300	$ 5,113,600	$ 5,277,100
$ 410,320	$ 423,430	$ 436,950	$ 450,900	$ 465,310	$ 480,190	$ 495,530	$ 511,360	$ 527,710
$ 410,320	$ 423,430	$ 436,950	$ 450,900	$ 465,310	$ 480,190	$ 495,530	$ 511,360	$ 527,710
$ 4,923,840	$ 5,081,160	$ 5,243,400	$ 5,410,800	$ 5,583,720	$ 5,762,280	$ 5,946,360	$ 6,136,320	$ 6,332,520

Table 8-9: CVMSHCP Management Program Budget – 75 year (3.29% inflation factor) (*cont.*)

2077	2078	2079	2080	2081	2082
Year 70	Year 71	Year 72	Year 73	Year 74	Year 75
$ 842,600	$ 870,300	$ 898,900	$ 928,500	$ 959,000	$ 990,600
$ 1,765,400	$ 1,818,400	$ 1,873,000	$ 1,929,200	$ 1,987,100	$ 2,046,700
$ 1,643,300	$ 1,697,400	$ 1,753,200	$ 1,810,900	$ 1,870,500	$ 1,932,000
$ 184,800	$ 190,900	$ 197,200	$ 203,700	$ 210,400	$ 217,300
$ 205,700	$ 212,500	$ 219,500	$ 226,700	$ 234,200	$ 241,900
$ 4,641,800	$ 4,789,500	$ 4,941,800	$ 5,099,000	$ 5,261,200	$ 5,428,500
7.5	7.5	7.5	7.5	7.5	7.5
538,000	538,000	538,000	538,000	538,000	538,000
$ 232,600	$ 240,300	$ 248,200	$ 256,400	$ 264,800	$ 273,500
$ 35,100	$ 36,300	$ 37,500	$ 38,700	$ 40,000	$ 41,300
$ 125,800	$ 129,900	$ 134,200	$ 138,600	$ 143,200	$ 147,900
$ 359,400	$ 371,200	$ 383,400	$ 396,000	$ 409,000	$ 422,500
$ 50,900	$ 52,600	$ 54,300	$ 56,100	$ 57,900	$ 59,800
$ 803,800	$ 830,300	$ 857,600	$ 885,800	$ 914,900	$ 945,000
$ 5,445,600	$ 5,619,800	$ 5,799,400	$ 5,984,800	$ 6,176,100	$ 6,373,500
$ 544,560	$ 561,980	$ 579,940	$ 598,480	$ 617,610	$ 637,350
$ 544,560	$ 561,980	$ 579,940	$ 598,480	$ 617,610	$ 637,350
$ 6,534,720	$ 6,743,760	$ 6,959,280	$ 7,181,760	$ 7,411,320	$ 7,648,200

Field Crew Labor. The field crew labor will provide for contract labor to accomplish specific management tasks such as fencing, exotic species removal, and small construction projects. The labor crews would work under the supervision of the Assistant Land Managers and the Land Manager.

Administrative Assistant. Administrative assistance for the reserve management staff is provided on a part-time basis (0.25 to 0.5 PY). The hours available for this position are increased in association with the addition of assistant managers to the staff.

8.8.2 Personnel for Monitoring Program

The personnel required for the first five years during the baseline phase will comprise an integrated team, with each specialist responsible for contributing to an integrated program. The program tasks are summarized below and are described for a sample one-year period in Table 8-10, which outlines the work plan for the Monitoring Program in years one through five. Individuals for each position must possess previous experience in the relevant field and a demonstrated ability to complete the functions described in this Plan.

Project Management. One permanent, full-time, senior level (1 PY) Monitoring Program Administrator will be responsible for holding all projects to the standards of the best available science. The Administrator will work with the management committees and scientific advisors as needed to implement the Monitoring Program.

Biotic Surveys. A team of biologists will conduct surveys of Covered Species and associated natural communities. The field biology team will be overseen by the Monitoring Program Administrator and supervised by a permanent, associate-level Community Ecologist/Field Supervisor responsible for field training and supervision of survey teams. The monitoring teams and their tasks will include:

Team I:

Personnel/Team Members:

1 permanent, full-time, associate-level ecologist as team leader (1 PY)

4 temporary, full-time, Seasonal Aides (4 @ 0.75 PYs = 3 PYs)

1 temporary, full-time associate-level entomologist (0.5 PY)

Tasks:

Covered Species Surveys

- Plant Species Surveys (March to May). Objectives: test and refine species distribution models and determine Habitat correlates, revisit historic record locations to see if species is extant at site and if suitable Habitat remains.

Table 8-10: Monitoring Program Tasks: Years 1-5

Monitoring Level Monitoring activity	**Baseline Phase**											
	JAN	*FEB*	*MAR*	*APRIL*	*MAY*	*JUNE*	*JULY*	*AUG*	*SEPT*	*OCT*	*NOV*	*DEC*
Species Level												
Covered perennial plant surveys						◊	◊	◊				
Covered annual plant surveys			◊	◊	◊							
Covered insect surveys	●	●	●									
Covered bird surveys					♦	♦	♦	♦				
Covered mammal surveys				■	■	■						
Sand community species surveys						◊	◊	◊				
Desert tortoise surveys				◊	◊							
Natural Community Level												
Habitat Monitoring on Transects												
1. Sand Compaction				◊	◊							
2. Perennial shrub abundance												
3. Annual and invasive plants			◊	◊								
4. Arthropod surveys			◊	◊								
5. Riparian Habitat surveys								♦	♦			
Landscape Level												
Continuous weather data recording												
Acquire & Analyze Digital Images/ Satellite Images												
Data Analysis – All Levels												
Data management	●	●	◊●	◊♦■	◊♦■	◊♦■	◊♦	◊♦	◊♦			
Data analysis 1. GIS modeling										❖	❖	❖

◊ = Team I, ♦ = Team II, ■ = Team III, ● = Entomologist, ❖ = Data Analyst

- Reptile Species (Sand) Surveys (June to August) establish permanent study sites in sand communities across the Coachella Valley, collect baseline data on species distribution and abundance for reptile Covered Species
- Mammal Species Surveys (April to July) establish permanent study sites in sand communities across the Coachella Valley, collect baseline data on species distribution and abundance for Coachella Valley round-tailed ground squirrel.
- Desert tortoise Surveys (April to May)
- Insect Surveys (January to March) establish permanent study sites in sand communities across the Coachella Valley, collect baseline data on species distribution and abundance for insect Covered Species

Natural Community Surveys.

- Sand Transects (June to August). Objectives: establish permanent study sites in sand communities across the Coachella Valley, collect baseline data on biodiversity, species distribution and abundance for plant, arthropod and vertebrate communities, characterize sand and soil variables.

Team II:

Personnel/Team Members:

- 1 permanent, full-time, associate-level ecologist as team leader (same position as Team I, no additional PYs)
- 2 temporary, full-time, Seasonal Aides (2 @ 0.50 PYs = 3 PYs)

Tasks:

Covered Species Surveys

- Riparian Birds (April to July). Objectives: test and refine species distribution models and determine Habitat correlates, quantify threats as possible correlates of species distributions, gather baseline data on ant community to track invasive species impacts.
- Crissal and LeConte's Thrasher transects (April to May). Objectives: test and refine species distribution models and determine Habitat correlates, revisit historic record locations to see if species is extant at site and if suitable Habitat remains, test different sampling strategies for detection of Le Conte's thrasher.

Team III:

Personnel/Team Members:

- temporary, part-time, associate-level mammalogist (0.25 PY)
- temporary, part-time, assistant-level mammalogists (0.25 PY)

Tasks:

Covered Species Surveys

- Palm Springs Pocket Mouse Surveys (April to June). Objectives: conduct trapping surveys for Palm Springs pocket mouse to refine species distribution models and determine Habitat correlates.
- Southern Yellow Bat Surveys (April to June)

Team IV:

Personnel/Team Members:

- temporary, full-time, Seasonal Aides (3 @ 0.75 PYs = 2.25 PYs)
- temporary, part-time research associate

Tasks:

Trail Use Monitoring and Permit Compliance Monitoring

- Monitoring of trail use according to protocol developed by CDFG, BLM, and CVCC.
- Research program on effects of recreational use on bighorn sheep as described in Section 8.5.1.

Abiotic Surveys. The team of biologists, depending on their relative workload, will accomplish surveys of abiotic factors and natural community sampling. The Vertebrate Ecologist/Field Supervisor will be responsible for acquisition and interpretation of aerial photos and other remote sensing images.

Data Analysis and Database Management.

- Data Analysis Project Director: one full-time, permanent, senior-level (PhD) data analyst with experience in multivariate statistics, spatial analysis, trend analysis and detection (0.5 PY).
- GIS Development and Analysis: one part-time, permanent database manager/GIS technician with experience in database management (NCEAS, BIOS, UFO structure), GIS, and remote sensing (0.5 PY).

Sample Field Work Schedule (from 2003).

- Sand Transects (February to July). Objectives: establish permanent study sites in sand communities across the Coachella Valley, collect baseline data on biodiversity, species distribution and abundance for plant, arthropod and vertebrate communities, characterize sand and soil variables, survey Covered Species in sand Habitats.
- Riparian Birds (April to July). Objectives: test and refine species distribution models and determine Habitat correlates, quantify threats as possible correlates of species distributions, gather baseline data on ant community to track invasive species impacts.

- Crissal and LeConte's thrasher transects (April to May). Objectives: test and refine species distribution models and determine Habitat correlates, revisit historic record locations to see if species is extant at site and if suitable Habitat remains, test different sampling strategies for detection of Le Conte's thrasher.
- Target Plant Species Surveys (January to August). Objectives: test and refine species distribution models and determine Habitat correlates, revisit historic record locations to see if species is extant at site and if suitable Habitat remains.
- Coachella Valley Jerusalem Cricket Survey (December to March). Objectives: refine species distribution, develop new non-lethal sampling techniques.

8.8.3 Program Cost Estimates

The cost estimates for the implementation of both the Monitoring and Management Programs, presented in Tables 8-9 (management budget) and 8-11 (monitoring budget), are dependent on assumptions regarding how these tasks will be completed. A more detailed budget for the Management Program, illustrating the costs for years one thru five of Plan Implementation, is presented in Table 8-12. It should be noted that some costs associated with land acquisition have been attributed as land improvement costs (See Section 5.1.2.2). These costs associated with land acquisition, including fencing, signage, removal of trash and invasive species, are not included in the Management Program budget. Section 5.2 of Appendix I provides detail on the land improvement costs.

Since this is, by definition, an adaptive program, change is inevitable. Estimating costs for changes that will occur on unknown timetables and Habitat trajectories, is obviously problematic, and introduces a potential error to any cost estimates. One untested assumption is that costs for implementing a particular monitoring or management method will be roughly equal to alternative methods should changes to recommended protocols occur. Contingency funds are incorporated in the budget to address this variable.

An Adaptive Management fund is incorporated into the Plan budget. This fund will provide $100,000 annually to cover the uncertainties of Adaptive Management. This fund is in addition to management budget. The Adaptive Management fund could be used for a research project or focused study to address a particular management issue identified in the Monitoring Program and/or the Management Program. Funds might be used to fund a university or graduate student project to address a management issue. Examples of potential Adaptive Management fund projects include:

- An evaluation of the impacts of and methods to control an invasive plant species on one or a group of Covered Species
- An evaluation of the impacts of changes in hydrology to one of the conserved natural communities (mesquite hummocks, desert dry wash woodland)

Table 8-11: CVMSHCP Monitoring Program Budget – 75 year (3.29% inflation factor)

Table 8-11: Monitoring Program Budget - 75 Years (3.29% inflation factor)

FY Ending June 30	2003		2008	2009	2010	2011	2012	2013	2014	2015
	Base Salary	PY Salary	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
ADMINISTRATION										
Personnel - All Species except sheep										
Monitoring Program Admin (1)	$ 100,000	$ 100,000	$ -	$ -	$ -	$ -	$ -	$ 100,000	$ 103,000	$ 106,100
Vertebrate Ecol - Field Supervisor (1)	90,000	90,000	$ 90,000	$ 93,000	$ 96,100	$ 99,300	$ 102,600	$ 106,000	$ 109,500	$ 113,100
Entomologist (1 @ 0.5)	80,000	40,000	$ 40,000	$ 41,300	$ 42,700	$ 44,100	$ 45,600	$ 47,100	$ 48,600	$ 50,200
Associate Biologist (1)	80,000	80,000	$ 80,000	$ 82,600	$ 85,300	$ 88,100	$ 91,000	$ 94,000	$ 97,100	$ 100,300
Biologist - Mammalogy (1@0.5)	70,000	35,000	$ 35,000	$ 36,200	$ 37,400	$ 38,600	$ 39,900	$ 41,200	$ 42,600	$ 44,000
Biologist - Ornithology (1-2@0.5)	70,000	70,000	$ 70,000	$ 72,300	$ 74,700	$ 77,200	$ 79,700	$ 41,150	$ 42,500	$ 43,900
Seasonal Aide - Ornithology (1@0.5)	30,000	15,000	$ 15,000	$ 15,500	$ 16,000	$ 16,500	$ 17,000	$ 17,600	$ 18,200	$ 18,800
Seasonal Aide (4-5@0.75)	30,000	112,500	$ 112,500	$ 116,200	$ 120,000	$ 123,900	$ 128,000	93,000	$ 96,100	$ 99,300
Personnel - Sheep and Trails										
Seasonal Aide (3@0.75)	30,000	67,500	$ 67,500	$ 69,700	$ 72,000	$ 74,400	$ 76,800	$ 79,300	$ 81,900	$ 84,600
Graduate Researcher	60,000	24,000	$ 24,000	$ 24,000	$ 24,000	$ 24,000	$ 24,000			
Sheep - Monitoring										
Personnel		50,000	$ 50,000	$ 51,600	$ 53,300	$ 55,100	$ 56,900	$ 58,800	$ 60,700	$ 62,700
Personnel - Data Analysis										
GIS Analyst (1 @ 0.5)	80,000	40,000	$ 40,000	$ 41,300	$ 42,700	$ 44,100	$ 45,600	$ 47,100	$ 48,600	$ 50,200
GIS Technician (1 @ 0.5)	70,000	35,000	$ 35,000	$ 36,200	$ 37,400	$ 38,600	$ 39,900	$ 41,200	$ 42,600	$ 44,000
Personnel Subtotal			$ 659,000	$ 678,800	$ 701,600	$ 723,900	$ 747,000	$ 766,450	$ 791,400	$ 817,200
One-time Cost Items										
Revise/Update Natural Communities Map			$ 100,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Equipment and Supplies										
Satellite/Aerial Imagery			$ 15,000	$ 3,000	$ 3,100	$ 3,200	$ 3,300	$ 3,400	$ 3,500	$ 3,600
Sampling Gear			$ 15,000	$ 15,500	$ 16,000	$ 5,000	$ 5,200	$ 5,400	$ 5,600	$ 5,800
Transect Set-up & Maintenance			$ 5,000	$ 5,200	$ 5,400	$ 5,600	$ 5,800	$ 1,000	$ 1,000	$ 1,000
Radio-tracking Equipment			$ 3,000	$ 600	$ 620	$ 640	$ 660	$ 680	$ 700	$ 720
Other Supplies			$ 5,000	$ 1,000	$ 1,030	$ 1,060	$ 1,090	$ 1,130	$ 1,170	$ 1,210
Weather Stations (3)			$ 6,000	$ 200	$ 210	$ 220	$ 230	$ 240	$ 250	$ 260
Vehicle Costs			$ 18,400	$ 19,000	$ 19,600	$ 20,200	$ 20,900	$ 21,600	$ 22,300	$ 23,000
Sheep Monitoring		65,000	$ 65,000	$ 67,100	$ 69,300	$ 71,600	$ 74,000	$ 76,400	$ 78,900	$ 81,500
Sheep Monitoring/Research	$ 120,000	48,000	$ 48,000	$ 49,600	$ 51,200	$ 52,900	$ 54,600	$ -	$ -	$ -
Equipment Subtotal			$ 180,400	$ 161,200	$ 166,460	$ 160,420	$ 165,780	$ 109,850	$ 113,420	$ 117,090
Subtotal - Estimated Cost			$ 939,400	$ 840,000	$ 868,060	$ 884,320	$ 912,780	$ 876,300	$ 904,820	$ 934,290
10% Contingency			$ 93,940	$ 84,000	$ 86,806	$ 88,432	$ 91,278	$ 87,630	$ 90,482	$ 93,429
Total - Estimated Cost			$ 1,033,340	$ 924,000	$ 954,866	$ 972,752	$ 1,004,058	$ 963,930	$ 995,302	$ 1,027,719

Table 8-11: CVMSHCP Monitoring Program Budget – 75 year (3.29% inflation factor) (*cont.*)

2016 Year 9	2017 Year 10	2018 Year 11	2019 Year 12	2020 Year 13	2021 Year 14	2022 Year 15	2023 Year 16	2024 Year 17	2025 Year 18	2026 Year 19	2027 Year 20
$ 109,300	$ 112,600	$ 116,000	$ 119,500	$ 123,100	$ 126,800	$ 130,600	$ 134,500	$ 138,500	$ 142,700	$ 147,000	$ 151,400
$ 116,800	$ 120,600	$ 124,600	$ 128,700	$ 132,900	$ 137,300	$ 141,800	$ 146,500	$ 151,300	$ 156,300	$ 161,400	$ 166,700
$ 51,900	$ 53,600	$ 55,400	$ 57,200	$ 59,100	$ 61,000	$ 63,000	$ 65,100	$ 67,200	$ 69,400	$ 71,700	$ 74,100
$ 103,600	$ 107,000	$ 110,500	$ 114,100	$ 117,900	$ 121,800	$ 125,800	$ 129,900	$ 134,200	$ 138,600	$ 143,200	$ 147,900
$ 45,400	$ 46,900	$ 48,400	$ 50,000	$ 51,600	$ 53,300	$ 55,100	$ 56,900	$ 58,800	$ 60,700	$ 62,700	$ 64,800
$ 45,300	$ 46,800	$ 48,300	$ 49,900	$ 51,500	$ 53,200	$ 55,000	$ 56,800	$ 58,700	$ 60,600	$ 62,600	$ 64,700
$ 19,400	$ 20,000	$ 20,700	$ 21,400	$ 22,100	$ 22,800	$ 23,600	$ 24,400	$ 25,200	$ 26,000	$ 26,900	$ 27,800
$ 102,600	$ 106,000	$ 109,500	$ 113,100	$ 116,800	$ 120,600	$ 124,600	$ 128,700	$ 132,900	$ 137,300	$ 141,800	$ 146,500
$ 87,400	$ 90,300	$ 93,300	$ 96,400	$ 99,600	$ 102,900	$ 106,300	$ 109,800	$ 113,400	$ 117,100	$ 121,000	$ 125,000
$ 64,800	$ 66,900	$ 69,100	$ 71,400	$ 73,700	$ 76,100	$ 78,600	$ 81,200	$ 83,900	$ 86,700	$ 89,600	$ 92,500
$ 51,900	$ 53,600	$ 55,400	$ 57,200	$ 59,100	$ 61,000	$ 63,000	$ 65,100	$ 67,200	$ 69,400	$ 71,700	$ 74,100
$ 45,400	$ 46,900	$ 48,400	$ 50,000	$ 51,600	$ 53,300	$ 55,100	$ 56,900	$ 58,800	$ 60,700	$ 62,700	$ 64,800
$ 843,800	$ 871,200	$ 899,600	$ 928,900	$ 959,000	$ 990,100	$ 1,022,500	$ 1,055,800	$ 1,090,100	$ 1,125,500	$ 1,162,300	$ 1,200,300
$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
$ 3,700	$ 3,800	$ 3,900	$ 4,000	$ 4,100	$ 4,200	$ 4,300	$ 4,400	$ 4,500	$ 4,600	$ 4,800	$ 5,000
$ 6,000	$ 6,200	$ 6,400	$ 6,600	$ 6,800	$ 7,000	$ 7,200	$ 7,400	$ 7,600	$ 7,900	$ 8,200	$ 8,500
$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000
$ 740	$ 760	$ 790	$ 820	$ 850	$ 880	$ 910	$ 940	$ 970	$ 1,000	$ 1,030	$ 1,060
$ 1,250	$ 1,290	$ 1,330	$ 1,370	$ 1,420	$ 1,470	$ 1,520	$ 1,570	$ 1,620	$ 1,670	$ 1,720	$ 1,780
$ 270	$ 280	$ 290	$ 300	$ 310	$ 320	$ 330	$ 340	$ 350	$ 360	$ 370	$ 380
$ 23,800	$ 24,600	$ 25,400	$ 26,200	$ 27,100	$ 28,000	$ 28,900	$ 29,900	$ 30,900	$ 31,900	$ 32,900	$ 34,000
$ 84,200	$ 87,000	$ 89,900	$ 92,900	$ 96,000	$ 99,200	$ 102,500	$ 105,900	$ 109,400	$ 113,000	$ 116,700	$ 120,500
$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
$ 120,960	$ 124,930	$ 129,010	$ 133,190	$ 137,580	$ 142,070	$ 146,660	$ 151,450	$ 156,340	$ 161,430	$ 166,720	$ 172,220
$ 964,760	$ 996,130	$ 1,028,610	$ 1,062,090	$ 1,096,580	$ 1,132,170	$ 1,169,160	$ 1,207,250	$ 1,246,440	$ 1,286,930	$ 1,329,020	$ 1,372,520
$ 96,476	$ 99,613	$ 102,861	$ 106,209	$ 109,658	$ 113,217	$ 116,916	$ 120,725	$ 124,644	$ 128,693	$ 132,902	$ 137,252
$ 1,061,236	$ 1,095,743	$ 1,131,471	$ 1,168,299	$ 1,206,238	$ 1,245,387	$ 1,286,076	$ 1,327,975	$ 1,371,084	$ 1,415,623	$ 1,461,922	$ 1,509,772

Table 8-11: CVMSHCP Monitoring Program Budget – 75 year (3.29% inflation factor) (*cont.*)

2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
Year 21	Year 22	Year 23	Year 24	Year 25	Year 26	Year 27	Year 28	Year 29	Year 30	Year 31	Year 32
$ 155,900	$ 160,600	$ 165,400	$ 170,400	$ 175,500	$ 180,800	$ 186,200	$ 191,800	$ 197,600	$ 203,500	$ 209,600	$ 215,900
$ 172,200	$ 177,900	$ 183,800	$ 189,800	$ 196,000	$ 202,400	$ 209,100	$ 216,000	$ 223,100	$ 230,400	$ 238,000	$ 245,800
$ 76,500	$ 79,000	$ 81,600	$ 84,300	$ 87,100	$ 90,000	$ 93,000	$ 96,100	$ 99,300	$ 102,600	$ 106,000	$ 109,500
$ 152,800	$ 157,800	$ 163,000	$ 168,400	$ 173,900	$ 179,600	$ 185,500	$ 191,600	$ 197,900	$ 204,400	$ 211,100	$ 218,000
$ 66,900	$ 69,100	$ 71,400	$ 73,700	$ 76,100	$ 78,600	$ 81,200	$ 83,900	$ 86,700	$ 89,600	$ 92,500	$ 95,500
$ 66,800	$ 69,000	$ 71,300	$ 73,600	$ 76,000	$ 78,500	$ 81,100	$ 83,800	$ 86,600	$ 89,400	$ 92,300	$ 95,300
$ 28,700	$ 29,600	$ 30,600	$ 31,600	$ 32,600	$ 33,700	$ 34,800	$ 35,900	$ 37,100	$ 38,300	$ 39,600	$ 40,900
$ 151,300	$ 156,300	$ 161,400	$ 166,700	$ 172,200	$ 177,900	$ 183,800	$ 189,800	$ 196,000	$ 202,400	$ 209,100	$ 216,000
$ 129,100	$ 133,300	$ 137,700	$ 142,200	$ 146,900	$ 151,700	$ 156,700	$ 161,900	$ 167,200	$ 172,700	$ 178,400	$ 184,300
$ 95,500	$ 98,600	$ 101,800	$ 105,100	$ 108,600	$ 112,200	$ 115,900	$ 119,700	$ 123,600	$ 127,700	$ 131,900	$ 136,200
$ 76,500	$ 79,000	$ 81,600	$ 84,300	$ 87,100	$ 90,000	$ 93,000	$ 96,100	$ 99,300	$ 102,600	$ 106,000	$ 109,500
$ 66,900	$ 69,100	$ 71,400	$ 73,700	$ 76,100	$ 78,600	$ 81,200	$ 83,900	$ 86,700	$ 89,600	$ 92,500	$ 95,500
$ 1,239,100	$ 1,279,300	$ 1,321,000	$ 1,363,800	$ 1,408,100	$ 1,454,000	$ 1,501,500	$ 1,550,500	$ 1,601,100	$ 1,653,200	$ 1,707,000	$ 1,762,400
$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
$ 5,200	$ 5,400	$ 5,600	$ 5,800	$ 6,000	$ 6,200	$ 6,400	$ 6,600	$ 6,800	$ 7,000	$ 7,200	$ 7,400
$ 8,800	$ 9,100	$ 9,400	$ 9,700	$ 10,000	$ 10,300	$ 10,600	$ 10,900	$ 11,300	$ 11,700	$ 12,100	$ 12,500
$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000
$ 1,090	$ 1,130	$ 1,170	$ 1,210	$ 1,250	$ 1,290	$ 1,330	$ 1,370	$ 1,420	$ 1,470	$ 1,520	$ 1,570
$ 1,840	$ 1,900	$ 1,960	$ 2,020	$ 2,090	$ 2,160	$ 2,230	$ 2,300	$ 2,380	$ 2,460	$ 2,540	$ 2,620
$ 390	$ 400	$ 410	$ 420	$ 430	$ 440	$ 450	$ 460	$ 470	$ 480	$ 490	$ 500
$ 35,100	$ 36,300	$ 37,500	$ 38,700	$ 40,000	$ 41,300	$ 42,700	$ 44,100	$ 45,600	$ 47,100	$ 48,600	$ 50,200
$ 124,500	$ 128,600	$ 132,800	$ 137,200	$ 141,700	$ 146,400	$ 151,200	$ 156,200	$ 161,300	$ 166,600	$ 172,100	$ 177,800
$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
$ 177,920	$ 183,830	$ 189,840	$ 196,050	$ 202,470	$ 209,090	$ 215,910	$ 222,930	$ 230,270	$ 237,810	$ 245,550	$ 253,590
$ 1,417,020	$ 1,463,130	$ 1,510,840	$ 1,559,850	$ 1,610,570	$ 1,663,090	$ 1,717,410	$ 1,773,430	$ 1,831,370	$ 1,891,010	$ 1,952,550	$ 2,015,990
$ 141,702	$ 146,313	$ 151,084	$ 155,985	$ 161,057	$ 166,309	$ 171,741	$ 177,343	$ 183,137	$ 189,101	$ 195,255	$ 201,599
$ 1,558,722	$ 1,609,443	$ 1,661,924	$ 1,715,835	$ 1,771,627	$ 1,829,399	$ 1,889,151	$ 1,950,773	$ 2,014,507	$ 2,080,111	$ 2,147,805	$ 2,217,589

Table 8-11: CVMSHCP Monitoring Program Budget – 75 year (3.29% inflation factor) (*cont.*)

2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051
Year 33	Year 34	Year 35	Year 36	Year 37	Year 38	Year 39	Year 40	Year 41	Year 42	Year 43	Year 44
$ 222,400	$ 229,100	$ 236,000	$ 243,100	$ 250,400	$ 257,900	$ 265,600	$ 273,600	$ 281,800	$ 290,300	$ 299,000	$ 308,000
$ 253,900	$ 262,300	$ 270,900	$ 279,800	$ 289,000	$ 298,500	$ 308,300	$ 318,400	$ 328,900	$ 339,700	$ 350,900	$ 362,400
$ 113,100	$ 116,800	$ 120,600	$ 124,600	$ 128,700	$ 132,900	$ 137,300	$ 141,800	$ 146,500	$ 151,300	$ 156,300	$ 161,400
$ 225,200	$ 232,600	$ 240,300	$ 248,200	$ 256,400	$ 264,800	$ 273,500	$ 282,500	$ 291,800	$ 301,400	$ 311,300	$ 321,500
$ 98,600	$ 101,800	$ 105,100	$ 108,600	$ 112,200	$ 115,900	$ 119,700	$ 123,600	$ 127,700	$ 131,900	$ 136,200	$ 140,700
$ 98,400	$ 101,600	$ 104,900	$ 108,400	$ 112,000	$ 115,700	$ 119,500	$ 123,400	$ 127,500	$ 131,700	$ 136,000	$ 140,500
$ 42,200	$ 43,600	$ 45,000	$ 46,500	$ 48,000	$ 49,600	$ 51,200	$ 52,900	$ 54,600	$ 56,400	$ 58,300	$ 60,200
$ 223,100	$ 230,400	$ 238,000	$ 245,800	$ 253,900	$ 262,300	$ 270,900	$ 279,800	$ 289,000	$ 298,500	$ 308,300	$ 318,400
$ 190,400	$ 196,700	$ 203,200	$ 209,900	$ 216,800	$ 223,900	$ 231,300	$ 238,900	$ 246,800	$ 254,900	$ 263,300	$ 272,000
$ 140,700	$ 145,300	$ 150,100	$ 155,000	$ 160,100	$ 165,400	$ 170,800	$ 176,400	$ 182,200	$ 188,200	$ 194,400	$ 200,800
$ 113,100	$ 116,800	$ 120,600	$ 124,600	$ 128,700	$ 132,900	$ 137,300	$ 141,800	$ 146,500	$ 151,300	$ 156,300	$ 161,400
$ 98,600	$ 101,800	$ 105,100	$ 108,600	$ 112,200	$ 115,900	$ 119,700	$ 123,600	$ 127,700	$ 131,900	$ 136,200	$ 140,700
$ 1,819,700	$ 1,878,800	$ 1,939,800	$ 2,003,100	$ 2,068,400	$ 2,135,700	$ 2,205,100	$ 2,276,700	$ 2,351,000	$ 2,427,500	$ 2,506,500	$ 2,588,000
$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
$ 7,600	$ 7,900	$ 8,200	$ 8,500	$ 8,800	$ 9,100	$ 9,400	$ 9,700	$ 10,000	$ 10,300	$ 10,600	$ 10,900
$ 12,900	$ 13,300	$ 13,700	$ 14,200	$ 14,700	$ 15,200	$ 15,700	$ 16,200	$ 16,700	$ 17,200	$ 17,800	$ 18,400
$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000
$ 1,620	$ 1,670	$ 1,720	$ 1,780	$ 1,840	$ 1,900	$ 1,960	$ 2,020	$ 2,090	$ 2,160	$ 2,230	$ 2,300
$ 2,710	$ 2,800	$ 2,890	$ 2,990	$ 3,090	$ 3,190	$ 3,290	$ 3,400	$ 3,510	$ 3,630	$ 3,750	$ 3,870
$ 520	$ 540	$ 560	$ 580	$ 600	$ 620	$ 640	$ 660	$ 680	$ 700	$ 720	$ 740
$ 51,900	$ 53,600	$ 55,400	$ 57,200	$ 59,100	$ 61,000	$ 63,000	$ 65,100	$ 67,200	$ 69,400	$ 71,700	$ 74,100
$ 183,600	$ 189,600	$ 195,800	$ 202,200	$ 208,900	$ 215,800	$ 222,900	$ 230,200	$ 237,800	$ 245,600	$ 253,700	$ 262,000
$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
$ 261,850	$ 270,410	$ 279,270	$ 288,450	$ 298,030	$ 307,810	$ 317,890	$ 328,280	$ 338,980	$ 349,990	$ 361,500	$ 373,310
$ 2,081,550	$ 2,149,210	$ 2,219,070	$ 2,291,550	$ 2,366,430	$ 2,443,510	$ 2,522,990	$ 2,604,980	$ 2,689,980	$ 2,777,490	$ 2,868,000	$ 2,961,310
$ 208,155	$ 214,921	$ 221,907	$ 229,155	$ 236,643	$ 244,351	$ 252,299	$ 260,498	$ 268,998	$ 277,749	$ 286,800	$ 296,131
$ 2,289,705	$ 2,364,131	$ 2,440,977	$ 2,520,705	$ 2,603,073	$ 2,687,861	$ 2,775,289	$ 2,865,478	$ 2,958,978	$ 3,055,239	$ 3,154,800	$ 3,257,441

Table 8-11: CVMSHCP Monitoring Program Budget – 75 year (3.29% inflation factor) (*cont.*)

2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063
Year 45	Year 46	Year 47	Year 48	Year 49	Year 50	Year 51	Year 52	Year 53	Year 54	Year 55	Year 56
$ 317,200	$ 326,700	$ 336,500	$ 346,600	$ 357,000	$ 367,700	$ 378,700	$ 390,100	$ 401,800	$ 413,900	$ 426,300	$ 439,100
$ 374,300	$ 386,600	$ 399,300	$ 412,400	$ 426,000	$ 440,000	$ 454,500	$ 469,500	$ 484,900	$ 500,900	$ 517,400	$ 534,400
$ 166,700	$ 172,200	$ 177,900	$ 183,800	$ 189,800	$ 196,000	$ 202,400	$ 209,100	$ 216,000	$ 223,100	$ 230,400	$ 238,000
$ 332,100	$ 343,000	$ 354,300	$ 366,000	$ 378,000	$ 390,400	$ 403,200	$ 416,500	$ 430,200	$ 444,400	$ 459,000	$ 474,100
$ 145,300	$ 150,100	$ 155,000	$ 160,100	$ 165,400	$ 170,800	$ 176,400	$ 182,200	$ 188,200	$ 194,400	$ 200,800	$ 207,400
$ 145,100	$ 149,900	$ 154,800	$ 159,900	$ 165,200	$ 170,600	$ 176,200	$ 182,000	$ 188,000	$ 194,200	$ 200,600	$ 207,200
$ 62,200	$ 64,200	$ 66,300	$ 68,500	$ 70,800	$ 73,100	$ 75,500	$ 78,000	$ 80,600	$ 83,300	$ 86,000	$ 88,800
$ 328,900	$ 339,700	$ 350,900	$ 362,400	$ 374,300	$ 386,600	$ 399,300	$ 412,400	$ 426,000	$ 440,000	$ 454,500	$ 469,500
$ 280,900	$ 290,100	$ 299,600	$ 309,500	$ 319,700	$ 330,200	$ 341,100	$ 352,300	$ 363,900	$ 375,900	$ 388,300	$ 401,100
$ 207,400	$ 214,200	$ 221,200	$ 228,500	$ 236,000	$ 243,800	$ 251,800	$ 260,100	$ 268,700	$ 277,500	$ 286,600	$ 296,000
$ 166,700	$ 172,200	$ 177,900	$ 183,800	$ 189,800	$ 196,000	$ 202,400	$ 209,100	$ 216,000	$ 223,100	$ 230,400	$ 238,000
$ 145,300	$ 150,100	$ 155,000	$ 160,100	$ 165,400	$ 170,800	$ 176,400	$ 182,200	$ 188,200	$ 194,400	$ 200,800	$ 207,400
$ 2,672,100	$ 2,759,000	$ 2,848,700	$ 2,941,600	$ 3,037,400	$ 3,136,000	$ 3,237,900	$ 3,343,500	$ 3,452,500	$ 3,565,100	$ 3,681,100	$ 3,801,000
$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
$ 11,300	$ 11,700	$ 12,100	$ 12,500	$ 12,900	$ 13,300	$ 13,700	$ 14,200	$ 14,700	$ 15,200	$ 15,700	$ 16,200
$ 19,000	$ 19,600	$ 20,200	$ 20,900	$ 21,600	$ 22,300	$ 23,000	$ 23,800	$ 24,600	$ 25,400	$ 26,200	$ 27,100
$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000
$ 2,380	$ 2,460	$ 2,540	$ 2,620	$ 2,710	$ 2,800	$ 2,890	$ 2,990	$ 3,090	$ 3,190	$ 3,290	$ 3,400
$ 4,000	$ 4,130	$ 4,270	$ 4,410	$ 4,560	$ 4,710	$ 4,860	$ 5,020	$ 5,190	$ 5,360	$ 5,540	$ 5,720
$ 760	$ 780	$ 800	$ 820	$ 840	$ 870	$ 900	$ 930	$ 960	$ 990	$ 1,020	$ 1,050
$ 76,500	$ 79,000	$ 81,600	$ 84,300	$ 87,100	$ 90,000	$ 93,000	$ 96,100	$ 99,300	$ 102,600	$ 106,000	$ 109,500
$ 270,600	$ 279,500	$ 288,700	$ 298,200	$ 308,000	$ 318,100	$ 328,600	$ 339,400	$ 350,600	$ 362,100	$ 374,000	$ 386,300
$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
$ 385,540	$ 398,170	$ 411,210	$ 424,750	$ 438,710	$ 453,080	$ 467,950	$ 483,440	$ 499,440	$ 515,840	$ 532,750	$ 550,270
$ 3,057,640	$ 3,157,170	$ 3,259,910	$ 3,366,350	$ 3,476,110	$ 3,589,080	$ 3,705,850	$ 3,826,940	$ 3,951,940	$ 4,080,940	$ 4,213,850	$ 4,351,270
$ 305,764	$ 315,717	$ 325,991	$ 336,635	$ 347,611	$ 358,908	$ 370,585	$ 382,694	$ 395,194	$ 408,094	$ 421,385	$ 435,127
$ 3,363,404	$ 3,472,887	$ 3,585,901	$ 3,702,985	$ 3,823,721	$ 3,947,988	$ 4,076,435	$ 4,209,634	$ 4,347,134	$ 4,489,034	$ 4,635,235	$ 4,786,397

Table 8-11: CVMSHCP Monitoring Program Budget – 75 year (3.29% inflation factor) (*cont.*)

2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075
Year 57	Year 58	Year 59	Year 60	Year 61	Year 62	Year 63	Year 64	Year 65	Year 66	Year 67	Year 68
$ 452,300	$ 465,900	$ 479,900	$ 494,300	$ 509,100	$ 524,400	$ 540,100	$ 556,300	$ 573,000	$ 590,200	$ 607,900	$ 626,100
$ 552,000	$ 570,200	$ 589,000	$ 608,400	$ 628,400	$ 649,100	$ 670,500	$ 692,600	$ 715,400	$ 738,900	$ 763,200	$ 788,300
$ 245,800	$ 253,900	$ 262,300	$ 270,900	$ 279,800	$ 289,000	$ 298,500	$ 308,300	$ 318,400	$ 328,900	$ 339,700	$ 350,900
$ 489,700	$ 505,800	$ 522,400	$ 539,600	$ 557,400	$ 575,700	$ 594,600	$ 614,200	$ 634,400	$ 655,300	$ 676,900	$ 699,200
$ 214,200	$ 221,200	$ 228,500	$ 236,000	$ 243,800	$ 251,800	$ 260,100	$ 268,700	$ 277,500	$ 286,600	$ 296,000	$ 305,700
$ 214,000	$ 221,000	$ 228,300	$ 235,800	$ 243,600	$ 251,600	$ 259,900	$ 268,500	$ 277,300	$ 286,400	$ 295,800	$ 305,500
$ 91,700	$ 94,700	$ 97,800	$ 101,000	$ 104,300	$ 107,700	$ 111,200	$ 114,900	$ 118,700	$ 122,600	$ 126,600	$ 130,800
$ 484,900	$ 500,900	$ 517,400	$ 534,400	$ 552,000	$ 570,200	$ 589,000	$ 608,400	$ 628,400	$ 649,100	$ 670,500	$ 692,600
$ 414,300	$ 427,900	$ 442,000	$ 456,500	$ 471,500	$ 487,000	$ 503,000	$ 519,500	$ 536,600	$ 554,300	$ 572,500	$ 591,300
$ 305,700	$ 315,800	$ 326,200	$ 336,900	$ 348,000	$ 359,400	$ 371,200	$ 383,400	$ 396,000	$ 409,000	$ 422,500	$ 436,400
$ 245,800	$ 253,900	$ 262,300	$ 270,900	$ 279,800	$ 289,000	$ 298,500	$ 308,300	$ 318,400	$ 328,900	$ 339,700	$ 350,900
$ 214,200	$ 221,200	$ 228,500	$ 236,000	$ 243,800	$ 251,800	$ 260,100	$ 268,700	$ 277,500	$ 286,600	$ 296,000	$ 305,700
$ 3,924,600	$ 4,052,400	$ 4,184,600	$ 4,320,700	$ 4,461,500	$ 4,606,700	$ 4,756,700	$ 4,911,800	$ 5,071,600	$ 5,236,800	$ 5,407,300	$ 5,583,400
$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
$ 16,700	$ 17,200	$ 17,800	$ 18,400	$ 19,000	$ 19,600	$ 20,200	$ 20,900	$ 21,600	$ 22,300	$ 23,000	$ 23,800
$ 28,000	$ 28,900	$ 29,900	$ 30,900	$ 31,900	$ 32,900	$ 34,000	$ 35,100	$ 36,300	$ 37,500	$ 38,700	$ 40,000
$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000
$ 3,510	$ 3,630	$ 3,750	$ 3,870	$ 4,000	$ 4,130	$ 4,270	$ 4,410	$ 4,560	$ 4,710	$ 4,860	$ 5,020
$ 5,910	$ 6,100	$ 6,300	$ 6,510	$ 6,720	$ 6,940	$ 7,170	$ 7,410	$ 7,650	$ 7,900	$ 8,160	$ 8,430
$ 1,080	$ 1,110	$ 1,140	$ 1,170	$ 1,210	$ 1,250	$ 1,290	$ 1,330	$ 1,370	$ 1,410	$ 1,450	$ 1,490
$ 113,100	$ 116,800	$ 120,600	$ 124,600	$ 128,700	$ 132,900	$ 137,300	$ 141,800	$ 146,500	$ 151,300	$ 156,300	$ 161,400
$ 399,000	$ 412,100	$ 425,700	$ 439,700	$ 454,200	$ 469,100	$ 484,500	$ 500,400	$ 516,900	$ 533,900	$ 551,500	$ 569,600
$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
$ 568,300	$ 586,840	$ 606,190	$ 626,150	$ 646,730	$ 667,820	$ 689,730	$ 712,350	$ 735,880	$ 760,020	$ 784,970	$ 810,740
$ 4,492,900	$ 4,639,240	$ 4,790,790	$ 4,946,850	$ 5,108,230	$ 5,274,520	$ 5,446,430	$ 5,624,150	$ 5,807,480	$ 5,996,820	$ 6,192,270	$ 6,394,140
$ 449,290	$ 463,924	$ 479,079	$ 494,685	$ 510,823	$ 527,452	$ 544,643	$ 562,415	$ 580,748	$ 599,682	$ 619,227	$ 639,414
$ 4,942,190	$ 5,103,164	$ 5,269,869	$ 5,441,535	$ 5,619,053	$ 5,801,972	$ 5,991,073	$ 6,186,565	$ 6,388,228	$ 6,596,502	$ 6,811,497	$ 7,033,554

Table 8-11: CVMSHCP Monitoring Program Budget – 75 year (3.29% inflation factor) (*cont.*)

2076 Year 69	2077 Year 70	2078 Year 71	2079 Year 72	2080 Year 73	2081 Year 74	2082 Year 75
$ 644,900	$ 664,200	$ 684,100	$ 704,600	$ 725,700	$ 747,500	$ 769,900
$ 814,200	$ 841,000	$ 868,700	$ 897,300	$ 926,800	$ 957,300	$ 988,800
$ 362,400	$ 374,300	$ 386,600	$ 399,300	$ 412,400	$ 426,000	$ 440,000
$ 722,200	$ 746,000	$ 770,500	$ 795,800	$ 822,000	$ 849,000	$ 876,900
$ 315,800	$ 326,200	$ 336,900	$ 348,000	$ 359,400	$ 371,200	$ 383,400
$ 315,600	$ 326,000	$ 336,700	$ 347,800	$ 359,200	$ 371,000	$ 383,200
$ 135,100	$ 139,500	$ 144,100	$ 148,800	$ 153,700	$ 158,800	$ 164,000
$ 715,400	$ 738,900	$ 763,200	$ 788,300	$ 814,200	$ 841,000	$ 868,700
$ 610,800	$ 630,900	$ 651,700	$ 673,100	$ 695,200	$ 718,100	$ 741,700
$ 450,800	$ 465,600	$ 480,900	$ 496,700	$ 513,000	$ 529,900	$ 547,300
$ 362,400	$ 374,300	$ 386,600	$ 399,300	$ 412,400	$ 426,000	$ 440,000
$ 315,800	$ 326,200	$ 336,900	$ 348,000	$ 359,400	$ 371,200	$ 383,400
$ 5,765,400	$ 5,953,100	$ 6,146,900	$ 6,347,000	$ 6,553,400	$ 6,767,000	$ 6,987,300
$ -	$ -	$ -	$ -	$ -	$ -	$ -
$ 24,600	$ 25,400	$ 26,200	$ 27,100	$ 28,000	$ 28,900	$ 29,900
$ 41,300	$ 42,700	$ 44,100	$ 45,600	$ 47,100	$ 48,600	$ 50,200
$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000
$ 5,190	$ 5,360	$ 5,540	$ 5,720	$ 5,910	$ 6,100	$ 6,300
$ 8,710	$ 9,000	$ 9,300	$ 9,610	$ 9,930	$ 10,260	$ 10,600
$ 1,530	$ 1,580	$ 1,630	$ 1,680	$ 1,730	$ 1,780	$ 1,830
$ 166,700	$ 172,200	$ 177,900	$ 183,800	$ 189,800	$ 196,000	$ 202,400
$ 588,300	$ 607,700	$ 627,700	$ 648,400	$ 669,700	$ 691,700	$ 714,500
$ -	$ -	$ -	$ -	$ -	$ -	$ -
$ 837,330	$ 864,940	$ 893,370	$ 922,910	$ 953,170	$ 984,340	$ 1,016,730
$ 6,602,730	$ 6,818,040	$ 7,040,270	$ 7,269,910	$ 7,506,570	$ 7,751,340	$ 8,004,030
$ 660,273	$ 681,804	$ 704,027	$ 726,991	$ 750,657	$ 775,134	$ 800,403
$ 7,263,003	$ 7,499,844	$ 7,744,297	$ 7,996,901	$ 8,257,227	$ 8,526,474	$ 8,804,433

Table 8-12: BUDGET FOR COACHELLA VALLEY MSHCP RESERVE SYSTEM

MANAGEMENT: YEARS 1 - 5 OF MSHCP IMPLEMENTATION
Detail of Management Costs

MANAGEMENT	SALARY OR ITEM EXPLANATION	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
PERSONNEL - SALARIES & BENEFITS						
PROJECT ADMINISTRATION						
Reserve Land Manager	90,200	90,200	93,200	96,300	99,500	102,800
Assistant Reserve Land Manager (4)	75,130	75,100	77,600	80,200	82,800	85,500
Ranger-Warden (2)[1]	88,000	176,000	181,800	187,800	194,000	200,400
Labor/Field Crews	39,600	39,600	40,900	42,200	43,600	45,000
Administrative Assistant	43,670	13,895	14,400	14,900	15,400	15,900
PERSONNEL - EXPENSE TOTALS		394,795	407,900	421,400	435,300	449,600
TOTAL STAFF (Pys) PER YEAR		4.25	4.25	4.25	4.25	4.25
SITE PROTECTION/MAINTENANCE						
Fencing - Materials	annual repair	11,400	11,775	12,162	12,563	12,976
Fencing - Gates, Locks	5 @ $925	3,000	3,096	3,198	3,303	3,412
Non-organic debris removal	Equip., dump fees	10,000	10,309	10,600	10,973	11,329
Trash containers	10, 18 x 24 @ $30	200	207	213	220	228
Septic Tank	pumping	400	413	427	441	455
Subtotal		25,000	25,800	26,600	27,500	28,400
HABITAT MAINT. & RESTORATION						
Invasive Plant Control - Herbicide	40 gal @ $108.60	4,400	2,200	2,300	2,400	2,500
Invasive Animal - Cowbird Control	10 traps	5,000	1,700	1,700	1,700	1,700
Invasive Animal Control - Other	1 trap	300	100	100	100	100
Subtotal		9,700	4,000	4,100	4,200	4,300
FIELD EQUIPMENT AND SUPPLIES						
GPS Unit and supplies		4,000	800	800	800	800
Vehicle - Small pickup (2)		50,000	6,300	6,300	6,300	6,300
Vehicle Fuel & Insurance		6,200	6,200	6,700	7,200	7,700
Cellular phone	phone unit	300	100	100	100	100
Chemical sprayer	5 gal	100	100	100	100	100
Chainsaw - tamarisk removal		700	400	400	400	400
Subtotal		61,300	13,900	14,400	14,900	15,400

Table 8-12: BUDGET FOR COACHELLA VALLEY MSHCP RESERVE SYSTEM (cont.)

MANAGEMENT: YEARS 1 - 5 OF MSHCP IMPLEMENTATION

Detail of Management Costs

	SALARY OR ITEM EXPLANATION	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
OFFICE EQUIPMENT						
Utilities	elec., gas, water	15,000	15,000	15,100	15,300	15,600
Telephone	annual charges	2,400	2,400	2,500	2,600	2,700
Insurance - Structure, Contents		20,300	20,300	20,600	20,900	21,100
Office Supplies		400	400	500	600	700
Furniture		400	100	200	300	400
Office machines - copier, fax		500	100	200	300	400
E-mail		400	400	500	600	700
Computer, PC	laptop	2,300	600	700	800	900
Computer software		400	100	200	300	400
Laser Printer		500	100	200	300	400
GIS Software	ArcView	2,000	400	500	600	700
Subtotal		44,600	39,900	41,200	42,600	44,000
PUBLIC EDUCATION, SERVICES						
Nature Center	maint./constr.	1,300	1,300	1,300	1,300	1,300
Preserve Office	maint./constr.	1,000	1,000	1,000	1,000	1,000
Residence		2,000	2,000	2,000	2,000	2,000
Boardwalk	constr. Repair	500	500	500	500	500
Boundary signage		1,600	300	400	500	600
Interpretive Signage		2,600	300	400	500	600
Interpretive Kiosk		0	300	300	300	300
Subtotal		9,000	5,700	5,900	6,100	6,300
TOTAL PERSONNEL COSTS PER YEAR		394,795	407,900	421,400	435,300	449,600
TOTAL EQUIP. & SUPPLIES PER YEAR		149,600	89,300	92,200	95,300	98,400
SUBTOTAL - ESTIMATED COST		544,395	497,200	513,600	530,600	548,000
CONTINGENCY EXPENSE (10%)		54,440	49,720	51,360	53,060	54,800
ADMINISTRATIVE OVERHEAD (10%)		54,440	49,720	51,360	53,060	54,800
TOTAL MANAGEMENT COSTS PER YR.		653,274	596,640	616,320	636,720	657,600

[1] Estimate for ranger/warden includes salary, benefits, vehicle & all costs associated with a ranger on patrol.

- Evaluation of the hydrological regimes that are important in riparian systems. In particular, hydrologic studies in the Salt Creek area are needed to determine if the water sources for Salt Creek are adequately protected or if additional water sources may be needed.
- Steps to enhance and restore riparian Habitat in the lower portion of the Whitewater River, if monitoring shows declines in the numbers of riparian species.
- Determine the potential need for additional cover to enhance the Biological Corridor, especially under the Interstate 10 bridge.
- A management action to address an unexpected impact to a Covered Species

These funds will not be required every year for monitoring and management implementation. In years they are not needed, the funds will instead serve as a research fund, supporting the necessary research that is called for in the Plan. In a given year when the $100,000 is not needed, it will be held in the fund and the fund will continue to grow.

Caltrans, CVWD, ~~and~~ IID, and MSWD as an obligation of their participation in the Plan will contribute to the endowment for the Monitoring Program, Management Program, and Adaptive Management. These contributions are described in Sections 6.6.1 and 6.6.2.

Another important assumption is that funding levels estimated here are largely additional to existing management funds (i.e. funds currently available to manage the existing Dos Palmas Preserve / ACEC). To the extent that such activities and costs are separable, only additional costs occurring through the adoption of the CV MSHCP are included here.

For the monitoring of trail use and the research on impacts of recreational activity on Peninsular bighorn sheep, the costs will be shared between the CVCC and the BLM, to the extent federal funding is available. These costs have been apportioned based on the land ownership of areas where existing and future perimeter trails occur. The ratio of private, local, or state lands to BLM lands is approximately 40% to 60%. Where federal funding is available, costs for these programs will be apportioned based on this ratio. Specific details on the human-use monitoring and research costs related to trails and bighorn sheep are incorporated in Table 8-11.

In the event that funding from state and federal partners is not available, CVCC is required to fully fund the Trails Plan-related research. The objective of the study will be evaluation of the potential effects of recreational trail use on wild bighorn sheep. A separate study of captive bighorn sheep related to the Palm Desert to La Quinta Connector Trail will be initiated pending available funds for research.

- The CVCC Monitoring Program budget (See Table 8-11) identifies the funding for personnel, equipment, and supplies for the research program. The total budget for the trails research program is $900,000 for 5 years, or $180,000 per year. The Monitoring Program budget includes funds for the research program should funding from state and federal partners not be available. Funding from BLM, USFWS, CDFG, or other agency partners that is available in any year of the research program can be used to supplement or replace CVCC funding.

In the event funding from state and federal partners is not available, the CVCC shall ensure funding for monitoring of bighorn sheep under the Plan. Monitoring of bighorn sheep will include distribution, abundance, and lamb and adult survival in the Conservation Areas on an annual basis, with the information provided to the Wildlife Agencies in the annual report. As noted in Section 7.3.3.2.1, monitoring of bighorn sheep will be a cooperative effort involving CDFG, USFWS, BLM, CVCC, and other partners, with funding provided primarily by CDFG, to the extent possible, and CVCC. Costs related to the personnel, equipment, and supplies for monitoring bighorn sheep are identified in Table 8-11. The CVCC share of this funding is $115,000 ($50,000 for personnel, $65,000 for equipment and supplies) per year. USFWS and CDFG, to the extent possible, will provide in-kind funding for staff to assist in coordination of the monitoring program.

The USFWS, BLM, CDPR, CDFG, and CNLM all have existing staff dedicated to the management of portions of the Plan area. Those current efforts are assumed to be continuing so the management cost estimates presented here are in addition to those ongoing efforts.

The Property Analysis Record (PAR), used here to calculate program costs, used state/federal level costs for the monitoring budget estimates, and used state level cost estimates for the management budget.

Trail construction and maintenance costs, parking lot construction and maintenance, visitor centers and displays are not included here. These costs and funding sources will be determined in Plan implementation. A limited amount of funding is provided for development of an environmental education program. These can be extremely effective tools to achieve Conservation goals at many levels, and as such, may be considered for addition to the Management Program in the future. Brochure development and printing are included here as minimal efforts to meet the need for public information/education. If existing facilities, such as the Coachella Valley Fringe-toed Lizard Preserve and Salton Sea State Recreation Area, adopt larger education responsibilities for the Plan, these costs could be reduced substantially.

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9.0 Species Accounts and Conservation Measures

This section begins with a general conservation approach that applies to all species. The application of this approach throughout the Plan Area varies depending on the species. Following the general conservation approach for all species, individual conservation strategies for each species together with background information on each species is presented. These species conservation strategies are arranged by taxonomic group, beginning with plants. These individual species accounts include all Species Conservation Goals and Objectives that relate to each of the Covered Species, such that a summary of the conservation approach for each species can be found here. There may be some information that is repeated elsewhere in other sections of the Plan that is included here to provide a complete description of the conservation approach for each species.

The following sections, beginning with Section 9.2, describe the general conservation approach, based in part on the species distribution models and known occurrences, for each species covered by the Plan. The species distribution models indicate the occurrence and distribution of known locations, occupied Habitat, and potential Habitat for each covered species. They do not provide data about the abundance of species within a given modeled area. Specific limitations of each individual species model are described in the relevant sections below. The known occurrences or known locations describe locations where a given covered species has been observed or collected. A given known location may represent a site where one or more individuals or a group of organisms of a given species were observed. The known location information is qualitative, not quantitative. These data do not represent a systematic survey of all areas within the Plan boundary where a given species could be expected to occur. The absence of a record for a species in a given location does not necessarily indicate that the species does not occur there. Additional information on development of these models, background on the known locations, and discussion of the limitations of both models and known locations is in Section 3.6 of Appendix I.

9.1 General Conservation Approach for Covered Species

This section contains a summary of the general conservation approach for all Covered Species. The implementation of this conservation approach is described in Section 4.0 for protection-related activities, including acquisition, and in Section 8.0, for monitoring, ongoing management, and Adaptive Management activities. The Conservation Area Conservation Objectives for the Covered Species are described for each Conservation Area in Section 4.3. Background information and the complete conservation strategy for each species are found in Section 9.2. The Conservation Area Conservation Objectives from Section 4.3 are repeated in Section 9.2 in summary form to describe all of the conservation measures proposed for each species.

9.1.1 Conservation: Acquisition and Related Protection Actions

The following conservation approaches are those that involve acquisition and other protection actions that will be used to achieve Conservation of the Covered Species.

1. Conserve, restore, and manage sustainable populations in as many Core Habitat areas as feasible within the Plan Area. The maximum number of Core Habitat areas available is delineated for conservation. Tables 9-1a and 9-1b shows the Conservation Areas where each species is conserved and identifies Core Habitat areas.

    1a. Within Core Habitat areas, maintain the ecological integrity of large Habitat blocks, ecosystem function, and biological diversity.

2. Conserve Other Conserved Habitat, representative of the range of environmental conditions within which the species is known to occur. Incorporate a range of environmental gradients (e.g. slope, elevation, aspect) and high Habitat diversity to provide for shifting species distributions.

3. Provide for population fluctuation, which may include spatial shifts through time as a result of responses to local environmental conditions. Provide opportunities for dispersal and resultant genetic and demographic exchange among populations, which fosters genetic diversity.

4. Protect Essential Ecological Processes that sustain Core Habitat and Other Conserved Habitat areas. Essential Ecological Processes, including sand source areas and sand transport systems, hydrological systems, watershed features, and flooding regimes, will be protected.

5. Maintain Biological Corridors and Linkages among Core Habitat areas to sustain the effective movement and interchange of organisms between Habitat areas inside and outside the Plan Area to the Maximum Extent Feasible.

9.1.2 Conservation: Monitoring and Management Actions

1. Implement a Monitoring Program that identifies trends in species and community level resources protected under the Plan.

2. Implement a Management Program that includes species-specific actions to secure and enhance Habitat quality and provide for long-term population viability. This Management Program will incorporate Adaptive Management.

3. Identify activities, and any restrictions on those activities, allowed within Conservation Areas that are compatible with the Conservation of species, Habitats, natural communities, and their associated ecological functions.

4. Control threats, which may include Habitat fragmentation, invasive plant and animal species, OHV use, and edge effects.

9.1.3 Summary of Core Habitat for Covered Species Protected in Conservation Areas

Tables 9-1a and 9-1b provide a summary of the Habitat to be conserved according to the Conservation Objectives for each Covered Species within each Conservation Area. The number of acres of Core Habitat or Other Conserved Habitat with a specific Conservation Objective is also shown. The number shown is the total acres to be conserved within the MSHCP Reserve System; this also includes acres of Existing Conservation Lands which will be managed as part of the Reserve System. If there is not a specific Conservation Objective, the acres of Habitat are not shown. These tables are intended to provide an overview of the Habitat for each Covered Species to be conserved within each Conservation Area.

9.2 Plants

This section contains species accounts, including Habitat parameters and significant threats, and a conservation strategy, including Species Conservation Goals and Objectives, for each of the five plant species proposed for coverage in the Plan. The plants proposed for coverage include two federal Endangered Species, the Coachella Valley milkvetch and the triple-ribbed milkvetch, and three species with no official status, Little San Bernardino Mountains linanthus, Mecca aster, and Orocopia sage. Some of the features of the biology of plant species warrant special note with regard to these conservation strategies. General measures common to all of these plants are listed below and measures specific to a given species are described in the Species Conservation Goals and Objectives, and the species-specific Adaptive Management discussion for each plant.

1. Maintain Essential Ecological Processes for plants, including pollination, seed dispersal, soil characteristics, mycorrhizal relationships, and nitrogen fixation.
2. Restore and enhance degraded Habitat, using native vegetation only, as necessary according to monitoring results.
3. Evaluate whether establishment of a seed bank to guarantee against extinction is needed.

Section 9 of FESA does not prohibit Take of federally listed plants. In the following sections, the descriptions of Conservation actions for plants and the analysis of impacts refer to Habitat loss, impacts of disturbance, and direct effects on plant species rather than Take.

Table 9-1a: Summary of Core Habitat and Other Conserved Habitat to Be Conserved in Conservation Areas

Species	***Cabazon***	***Stubbe and Cottonwood Canyons***	***Snow Creek/ Windy Point***	***Whitewater Canyon***	***Hwy 111/ I-10***	***Whitewater Floodplain***	***Upper Mission Creek/ Big Morongo Canyon***	***Willow Hole***	***Long Canyon***	***Edom Hill***
	Acres shown are the number of acres to be conserved within each Conservation Area based on Species Conservation Objectives									
Coachella Valley milkvetch	◆	◆	2,385 CH	◆	335 OCH	5,325 CH	◆	2,884 CH	◆	1,639 OCH
Little San Bernardino Mountains linanthus	◇	◇	◇	540 OCH	◇	◇	2,186~~2,235~~ CH	◆	◇	◇
Mecca aster	◇	◇	◇	◇	◇	◇	◇	◇	◇	◆
Orocopia sage	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇
Triple-ribbed milkvetch	◇	◇	◇	1,254 CH	◆	◆	772 CH	◇	◇	◇
Coachella Valley giant sand-treader cricket	◇	◇	1,243 CH	◇	◇	5,309 CH	◇	◆	◇	98 OCH
Coachella Valley Jerusalem cricket	◆	◆	1,540 CH	◆	335 OCH	◆	661~~663~~ OCH	◆	◆	◆
Desert pupfish	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇
Arroyo toad	◇	◇	◇	2,004 CH	◇	◇	◆	◇	◇	◇
Coachella Valley fringe-toed lizard	◇	◇	1,244 CH	◇	◇	5,309 CH	◇	823 CH	◇	98 OCH
Desert tortoise	◆	5,482 CH	◆	4,374 CH	◆	◆	27,127~~26,519~~ CH	◆	◆	◇
Flat-tailed horned lizard	◇	◇	◆	◇	◇	◆	◆	◆	◆	◆

Table 9-1a (cont.)

Species	***Cabazon***	***Stubbe and Cottonwood Canyons***	***Snow Creek/ Windy Point***	***Whitewater Canyon***	***Hwy 111/ I-10***	***Whitewater Floodplain***	***Upper Mission Creek/ Big Morongo Canyon***	***Willow Hole***	***Long Canyon***	***Edom Hill***
	Acres shown are the number of acres to be conserved within each Conservation Area based on Species Conservation Objectives									
Burrowing owl	◆	◆	◆	◇	◇	◆	◆	◆	◆	◆
California black rail	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇
Crissal thrasher	◇	◇	◇	◇	◇	◇	◇	◆	◇	◇
Gray vireo	◆	◆	◆	◆	◇	◇	◆	◇	◇	◇
Le Conte's thrasher	◆	1,142 OCH	2,540 OCH	◆	350 OCH	6,867 OCH	3,549~~3,290~~ OCH	4,928~~5,139~~ OCH	◆	2,354 OCH
Least Bell's vireo	◆	◆	◇	◆	◇	◇	◆	◆	◇	◇
Southwestern willow flycatcher	◆	◆	◇	◆	◇	◇	◆	◆	◇	◇
Summer tanager	◆	◆	◇	◆	◇	◇	◆	◆	◇	◇
Yellow warbler	◆	◆	◇	◆	◇	◇	◆	◆	◇	◇
Yellow-breasted chat	◆	◆	◇	◆	◇	◇	◆	◆	◇	◇
Yuma clapper rail	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇
CV round- tailed ground squirrel	◆	◆	2,569 CH	◆	350 OCH	5,769 CH	~~◆~~2,512 OCH	3,296CH	◆	1,677 OCH
Palm Springs pocket mouse	◆	◆	2,503 CH	◆	350 OCH	6,574 CH	3,467~~3,263~~ / 362 CH/OCH	4,205~~4,409~~ CH	◆	1,227 OCH
Peninsular bighorn sheep	83 EH	◇	640 EH	◇	◇	◇	◇	◇	◇	◇
Southern yellow bat	◇	◇	◇	◆	◇	◇	◇	◆	◇	◇

Table 9-1b: Summary of Core Habitat and Other Conserved Habitat to Be Conserved in Conservation Areas

Species	*Thousand Palms*	*West Deception Canyon*	*Indio Hills/ Joshua Tree National Park Linkage*	*Indio Hills Palms*	*East Indio Hills*	*Joshua Tree National Park*	*Desert Tortoise and Linkage*	*Mecca Hills/ Orocopia Mountains*	*Dos Palmas*	*Coachella Valley Stormwater Channel and Delta*	*Santa Rosa and San Jacinto Mountains*
	Acres shown are the number of acres to be conserved within each Conservation Area based on Species Conservation Objectives										
Coachella Valley Milkvetch	4,292 CH	◆	◆	◇	◇	◆	◇	◇	◇	◇	◆
Little San Bernardino Mountains Linanthus	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇
Mecca aster	11,448 CH	◇	◆	5,836 CH	1,478 OCH	◇	4,525 CH	31,190 CH	◇	◇	◇
Orocopia sage	◇	◇	◇	◇	◇	◇	735 CH	64,377 CH	◆	◇	◇
Triple-ribbed milkvetch	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◆
Coachella Valley giant sand-treader cricket	3,869 CH	◇	◇	◇	◆	◇	◇	◇	◇	◇	◆
Coachella Valley Jerusalem cricket	◆	◇	◇	◇	◇	◇	◇	◇	◇	◇	◆
Desert pupfish	$(15m)^2$ refugium	◇	◇	◇	◇	◇	◇	◇	$(30m)^2$ CH	25 CH	◇
Arroyo toad	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇
Coachella Valley fringe-toed lizard	3,869 CH	◇	◇	◇	◆	◇	◇	◇	◇	◇	◆
Desert tortoise	◇	◆	9,449 CH	◇	◆	125,453 CH	84,150 CH	109,951 CH	◆	◇	120,953 OCH

Table 9-1b (cont.)

Species	*Thousand Palms*	*West Deception Canyon*	*Indio Hills/ Joshua Tree National Park Linkage*	*Indio Hills Palms*	*East Indio Hills*	*Joshua Tree National Park*	*Desert Tortoise and Linkage*	*Mecca Hills/ Orocopia Mtns.*	*Dos Palmas*	*Coachella Valley Stormwater Channel and Delta*	*Santa Rosa and San Jacinto Mtns.*
	Acres shown are the number of acres to be conserved within each Conservation Area based on Species Conservation Objectives										
Flat-tailed horned lizard	4,051 CH[1]	◇	◇	◇	587 OCH[1]	◇	◇	◇	5,134 OCH[1]	◇	◆
Burrowing owl	◆	◇	◇	◇	◇	◇	◇	◇	◇	◆	◆
California black rail	◇	◇	◇	◇	◇	◇	◇	◇	560 OCH	56 OCH	◇
Crissal thrasher	◆	◇	◇	◆	◆	◇	◇	◇	498 CH	809 CH	◇
Gray vireo	◇	◇	◇	◇	◇	30,519 OCH	◇	◇	◇	◇	66,089 OCH
Le Conte's thrasher	10,506 OCH	◆	5,790 OCH	105 OCH	1,985 OCH	4,305 OCH	46,571 OCH	16,815 OCH	14,139 OCH	706 CH	10,006 OCH
Least Bell's vireo	◆	◇	◇	◆	◆	◆	◆	◆	◆	◆	◆
Southwestern willow flycatcher	◆	◇	◇	◆	◆	◆	◆	◆	◆	◆	◆
Summer tanager	◆	◇	◇	◆	◆	◆	◆	◆	◆	◆	◆
Yellow warbler	◆	◇	◇	◆	◆	◆	◆	◆	◆	◆	◆
Yellow-breasted chat	◆	◇	◇	◆	◆	◆	◆	◆	◆	◆	◆
Yuma clapper rail	◇	◇	◇	◇	◇	◇	◇	◇	560 OCH	56 OCH	◇

Table 9-1b (cont.)

Species	*Thousand Palms*	*West Deception Canyon*	*Indio Hills/ Joshua Tree National Park Linkage*	*Indio Hills Palms*	*East Indio Hills*	*Joshua Tree National Park*	*Desert Tortoise and Linkage*	*Mecca Hills/ Orocopia Mtns.*	*Dos Palmas*	*Coachella Valley Stormwater Channel and Delta*	*Santa Rosa and San Jacinto Mtns.*
	Acres shown are the number of acres to be conserved within each Conservation Area based on Species Conservation Objectives										
CV round- tailed ground squirrel	8,045 CH	◆	◆	◆	1,364 OCH	◆	◆	◆	◆	◆	◆
Palm Springs pocket mouse	11,189 CH	◆	◆	◆	1,534 OCH	◆	◆	◆	◆	◆	◆
Peninsular bighorn sheep	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	165,133 EH
Southern yellow bat	◆	◇	◇	◆	◇	◆	◇	◆	◆	◇	◆

◆ = Species present in this Conservation Area and conserved by virtue of Conservation Objectives for Essential Ecological Process areas, Biological Corridors, or Core Habitat for other Covered Species

◇ = Species not present or not known to occur in this Conservation Area

CH = Core Habitat; EH = Essential Habitat; OCH = Other Conserved Habitat covered by specific Conservation Objective

[1] This includes predicted Core Habitat or predicted Other Conserved Habitat. For an explanation of predicted Habitat see Section 9.6.3.3.

9.2.1 Mecca Aster *Xylorhiza cognata*

Status Federal: **No official status**
State: **No official status**
CNPS: **List 1B**

9.2.1.1 Species Conservation Goals and Objectives

Conserve and manage populations within the MSHCP Reserve System according to the following criteria:

Goal 1: Protect Core Habitat areas that include occupied Habitat, and associated Essential Ecological Processes, allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused disturbance, and edge effects to Core Habitat by conserving contiguous Habitat patches and effective Linkages between patches of Core Habitat.

Objective 1. Ensure conservation of Core Habitat within the following Conservation Areas:

- Thousand Palms Conservation Area
- Indio Hills Palms Conservation Area
- East Indio Hills Conservation Area
- Desert Tortoise and Linkage Conservation Area
- Mecca Hills/Orocopia Mountains Conservation Area

Please refer to Section 4.3 and Table 9-2 for specific acreages to be protected by this Conservation Objective.

Goal 2: Protect Other Conserved Habitat to provide sufficient area and variety of Habitat types to accommodate population fluctuations, allow for genetic diversity, and to conserve the full range of environmental conditions within which this aster is known to occur.

Objective 2. Conserve Other Conserved Habitat for this aster through adherence to other Conservation Objectives (for another species, a natural community, Essential Ecological Process area, Biological Corridor, or Linkage area) in the following Conservation Areas:

- Edom Hill Conservation Area
- Indio Hills/Joshua Tree National Park Linkage Conservation Area

Please refer to Section 4.3 and Table 9-2 for specific acreages to be conserved by other Conservation Objectives.

Goal 3: Ensure conservation of Mecca aster by maintaining the long-term persistence of self-sustaining populations and conserving Habitat quality through biological monitoring and Adaptive Management actions in the Plan Area. .

Objective 3. Implement biological monitoring and Adaptive Management actions to ensure self-sustaining populations within each Core Habitat.

Table 9-2: Summary of Habitat within Conservation Areas Mecca Aster

Conservation Area	*Total Acres of Habitat in Conserv. Area*	*Acres of Disturbance Authorized*	*Acres of Existing Conservation Lands*	*Remaining Acres to be Conserved*	*Total Acres to be Conserved in MSHCP Reserve System*	*Designation*
Edom Hill	28	3	2	23	25	Other Cons. Habitat
Thousand Palms	11,745	297	8,772	2,676	11,448	Core Habitat
Indio Hills/ Joshua Tree NP Linkage	166	16	4	146	150	Other Cons. Habitat
Indio Hills Palms	6,091	255	3,546	2,290	5,836	Core Habitat
East Indio Hills	1,594	116	433	1,045	1,478	Core Habitat
Des. Tortoise & Linkage	4,731	206	2,670	1,855	4,525	Core Habitat
Mecca Hills/ Orocopia Mtns	31,655 / 17	465 / 2	27,009 / 0	4,181 / 15	31,190 / 15	Core / Other Cons. Habitat
Total – All Habitat	*56,027*	*1,360*	*42,436*	*12,231*	*54,667*	--
Total – Core Habitat	*55,816*	*1,339*	*42,430*	*12,047*	*54,477*	--
Total – Other Cons. Habitat	*211*	*21*	*6*	*184*	*190*	--

9.2.1.2 Threats, Limiting Factors, and Adaptive Management

Threats to this species include cumulative Habitat loss and degradation of the existing Habitat from OHV activity, illegal dumping, sand and gravel mining (J. Dice, pers. comm.), and edge effects. OHV activity that formerly threatened populations in the Mecca Hills has been eliminated with the designation of this area as Wilderness. OHV activity in the Indio Hills may threaten several populations and may increase as other areas become unavailable through Development or protection. For example, plants in the vicinity of Macomber Palms occur in a wash where they are vulnerable to OHV. Isolation of the two significant populations in the Indio

Hills and Mecca Hills may reduce genetic diversity. However, these two populations appear to be naturally isolated in two Habitat islands, the Indio Hills and the Mecca Hills. It has been suggested that this species is associated with soils of the Palm Springs and Canebrake formations (J. Stewart, pers. comm.), which are limited in distribution within the Plan Area. However, current maps of these formations do not exactly correspond with the distribution of this plant, so this relationship is unclear and would require further study.

The following actions may be needed to ensure species persistence and long-term viability if biological monitoring indicates that such actions are warranted. This list is not comprehensive but identifies some of the known or likely threats to Mecca aster. More detailed information on the Management and Monitoring Programs can be found in Section 8.0. Some of the appropriate actions may include:

1. Control and manage activities that degrade Mecca aster Habitat. These activities are generally prohibited in the Mecca Hills Wilderness Area (OHV use). In the Indio Hills, edge effects and OHV activity could be a concern as areas outside the conservation boundaries develop. These impacts will be addressed through the Management and Monitoring Programs.
2. Identify and implement actions to reduce impacts from, and control where feasible, invasive species if it is determined from monitoring results that there are impacts to the Mecca aster or to its Habitat.
3. Develop and test models through the Management and Monitoring Programs to address the distribution, abundance, and ecological requirements of the Mecca aster.

9.2.1.3 Species Conservation Analysis

Conservation Area Reserve Design. The Conservation Areas include the entire known Habitat for this species as well as additional potential Habitat in both the Indio Hills and Mecca Hills. The conserved area includes continuous Habitat, which should provide for species persistence and support appropriate pollinators or dispersal agents. As information about the dispersal mechanisms and pollinators for this species is not known, the potential for exchange of genetic material between populations in the Indio Hills and those in the Mecca Hills cannot be evaluated. Conserved populations of this species are potentially subject to edge effects in the Indio Hills where Development could occur along the southern boundary of the East Indio Hills Conservation Area. Acquisition of private lands from willing sellers would be required to complete protection of the Habitat in the Indio Hills. The Habitat for Mecca aster in the Mecca Hills is within the BLM's Mecca Hills Wilderness Area, where acquisition of private inholdings would complete protection of the Habitat in the Mecca Hills/Orocopia Mountains Conservation Area.

The Planning Team did not attempt to estimate population densities for the Mecca aster, as data are limited on the number of individuals at known occurrences in the Indio Hills and in the Mecca Hills. The Planning Team selected Core Habitat from the Habitat model for this species using the following criteria: (1) the inclusion of the known Habitat areas, which currently support a population that continues to persist; (2) the absence of fragmentation and edge effects; and (3) an intact watershed. There is little known about the Essential Ecological Processes that may contribute to viable Habitat for this species. The Planning Team used watershed boundaries

to delineate a protected area surrounding the known locations, particularly in the Indio Hills. As depicted in Table 9-3, observations of this species have included more than 500 individuals in the Indio Hills and as many as 1,000 individuals in the Mecca Hills; additional data are needed to assess the population status and viability of Mecca aster. The Planning Team identified the Conservation Areas below as Core Habitats. For each area, see Table 9-2 for a breakdown of Existing Conservation Lands and remaining lands to be conserved.

Core Habitat Areas:

1. ***Thousand Palms.*** The Plan includes approximately 11,745 acres of Mecca aster Habitat modeled in this Conservation Area. Under the Plan, approximately 11,448 acres of this Habitat will be protected. At the present time, this species is only known from the southern slopes of the Indio Hills and adjacent foothills, east of Thousand Palms Canyon Road. Most of the plants that have been observed in this area occur in canyon bottoms and along the toe of the slope of the Indio Hills. This Conservation Area was considered as Core Habitat when included with the adjacent Indio Hills Palms Conservation Area.
2. ***Indio Hills Palms.*** This Conservation Area includes approximately 6,091 acres of modeled Mecca aster Habitat. Under the Plan, approximately 5,836 acres of this Habitat will be protected. This Conservation Area includes most of the significant Habitat known for this species in the Indio Hills. This Conservation Area was considered as Core Habitat when included with the adjacent Thousand Palms Conservation Area.
3. ***East Indio Hills.*** This Conservation Area includes approximately 1,594 acres of modeled Habitat for the Mecca aster. The Plan ensures conservation of approximately 1,478 of these acres. Known occurrences for this species are limited to the southwestern edge of the Conservation Area. Additional surveys would be necessary to better describe the presence and distribution of this species within this Conservation Area. The area is included as providing Core Habitat for this species when considered as functionally contiguous with Core Habitat in the Thousand Palms and Indio Hills Palms Conservation Areas.
4. ***Desert Tortoise and Linkage.*** This Conservation Area includes approximately 4,731 acres of modeled Habitat for the Mecca aster. The Plan ensures conservation of approximately 4,525 acres of this Habitat. The Habitat in this Conservation Area is contiguous with the Core Habitat for Mecca aster in the Mecca Hills/Orocopia Mountains Conservation Area. Therefore this Conservation Area was considered as providing Core Habitat, which is functionally part of the Core Habitat in the adjacent Conservation Area. However, it should be noted that Mecca aster has not been reported from this Conservation Area.
5. ***Mecca Hills/Orocopia Mountains.*** The Plan includes approximately 31,655 acres of modeled Habitat for the Mecca aster in this Conservation Area. The Plan ensures conservation of approximately 31,190 of these acres. This Conservation Area includes most of the significant Habitat known for this species in the Mecca Hills. Most if not all of this Habitat is within the Mecca Hills Wilderness Area. This Conservation Area was considered as Core Habitat.

Other Conserved Habitat Areas:

1. ***Edom Hill.*** This Conservation Area includes only 28 acres of modeled Habitat for the Mecca aster. The presence of this modeled Habitat is based on similarities in the soils and geology of this area compared to the Indio Hills portion of the adjacent Thousand Palms Conservation Area. The species has not been recorded in this Conservation Area, although no surveys have been conducted. The Plan ensures that at least 25 acres of modeled Mecca Aster Habitat will be conserved. With no known occurrences of Mecca aster, the Planning Team did not consider this Conservation Area as Core Habitat but rather as Other Conserved Habitat.
2. ***Indio Hills/Joshua Tree National Park Linkage.*** The Plan includes approximately 166 acres of modeled Habitat for the Mecca aster in this Conservation Area. The Plan will conserve 150 acres of this modeled Habitat. Known occurrences for this species have not been recorded in this Conservation Area so it is considered as Other Conserved Habitat and not Core Habitat.

9.2.1.4 Impacts Analysis

Significance of the Plan Area to Mecca Aster

Mecca aster is an endemic species found in the Indio Hills and the Mecca Hills. Its known range is entirely within the Plan Area. Mecca aster has no official state or federal status but is listed by the California Native Plant Society on List 1B (CNPS 2001). It typically occurs in fluvial mud hills in washes and along the lower slopes. It is known to occur from Macomber Palms and Biskra Palms on the Thousand Palms Preserve east along the base of the Indio Hills. The easternmost location in the Indio Hills is in the vicinity of Curtis Palms, east of the Granite Construction facility. In the Mecca Hills, it occurs in Painted Canyon, in Box Canyon along Highway 195, and in Hidden Spring Canyon as well as in other suitable Habitat in this area.

Direct Effects on Mecca Aster

The Plan Area includes 63,163 acres of modeled Habitat for Mecca aster, of which approximately 55,816 acres are identified as Core Habitat. The Plan would ensure Conservation of 54,477 acres (98%) of the Core Habitat and 190 acres (90%) of the Other Conserved Habitat for this endemic plant. Each of the conserved Core Habitat areas would be greater than 1,000 acres. Approximately 42,436 acres (67%) of the modeled Habitat are within Existing Conservation Lands and would be managed as part of the Reserve System. The Plan would conserve an additional 12,231 acres (19%) of the modeled Habitat for Mecca aster in the Plan Area.

Potential adverse impacts could occur within the Conservation Areas, affecting 1,360 acres (2% of total) of modeled Mecca aster Habitat. Approximately 1,339 acres (2% of total) Core Habitat and 21 acres (10%) of Other Conserved Habitat would be subject to disturbance (See Table 9-2 and Table 4-114).

Outside of the Conservation Areas, there are 4,968 acres (8%) of modeled Mecca aster

Habitat that could be subject to disturbance. The Habitat for this species that is not within the Conservation Areas is primarily at the margins of the modeled Habitat. In the Indio Hills it occurs on the north side of the Indio Hills where the Habitat was deemed potential but the species has not been observed. A limited amount of potential Habitat occurs outside the East Indio Hills Conservation Area on the so-called Adams Ranch property. This Habitat does not include known occurrences of Mecca Aster. In the Mecca Hills potential Habitat outside the MSHCP Reserve System occurs along the margins of the Mecca Hills and in an area south of Box Canyon Road where the species has not been recorded. The areas subject to Development provide only marginal Habitat for Mecca Aster and the impacts to this species as a result of the Plan are insignificant.

The establishment of Conservation Areas where this species is protected is a significant improvement over the current situation where piecemeal and fragmenting nature of development patterns within this Habitat occurring now. The proposed Conservation Areas in the Plan include approximately 90% of the occupied and potential Habitat for Mecca aster as currently mapped. The actual reduction in Habitat value is expected to be considerably less than indicated by the raw acreage numbers because:

1. The Plan would conserve Habitat for both of the known populations within the Plan Area in the Indio Hills generally east of Washington Avenue and in the Mecca Hills. This includes areas considered as Core Habitat in the Thousand Palms Conservation Area, Indio Hills Palms Conservation Area, East Indio Hills Conservation Area, Desert Tortoise and Linkage Conservation Area, and Mecca Hills/Orocopia Mountains Conservation Area.
2. Habitat loss within the Conservation Areas would not eliminate or significantly impact any core populations. Conservation Objectives require any approved development within Conservation Areas to ensure protection of Core Habitat.
3. Habitat for Mecca aster would be protected as a result of implementing Conservation Objectives for Essential Ecological Processes. Some of the Habitat included in the current model, based on the distribution of the Palm Springs formation, is in the Indio Hills west of the Thousand Palms Preserve in an area where this species has never been observed; most, if not all, of this Habitat is conserved under the Plan as a sand source area for the preserve.
4. Lands in the MSHCP Reserve System would be managed and monitored to address significant edge effect problems, OHV impacts, invasive species, and other known and potential stressors to this species.

The issuance of Permits, therefore, will not likely jeopardize the continued existence of the Mecca aster and the implementation of the MSHCP will provide for the Conservation of the species.

<u>Measures to Avoid, Minimize, and Mitigate Impacts to Mecca Aster</u>

To mitigate the effects of disturbance on Mecca aster, the Permittees will protect and manage, in perpetuity, 12,231 acres of the modeled Habitat for this species, including 12,047 acres of Core Habitat. The 42,436 acres of modeled Habitat within Existing Conservation Lands

will be monitored and managed to ensure that Conservation Objectives are met. The Plan will thus ensure Conservation, through protection and management, of 54,667 acres of Reserve Lands for this species.

The proposed Conservation Areas in the Plan include approximately 90% of the occupied and potential Habitat for Mecca aster; as currently mapped. The Plan would conserve Habitat for both of the known populations within the Plan Area in the Indio Hills generally east of Washington Avenue and in the Mecca Hills. This includes areas considered as Core Habitat in the Thousand Palms Conservation Area, Indio Hills Palms Conservation Area, East Indio Hills Conservation Area, Desert Tortoise and Linkage Conservation Area, and Mecca Hills/Orocopia Mountains Conservation Area. Other Conserved Habitat from a range of environmental conditions within which this aster is known to or may occur will be protected in the Edom Hill and Indio Hills/Joshua Tree National Park Linkage Conservation Areas. Again, caution is advised in that some of the Habitat included in the current model, based on the distribution of the Palm Springs formation, is in the Indio Hills west of the Thousand Palms Preserve in an area where this species has never been observed; most, if not all, of this Habitat is conserved under the Plan as a sand source area for the preserve. There are 21 known locations for Mecca aster, 16 of which are within the Conservation Areas. Ten known locations occur on Existing Conservation Lands and five known locations occur outside the Conservation Areas and are subject to Take. Two of the locations outside the Conservation Area are east of the Granite Construction gravel mine in the Indio Hills and three are east of Box Canyon Road just outside the Conservation Areas boundary; two of the latter are on BLM land.

Additionally, the Plan calls for Management and Monitoring Programs to ensure the Conservation of this species, including control of activities that degrade Mecca aster, control of invasive species where necessary, and restoration and enhancement of degraded Habitat as necessary according to monitoring results. The Management and Monitoring Programs include a provision to develop and test models to address the distribution, abundance, and ecological requirements of Mecca aster.

Overall Impacts to Mecca Aster under the Plan

Implementation of this Plan is expected to conserve and enhance population viability of the Mecca aster, as unprotected portions of its Habitat will be conserved. The potential for impacts from human uses, including OHV activity, appears to be low, although edge effects, particularly in the Indio Hills, should be monitored. Management and monitoring prescriptions will further enhance long-term Conservation of this species.

The Mecca aster will benefit from the establishment of the MSHCP Reserve System which will include Habitat in the Indio Hills and Mecca Hills where they occur. Implementation of the Plan is expected to provide for persistence of the Mecca aster within the Plan Area, as currently unprotected portions of its Habitat and potential Habitat areas will be conserved. The combination of the overall Conservation measures; species-specific measures such management to minimize impacts in aster Habitat, monitoring to better understand the distribution and ecology of this species, and long-term protection, management, and enhancement of Mecca aster Habitat is expected to effectively compensate for potential adverse effects to this plant species.

9.2.1.5 Species Account: Background

Distribution, Abundance, and Trends. Most of the known occurrences are along roads or well-traveled hiking routes; it is likely that the species has a scattered distribution throughout the Mecca Hills (Stewart 1991). Information on population size and density is not available. Table 9-3 summarizes the number of plants observed at 17 occurrences, as reported in the CNDDB (CDFG 1997).

Table 9-3: Summary of Observations of Mecca Aster [1]

LOCATION	NUMBER OF PLANTS					
	PRE-1976	1976	1984	1985	1986	1995-1997
INDIO HILLS – MACOMBER PALMS			660			
INDIO HILLS – BISKRA PALMS: several sites from 3.2 mi. to just SE of Biskra Palms			200/ 7/ 250	7 3.2 mi. SE		
MECCA HILLS – PAINTED CANYON	Collected in '38	25 1 mi. up				
MECCA HILLS – HIDDEN SPRING: from 1 mi. SE to 2.8 mi. SSE of Hidden Spring	Collected in '27, '30, '32, '46				<10/ <10/ 50	
MECCA HILLS – 1.4 mi. S of SHEEP HOLE OASIS					50-100	
MECCA HILLS – SOUTH OF SHAVERS WELL	Collected in '36			520/ 2.5 mi. SW 49 1.1 mi. S	100-1000+ 4.2 mi. SW	
MECCA HILLS – THERMAL MINE AREA 1 mi. S of Thermal Canyon						17/ 134 [1]

[1] Numbers of plants given are as reported to the CNDDB (CDFG 1997) by various observers, including J. Stewart, T. Bennett, A. Sanders, M.D. Clary, W. Follett, R. Ferris, and Lilburn Corp. (1995). In some areas (e.g. Hidden Spring area) more than one occurrence is reported, with numbers of plants separated by a slash.

Jon Stewart, a botanist familiar with the species, has suggested that occurrences of the Mecca aster may be associated with two intergraded geologic formations found in these hills, the Palm Springs formation and the Canebrake formation (Stewart 1991). These formations are similar in age and are both fluvial deposits; the Palm Springs formation is composed of sandstones and clays while the Canebrake formation includes granitic conglomerates of larger materials. Stewart noted a strong correlation between the known occurrences of this species and the Palm Springs and Canebrake geologic formations. It should be noted that these two formations are not restricted to the Coachella Valley. The original model for this species incorporated the mapped distribution of the Palm Springs formation. This formation includes a significant area in the Indio Hills west of the Thousand Palms Preserve where this species has never been observed. Conversely, the Palm Springs formation is not mapped in an area in the East Indio Hills, between Macomber Palms and Biskra Palms, where many known occurrences of Mecca aster have been recorded. So in October 2002, the model was revised to more accurately reflect the known distribution of the Mecca aster.

It may be that the observation of this species in proximity to major roads has given the false impression that the plants are very common. While the species may be numerous in places, its limited geographic distribution and restricted soil preferences suggest that it is only very locally common.

Associated Covered Species. Other species of concern which occur in the same general area as Mecca aster include Orocopia sage, desert tortoise, and Le Conte's thrasher.

9.2.2 Coachella Valley Milkvetch *Astragalus lentiginosus var. coachellae*

Status	**Federal:**	**Endangered**
	State:	**No official status**
	CNPS:	**List 1B**

9.2.2.1 Species Conservation Goals and Objectives

Conserve and manage populations within the MSHCP Reserve System according to the following criteria:

Goal 1: Protect Core Habitat areas that include occupied Habitat, and associated Essential Ecological Processes, allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused disturbance, and edge effects to Core Habitat by conserving contiguous Habitat patches and effective Linkages between patches of Core Habitat.

Objective 1. Ensure conservation of Core Habitat within the following Conservation Areas:

- Snow Creek/Windy Point Conservation Area
- Whitewater Floodplain Conservation Area
- Willow Hole Conservation Area
- Thousand Palms Conservation Area

Please refer to Section 4.3 and Table 9-4 for specific acreages to be protected by this Conservation Objective.

Goal 2: Protect Other Conserved Habitat to provide to provide sufficient area and variety of Habitat types to accommodate population fluctuations, allow for genetic diversity, and to conserve the full range of environmental conditions within which this milkvetch is known to occur.

Objective 2. Conserve Other Conserved Habitat for the Coachella Valley milkvetch through adherence to other Conservation Objectives (for another species, a natural community, Essential Ecological Process area, Biological Corridor, or Linkage area) in the following Conservation Areas:

- Cabazon Conservation Area

- Stubbe and Cottonwood Canyons Conservation Area
- Whitewater Canyon Conservation Area
- Highway 111/I-10 Conservation Area
- Upper Mission Creek/Big Morongo Canyon Conservation Area
- Edom Hill Conservation Area
- Indio Hills/Joshua Tree National Park Linkage Conservation Area
- Indio Hills Palms Conservation Area
- East Indio Hills Conservation Area
- Santa Rosa and San Jacinto Mountains Conservation Area

Please refer to Section 4.3 and Table 9-4 for specific acreages to be conserved by other Conservation Objectives.

Goal 3: Protect Essential Ecological Processes, including sand source/transport systems, necessary to maintain Core Habitat and Other Conserved Habitat for this species.

Objective 3. Ensure protection of Essential Ecological Process areas through Conservation Area Conservation Objectives for Essential Ecological Processes.

Goal 4: Maintain Biological Corridors and Linkages among all conserved populations to provide for seed dispersal and shifts in species distribution over time.

Objective 4. Protect Biological Corridors and Linkages through Conservation Area Conservation Objectives for Biological Corridors and Linkages.

Goal 5. Ensure conservation of Coachella Valley milkvetch by maintaining the long-term persistence of self-sustaining populations and conserving Habitat quality through biological monitoring and Adaptive Management actions in the Plan Area.

Objective 5. Implement biological monitoring and Adaptive Management actions to ensure self-sustaining populations within each Core Habitat area.

Table 9-4: Summary of Habitat within Conservation Areas Coachella Valley Milkvetch

Conservation Area	*Total Acres of Habitat in Conserv. Area*	*Acres of Disturbance Authorized*	*Acres of Existing Conservation Lands*	*Remaining Acres to be Conserved*	*Total Acres to be Conserved in MSHCP Reserve System*	*Designation*
Cabazon	987	N/A	24	1 (962)[1]	25	Other Cons. Habitat
Stubbe and Cottonwood Canyons	232	15	84	133	217	Other Cons. Habitat
Snow Creek/ Windy Point	2,610 / 90	225 / 9	359 / 0	2,026 / 81	2,385 / 81	Core / Other Cons. Habitat
Whitewater Canyon	202	13	75	114	189	Other Cons. Habitat
Hwy 111/I-10	372	37	0	335	335	Other Cons. Habitat
Whitewater Floodplain	5,635 / 77	310 / 8	2,535 / 0	2,790 / 69	5,325 / 69	Core / Other Cons. Habitat
Upper Mission Creek/Big Morongo Canyon	829~~827~~	57	256	516~~514~~	772~~770~~	Other Cons. Habitat
Willow Hole	3,166 / 168	282 / 13	351 / 37	2,533 / 118	2,884 / 155	Core / Other Cons. Habitat
Long Canyon	113	N/A	2	(111)[1]	2	Other Cons. Habitat
Edom Hill	1,788	149	298	1,341	1,639	Other Cons. Habitat
Thousand Palms	4,403 / 682	111 / 38	3,291 / 305	1,001 / 339	4,292 / 644	Core / Other Cons. Habitat
West Deception Canyon	115	6	15	50 (44)[1]	65	Other Cons. Habitat
Indio Hills/ Joshua Tree National Park Linkage	17	1	10	6	16	Other Cons. Habitat
Joshua Tree National Park	4	1	0	3	3	Other Cons. Habitat
Santa Rosa & San Jacinto Mountains	292	31	65	196	261	Other Cons. Habitat
Total – All Habitat	*21,782~~21,780~~*	*1,306*	*7,707*	*11,652~~11,650~~ (1,117)*[1]	*19,359~~19,357~~*	--
Total – Core Habitat	*15,814*	*928*	*6,536*	*8,350*	*14,886*	--
Total – Other Cons. Habitat	*5,968~~5,966~~*	*378*	*1,171*	*3,302~~3,300~~ (1,117)*[1]	*4,473 ~~4,471~~*	--

[1] Numbers within parentheses are acres of Habitat in fluvial sand transport areas. The only Conservation Objective in these areas is to maintain fluvial sand transport. Habitat conservation is not an objective.

9.2.2.2 Threats, Limiting Factors, and Adaptive Management

The primary threat to the Coachella Valley milkvetch is Habitat destruction due to continuing urban Development, including the direct effects of Habitat conversion. Many of the sand dune areas where this milkvetch occurs have now been developed, stabilized by adjacent Development, or fragmented by urbanization. Other impacts to the species are from increased human activity, including OHV use, trampling, and the introduction of non-native plants, including Russian thistle (*Salsola tragus*) and Saharan mustard (*Brassica tournefortii*). Development of wind energy parks appears to have a very limited impact; the plants can persist associated with wind parks as long as disturbance to the species' sandy Habitat is minimized. Each of the impacts described above relates to the sand dune ecosystem and the interference with the windblown sand transport system. These ecosystems require a source of new sand to be maintained over long periods of time and a wind corridor to maintain dune dynamics. Though Coachella Valley milkvetch does not necessarily occupy active blowsand Habitats, the species does appear to be dependent on sand dune ecosystems.

The following actions may be needed to ensure species persistence and long-term viability if biological monitoring indicates that such actions are warranted. This list is not comprehensive but identifies some of the known or likely threats to this species. More detailed information on the Monitoring and Management Programs can be found in Section 8.0. Some of these actions may include:

1. Control and manage activities that degrade Coachella Valley milkvetch Habitat. In particular, control and manage those activities that result in sand compaction and vegetation destruction, which may include OHV travel within Core or Other Conserved Habitat except on designated routes of travel, if any; vegetation manipulation or clearing; and other human disturbance.
2. Control invasive species if it is determined from monitoring results that there are impacts to the milkvetch or milkvetch Habitat.
3. Maintain the aeolian sand transport system through the Monitoring and Management Programs.
4. Develop and test models through the Management and Monitoring Programs to address the distribution, abundance, and ecological requirements of the Coachella Valley Milkvetch.

9.2.2.3 Species Conservation Analysis

Conservation Area Reserve Design. The proposed Conservation Areas in the MSHCP Reserve System include those areas judged by the Planning Team to be the most viable known Habitat for this species, from the Snow Creek area east to the Thousand Palms Preserve. The Planning Team selected Core Habitat from the Habitat model for this species using the following four criteria: (1) Core Habitat is sufficiently large that it can support a self-sustaining population independent of other Core Habitat areas and the presence of this species in sufficient numbers to constitute a persistent population has been confirmed; (2) Core Habitat is not fragmented by Development, including roads, in such a way to isolate populations. Although roads probably do not create barriers to dispersal for this species, they can contribute to edge effects, including

exotic plant species that colonize disturbed areas; (3) Core Habitat has intact Essential Ecological Processes, including sand source and sand delivery systems. While this species does not appear to require, or even prefer, active blowsand (K. Barrows 1987), natural disturbance from aeolian and fluvial processes (wind and flooding) may be necessary to promote establishment of new seedlings (Sanders 1996, R. Kobaly, pers. comm.) and was considered essential; and (4) Core Habitat has effective connections to other Core Habitat via Biological Corridors and/or Linkages, to allow gene flow among populations. For more detail on the process used to identify Conserved Habitat for this species, see Section 3.0. For each Conservation Area, see Table 9-4 for a breakdown of Existing Conservation Lands and remaining lands to be conserved.

Core Habitat Areas:

1. ***Snow Creek/Windy Point.*** There are approximately 2,610 acres of milkvetch Habitat Core Habitat here. The Plan will conserve approximately 2,385 acres of Core Habitat in this Conservation Area. Quantitative information on the occurrence of this species is very limited for all locations in the Plan Area. Sanders (1996) did estimate density for the areas where he surveyed on either side of Snow Creek Road; his estimates were 0.8 plants/acre (± 2/ha) on the west side of the road and 1.5 plants/acre (3.75/ha) on the east side of the road. Sanders (1996) reported that in some patchy areas in the dunes of the Snow Creek area, density for this species could reach 60 plants/ha. The Planning Team considered this area as Core Habitat for Coachella Valley milkvetch.

2. ***Whitewater Floodplain.*** The MSHCP Reserve System includes approximately 1,230 acres of modeled Habitat for the Coachella Valley milkvetch on the existing Whitewater Floodplain Preserve, and an additional approximately 4,374 acres of Habitat east of the Whitewater River between Highway 10 and Highway 111 (one occurrence here) in the area north of the CVWD recharge basins and adjacent to the southeastern corner of the preserve, to comprise a total of approximately 5,635 acres. The Plan will conserve approximately 5,325 acres of Core milkvetch Habitat. Indian Avenue and any other roads within this Conservation Area were not considered a fragmentation factor for this species; all of the Habitat within the Conservation Area was considered contiguous. Mark Fisher and Al Muth have reported the presence of the Coachella Valley milkvetch on their Coachella Valley fringe-toed lizard 2.5-acre study plot along the northern portion of the Whitewater Floodplain Preserve. In the years between 1993 and 2001, they observed a range from one plant in 1997 to 226 plants in 1995 (Muth and Fisher, pers. comm.). In surveys for the Plan in June 1995, Katie Barrows and Jennifer Purcell (K. Barrows 1995) reported 25 individuals of this milkvetch on four transects in the southern area of the preserve. The Planning Team considered this area as Core Habitat for Coachella Valley milkvetch.

3. ***Willow Hole.*** The Plan includes approximately 3,334 acres of milkvetch Habitat in this Conservation Area including 3,166 acres of Core Habitat. The Plan will conserve approximately 2,884 acres of the Core Habitat and 155 acres of Other Conserved Habitat in this Conservation Area. Habitat for the Coachella Valley milkvetch within the Willow Hole Conservation Area occurs in the sandy flats and dunes from west of Palm Drive, along the San Andreas Fault where sandy deposits from Mission Creek and Big Morongo Wash provide suitable Habitat, along either side of Varner Road east of Palm Drive, on Flat Top Mountain, particularly along the power line corridor, and on the Willow Hole-

Edom Hill Preserve/ACEC. Surveys by the USFWS in 2001 (K. Corey, pers. comm.) revealed the presence of this species at several locations along the Mission Creek and Big Morongo Wash sand transport channels, along the fault dunes west of Palm Drive, and on either side of Varner Road east of Palm Drive. The roads that bisect the southern portion of this Conservation Area, including Palm Drive, Mountain View Road, and Varner Road, were not considered as a barrier to dispersal for this species. For this reason, the Planning Team considered all of the Habitat within the Willow Hole Conservation Area as contiguous. Density information for this species is very limited at the Willow Hole-Edom Hill Preserve/ACEC, as elsewhere. Andy Sanders (1996) estimated the density in this area as 0.5 plants/acre (1.25 plants/ha). The density for this species could be higher in some areas of more favorable Habitat, as at the top of Flat Top Mountain, along the fault west of Palm Drive, and along the sandy flats on the existing preserve. The Planning Team did consider this area as Core Habitat.

4. ***Thousand Palms***. The Plan will protect approximately 4,292 acres of the approximately 4,403 acres of modeled Core Habitat for this species, including approximately 3,291 acres already protected on the existing preserve. An additional 644 acres of Other Conserved Habitat will also be protected. The Thousand Palms Preserve includes Habitat for the Coachella Valley milkvetch in the main dune system, on the smaller dunes in Thousand Palms Canyon, and to a limited extent, north of Ramon Road in the sand source area. There are two Core Habitat areas described for this Conservation Area, a relatively small area in Thousand Palms Canyon and the much larger Core Habitat area mostly south of Ramon Road. These two areas are separated by approximately three miles. For a species with seeds probably dispersed by wind and water this intervening Habitat would probably not be a barrier to dispersal and genetic exchange. As with other parts of the Plan Area, roads were not considered as a barrier to dispersal for this species. The available information on the occurrence of this species within this preserve is primarily from surveys done for the Plan in 1995 (K. Barrows 1995) and from annual biological monitoring transects conducted by the preserve staff (C. Barrows 2001). Density estimates are not available. Generally, the density of this species within this Conservation Area is lower than at more western locations, such as Snow Creek. The Planning Team included this area as Core Habitat.

Other Conserved Habitat Areas:

1. ***Cabazon.*** This milkvetch has not been observed within this Conservation Area. This Conservation Area includes approximately 987 acres of modeled milkvetch Habitat; of this total acreage, the Plan will protect approximately 1 additional acre. An additional 24 acres of Habitat on existing BLM land will also be conserved. The remaining 962 acres of milkvetch Habitat are not protected by a Conservation Objective; these acres are within the fluvial sand transport area which has a Conservation Objective to maintain fluvial sand transport. The small parcel sizes within these sand transport areas would contribute to greater edge effects and make Habitat conservation in this area a challenge. The primary means for achieving Conservation in this Conservation Area is through compliance with Riverside County General Plan and Area Plan policies.

2. ***Stubbe and Cottonwood Canyons.*** This Conservation Area includes relatively low acreage of modeled milkvetch Habitat, approximately 232 acres. The Plan will conserve 217 acres of this Other Conserved Habitat. Surveys would need to be done to determine

the extent to which this species occurs within this Conservation Areas.

3. ***Whitewater Canyon.*** This Conservation Area includes 202 acres of milkvetch Other Conserved Habitat. In this Conservation Area, the Plan will conserve 189 acres. Surveys would need to be done to determine the extent to which this species occurs within these Conservation Areas.

4. ***Highway 111/I-10 Conservation Area.*** This area was added to the MSHCP Reserve System primarily as Habitat for the Coachella Valley Jerusalem cricket. However, the area is probably suitable Habitat for Coachella Valley milkvetch; individuals have been observed along the south side of Tipton Road, adjacent to this Conservation Area (K. Barrows, pers. comm.). The Plan will ensure protection of approximately 335 of the 372 acres of modeled Habitat in this Conservation Area. The area is not large enough to be considered as a Core Habitat area.

5. ***Upper Mission Creek/Big Morongo Canyon.*** The modeled Habitat for the Coachella Valley milkvetch in this Conservation Area is limited. The Plan includes approximately 829~~827~~ acres of modeled Habitat for this milkvetch in this Conservation Area. The Plan will protect approximately 772~~770~~ acres of this Other Conserved Habitat. In Upper Mission Creek, one occurrence near the entrance gate to the Wildlands Conservancy property may be the result of sandy soil, containing seeds of this species, which was dumped there. Most of this area is much more gravelly or rocky than typical Habitat for this species. There are patches of suitable soil substrate east of Highway 62 in scattered fragments along both Mission Creek and Morongo Wash. Observations of this species were reported along Morongo Wash and Mission Creek, mostly around and south of Ramon Road, in May 2001 (K. Corey, pers. comm.). Surveys would need to be done to determine the extent to which this species occurs within these Conservation Areas.

76. ***Long Canyon.*** This Conservation Area does not have a specific Conservation Objective for species Habitat. There are approximately 113 acres of modeled milkvetch Habitat; 111 of these acres are within the Essential Ecological Process fluvial sand transport area, which has a Conservation Objective only to maintain sand transport. Because of existing land use patterns and associated edge effects in these sand transport areas, they would be unsuitable for Habitat protection through acquisition. The remaining 2 acres are within Existing Conservation Lands.

7. ***Edom Hill.*** This Conservation Area includes scattered sandy substrate Habitat between Willow Hole and the Thousand Palms Preserve in the Indio Hills. There are approximately 1,788 acres of modeled Habitat included in this Conservation Area. The Plan will conserve approximately 1,639 acres of this Habitat. The only records for the Coachella Valley milkvetch within this Conservation Area are from immediately north of Varner Road at the base of Edom Hill. This area was primarily envisioned as a connection between the Willow Hole Preserve and the Thousand Palms Preserve. With very few known occurrences of Coachella Valley milkvetch, the Planning Team did not consider this Conservation Area as Core Habitat.

8. ***West Deception Canyon.*** There are 115 acres of modeled milkvetch Habitat in this Conservation Area. The Plan calls for at least 65 acres of this Habitat to be conserved. Approximately 44 of these acres are within the Essential Ecological Process fluvial sand transport area, which is not covered by a Conservation Objective for Habitat. Because of existing land use patterns and associated edge effects in these areas, they would be unsuitable for Habitat protection through acquisition.

9. ***East Indio Hills.*** This Conservation Area was not considered as important Habitat for the Coachella Valley milkvetch as the species has never been recorded here. The Habitat at the most eastern end of the Indio Hills, particularly along the north-facing slope, appears suitable for this species; however, the Coachella Valley milkvetch has not been recorded east of the main dune area on the Thousand Palms Preserve, within the Plan Area. (There is an occurrence east of Desert Center as described previously.) Surveys in 1995 (K. Barrows 1995) and casual observations between 1987 and the present (K. Barrows, pers. comm.) did not locate any individuals of this species in this area. As this area is at the dry end of the moisture regime in the Coachella Valley, it may not provide suitable conditions, due to lower rainfall amounts, compared to areas to the west. This milkvetch has not actually been observed within this Conservation Area.

10. ***Santa Rosa and San Jacinto Mountains.*** There are 292 acres of modeled Habitat for this species within this Conservation Area. The Plan will conserve approximately 261 acres of this Habitat, most of which is located in the vicinity of Snow Creek.

11. ***Other Conservation Areas.*** There are two Conservation Areas with very limited Coachella Valley milkvetch Habitat: Indio Hills/Joshua Tree National Park Linkage with 17 acres and Joshua Tree National Park with 4 acres.

9.2.2.4 Impacts Analysis

Significance of the Plan Area to Coachella Valley Milkvetch

The Coachella Valley milkvetch is a variety of the more widely distributed species, *Astragalus lentiginosus;* other varieties of this species occur in Washington, Oregon, Idaho, Nevada, New Mexico, Arizona, northern Baja California, and Sonora.

The Coachella Valley milkvetch is restricted to the Plan Area between Cabazon and Indio, with the exception of six outlying occurrences within a 5-mile area along Rice Road in the Chuckwalla Valley north of Desert Center (BLM 2000, J. Dice, pers. comm.). The Coachella Valley milkvetch is a federal endangered species although it has no official status with the State of California. The current and apparently historical distribution is within a longitudinal, west to east range of approximately 33 miles. This species is known in locations from One Horse Spring near Cabazon to the sand dunes off Washington Avenue, north and west of Indio. Extensive dune systems at the base of the Santa Rosa Mountains in what are now the cities of Palm Springs, Cathedral City, Rancho Mirage, Palm Desert, Indian Wells, and La Quinta, now much reduced from what once occurred, provided suitable Habitat for the Coachella Valley milkvetch. While the overall range of this species may not be significantly reduced from the historical distribution, the number of extant occurrences has declined dramatically (K. Barrows 1987, USFWS 1996).

Direct Effects on the Coachella Valley Milkvetch

The MSHCP Reserve System would provide for Habitat protection, management, and monitoring for currently unprotected Core Habitat and Other Conserved Habitat for the Coachella Valley milkvetch, from a range of environmental conditions within which it is known to occur. The important Essential Ecological Processes, including wind corridors and sand sources, would be protected under the Plan. Potential Linkages would also be protected.

There are 36,398 acres of modeled Coachella Valley milkvetch Habitat in the Plan area. The Plan would ensure Conservation of 14,886 acres (94%) of the total 15,814 acres of Core Habitat and 4,473~~4,471~~ acres (76%) of Other Conserved Habitat, or 89% of the significant Habitat for the Coachella Valley milkvetch. Each of the four Core Habitat areas conserved would be greater than 2,000 acres. Approximately 7,707 acres (21%) of the modeled Habitat are within Existing Conservation Lands and would be managed as part of the Reserve System. Overall, an additional 11,652~~11,650~~ acres (32%) of the modeled Habitat for Coachella Valley milkvetch in the Plan Area would be conserved.

Within the Conservation Areas potential adverse effects could occur to a maximum of 1,306 acres (4%) of modeled Coachella Valley milkvetch Habitat. There would be approximately 928 acres (6% of all Core Habitat) of Core Habitat and 378 acres of Other Conserved Habitat (6% of all Other Conserved Habitat) subject to disturbance (See Table 9-4 and Table 4-114). The Reserve System will effectively compensate for potential adverse impacts to this species because it will: 1) ensure Conservation of Core Habitat; 2) protect Essential Ecological Processes needed to maintain milkvetch Habitat; and 3) maintain Biological Corridors and Linkages among conserved populations to provide for population fluctuation and enhance genetic diversity. So, although some disturbance could occur within the Conservation Areas, the Conservation Objectives required by the Plan will provide for protection of Habitat to ensure the long-term persistence of this species.

Outside of the Conservation Areas, there are 14,084~~14,086~~ acres of modeled Habitat and 33 of the 122 known occurrences subject to Development and other proposed Covered Activities. The area where this species is known to occur south of Interstate 10, in the area known as the Big Dune, was not included in the Conservation Areas. This area was judged by the Planning Team to be too highly fragmented, with negative impacts of edge effects along the major roadways that now traverse this area. The Planning Team determined that Essential Ecological Processes, including sand transport, that are probably important to maintain Habitat for this species have been compromised. Some of the Habitat for Coachella Valley milkvetch within the Big Dune area south of Interstate 10 is on land owned by the Agua Caliente Band of Cahuilla Indians and will be addressed through their MSHCP. Other potential Habitat included within the species distribution model, particularly east of the Thousand Palms Preserve, is in areas where this species has never been observed. As part of the Biological Monitoring Program, this model will be revised to reflect occupancy. The Planning Team carefully considered all available and occupied Habitat for this species and determined that only those areas within the proposed Conservation Areas would provide long-term protection for self-sustaining populations of this species.

Although the percentage of Coachella Valley milkvetch modeled Habitat that could be lost to development within the next 75 years appears to be substantial, evaluation of the potential

adverse effects requires an assessment of the quality of this Habitat. The establishment of Conservation Areas where this species is protected is a significant improvement over the piecemeal and fragmenting nature of Development patterns within this Habitat occurring now. The actual reduction in Habitat value is expected to be considerably less than indicated by the raw acreage numbers because:

1. Conserved Habitat areas are large enough to contain self-sustaining populations of milkvetch and incorporate key Habitat elements.
2. Potential adverse effects within the Conservation Areas would not eliminate or significantly impact any core populations. Conservation Objectives require any approved development within Conservation Areas to ensure protection of Core Habitat.
3. Potential Development would not adversely impact the Essential Ecological Processes needed to maintain currently viable Habitat. Conservation Areas were carefully designed to incorporate the sand source and sand transport systems.
4. Lands in the MSHCP Reserve System would be managed and monitored to address significant edge effect problems, potential loss of Habitat from introduction of exotic species, and other stressors to this milkvetch.

Implementation of the Plan is expected to protect Habitat for this species and to maintain population viability of the Coachella Valley milkvetch, as significant Habitat that is currently unprotected will be conserved. The Plan will also secure the Essential Ecological Processes and Linkages necessary to maintain this Habitat.

Measures to Avoid, Minimize, and Mitigate Adverse Effects on Coachella Valley Milkvetch

To mitigate the impacts to Coachella Valley milkvetch, the Permittees will protect and manage, in perpetuity, 11,652~~11,650~~ acres of the modeled Habitat for this species, including 89 of the 122 known occurrences. The 7,707 acres of modeled Habitat within Existing Conservation Lands will be monitored and managed to ensure that Conservation Objectives are met. The Plan will thus ensure Conservation, through protection and management, of 19,359~~19,357~~ acres of Reserve Lands for this species.

The proposed Conservation Areas in the Plan would protect the Core Habitat areas from Cabazon to Windy Point, including Snow Creek; significant Habitat for this milkvetch in the Whitewater Floodplain area; the Willow Hole area, including additional Habitat west of Palm Drive and on Flat Top Mountain; and all of the occupied and potential Habitat on the Thousand Palms Preserve. Other Conserved Habitat from a range of environmental conditions within which this milkvetch is known to occur will be protected in the following Conservation Areas: Cabazon, Stubbe and Cottonwood Canyons, Whitewater Canyon, Highway 111/I-10, Upper Mission Creek/Big Morongo Canyon, Edom Hill, Indio Hills/Joshua Tree National Park Linkage, Indio Hills Palms, East Indio Hills, Joshua Tree National Park, Desert Tortoise and Linkage, Mecca Hills/Orocopia Mountains, Dos Palmas, Coachella Valley Stormwater Channel and Delta, and the Santa Rosa and San Jacinto Mountains. Reserve Design criteria used to establish the Conservation Areas require Conservation of Essential Ecological Processes. The MSHCP Reserve System will incorporate and protect additional sand source/sand transport areas

for Snow Creek/Windy Point, the Whitewater Floodplain Conservation Area, Willow Hole and Flat Top Mountain, and the Thousand Palms Preserve.

Additionally, the Plan calls for Management and Monitoring Programs to ensure the Conservation of this milkvetch, including control of activities that degrade milkvetch Habitat, control of invasive species where necessary, and restoration and enhancement of degraded Habitat as necessary according to monitoring results.

Overall Impacts to Coachella Valley Milkvetch under the Plan

Implementation of this Plan is expected to conserve and enhance population viability of the Coachella Valley milkvetch, as unprotected portions of its Habitat will be conserved. The potential for impacts from human uses, including OHV activity, appears to be low, although edge effects should be monitored. Management and monitoring prescriptions will further enhance long-term Conservation of this species.

The Coachella Valley milkvetch will benefit from the establishment of the MSHCP Reserve System which will include conserved Habitat from Cabazon to the sand dunes of the Thousand Palms Conservation Area. Implementation of the Plan is expected to provide for persistence of this endangered milkvetch within the Plan Area, as currently unprotected portions of its Core Habitat and potential Habitat areas will be conserved. The combination of the overall Conservation measures; species-specific measures such as management to minimize impacts such as OHV trespass and invasive species, monitoring to better understand the ecology of this species and the potential impacts of invasive species, and long-term protection, management, and enhancement of Coachella Valley milkvetch Habitat is expected to effectively compensate for potential adverse effects to this endangered plant species.

9.2.2.5 Species Account: Background

Distribution, Abundance, and Trends

The Coachella Valley milkvetch occurs in dunes and sandy flats, along the disturbed margins of sandy washes, and in sandy soils along roadsides where they occur adjacent to existing sand dunes. Within the sand dunes and sand fields, this milkvetch tends to occur in the coarser sands at the margins of dunes, not in the most active blowsand areas. As this species is strongly affiliated with sandy substrates, it may occur in localized pockets where sand has been deposited by wind or by active washes. It may also occur in sandy substrates in creosote bush scrub, not directly associated with sand dune Habitats. In the Plan Area, populations are known from the Snow Creek area (in the sandy areas on either side of Snow Creek Road east toward Windy Point and scattered along Tipton Road, north of Highway 111), on the Whitewater Floodplain Preserve, the Willow Hole-Edom Hill Preserve/ACEC, and the Thousand Palms Preserve. Other concentrations of the species occur along Gene Autry Trail near the airport in Palm Springs, on and around Flat Top Mountain, along Varner Road at the base of Edom Hill, on remnants of the Big Dune south of Interstate 10, and in scattered locations in the southern parts of Desert Hot Springs (including at the wastewater treatment plant). In the area of the Big Dune, Habitat viability has been much reduced by roads, fragmentation, and disturbance (C. Barrows 1987, CNDDB/CDFG 1997). In one location within the Big Dune area, however, near DaVall Road and 30th Avenue, a significant population of more than 1,000 individuals (K. Nicol, pers.

comm.) appears to be persisting. This population occurs on land owned by the Agua Caliente Band of Cahuilla Indians, which is not included in this Plan. The presence of large numbers of this species at this location in the spring of 2000 may have been due to very localized conditions, such as a break in an underground water line (K. Barrows, pers. comm.). Though suitable Habitat appears to be present in the Indio and La Quinta areas, this species has not been recorded there. Within the Plan Area, the easternmost occurrence for the Coachella Valley milkvetch is on the Thousand Palms Preserve.

The Coachella Valley milkvetch was first described by Rupert Barneby in Shreve and Wiggins (1964) based on a collection made by Alice Eastwood in 1913 near Palm Springs, Riverside County. Barneby had previously identified this specimen as *Astragalus lentiginosus* var. *coulteri* in the description of that taxon in 1945. The Coachella Valley milkvetch is a variety of a much more widespread species, *Astragalus lentiginosus*. Varieties of this species occur in Washington, Oregon, Idaho, Nevada, New Mexico, Arizona, northern Baja California, and Sonora.

This federal listed, endangered Species is an erect winter annual or short-lived perennial, which blooms from February to May, producing pink to deep-magenta-colored flowers. It is distinguished in part from other members of the milkvetch genus by its strongly inflated, two-chambered, mottled pods. These pods, when dried, fall to the ground and are blown along the dunes. In good years, 100s to 1,000s of individuals have been described in a population, but often reports are of less than 20 plants. Specific data on population size and dynamics are not available for this species. The factors controlling population size through effects on seed germination, seedling establishment, and plant longevity have not been studied, but presumably involve moisture availability and soil and air temperatures (Sanders 1996).

Annual variation in population size has been observed in this species, associated with drought conditions and the occurrence of seasonal rainfall. The small size of populations in drought years could leave this milkvetch vulnerable to extinction from stochastic events. The number of individuals of this species at a given location can vary dramatically from year to year, depending on available soil moisture and other factors. For example, during the course of a biological survey for the COE at the Cabazon Windpark site in May 1979, 209 individuals were observed (Wright and La Pre 1979); a survey of this same area in May 1987 (K. Barrows 1987), a dry year, recorded only six Coachella Valley milkvetch. Results of various surveys for Coachella Valley milkvetch are given in Table 9-5.

Table 9-5: Results of Various Surveys for Coachella Valley Milkvetch[1]

LOCATION	Year of Observation	Number of CV Milkvetch Observed	Number of Transects
CABAZON WIND PARK	1979/1982[1] 1987[2]	209/2 6	-
SNOW CREEK ROAD	1982[1] 1987[2] 1995[3]	>100 8 (60/ha – dunes 3.8/ha –flats)	-
WINDY POINT	1987[2]	28	-
WHITEWATER FLOODPLAIN PRESERVE	1995[2]	25	4
MISSION CREEK & MORONGO WASH	2001[4]	> 2	-
WEST OF PALM DRIVE, FAULT DUNES	2001[4]	5	-
EAST OF PALM DRIVE, VARNER RD. N. OF FLAT TOP MOUNTAIN	2001[4]	>100	-
WILLOW HOLE PRESERVE	1987[2] 1995[2] 1995[3]	9 13 (1.25/ha)	10 10
FLAT TOP MOUNTAIN (ALONG POWERLINE ROAD	1982[1] 1987[2] 2001[4]	> 100 15/22 10/1	-
EAST OF DATE PALM DRIVE, S. OF VARNER ROAD	2001[4]	± 50	-
WEST OF BOB HOPE DRIVE, S. OF I-10 FWY (AGUA CALIENTE INDIAN RESERVATION)	2001[5]	20-1400	--
THOUSAND PALMS PRESERVE	1995[2]	309	36
EAST END INDIO HILLS (1999)	1995[2]	0	3

[1] Results are from the CNDDB (CDFG 1997) as reported by Robin Kobaly for 1979 and 1982. Record from Snow Creek Road was reported by Dan Pearson to CNDDB for April 1982 survey.

[2] 1987 results are from Katie Barrows (1987). Records from 1995 are from a report on biological surveys completed for this Plan by Katie Barrows (1995); in this survey, plants were counted along 10-meterwide transects of variable length.

[3] Density estimates are from Sanders and Thomas Olsen Associates (1996).

[4] Observations for 2001 were reported by Ken Corey (pers. comm.), USFWS, Carlsbad Field Office, from surveys conducted on May 23/24 and June 4, 2001. No specific number of individuals was reported for Mission Creek and Morongo Wash.

[5] Observations reported by Michael Brandman Associates (2001) were based on focused surveys along parallel transects on Agua Caliente Band of Cahuilla Indians Reservation land in March and April 2001. The highest concentrations of Coachella Valley milkvetch were found south of I-10 between Date Palm Drive and Bob Hope Drive in Sections 10, 14, 22, and 24 (T4S, R5E). In Section 14, 1,491 individuals were observed (2.3/acre).

Associated Covered Species. Within the Plan Area, other species of concern whose Core Habitat overlaps with that of the Coachella Valley milkvetch include flat-tailed horned lizard, Palm Springs pocket mouse, Coachella Valley fringe-toed lizard, Coachella Valley round-tailed ground squirrel, Coachella Valley giant sand-treader cricket, Coachella Valley Jerusalem cricket, and burrowing owl.

9.2.3 Triple-Ribbed Milkvetch *Astragalus tricarinatus*

Status	**Federal:**	**Endangered**
	State:	**No official status**
	CNPS:	**List 1B**

9.2.3.1 Species Conservation Goals and Objectives

Conserve and manage populations within the MSHCP Reserve System according to the following criteria:

Goal 1: Protect Core Habitat areas that include occupied Habitat, and associated Essential Ecological Processes, allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused disturbance, and edge effects to Core Habitat by conserving contiguous Habitat patches and effective Linkages between patches of Core Habitat.

Objective 1. Ensure conservation of Core Habitat within the following Conservation Areas:

- Whitewater Canyon Conservation Area
- Upper Mission Creek/Big Morongo Canyon Conservation Area

Please refer to Section 4.3 and Table 9-6 for specific acreages to be protected by this Conservation Objective.

Goal 2: Protect Other Conserved Habitat to provide sufficient area and variety of Habitat types to accommodate population fluctuations, allow for genetic diversity, and to conserve the range of environmental conditions within which this milkvetch is known to occur.

Objective 2. Conserve Other Conserved Habitat for this milkvetch through adherence to other Conservation Objectives (for another species, a natural community, Essential Ecological Process area, Biological Corridor, or Linkage area) in the following Conservation Areas

- Whitewater Floodplain Conservation Area
- Joshua Tree National Park Conservation Area
- Santa Rosa and San Jacinto Mountains Conservation Area

Please refer to Section 4.3 and Table 9-6 for specific acreages to be conserved by other Conservation Objectives.

Table 9–6: Summary of Habitat within Conservation Areas Triple-Ribbed Milkvetch

Conservation Area	*Total Acres of Habitat in Conserv. Area*	*Acres of Disturbance Authorized*	*Acres of Existing Conservation Lands*	*Remaining Acres to be Conserved*	*Total Acres to be Conserved in MSHCP Reserve System*	*Designation*
Whitewater Canyon	1,295	41	886	368	1,254	Core Habitat
Hwy 111/I-10	5	1	0	4	4	Other Cons. Habitat
Whitewater Floodplain	866	59	272	535	807	Other Cons. Habitat
Upper Mission Creek/Big Morongo Canyon	819	47	346	426	772	Core Habitat
Santa Rosa & San Jacinto Mountains[1]	1	0	0	1	1	Other Cons. Habitat
Total – All Habitat	*2,986*	*148*	*1,504*	*1,334*	*2,838*	--
Total – Core Habitat	*2,114*	*88*	*1,232*	*794*	*2,026*	--
Total – Other Cons. Habitat	*872*	*60*	*272*	*540*	*812*	--

[1] There is one known occurrence for this species in Agua Alta Canyon within this Conservation Area.

Goal 3: Protect Essential Ecological Processes, including hydrological regimes, necessary to maintain Core Habitat and Other Conserved Habitat for this species.

Objective 3. Ensure protection of Essential Ecological Process areas through Conservation Area Conservation Objectives for Essential Ecological Processes.

Goal 4: Maintain Biological Corridors and Linkages among all conserved populations to provide for seed dispersal and shifts in species distribution over time.

Objective 4. Protect Biological Corridors and Linkages through Conservation Area Conservation Objectives for Biological Corridors and Linkages. Key Habitat connections and corridors include the following:

- Mission Creek undercrossings at Highway 62 in the Upper Mission Creek/Big Morongo Canyon Conservation Area.

Goal 5: Ensure conservation of triple-ribbed milkvetch by maintaining the long-term persistence of self-sustaining populations and conserving Habitat quality through biological monitoring and Adaptive Management actions in the Plan Area.

Objective 5. Implement biological monitoring and Adaptive Management actions to ensure self-sustaining populations within each Core Habitat area.

9.2.3.2 Threats, Limiting Factors, and Adaptive Management

This species occurs in locations within the Plan Area where there are few, if any, human-caused threats. Most of the occurrences (85%) occur on Existing Conservation Lands in protected status, including those in Mission Creek on land owned by BLM or the Wildlands Conservancy, in Big Morongo Canyon on BLM land, or in Whitewater Canyon on BLM land. In the wash bottom Habitat and along roads, the species may be subject to trampling by vehicles, but most of the occurrences receive very limited vehicular traffic. Development pressures are a concern primarily in the Mission Creek drainage on private lands immediately west of Highway 62 and in the vicinity of Dry Morongo Wash near Highway 62 and Indian Avenue. One disturbance that may impact this species is flood control maintenance activities in the Whitewater Canyon and Mission Creek drainages. Sand and gravel mining is not a current threat, although there is some potential for mining in Whitewater Canyon. Road widening along Highway 62 could impact the Dry Morongo Canyon location in the future, although no widening is proposed. Grazing is not currently a threat in the locations where this species occurs. Illegal berming and drainage diversions are potential impacts that may, or might in the future, affect the structure and function of canyon Habitats. In the upper reaches of Big Morongo Canyon, outside the Plan boundary in San Bernardino County, Habitat for triple-ribbed milkvetch has been disturbed by pipeline construction and maintenance. This is a threat with mixed impacts, as, while individual plants may be destroyed, some plants may germinate in soil freshly disturbed by pipeline construction activities (G. Helmkamp, pers. comm.). In 1995, however, a pipeline realignment project in Big Morongo Canyon, outside the Plan Area, may have impacted this milkvetch.

With the low population numbers reported by most observers, a significant threat may be impacts to the species from stochastic natural events. Within the Plan Area, low population numbers for this species are a concern as is uncertainty about the preferred Habitat for triple-ribbed milkvetch. A natural event such as a large slide in the upland population or a major flood could impact the small groups of scattered plants that are the typical observation of this species. Climate change could also impact this species. An immediate need is for surveys throughout its range to better describe Habitat preferences, and to delimit extent and size of the populations.

The following actions may be needed to ensure species persistence and long-term viability if biological monitoring indicates that such actions are warranted. This list is not comprehensive but identifies some of the known or likely threats to this species. More detailed information on the Management and Monitoring Programs can be found in Section 8.0.

1. Control and manage activities that degrade triple-ribbed milkvetch Habitat. In particular, control and manage those activities that may involve vehicular travel within washes and flood control maintenance activities that could result in damage to plants and their Habitat outside of the flood control channel itself; activities within the flood control channel will be permitted by the Plan as Covered Activities (see Section 7.0).
2. Identify and implement actions to reduce impacts from, and control where feasible, invasive species if it is determined from monitoring results that there are impacts to the milkvetch or milkvetch Habitat.

3. Determine the conditions that favor germination and growth in this species and insure that these conditions persist (e.g. scouring by large floods).
4. In Mission Creek, coordinate with the Wildlands Conservancy to achieve Species Conservation Goals.

9.2.3.3 Species Conservation Analysis

Conservation Area Reserve Design. The occurrences for this species in the Mission Creek and Big Morongo Canyon areas are primarily on land conserved under BLM or Wildlands Conservancy ownership. These areas both provide contiguous Habitat of the wash and canyon bottoms where this species has been observed, adjacent to hill slopes above these washes where the species may occur. However, the small size of most known populations reduces the certainty that these Habitat areas are an appropriate configuration. Fortunately, most of the potential Habitat, which may include hill slopes above these washes, is also protected. The Whitewater Canyon area includes a small residential area and a public road, a trout fishing operation, and the Colorado River Aqueduct of the Metropolitan Water District. The Plan will not eliminate these Existing Uses such that some deleterious impacts to triple-ribbed milkvetch Habitat could occur. The risk of these impacts, primarily from foot traffic in the Habitat, is probably low. Acquisition of private land in Whitewater Canyon from willing sellers is a goal of the Plan.

As noted in the discussion in the Distribution, Abundance, and Trends section below, the population dynamics of this species are unknown. In the face of uncertainty about the preferred Habitat for this species, the Planning Team took the conservative approach and recommended inclusion of all known occurrences for this species and all occupied and potential Habitat. The proposed Conservation Areas in the MSHCP Reserve System include those areas judged by the Planning Team to be the most viable known Habitat for this species. The viability of this Habitat was based on the inclusion of the known occurrences, absence of fragmentation and edge effects, and an intact watershed and flood regime. The protection of the flooding regime may be the most significant feature for conservation of this species' Habitat. Additional research is needed to understand the distribution and population dynamics of this endangered plant. The Planning Team identified the Conservation Areas below as Core Habitats. For each area, see Table 9-6 for a breakdown of Existing Conservation Lands and remaining lands to be conserved.

Core Habitat Areas:

1. ***Whitewater Canyon.*** This canyon is one of the primary locations for known occurrences of this species and includes the type locality. The Conservation Area includes approximately 1,295 acres of modeled Habitat. The Plan will conserve approximately 1,254 acres of Core Habitat here. This milkvetch has been observed from near the fish hatchery to just north of Interstate 10. Several of the historic locations near the area where the Whitewater River passes under Interstate 10 may have been disturbed or eliminated by levee construction and activities related to the aqueduct. The Planning Team considered this area as Core Habitat for triple-ribbed milkvetch.

2. ***Upper Mission Creek and Big Morongo Canyon.*** The Plan includes approximately 819 acres of modeled Habitat for this milkvetch in this Conservation Area. Approximately 772 acres of Core Habitat will be protected by the Plan. This Conservation Area includes significant Habitat areas for this species in Upper Mission Creek, Big Morongo Canyon, and Dry Morongo Wash. Surveys for this species from 1991 to 1998, by George Helmkamp and Robin Kobaly (pers. comm.), and surveys for the Plan by a team of USFWS, BLM, and CVMC biologists (K. Barrows, pers. comm.) report from 13 to 120 individuals. In April 2004, a population of close to 200 triple-ribbed milkvetch plants on an upland site in the Mission Creek watershed west of Catclaw Flat was reported by Scott White and John Green (White et al. 2004). This discovery confirmed a suspicion that this species might occur on upland areas in addition to the sandy and gravelly washes where most known locations occur. Further discussion of this population is included below in Section 9.2.3.5.

This Conservation Area was designed in part to maximize Conservation of this species. All available Habitat was included in the Conservation Area. The Planning Team did consider the area as Core Habitat.

Other Conserved Habitat Areas:

1. ***Whitewater Floodplain***. There are approximately 866 acres of modeled Habitat for triple-ribbed milkvetch within this Conservation Area. The Plan will conserve 807 acres of this Habitat. Although suitable Habitat for this species certainly occurs within this Conservation Area, the Planning Team did not consider the area as Core Habitat in that not enough information on the extent to which the milkvetch occurs here was available.
2. ***Joshua Tree National Park Conservation Area.*** There is no Habitat for this species currently mapped and no known occurrences have been recorded within the Joshua Tree National Park Conservation Area. However, suitable Habitat appears to exist in Long Canyon and may occur in other canyons to the east. Additional surveys would be needed to determine whether triple-ribbed milkvetch does occur in these areas. The potential Habitat would be conserved within this Conservation Area.
3. ***Santa Rosa and San Jacinto Mountains.*** The Plan includes approximately 1 acre of modeled Habitat within this Conservation Area, all of this Habitat would be conserved under the Plan. The modeled Habitat in this Conservation Area is based on one observation of one individual in Agua Alta Canyon, a branch of Martinez Canyon. As the species has not been observed at this location since the original sighting in 1991, it was not considered as Core Habitat.

9.2.3.4 Impacts Analysis

Significance of the Plan Area to Triple-Ribbed Milkvetch

A significant portion of the total known range of triple-ribbed milkvetch is within the Plan Area. This endemic species is found in a narrow range primarily from the northwestern portion of the Coachella Valley, from the vicinity of Whitewater Canyon, the type locality, in Mission Creek Canyon (where one of the largest populations was recently discovered) across

Highway 62 to Dry Morongo Wash and Big Morongo Canyon. The species is also known from several locations outside the Plan boundary in San Bernardino County, including the upper reaches of Big Morongo Canyon, Dry Morongo Canyon just north of the county line, near Key's Ranch in Joshua Tree National Park (Sanders 1999). These locations in San Bernardino County are within the boundaries of BLM's West Mojave Planning Area. One individual of this species was collected in Agua Alta Canyon, a branch of Martinez Canyon in the Santa Rosa Mountains in the southern portion of the Plan Area. The species may be more widely distributed in the Plan Area (See Section 9.2.3.5)

Direct Effects on the Triple-Ribbed Milkvetch

The MSHCP Reserve System would provide for Habitat protection, management, and monitoring for currently unprotected Core Habitat and Other Conserved Habitat for the triple-ribbed milkvetch, from a range of environmental conditions within which it is known to occur. Potential Linkages would also be protected. Large areas in Joshua Tree National Park and the Santa Rosa Mountains that may provide Habitat for this species will be protected.

There are 3,007 acres of modeled triple-ribbed milkvetch Habitat in the Plan area. The Plan would ensure Conservation of 2,838 acres (94%) of the total modeled Habitat, including 2,026 acres of Core Habitat (96% of total) and 812 acres (93%) of Other Conserved Habitat. Each of the two Core Habitat areas conserved would be greater than 2,000 acres. Approximately 1,504 acres (50%) of the modeled Habitat are within Existing Conservation Lands and would be managed as part of the Reserve System. An additional 1,334 acres (44%) of the modeled Habitat for triple-ribbed milkvetch in the Plan Area would be conserved.

Within the Conservation Areas potential adverse effects could occur to a maximum of 148 acres (5%) of modeled triple-ribbed milkvetch Habitat. There would be approximately 88 acres (4% of all Core Habitat) of Core Habitat and 60 acres of Other Conserved Habitat (7% of all Other Conserved Habitat) subject to disturbance (See Table 9-6 and Table 4-114). The Reserve System will effectively compensate for potential adverse impacts to this species because it will: 1) ensure Conservation of Core Habitat; 2) protect Essential Ecological Processes needed to maintain milkvetch Habitat; and 3) maintain Biological Corridors and Linkages among conserved populations to provide for population fluctuation and enhance genetic diversity. So, although some disturbance could occur within the Conservation Areas, the Conservation Objectives required by the Plan will provide for protection of Habitat to ensure the long-term persistence of this species.

Outside of the Conservation Areas, there are only 17 acres of modeled Habitat and 1 of the 34 known occurrences subject to Development and other proposed Covered Activities. The modeled Habitat outside the MSHCP Reserve System occurs at the margins of the Whitewater Canyon Conservation Area, south of Interstate 10 where this species has not been observed. The one known location outside the Conservation Areas is near the Riverside County line in upper Mission Creek canyon in an area not likely to be threatened by Development. The Planning Team carefully considered all available and occupied Habitat for this species and determined that only those areas within the proposed Conservation Areas would provide long-term protection for self-sustaining populations of this species.

Implementation of the Plan is expected to protect Habitat and to maintain population viability of the triple-ribbed milkvetch, as significant Habitat on private land that is currently unprotected will be conserved. The Plan will also secure the Essential Ecological Processes and Linkages necessary to maintain this Habitat.

Measures to Avoid, Minimize, and Mitigate Adverse Effects on Triple-Ribbed Milkvetch

To mitigate the impacts to triple-ribbed milkvetch, the Permittees will protect and manage, in perpetuity, 1,334 acres of the modeled Habitat for this species, including 33 of the 34 known locations. The 1,504 acres of modeled Habitat within Existing Conservation Lands will be monitored and managed to ensure that Conservation Objectives are met. The Plan will thus ensure Conservation, through protection and management, of 2,838 acres of Reserve Lands for this species.

As noted in the discussion in the Distribution, Abundance, and Trends section below, the population dynamics of this species are unknown. In the face of uncertainty about the preferred Habitat for this species, the Planning Team took the conservative approach and recommended inclusion of all known occurrences for this species and all occupied and potential Habitat. The proposed Conservation Areas in the MSHCP Reserve System include those areas judged by the Planning Team to be the most viable known Habitat for this species. The viability of this Habitat was based on the inclusion of the known occurrences, absence of fragmentation and edge effects, and an intact watershed and flood regime. The protection of the flooding regime may be the most significant feature for conservation of this species' Habitat. Additional research is needed to understand the distribution and population dynamics of this endangered plant. For each area, see Table 9-6 for a breakdown of Existing Conservation Lands and remaining lands to be conserved.

Additionally, the Plan calls for Management and Monitoring Programs to ensure the Conservation of this milkvetch, including control of activities that degrade milkvetch Habitat. The Monitoring and Management Programs also provide for determination of the conditions that favor germination and growth in this species to ensure that these conditions persist (e.g. scouring by large floods).

Overall Impacts to Triple-Ribbed Milkvetch under the Plan

Implementation of this Plan is expected to conserve and enhance population viability of the triple-ribbed milkvetch, as unprotected portions of its Habitat will be conserved. The potential for impacts from human uses at the present time appears to be very low, primarily related to occupied and potential Habitat in the lower reaches of the Whitewater River and Mission Creek which may be affected by flood control maintenance activities that alter the wash and could disturb triple-ribbed milkvetch populations. The Plan will also secure potential Habitat in each of the canyons where this species persists, including Whitewater, Mission Creek, Big Morongo, Dry Morongo, and Martinez/Agua Alta Canyons. It is possible that the species could occur in canyons east of Big Morongo Canyon, including Long Canyon; the portion of this canyon where this species could occur is within Existing Conservation Land in Joshua Tree National Park Conservation Area. Management and monitoring prescriptions will further enhance long-term Conservation of this species.

The Conservation Areas in Whitewater Canyon and Upper Mission Creek/Big Morongo Canyon include all of the Core Habitat for this species. The triple-ribbed milkvetch currently has 68% of the known occurrences on Existing public or private Conservation Lands in the Plan Area. In addition, Other Conserved Habitat that did not meet the Core Habitat standard set by the Planning Team, and which provides significant Habitat for this milkvetch, will be conserved in the Whitewater Floodplain and the Santa Rosa and San Jacinto Mountains Conservation Areas. The Plan will conserve 33 of the 34 known occurrences. Conservation of 2,026 acres of Core Habitat and 812 acres of Other Conserved Habitat, or 95%, of the significant Habitat for the triple-ribbed milkvetch will ensure that this species can persist in the Plan Area.

9.2.3.5 Species Account: Background

Distribution, Abundance, and Trends. The triple-ribbed milkvetch is an endemic species found in a narrow range primarily from the northwestern portion of the Coachella Valley, from the vicinity of Whitewater Canyon, the type locality, in Mission Creek Canyon across Highway 62 to Dry Morongo Wash and Big Morongo Canyon. Another location where the species has been collected is Agua Alta Canyon, a branch of Martinez Canyon in the Santa Rosa Mountains in the southern portion of the Plan Area; this record is for one individual collected by Jon Stewart and identified by Andy Sanders of the U.C. Riverside herbarium. It is of interest that Barneby, in Munz and Keck (1959), Munz (1968, 1974), and Barneby (1964) described the range of the species from Whitewater to the Orocopia Mountains, east of the Martinez Canyon location. Apparently, Barneby reported the triple-ribbed milkvetch in the Orocopia Mountains. Gary Wallace of the USFWS reports that he has not been able to locate a specimen for this Barneby observation but considers it a good record based on Barneby's reputation (G. Wallace, pers. comm.). The Martinez Canyon known location has led some to suggest that this species could occur in the rugged canyons of the Santa Rosa and San Jacinto Mountains. The Deep Canyon area, which includes the University of California Boyd Deep Canyon Desert Research Center, has received a fair amount of attention from botanists, particularly in the Deep Canyon watershed near Palm Desert (Zabriskie 1979) where the triple-ribbed milkvetch has never been recorded. The species is also known from several locations outside the Plan boundary in San Bernardino County, including the upper reaches of Big Morongo Canyon, Dry Morongo Canyon just north of the county line, and a somewhat anomalous, relatively high elevation, location (Sanders 1999) near Key's Ranch in Joshua Tree National Park. These locations in San Bernardino County are within the boundaries of BLM's West Mojave Planning Area.

Most of the populations of this species appear to be in the eastern end of the San Bernardino Mountains and at the western end of the Little San Bernardino Mountains. Much of the suitable Habitat along the southern margin of these mountains is rugged and poorly explored, and so it is possible that additional populations occur in the upper reaches of Mission Creek, Dry Morongo, and Big Morongo Canyons, as well as in the westernmost portions of Joshua Tree National Park, including Long Canyon (Sanders 1999).

The preferred Habitat of the triple-ribbed milkvetch has been characterized as sandy and gravelly soils of dry washes or on decomposed granite or gravelly soils at the base of canyon slopes. Recent observations of the species have illustrated that its Habitat requirements are very poorly understood. Most, if not all, observations of the species are in disturbed areas, such that it may be require some disturbance, whether natural or man-made. In Big Morongo Canyon, it is found on decomposed granite "slides" at the base of canyon slopes. Other disturbed sites include

along washes, on canyon bottoms where slides or flooding occurs. In Mission Creek Canyon, the species was observed in 1998 growing along the rocky edge of the stream, in the middle of roads, in a "rip-rap" barrier above the USGS gauging station, in open soils in a recently burned willow thicket at the margins of the cienega, and on gravelly sandbars in the midst of the stream channel (K. Barrows, pers. comm.). In each of these locations, natural or man-made disturbance is a feature.

Andy Sanders (1999) has suggested that washes may not in fact be the typical Habitat for this species, which may be more common on the slopes above washes. Very limited surveys by Andy Sanders and Katie Barrows in Mission Creek Canyon between 1995 and 1998 have not located triple-ribbed milkvetch on these slopes. It also should be noted that Robin Kobaly and George Helmkamp described surveying hillsides in Big Morongo Canyon extensively without finding this species; they found the species to be mostly limited to the canyon bottoms in Big Morongo Canyon (R. Kobaly and G. Helmkamp, pers. comm.). It may be that the species requires a very specific set of environmental conditions for germination and growth. In this scenario, seeds only find these conditions infrequently in various years, such that plants are only seen in good numbers in certain years. In its wash Habitat, large-scale floods may be a necessary condition for the successful germination of many seeds of triple-ribbed milkvetch. These large, scouring flood events occur only infrequently in this arid desert climate. A question remains as to how this species can persist given the small size of most known populations and the relative level of disturbance that could, presumably, wipe out a substantial number of individuals. Consideration should be given to retaining an active and intact hydrological regime for this Listed Species.

In his summary of the species for the West Mojave Desert HCP (Sanders 1999), Andy Sanders nicely summarizes the questions about the Habitat requirements and population status of this species:

> "It is apparent that this species is most commonly collected along washes and on canyon bottoms, but whether this represents the preferred Habitat of the species or is simply the place that people collect, and hence find waifs, is yet to be determined. Given the small size of most populations and the instability of the Habitats occupied, it is difficult to see how this species could maintain itself if washes truly are its main Habitat. With every flood, seeds and plants will be destroyed or washed downstream out of the Habitat area. If there is not a substantial population, some of which will escape destruction, or a permanent population in areas not subject to scouring, it is difficult to see how a scarce fugitive can maintain itself at all. Seed longevity should be investigated to determine if seeds are able to survive prolonged burial in sand following a flood so that they might wait for many years until another flood again exposes them and makes open Habitat available. There is a great need for careful and thorough surveys of the slopes above the washes where this species is usually found. If there are no permanent populations found there, then it should be concluded that this species is in fact a wash inhabitant and that the plants are few in number and their status precarious indeed."

Where it does occur, triple-ribbed milkvetch is apparently not common. Surveys for the species in the Mission Creek area in 1998 detected only 13 plants, in spite of what would appear to have been favorable growth conditions with relatively high rainfall that year; the 13 plants

were large and laden with fruits (K. Barrows, pers. comm.). Reported observations of the number of individuals of the triple-ribbed milkvetch in Whitewater Canyon, Dry Morongo Wash, and Big Morongo Canyon are mostly of one to 13 plants, with the exception of 120 plants reported in 1991 (in 1997, six to eight individuals were observed at this site), 35 plants reported in 1992 (both by G. Helmkamp, pers. comm.), and 70 plants in 1993 (C. Jacobsen 1993). The known location in Martinez Canyon is a single observation of one plant, which has not been observed since it was reported in 1985; additional casual surveys of this location have been accomplished several times since 1985, but no plants have been found (W. Miller 1997; J. Dice, pers. comm.).

As mentioned above, in April 2004 a population of at least 300 plants was located by Scott White and John Green (White et al. 2004) just west of Wathier Landing in Mission Creek canyon west of Catclaw Flat. This location is near the Plan boundary. The plants were growing in a small outcrop of "unproductive-looking" gravelly soil and the species was not seen in the surround granitic slopes or alluvial fans and washes. The site of this population is on land owned by the Wildlands Conservancy and included within the Existing Conservation Lands for this Plan. Many more plants were found at this small outcrop than have been censused at other known occurrences. Additional triple-ribbed milkvetch plants were seen but not counted at similar outcrops in the vicinity (Scott White, pers. comm.). This discovery supports the view that other observations of this species may be "waifs" washed downstream or downslope from populations higher in the canyons.

As noted, the factors that control the distribution and size of populations of this species are not understood. During some years, the species is difficult to find, while in other years it may be relatively common at some sites. The occurrence in Big Morongo Canyon consists of approximately 50 plants, occupying a total area of about 36 acres; these plants occur in scattered locations along the canyon bottom, north of and within the Plan Area. As previously noted, George Helmkamp (pers. comm.) has seen this population vary from six to 120 plants. In the year when 120 plants were observed (ca. 1991), heavy rains resulting in floodwaters had scoured the bottom of the canyon; the plants appeared in the open canyon bottom. The Big Morongo Canyon has been monitored from 1983 and 1998, with changes in abundance apparently dependent on the amount of winter rainfall.

The triple-ribbed milkvetch may be a short-lived perennial, but more commonly behaves as an annual. It may best be described as a short-lived perennial, persisting for about 3 to 5 years (Sanders 1999). Healthy individuals appear as a somewhat bushy herb, which at maturity are usually 12-20 inches (30-50 cm) tall. The lower stem is somewhat woody, with a tap root. The white to pale cream-colored flowers appear from February through April, with fruits appearing as early as March and present until at least May. The fruits are distinctive, narrow pods, 2 to 4 cm long and three-ribbed in cross section. Most aspects of the biology of this species are unknown, including pollinators, germination requirements, longevity of seeds in the soil, and specific Habitat requirements.

Associated Covered Species. Within the Plan Area, other species of concern whose Core Habitat overlaps with that of the triple-ribbed milkvetch include the Little San Bernardino Mountains linanthus, desert tortoise, riparian birds, and burrowing owl.

9.2.4 Orocopia Sage *Salvia greatae*

Status	**Federal:**	**No official status**
	State:	**Special Plant, California Species of Special Concern**
	CNPS:	**List 1B**

9.2.4.1 Species Conservation Goals and Objectives

Conserve and manage populations within the MSHCP Reserve System according to the following criteria:

Goal 1: Protect Core Habitat areas that include occupied Habitat, and associated Essential Ecological Processes, allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused disturbance, and edge effects to Core Habitat by conserving contiguous Habitat patches and effective Linkages between patches of Core Habitat.

Objective 1. Ensure conservation of Core Habitat within the following Conservation Areas:

- Desert Tortoise and Linkage Conservation Area
- Mecca Hills/Orocopia Mountains Conservation Area

Please refer to Section 4.3 and Table 9-7 for specific acreages to be protected by this Conservation Objective.

Goal 2: Protect Other Conserved Habitat to provide sufficient area and variety of Habitat types to accommodate population fluctuations, allow for genetic diversity, and to conserve the range of environmental conditions within which this sage is known to occur.

Objective 2. Conserve Other Conserved Habitat for this sage through adherence to other Conservation Objectives (for another species, a natural community, Essential Ecological Process area, Biological Corridor, or Linkage area) in the following Conservation Areas:

- Dos Palmas Conservation Area

Please refer to Section 4.3 and Table 9-7 for specific acreages to be conserved by other Conservation Objectives.

Goal 3: Maintain Biological Corridors and Linkages among all conserved populations to provide for seed dispersal and shifts in species distribution over time.

Objective 3. Ensure conservation of Biological Corridors and Linkages through Conservation Area Conservation Objectives.

Table 9-7: Summary of Habitat within Conservation Areas Orocopia Sage

Conservation Area	*Total Acres of Habitat in Conserv. Area*	*Acres of Disturbance Authorized*	*Acres of Existing Conservation Lands*	*Remaining Acres to be Conserved*	*Total Acres to be Conserved in MSHCP Reserve System*	*Designation*
Desert Tortoise and Linkage	779	44	337	398	735	Core Habitat
Mecca Hills/ Orocopia Mtns.	66,180	1,803	48,150	16,227	64,377	Core Habitat
Dos Palmas	4,022	185	2,177	1,661	3,838	Other Cons. Habitat
Total – All Habitat	*70,981*	*2,032*	*50,664*	*18,286*	*68,950*	--
Total – Core Habitat	*66,959*	*1,847*	*48,487*	*16,625*	*65,112*	--
Total – Other Cons. Habitat	*4,022*	*185*	*2,177*	*1,661*	*3,838*	--

Goal 4: Ensure conservation of Orocopia sage by maintaining the long-term persistence of self-sustaining populations and conserving Habitat quality through biological monitoring and Adaptive Management actions in the Plan Area.

Objective 4. Implement biological monitoring and Adaptive Management actions to ensure self-sustaining populations within each Core Habitat area.

9.2.4.2 Threats, Limiting Factors, and Adaptive Management

Threats to this species are few in that its Habitat is largely protected within the Mecca Hills, Orocopia Mountains, and Chuckwalla Mountains Wilderness Areas, established by the 1994 Desert Protection Act. There may be some threat from illegal OHV activity, for example along the Bradshaw Trail, where lands on either side of this road were excluded from the Wilderness Areas. Fortunately, Orocopia sage populations are typically on rocky slopes or alluvial fans and are either inaccessible to vehicular traffic or are some distance from major roads. K. Barrows (1986) reported that no evidence of OHV impacts within Orocopia sage populations was observed along the Bradshaw Trail.

The following actions may be needed to ensure species persistence and long-term viability if biological monitoring indicates that such actions are warranted. This list is not comprehensive but identifies some of the known or likely threats to Orocopia sage. More detailed information on the Monitoring and Management Programs can be found in Section 8.0.

1. Control and manage activities that degrade Orocopia sage Habitat. These activities are prohibited in the Mecca Hills and Orocopia Mountains Wilderness Areas (e.g. OHV use). Future increases in activity along the Bradshaw Trail, if they occur, could result in impacts to this species.
2. Identify and implement actions to reduce impacts from, and control where feasible, invasive species if it is determined from monitoring results that there are impacts to the Orocopia sage or impact to its Habitat.

9.2.4.3 Species Conservation Analysis

Conservation Area Reserve Design. The proposed Conservation Areas include nearly all of the known Habitat for this species as well as additional modeled Habitat in the Orocopia Mountains. This species has not been recorded along the north slopes of the Orocopia Mountains, but much of this area is not well explored by botanists. It is also protected within the BLM Wilderness Area. The dispersal mechanisms and pollinators for this species are not known. Conserved populations of this species are potentially subject to limited edge effects as a result of recreational use along the Bradshaw Trail, but these effects do not appear significant.

The Planning Team did not attempt to estimate population densities for the Orocopia sage, as data are limited on the number of individuals at known occurrences throughout its range in the Orocopia Mountains. This species occurs in only three Conservation Areas within the Plan Area, Desert Tortoise and Linkage, the Mecca Hills/Orocopia Mountains, and Dos Palmas. The proposed Conservation Areas include all known occurrences and modeled Habitat judged by the Planning Team to be the known Habitat suitable to support a self-sustaining population for this species. The viability of this Habitat was based on the inclusion of the known Habitat areas, which currently support an apparently successful population, absence of fragmentation and edge effects, and an intact watershed. There is little known about the ecosystem or large-scale processes that may contribute to viable Habitat for this species. Additional data are needed to assess the population status and viability of Orocopia sage. For each area, see Table 9-7 for a breakdown of Existing Conservation Lands and remaining lands to be conserved.

Core Habitat Areas:

1. ***Mecca Hills/Orocopia Mountains.*** The Plan includes approximately 66,180 acres of modeled Habitat for the Orocopia sage in this Conservation Area. The Plan will conserve approximately 64,377 of these acres. This Conservation Area includes most of the significant Habitat known for this species in the Orocopia Mountains. Most of this Habitat is within the Orocopia Mountains Wilderness Area. This Conservation Area was considered as Core Habitat.
2. ***Desert Tortoise and Linkage.*** This Conservation Area includes approximately 779 acres of modeled Habitat for the Orocopia sage. The Plan would ensure conservation of approximately 735 acres of this Habitat. The Habitat in this Conservation Area is contiguous with the Core Habitat for Orocopia sage in the Mecca Hills/Orocopia Mountains Conservation Area. Therefore this Conservation Area was considered as providing Core Habitat that is functionally part of the Core Habitat in the adjacent Conservation Area.

Other Conserved Habitat Areas:

1. ***Dos Palmas.*** The Dos Palmas Conservation Area includes approximately 4,022 acres that have been delineated as modeled Habitat for the Orocopia sage, of which approximately 3,838 acres will be conserved under the Plan. More data would be necessary to confirm the potential for this area to constitute Core Habitat.

9.2.4.4 Impacts Analysis

Significance of the Plan Area to Orocopia Sage

The Orocopia sage is endemic to the Orocopia Mountains, Mecca Hills, and Chocolate Mountains in the eastern part of the Plan Area. Its known range is entirely within the Plan Area. Orocopia sage has no official state or federal status but is listed by the California Department of Fish and Game as a Species of Special Concern and by the California Native Plant Society on List 1B (CNPS 2001). Orocopia sage occurs in a longitudinal, west to east range of approximately 30 miles.

Direct Effects on Orocopia Sage

The Plan Area includes 78,868 acres of modeled Habitat for Orocopia sage, of which approximately 66,959 acres are identified as Core Habitat. The Plan would ensure Conservation of 65,112 acres (97%) of the Core Habitat and 95% (3,838 acres) of the Other Conserved Habitat for this endemic plant. Each of the conserved Core Habitat areas would be greater than 3,000 acres. Approximately 50,664 acres (64%) of the modeled Habitat are within Existing Conservation Lands and would be managed as part of the Reserve System. As a result of the Plan acquisitions 18,286 acres (23%) of the modeled Habitat for Orocopia sage in the Plan Area would be conserved. A total of 68,950 acres (87%) of modeled Orocopia sage Habitat would be conserved.

Potential adverse impacts could occur within the Conservation Areas, affecting 2,032 acres of modeled Orocopia sage Habitat. Approximately 1,847 acres (3% of total) Core Habitat and 185 acres (5%) of Other Conserved Habitat would be subject to disturbance (See Table 9-7 and Table 4-114).

Outside of the Conservation Areas, there are 4,901 acres of modeled Orocopia sage Habitat that could be subject to disturbance. The Habitat for this species that is not within the Conservation Areas is primarily at the margins of the modeled Habitat. It includes potential Habitat in the southeastern portion of the Mecca Hills. It is a mountainous area of the Mecca Hills where the Habitat was deemed potential but the Orocopia sage has not been observed. This area is part of the rugged badlands of the Mecca Hills that would not likely be subject to Development but could be subject to OHV use on designated routes, primarily in the canyon bottoms. The areas subject to disturbance outside the Conservation Areas provide only marginal Habitat for Orocopia sage and the impacts to this species as a result of the Plan are insignificant.

The proposed Conservation Areas in the Plan include approximately 87% of the occupied and potential Habitat for Orocopia sage as currently mapped. The actual reduction in Habitat value is expected to be considerably less than indicated by the raw acreage numbers because:

1. The Plan would conserve all of the known occurrences of Orocopia sage and Habitat for the known populations within the Plan Area in the Orocopia Mountains. This includes areas considered as Core Habitat in the Mecca Hills/Orocopia Mountains Conservation Area.
2. Take within the Conservation Areas would not eliminate or significantly impact any core populations. Conservation Objectives require any approved disturbance within Conservation Areas to ensure protection of Core Habitat.
3. Lands in the MSHCP Reserve System would be managed and monitored to address significant edge effect problems, OHV impacts, invasive species, and other known and potential stressors to this species,

The issuance of Take Permits, therefore, will not likely jeopardize the continued existence of Orocopia sage and the implementation of the MSHCP will provide for the Conservation of the species.

Measures to Avoid, Minimize, and Mitigate Impacts to Orocopia Sage

To mitigate the effects of disturbance on Orocopia sage, the Permittees will protect and manage, in perpetuity, 18,286 acres of the modeled Habitat for this species, including 16,625 acres of Core Habitat. The 50,664 acres of modeled Habitat within Existing Conservation Lands, including 48,487 acres of Core Habitat, will be monitored and managed to ensure that Conservation Objectives are met. The Plan will thus ensure Conservation, through protection and management, of 68,950 acres of Reserve Lands for this species

The proposed Conservation Areas include 87% of the known modeled Habitat for Orocopia sage. Most of the Conserved Habitat is on BLM land within the Mecca Hills and Orocopia Mountains Wilderness Areas. This includes areas considered as Core Habitat in the Desert Tortoise and Linkage Conservation Area and in the Mecca Hills/Orocopia Mountains Conservation Area. Other Conserved Habitat from a range of environmental conditions within which this sage is known to or may occur will also be protected in the Dos Palmas Conservation Area. This Plan includes 100% of the occurrences for this plant on 70,981 acres of Core and Other Conserved Habitat within the Conservation Areas. Consequently, the amount of modeled Habitat for Orocopia sage that could be subject to Take within the Conservation Areas would be 2,032 acres or 3% of all the modeled Habitat.

Additionally, the Plan calls for Management and Monitoring Programs to ensure the Conservation of this species, including control of activities that degrade Orocopia sage. This could include Adaptive Management of impacts as a result of future increases in OHV activity along the Bradshaw Trail, if they occur, and control of invasive species where necessary. The Management and Monitoring Programs include a provision to develop and test models to address the distribution, abundance, and ecological requirements of Orocopia sage.

Overall Impacts to Orocopia Sage under the Plan

Implementation of this Plan is expected to conserve and enhance population viability of the Orocopia sage, as unprotected portions of its Habitat will be conserved. The potential for

impacts from human uses, including OHV activity, appears to be low. Management and monitoring prescriptions will further enhance long-term Conservation of this species.

The Orocopia sage will benefit from the establishment of the MSHCP Reserve System which will include Habitat in the Orocopia Mountains where they occur. Implementation of the Plan is expected to provide for persistence of this species within the Plan Area, as currently unprotected portions of its Habitat and potential Habitat in the Mecca Hills area will be conserved. The combination of the overall Conservation measures; species-specific measures such as management to minimize impacts in Orocopia sage Habitat, monitoring to better understand the distribution and ecology of this species, and long-term protection, management, and enhancement of Orocopia sage Habitat is expected to effectively compensate for potential adverse effects to this plant species.

9.2.4.5 Species Account: Background

Distribution, Abundance, and Trends. The preferred Habitat of Orocopia sage is in gravelly or rocky soils on broad bajadas or fans, often adjacent to desert washes or on the rocky slopes of canyons. It may occur on alluvial terraces and sandy or rocky benches elevated above the flood plain of a wash, as in the Salt Creek Wash along the Bradshaw Trail. The species does not appear to occur within the immediate wash zone. This species has been recorded up to 2,800 feet in the Orocopia Mountains. It has only been observed on the south-facing slopes of the Orocopia Mountains, although thorough surveys have not yet been completed. Surveys completed several years ago in the Chocolate Mountains Aerial Gunnery Range (CMAGR) indicate it is fairly common in these mountains, which are outside the Plan boundary. This species has also been reported by BLM from the north side of the Chuckwalla Mountains, outside the Plan Area. This location, south of Desert Center, was visited in 1986 but the presence of Orocopia sage was not confirmed (K. Barrows 1986). A report of Orocopia sage from limestone outcrops in the Marble Mountains of San Bernardino County near Cadiz is considered questionable and has not been confirmed since it was reported 20 years ago; a search for this species at this location was made but no plants were found (K. Barrows 1986). Information on population size and density of Orocopia sage is not available. Observations at occurrences of the species by K. Barrows (1986) were reported as ranging from 50 plants to 1,000 or more plants. In the spring of 2002, botanists from U.C. Riverside initiated surveys of Orocopia sage as part of the preliminary development of monitoring protocols. These initial efforts indicated the need for additional sampling. Of the 15 known populations, two were not located, two new populations were located, and four populations appear to be much larger than previously described (Allen 2003).

Though Orocopia sage is patchy in its distribution, it is typically one of the dominant members of the vegetation where it occurs. Plants may be 3 to 4 feet tall and usually form dense, rounded clumps, sometimes as large as 4 or 5 feet in diameter. Multiple branching from near ground level results in a very bushy appearance. This species is associated with desert dry wash woodland and Sonoran creosote bush scrub.

Little is known of the life history and ecology of Orocopia sage. Its remarkable ability to withstand long periods of drought was noted by Jaeger (1941). During drought periods, it may lose nearly all its leaves. In dry years, this plant may be virtually dormant, forming only a few

new shoots and perhaps no flowers (Clary, in Jepson 1943), whereas in wet years, plants may bloom by early April. Orocopia sage is reportedly pollinated by bees (Jones 1995).

Associated Covered Species. Other species of concern which occur in the same general area as Orocopia sage include Mecca aster, desert tortoise, and Le Conte's thrasher.

9.2.5 Little San Bernardino Mountains Linanthus *Linanthus maculatus (also Gilia maculata)*

Status	**Federal:**	**Species of Concern**
	State:	**Species of Special Concern**
	CNPS:	**List 1B**

9.2.5.1 Species Conservation Goals and Objectives

Conserve and manage populations within the MSHCP Reserve System according to the following criteria:

Goal 1: Protect Core Habitat areas that include occupied Habitat, and associated Essential Ecological Processes, allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused disturbance, and edge effects to Core Habitat by conserving contiguous Habitat patches and effective Linkages between patches of Core Habitat.

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Objective 1. Ensure conservation of Core Habitat within the following Conservation Areas ~~and Special Provisions Area:~~

- Whitewater Canyon Conservation Area
- Upper Mission Creek/Big Morongo Canyon Conservation Area
- ~~Morongo Wash Special Provisions Area within the Upper Mission Creek/Big Morongo Canyon Conservation Area~~

Please refer to Section 4.3 and Table 9-8 for specific acreages to be protected by this Conservation Objective.

Goal 2: Protect Other Conserved Habitat to provide sufficient area and variety of Habitat types to accommodate for population fluctuations, allow for and genetic diversity, and to conserve the range of environmental conditions within which this small annual plant is known to occur.

Objective 2. Conserve Other Conserved Habitat for this small annual plant through adherence to other Conservation Objectives (for another species, a natural community, Essential Ecological Process area, Biological Corridor, or Linkage area) in the following Conservation Area ~~and Special Provisions Area~~ :

- Willow Hole Conservation Area
- ~~Morongo Wash Special Provisions Area within the~~ Upper Mission Creek/Big Morongo Canyon Conservation Area

Please refer to Section 4.3 and Table 9-8 for specific acreages to be conserved by other Conservation Objectives.

Table 9-8: Summary of Habitat within Conservation Areas Little San Bernardino Mountains Linanthus

Conservation Area	*Total Acres of Habitat in Conserv. Area*	*Acres of Disturbance Authorized*	*Acres of Existing Conservation Lands*	*Remaining Acres to be Conserved*	*Total Acres to be Conserved in MSHCP Reserve System*	*Designation*
Whitewater Canyon	579	39	192	348	540	Other Cons. Habitat
Upper Mission Creek/Big Morongo Canyon	2,410	224~~175~~	168	2,018~~2,067~~	2,186~~2,235~~	Core Habitat
Willow Hole	200	20	3	177	180	Other Cons. Habitat
Total – All Habitat	*3,189*	*283~~234~~*	*363*	*2,543~~2,592~~*	*2,906~~2,955~~*	--
Total – Core Habitat	*2,410*	*224~~175~~*	*168*	*2,018~~2,067~~*	*2,186~~2,235~~*	--
Total – Other Cons. Habitat	*779*	*59*	*195*	*525*	*720*	--

~~[1] Includes 60 acres within the Morongo Wash Special Provisions Area.~~

Goal 3: Protect Essential Ecological Processes, including hydrological regimes, necessary to maintain Core Habitat and Other Conserved Habitat for this species.

Objective 3. Ensure protection of Essential Ecological Process areas through Conservation Area Conservation Objectives for Essential Ecological Processes.

Goal 4: Maintain Biological Corridors and Linkages among all conserved populations to provide for seed dispersal and shifts in species distribution over time.

Objective 4. Protect Biological Corridors and Linkages through Conservation Area Conservation Objectives for Biological Corridors and Linkages.

Goal 5: Ensure conservation of Little San Bernardino Mountains linanthus by maintaining the long-term persistence of self-sustaining populations and conserving Habitat quality through biological monitoring and Adaptive Management actions in the Plan Area.

Objective 5. Implement biological monitoring and Adaptive Management actions to ensure self-sustaining populations within each Core Habitat area.

9.2.5.2 Threats, Limiting Factors, and Adaptive Management

The greatest threat to this species is growing urbanization in the vicinity of Desert Hot Springs and Highway 62 where the largest populations exist. Only 2% of the occurrences for Little San Bernardino Mountains linanthus are currently protected on public or private Existing Conservation Lands. Within the Plan Area, all populations not on public land must be considered highly threatened as they occur on relatively flat sites and predominantly on private land. Urbanization spreading westward from Desert Hot Springs could eliminate the most significant populations in the long term. Development pressures are a concern primarily in the Mission Creek drainage east of Highway 62 and in the vicinity of Dry Morongo Wash near Highway 62 and Indian Avenue. One disturbance that could impact this species is flood control maintenance activities in the Whitewater Canyon and Mission Creek drainages. Another threat to this species is OHV activity in the wash Habitat where it occurs. The small size of the plants and their occurrence along the margins of washes, which may serve as routes of travel for OHV users, make them particularly vulnerable to vehicular damage.

The following actions may be needed to ensure species persistence and long-term viability if biological monitoring indicates that such actions are warranted. This list is not comprehensive but identifies some of the known or likely threats to this species. More detailed information on the Monitoring and Management Programs can be found in Section 8.0.

1. Control and manage activities that degrade Little San Bernardino Mountains linanthus Habitat. In particular, control those activities that may involve vehicular travel within washes and flood control maintenance activities that could result in damage to plants and their Habitat outside of the flood control channel itself. Operation and maintenance activities within the flood control channel itself are Covered Activities (see Section 7.0).
2. Identify and implement actions to reduce impacts from, and control where feasible, invasive species if it is determined from monitoring results that there are impacts to linanthus or impacts to its Habitat.
3. Develop and test models through the Management and Monitoring Program to address the distribution, abundance, and ecological requirements of the Little San Bernardino Mountains linanthus.
4. Determine the conditions that favor germination and growth in this species and insure that these conditions can continue to occur (e.g. scouring by large floods).
5. In Mission Creek, coordinate with the Wildlands Conservancy to achieve Species Conservation Goals.

9.2.5.3 Species Conservation Analysis

Conservation Area Reserve Design. The occurrences for this species in the Mission Creek and Big Morongo Canyon areas are primarily on private land. Those locations that are on public (BLM land in Whitewater Canyon) or private (Wildlands Conservancy land in Mission Creek) conservation lands are not of adequate size to constitute a secured population alone. Conservation of the occurrences on private lands will help to provide contiguous Habitat of adequate size to secure the persistence of this species within the Plan Area, provided appropriate management actions can also be insured. The small areal extent of this species' Habitat and the linear Habitat corridor increases the potential for deleterious edge effects. The Whitewater Canyon area includes a small residential area and a public road, a trout fishing operation, and the Colorado River Aqueduct of the Metropolitan Water District. The Plan will not eliminate these Existing Uses; therefore, some deleterious impacts to Little San Bernardino Mountains linanthus populations could occur. Similar concerns apply in the lower Mission Creek and Big Morongo Canyon drainages where a public road (Worsley Road) and low-density residential areas could result in impacts to this species.

The Planning Team did not attempt to identify Core Habitat for this species using density estimates. The Planning Team attempted to include as much of the known Habitat for this species as feasible, incorporating all known occurrences and all available and occupied Habitat for populations in Whitewater Canyon Conservation Area and~~,~~ Upper Mission Creek/Big Morongo Canyon Conservation Area~~, and Morongo Wash Special Provisions Area~~. Known Habitat was based on the species distribution model, developed with considerable assistance from Robin Kobaly and George Helmkamp who both have a great deal of familiarity with this species. As part of the Habitat model development for this species, the network of drainages and interlaced washes that occur in the Mission Creek and Morongo Wash area, mostly east of Highway 62 on either side of Indian Avenue were mapped. George Helmkamp (pers. comm.) has observed more than 10,000 individuals of this linanthus at the mouth of Big Morongo Canyon. The Planning Team focused on ensuring that Essential Ecological Processes that maintain this species' Habitat, including flooding events, could continue to occur. The Planning Team also worked with County Flood to ensure that the Core Habitat and Other Conserved Habitat for this species would be kept free of flood control channels and other disturbance that could alter the Habitat character. For each area, see Table 9-8 for a breakdown of Existing Conservation Lands and remaining lands to be conserved.

Core Habitat Areas:

1. ***Whitewater Canyon.*** This canyon is one of the primary locations for known occurrences of this species. The Conservation Area includes approximately 579 acres of modeled Habitat, of which approximately 540 acres will be conserved under the Plan. The Little San Bernardino Mountains linanthus has been observed from the fish hatchery to below Interstate 10. A survey by Will Miller and others of the USFWS in 1997 detected two populations. The first population of 300 to 500 plants was approximately 1 mile north of Bonnie Bell. The second population, 0.4 miles south of the gauging station, was described in 1997 as more than 1,000 individuals. The Planning Team considered the area as Core Habitat.

2. ***Upper Mission Creek/Big Morongo Canyon.*** The Plan includes approximately 2,410 acres of modeled Core Habitat for this linanthus in this Conservation Area. The Plan will

conserve approximately 2,186~~2,235~~ acres of this Habitat. This Conservation Area includes significant Habitat areas for this species in the outwash fans of Mission Creek, Big Morongo Canyon, Dry Morongo Wash, Little Morongo Wash, and Morongo Wash south of Indian Ave. Surveys in 1997 (USFWS 1997) described 42 populations or subpopulations in this area. These subpopulations were described as containing 50 to 1,000s of individuals; in one case, a subpopulation was estimated at over 10,000 plants. This Conservation Area was designed in part to maximize Conservation of this species. Braided washes associated with the above named drainages were included to provide for the fluvial terraces this species occurs on. The Planning Team did consider the area as Core Habitat.

~~3. ***Morongo Wash Special Provisions Area.*** The Morongo Wash Special Provisions Area is within the Upper Mission Creek/Big Morongo Canyon Conservation Area. The Plan includes approximately 1,016 total acres of Core Habitat within this Special Provisions Area, of which approximately 956 acres will be conserved under the Plan.~~

Other Conserved Habitat Areas:

1. ***Willow Hole.*** The Plan includes approximately 200 total acres of Other Conserved Habitat within this Conservation Area, of which approximately 180 acres will be conserved under the Plan. There is an historical record downstream from Willow Hole, last observed in 1952, that has not been confirmed in the recent past. George Helmkamp and Robin Kobaly suggested potential Habitat in this area, which was included in the model. As the species has not been confirmed at this location, it was not considered as Core Habitat.

2. ***Long Canyon, Indio Hills/Joshua Tree National Park Linkage, and Joshua Tree National Park.*** Habitat for this species was not modeled in the vicinity of the mouth of Long Canyon, or in other canyons in Joshua Tree National Park to the east of Long Canyon. Several botanists have suggested that the species could occur in these areas. This potential Habitat includes the canyon mouths that occur within the Indio Hills/Joshua Tree National Park Linkage Conservation Area. Little San Bernardino Mountains linanthus is known from locations on the north slopes of the Little San Bernardino Mountains, north and east of Long Canyon. Surveys would need to be done to determine whether this species occurs within these Conservation Areas. The areas of potential Habitat are fully within these Conservation Areas and as such are conserved.

9.2.5.4 Impacts Analysis

Significance of the Plan Area to Little San Bernardino Mountains Linanthus

The Little San Bernardino Mountains linanthus is a tiny endemic plant species found in a restricted range in the northwestern part of the Plan Area. Although extensive populations occur outside the Plan Area, the portion of its range within the Plan Area is significant. This tiny annual plant has no official state or federal status although it is considered a Species of Concern by USFWS and is on CNPS List 1B (CNPS 2001). It occurs in the vicinity of the Little San Bernardino Mountains near Desert Hot Springs, in Mission Creek Canyon across Highway 62 to Dry Morongo Wash and Big Morongo Canyon and near the mouth of Dry Morongo Canyon in

the northwestern portion of the Coachella Valley, in Whitewater Canyon in the eastern San Bernardino Mountains, and from Whitewater to Palm Springs, the type locality. The most extensive populations of this species are outside the Plan boundary, along washes at the northern edge of Joshua Tree National Park, in the vicinity of Joshua Tree, Yucca Valley, and Twentynine Palms. It seems likely that additional populations of this species may occur in the area of approximately 22 miles between Rattlesnake Canyon and Yucca Valley. There is one very recently described location in Rattlesnake Canyon on the north side of the San Bernardino Mountains.

Direct Effects on the Little San Bernardino Mountains Linanthus

The MSHCP Reserve System would provide for Habitat protection, management, and monitoring for currently unprotected Core Habitat and Other Conserved Habitat for the Little San Bernardino Mountains Linanthus, from a range of environmental conditions within which it is known to occur. Potential Linkages would also be protected. Large areas in Joshua Tree National Park and the Santa Rosa Mountains that may provide Habitat for this species will be protected.

There are 3,389 acres of modeled Little San Bernardino Mountains Linanthus Habitat in the Plan area. The Plan would ensure Conservation of 2,906~~2,955~~ acres (86~~87~~%) of the total modeled Habitat, including 2,186~~2,235~~ acres of Core Habitat (93% of total) and 720 acres (92%) of Other Conserved Habitat. The primary Core Habitat area for this species in Upper Mission Creek/Big Morongo Canyon Conservation Area would be greater than 1,500 acres. Approximately 363 acres (11%) of the modeled Habitat are within Existing Conservation Lands and would be managed as part of the Reserve System. An additional 2,543~~2,592~~ acres (81%) of the modeled Habitat for Little San Bernardino Mountains Linanthus in the Plan Area would be conserved. Overall, 2,906~~2,955~~ acres (93%) of modeled linanthus Habitat would be conserved and managed as a result of the Plan.

Within the Conservation Areas~~ and Morongo Wash Special Provisions Area~~, potential adverse effects could occur on a maximum of 283~~234~~ acres (7%) of modeled Little San Bernardino Mountains Linanthus Habitat. There would be approximately 224~~175~~ acres (7% of all Core Habitat) of Core Habitat and 59 acres of Other Conserved Habitat (8% of all Other Conserved Habitat) subject to disturbance (See Table 9-8 and Table 4-114). The Reserve System will effectively compensate for potential adverse impacts to this species because it will: 1) ensure Conservation of Core Habitat; 2) protect Essential Ecological Processes needed to maintain Little San Bernardino Mountains Linanthus Habitat; and 3) maintain Biological Corridors and Linkages among conserved populations to provide for population fluctuation and enhance genetic diversity. So, although some disturbance could occur within the Conservation Areas~~ and Morongo Wash Special Provisions Area~~, the Conservation Objectives required by the Plan will provide for protection of Habitat to ensure the long-term persistence of this species. The Planning Team, in consultation with local botanists, carefully considered all available and occupied Habitat for this species and determined that only those areas within the proposed Conservation Areas would provide long-term protection for self-sustaining populations of this species.

Outside of the Conservation Areas, there are only 195 acres (6%) of modeled Habitat subject to Development and other proposed Covered Activities. The modeled Habitat outside the

MSHCP Reserve System occurs at the margins of the Upper Mission Creek/Big Morongo Canyon Conservation Area, east of Indian Avenue in an area where the hydrological regime has been compromised by surrounding development. At present, only one known occurrence, located east of Mission Lakes Country Club, is identified as subject to potential Habitat loss. Habitat loss could occur primarily in the lower reaches of Mission Creek and Big Morongo Canyons, south of Indian Avenue. Other populations of this species that occur outside the Plan Area in Joshua Tree National Park are not affected by this Plan. The protection of Habitat and known occurrences of this species will require acquisition of private lands. Public lands in Whitewater Canyon will require management actions to conserve the Habitat for this linanthus and other target species.

Implementation of the Plan is expected to protect Habitat and to maintain population viability of the Little San Bernardino Mountains Linanthus, as significant Habitat on private land that is currently unprotected will be conserved. The Plan will also secure the Essential Ecological Processes and Linkages necessary to maintain this Habitat.

Measures to Avoid, Minimize, and Mitigate Adverse Effects on Little San Bernardino Mountains Linanthus

To mitigate the impacts to Little San Bernardino Mountains Linanthus, the Permittees will protect and manage, in perpetuity, 3,189 acres of the modeled Habitat for this species, including 58 of the 60 known occurrences. At the ~~present time~~time the permit was issued, 57 of the known occurrences for this tiny plant ~~are~~ were on private or public non-conservation land (e.g. utility land). ~~Only~~ As of 2012 66~~11~~% of the acres of modeled Habitat for this species are currently conserved; the conserved lands include 40 of the 60 known occurrences for linanthus. The Plan will ultimately conserve 86~~87~~% of all Habitat and 91~~93~~% of all Core Habitat for this species. The 363 acres of modeled Habitat within Existing Conservation Lands will be monitored and managed to ensure that Conservation Objectives are met. The Plan will thus ensure Conservation, through protection and management, of 2,906~~2,955~~ acres of Reserve Lands for this species.

The proposed Conservation Areas in the MSHCP Reserve System include those areas judged by the Planning Team to be the most viable known Habitat for this species. The viability of this Habitat was based on the inclusion of the known occurrences, absence of fragmentation and edge effects, and an intact watershed and flood regime. The protection of the flooding regime may be the most significant feature for conservation of this species' Habitat. Additional research is needed to understand the distribution and population dynamics of Little San Bernardino Mountains Linanthus. See Table 9-8 for a breakdown of Existing Conservation Lands and remaining lands to be conserved.

Additionally, the Plan calls for Management and Monitoring Programs to ensure the Conservation of this species, including control of activities that degrade little San Bernardino Mountains linanthus Habitat. The Monitoring and Management Programs also provide for determination of the conditions that favor germination and growth in this species to ensure that these conditions persist (e.g. scouring by large floods). It will also develop and test models through the Management and Monitoring Programs to address the distribution, abundance, and ecological requirements of the Little San Bernardino Mountains linanthus.

Overall Impacts to Little San Bernardino Mountains Linanthus under the Plan

The Little San Bernardino Mountains linanthus currently has only 2% of the known occurrences on public or private Existing Conservation Lands in the Plan Area. This includes portions of the occurrences in Whitewater Canyon and in Mission Creek. The MSHCP Reserve System would provide protection for two Core Habitat areas identified by the SAC and the Planning Team: Whitewater Canyon and Upper Mission Creek/Big Morongo Canyon ~~(which includes the Morongo Wash Special Provisions Area)~~. Other Conserved Habitat from a range of environmental conditions within which this linanthus is known to or may occur will be protected in the following Conservation Areas: Willow Hole, Indio Hills/Joshua Tree National Park Linkage, and Joshua Tree National Park. The Conservation Area boundaries were delineated to include almost all of the available and occupied Habitat for this species. The Plan will conserve 97%, or 58 of the 60 known occurrences for this species. The Little San Bernardino Mountains Linanthus currently has only one of the known occurrences on Existing public or private Conservation Lands in the Plan Area. Conservation of 2,410 acres of Core Habitat and 779 acres of Other Conserved Habitat, or 100% of the significant Habitat for the Little San Bernardino Mountains linanthus, will ensure that this species can persist within the Plan Area.

Implementation of the Plan will maintain and enhance population viability of the Little San Bernardino Mountains Linanthus, as the significant populations and occurrences will be conserved. Equally important, the Plan will ensure that the hydrological regimes that maintain this Habitat, including meandering or braided washes, are maintained. The Plan will also secure potential Habitat in each of the canyons and washes where this species persists, including Whitewater Canyon, Mission Creek, Big Morongo wash, and Dry Morongo Canyon. It is possible that the species could occur in canyons east of Big Morongo Canyon, including Long Canyon; the portion of this canyon where this species could occur is within Existing Conservation Land in Joshua Tree National Park Conservation Area.

9.2.5.5 Species Account: Background

Distribution, Abundance, and Trends. The size and ephemeral habit of the Little San Bernardino Mountains linanthus have made it difficult to find, and hence, it is little collected and studied. This tiny desert annual was first described by Parish in 1892 from a collection at "Agua Caliente" (at a location that is now in downtown Palm Springs) in 1889; the location of this collection was described as just west of the hot springs in Palm Springs. The next collection was at Joshua Tree in 1924. It was little known until Patterson (1989) described more exactly its preferred Habitat. More records have been reported in the last five to ten years. Recently, the nomenclature for this species has been revised and it is included in the genus Linanthus (Porter and Johnson 2000). There is, however, still discussion about its taxonomy, as some authors prefer to retain this species in the genus Gilia (Patterson 1989).

The preferred Habitat of Little San Bernardino Mountains linanthus is in loose soft sandy soils on low benches along washes, generally where the substrate shows some evidence of water flow. It seems to occur in areas where few or no competing species are found, with little shrub or tree cover in the immediate vicinity. The sand is loose and well-aerated, soft and unconsolidated (Sanders 1999). The occurrences within the Plan Area are on the margins of washes on shallow sandy benches, not on areas where a hard surface layer occurs, and not on loose blowsand away from washes. It is associated with creosote bush scrub, but avoids growing in the shadow of other plants. The elevation range of the species is from 500 to 4,000 feet.

Little is known of the life history of this species. Its pollinators, germination requirements, seed longevity, and population parameters have not been described. The flower form and color are indicative of insect pollination but no information on pollination ecology is available. The plants are very small, generally reaching a height of only 0.8 to 1.2 inches. They have a slender, little-branched tap root that may extend over 3 inches into the sand, probably allowing the plants to tap subsurface supplies of moisture and thus avoid atmospheric drying. They are nevertheless very ephemeral.

No comprehensive population estimates have been made, but records for the species give an idea of the size of the known populations. In Dry Morongo Canyon, Helmkamp (in Sanders 1999) reported a few hundred plants in 1995 but only six in 1996. At the mouth of Big Morongo Canyon north of Indian Avenue, more than 10,000 plants were reported in the spring of 1996. Populations in the Whitewater River area have been reported in the range of 200 individuals. In Mission Creek wash east of old Highway 62, Helmkamp reported a single population of more than 2,000 plants in 1992. Clearly, populations vary with environmental conditions in a given year.

Associated Covered Species. Within the Plan Area, other species of concern whose Core Habitat overlaps with that of the Little San Bernardino Mountains linanthus include triple-ribbed milkvetch, Palm Springs pocket mouse, desert tortoise, and burrowing owl.

9.3 Insects

This section contains species accounts, including Species Conservation Goals and Objectives, Habitat parameters and significant threats, for each of the two insect species proposed for coverage under this Plan. Neither of the target insect species has any state or federal status. These insects, the Coachella Valley giant sand-treader cricket and the Coachella Valley Jerusalem cricket, are endemic to the Coachella Valley and the Plan Area. Some of the features of the biology of insect species warrant special note with regard to these conservation strategies. General measures common to both of these insects are listed below, and measures specific to either species are considered in the individual species description.

1. Maintain Habitat features and ecological processes essential to insects, including availability of food plants and suitable local environmental conditions such as vegetation and soil microclimates.
2. Restore and enhance degraded Habitat as necessary according to monitoring results.

9.3.1 Coachella Valley Giant Sand-Treader Cricket *Macrobaenetes valgum*

Status **Federal:** **Species of Concern (No official status)**
State: **No official status**

9.3.1.1 Species Conservation Goals and Objectives

Conserve and manage populations within the MSHCP Reserve System according to the following criteria:

Goal 1: Protect Core Habitat areas that include occupied Habitat, and associated Essential Ecological Processes, allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused disturbance, and edge effects to Core Habitat by conserving contiguous Habitat patches and effective Linkages between patches of Core Habitat.

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Objective 1. Ensure conservation of Core Habitat within the following Conservation Areas:

- Snow Creek/Windy Point Conservation Area
- Whitewater Floodplain Conservation Area
- Thousand Palms Conservation Area

Please refer to Section 4.3 and Table 9-9 for specific acreages to be protected by this Conservation Objective.

Goal 2: Protect Other Conserved Habitat to provide sufficient area and variety of Habitat types to accommodate population fluctuations, allow for genetic diversity, and to conserve the range of environmental conditions within which this sand-treader cricket is known to occur.

Objective 2. Conserve Other Conserved Habitat for this cricket through adherence to other Conservation Objectives (for another species, a natural community, an Essential Ecological Process area, a Biological Corridor, or Linkage area) in the following Conservation Areas:

- Willow Hole Conservation Area
- Edom Hill Conservation Area
- East Indio Hills Conservation Area
- Santa Rosa and San Jacinto Mountains Conservation Area

Please refer to Section 4.3 and Table 9-9 for specific acreages to be conserved by other Conservation Objectives.

Table 9-9: Summary of Habitat within Conservation Areas Coachella Valley Giant Sand-Treader Cricket

Conservation Area	*Total Acres of Habitat in Conserv. Area*	*Acres of Disturbance Authorized*	*Acres of Existing Conservation Lands*	*Remaining Acres to be Conserved*	*Total Acres to be Conserved in MSHCP Reserve System*	*Designation*
Snow Creek/ Windy Point	1,374	131	70	1,173	1,243	Core Habitat
Whitewater Floodplain	5,617	309	2,532	2,777	5,309	Core Habitat
Willow Hole	1,754	160	157	1,437	1,594	Other Cons. Habitat
Edom Hill	120	6	58	56	114	Other Cons. Habitat
Thousand Palms	3,962 / 3	93 / 0	3,035 / 2	834 / 1	3,869 / 3	Core / Other Cons. Habitat
East Indio Hills	824	70	123	631	754	Other Cons. Habitat
Santa Rosa & San Jacinto Mountains	122	10	22	90	112	Other Cons. Habitat
Total – All Habitat	*13,776*	*779*	*5,999*	*6,998*	*12,997*	--
Total – Core Habitat	*10,953*	*533*	*5,637*	*4,784*	*10,421*	--
Total – Other Cons. Habitat	*2,823*	*246*	*362*	*2,215*	*2,577*	--

Goal 3: Protect Essential Ecological Processes, including hydrological regimes, necessary to maintain Core Habitat and Other Conserved Habitat for this species.

Objective 3. Ensure protection of Essential Ecological Process areas through Conservation Area Conservation Objectives for Essential Ecological Processes.

Goal 4: Maintain Biological Corridors and Linkages among all conserved populations to provide for dispersal and shifts in species distribution over time.

Objective 4. Protect Biological Corridors and Linkages through Conservation Area Conservation Objectives for Biological Corridors and Linkages.

Goal 5: Ensure conservation of Coachella Valley giant sand-treader cricket by maintaining the long-term persistence of self-sustaining populations and conserving Habitat quality through biological monitoring and Adaptive Management actions in the Plan Area.

Objective 5. Implement biological monitoring and Adaptive Management actions to ensure self-sustaining populations within each Core Habitat area.

9.3.1.2 Threats, Limiting Factors, and Adaptive Management

The most significant limiting factor for this species is the availability of the aeolian sand ecosystem and the sand sources and corridors that maintain it. Threats to this species include cumulative Habitat loss and degradation of the existing Habitat as a result of Development, in particular where sand transport processes are disturbed. OHV activity is a threat to the Habitat of this species, as the shallow burrows of these crickets can be crushed and the sand compacted. This species is strongly associated with wind-blown, active sand dunes and fields. Sand sources, sand corridors, and dune hummocks must all be connected and protected. Any human activity that results in sand stabilization is also a concern. Non-native species, including Saharan mustard (*Brassica tournefortii*) and Russian thistle (*Salsola tragus*), can significantly stabilize active sand Habitats and may decrease Habitat quality for these crickets.

The following actions may be needed to ensure species persistence and long-term viability if biological monitoring indicates that such actions are warranted. This list is not comprehensive but identifies some of the known or likely threats to this species. More detailed information on the Monitoring and Management Programs can be found in Section 8.0. Actions may include:

1. Control and manage activities that degrade Coachella Valley giant sand-treader cricket Habitat. In particular, control and manage those activities that result in sand compaction or may crush burrows, which may include OHV travel within Core Habitat except on designated routes of travel, if any; vegetation manipulation or clearing, and other human disturbance.
2. Restrict human access to occupied Habitat during the emergence period in the winter months and during the breeding season in the spring.
3. Identify actions to reduce impacts from, and control where feasible, invasive species if it is determined from monitoring results that there are impacts such as stabilization of sand dunes and sand fields or other impacts to sand-treader cricket Habitat.
4. Refine and test models on habitat associations and estimate the distribution of this species in the Plan Area.

9.3.1.3 Species Conservation Analysis

Conservation Area Reserve Design. The Planning Team selected Core Habitat from the Habitat model for this cricket using the following four criteria: (1) Core Habitat is sufficiently large that it can support a self-sustaining population independent of other Core Habitat areas, and the presence of this species in sufficient numbers to constitute a persistent population has been confirmed; (2) Core Habitat is not fragmented by Development, including roads, in such a way as to isolate populations. The extent to which roads create barriers to dispersal for this species is not well known, but they can contribute to edge effects, including exotic plant species that colonize disturbed areas. Although lightly traveled two-lane roads that have limited potential for expansion (e.g. Snow Creek Road) are not barriers to this species, two-lane roads with heavy traffic (e.g. Indian Ave.) create significant barriers. Where roads are considered to have a potential fragmenting effect on Core Habitat, the Plan calls for wildlife underpasses to be

constructed when the roads become wide enough to cause potential fragmentation; (3) Core Habitat has intact Essential Ecological Processes, including sand source and sand delivery systems. This species appears to require active blowsand such that natural disturbance from aeolian and fluvial processes (wind and flooding) is considered essential; and (4) Core Habitat has effective connections to other Biological Corridors and/or Linkages to allow gene flow among populations.

The Conservation Areas benefit this species by securing the long-term sand source/transport systems for the active sand dune and sand fields upon which this species depends. At the present time, the sand transport corridors for the Snow Creek area and for the Thousand Palms Preserve are unprotected; these areas would be protected under the Plan. The Planning Team identified the Conservation Areas below as Core Habitats. For each area, see Table 9-9 for a breakdown of Existing Conservation Lands and remaining lands to be conserved.

Core Habitat Areas:

1. ***Snow Creek/Windy Point.*** There are approximately 1,374 acres of Habitat for the Coachella Valley giant sand-treader cricket within this Conservation Area. The Plan will protect approximately 1,243 acres of this Core Habitat. As noted by Cameron Barrows (1998) the distinctive excavations of this species were common on the more active portions of the aeolian sands within the Snow Creek/Windy Point area. Some preliminary density estimates can be made for this area. Conversion of the trapping results from this area to number of individuals per acre gives a density for two different trap dates of 58 to 76 individuals per acre (73 and 95 individuals in a 0.50 ha (1.25 acre) pitfall grid) (C. Barrows 2001). Another trapping effort in 1998 resulted in an average 3.4 individuals per acre (4.25 individuals in a 0.5 ha (1.25 acre) pitfall grid) over a four-month period from January to April (C. Barrows 1998). The two-lane Snow Creek Road was not considered a barrier to movement for this insect because traffic volumes are low. As all of the land surrounding Snow Creek Road is slated for conservation, no large increase in traffic is expected. In that this area is the location with what appears to be the largest number of individuals of this species reported for the Plan Area and the sand transport system will be conserved, the Planning Team considered this area as Core Habitat for the Coachella Valley giant sand-treader cricket.

2 ***Whitewater Floodplain.*** The Plan includes approximately 1,230 acres of modeled Habitat on the existing Whitewater Floodplain Preserve, and an additional approximately 4,520 acres of Habitat adjacent to the southeastern corner of the preserve and west of Indian Avenue, north and northeast of the existing recharge ponds, to comprise a total of approximately 5,617 acres. The Plan will conserve approximately 5,309 acres of this sand-treader cricket Habitat. Trap results from Cameron Barrows (1998) were from the active dune area west of Gene Autry Trail at the Whitewater Wash. He reported that an average of 6.4 individuals per acre (average of eight individuals for the 0.5 ha pitfall grid) were trapped during a four-month period (see Table 9-10). The Planning Team considered this area as Core Habitat for the Coachella Valley giant sand-treader cricket.

3. ***Thousand Palms.*** The existing Thousand Palms Preserve and additional Habitat within the Conservation Area includes a total of approximately 3,962 acres of Core Habitat for the Coachella Valley giant sand-treader cricket in the main dune system in the area south of Ramon Road and west of Washington Avenue, and in the area north of Ramon Road,

including dunes in Thousand Palms Canyon. The Plan will conserve approximately 3,869 acres of this Habitat. Because Ramon Road and Washington Avenue receive moderate traffic volumes that are likely to increase, the main dune system is somewhat isolated from the remaining dune Habitat on the preserve. Information on the occurrence of the Coachella Valley giant sand-treader cricket population on the Thousand Palms Preserve is primarily from the trapping data of Cameron Barrows (C. Barrows 1998, CNLM 2000). From a site near Varner Road, an average of 0.8 individuals per acre (one individual for a 0.5 ha pitfall grid) were trapped over a four-month period; these data are collected from the equivalent of 100 trap nights. This species may be restricted to the more active dune areas on the preserve. The large areas of contiguous occupied Habitat within the preserve were the basis for the Planning Team including this area as Core Habitat.

Other Conserved Habitat Areas:

1. ***Willow Hole.*** There are approximately 1,754 acres of modeled Habitat for this sand-treader cricket in the Willow Hole Conservation Area, of which approximately 1,594 acres will be conserved under the Plan. The Willow Hole-Edom Hill Preserve/ACEC area includes Habitat primarily on the existing preserve east of Mountain View Road and south of the San Andreas Fault where sandy deposits from Mission Creek and Big Morongo Wash provide suitable Habitat for the sand-treader cricket. There is some fragmentation in this area as a result of roads, including Palm Drive, Mountain View Drive, and Varner Road. Data for the presence of this species in the Willow Hole vicinity comes from the trapping results of Cameron Barrows (1998). This trapping was done near the junction of Varner Road and Mountain View Drive. The average number of individuals trapped for the same four-month period was 0.6 individuals per acre (0.75 individuals for a 0.5 ha pitfall grid). Cameron Barrows (1998) did note that the cone-shaped excavations of this species were less common at Willow Hole than at areas to the west (Snow Creek and Whitewater Floodplain). The largest patch of contiguous Habitat for this species is 800 acres west of Palm Drive. The other Habitat patch east of Palm Drive is 954 acres for a total of 1,754 acres of modeled Habitat. Future data gathering and analysis may indicate that Willow Hole could be considered Core Habitat for the sand-treader cricket.

Table 9-10: Results of Pit-Trapping for Coachella Valley Giant Sand-Treader Cricket[1]

LOCATION	NUMBER OF CRICKETS					
	JAN 1998	FEB 1998	MAR 1998	APRIL 1998	JAN 1999	FEB 1999
SNOW CREEK (West valley)	5	2	2	8	95/73[2]	28
WHITEWATER FLOODPLAIN PRESERVE (west valley)	28	1	2	1	N/A	N/A
WILLOW HOLE PRESERVE	0	1	0	2	N/A	N/A
THOUSAND PALMS PRESERVE - Main Dunes (central valley)	2	0	2	0	1	N/A
THOUSAND PALMS PRESERVE - Simone Dunes (central valley)	3	0	0	0	N/A	N/A
LA QUINTA, W. OF WASHINGTON AVE. – near St. Francis of Assisi Church	0	0	0	0	N/A	N/A
EAST END OF THE INDIO HILLS (east valley)	0	0	0	0	0	0

[1] Results are from Cameron Barrows (pers. comm., C. Barrows 1998, and CNLM 2000); except as noted (see [2]). Data represent one sample of 20 pit traps (500 ml cups) placed within 0.50 to 0.25 ha area of active aeolian sand hummocks at each location. The 1998 survey used 25 unbaited, dry pitfall traps, one night per month for the 4 months noted.

[2] Two different samples are reported.

2. ***Edom Hill.*** This Conservation Area includes scattered sandy substrate Habitat between Willow Hole and the Thousand Palms Preserve in the Indio Hills. There are approximately 120 acres of modeled Habitat, not enough to constitute Core Habitat for this species. The Plan ensures that 114 acres of this Habitat will be conserved. In 1994, 17 Coachella Valley giant sand-treader crickets were trapped in surveys to evaluate the expansion of the Edom Hill Landfill (Tierra Madre 1994). This area does provide slightly higher elevation Habitat and a Linkage between Willow Hole and the Thousand Palms Preserve. The Planning Team did not consider this area as Core Habitat.

3. ***East Indio Hills.*** The East Indio Hills appears to provide suitable Habitat for the Coachella Valley giant sand-treader cricket; there are approximately 824 acres of modeled Habitat here, of which approximately 754 acres will be conserved under the Plan. Trap results from Cameron Barrows (1998) report no captures of this species at this location. The typical cone-shaped excavations that reveal this species presence were not observed at all in what appeared to be suitable Habitat at the East Indio Hills. The viability of the sand transport system was a particular concern here; the system, which carried sand from Whitewater River, Mission Creek and Morongo Wash, and others, has been blocked by Development upwind. The remaining sand sources in the Indio Hills and Little San Bernardino Mountains are at least partially compromised by roads. These uncertainties, in particular the absence of confirmed locations, led the Planning Team not to consider this area as Core Habitat for the Coachella Valley giant sand-treader cricket.

4. ***Santa Rosa and San Jacinto Mountains.*** The Santa Rosa and San Jacinto Mountains Conservation Area has very limited Coachella Valley giant sand-treader cricket Habitat, primarily in the Snow Creek/Windy Point Conservation Area where sandy substrate

Habitat occurs along the toe of the San Jacinto Mountains. Of the approximately 122 acres of modeled Habitat, approximately 112 acres will be conserved under the Plan.

9.3.1.4 Take Analysis

Significance of the Plan Area to Coachella Valley Giant Sand-Treader Cricket

The Coachella Valley giant sand-treader cricket occurs exclusively in the active sand hummocks and dunes in the Coachella Valley. The historic range of this species is entirely within the Plan Area, from Fingal's Finger east to the sand dune areas in the vicinity of Indio. This insect has no official state or federal status although it is considered a Species of Concern by USFWS. The Coachella Valley giant sand-treader cricket is most abundant in the active dunes and ephemeral sand fields at the west end of the Coachella Valley, west of Palm Drive at least to Snow Creek Road, adjacent to the Whitewater River and San Gorgonio River washes. Suitable Habitat also occurs within the Whitewater Floodplain Preserve and at the Thousand Palms Preserve, on the main dunes and on the Simone Dunes. It's distribution has been described by Tinkham (1962) as extending to two miles west of Indio.

Effects of Take on the Coachella Valley Giant Sand-Treader Cricket

The primary importance of the proposed MSHCP to Coachella Valley giant sand-treader cricket is that it provides Conservation (including Habitat protection, management and monitoring) of the species across its entire range. The Plan ensures the long-term conservation of Core Habitat, the associated Essential Ecological Processes, and connectivity between these Habitat areas. In addition, the Conservation Areas provide protection across an array of Habitat variables, including moisture, soil character, elevation, and vegetation, within the entire range of this subspecies.

There are 27,070 acres of modeled Habitat for this species within the Plan Area of which approximately 10,953 acres are identified as Core Habitat. The Plan would ensure Conservation of 10,421 acres (95%) of the Core Habitat and 2,577 (91%) of the Other Conserved Habitat for this cricket. The conserved Core Habitat areas range from 1,200 to over 5,000 acres. Approximately 5,999 acres (22%) of the modeled Habitat are within Existing Conservation Lands and would be managed as part of the Reserve System. The Plan would ensure that 6,998 acres (26%) of additional modeled Habitat would be protected. Overall, the Plan would conserve 12,997 acres (48%) of the modeled Habitat for Coachella Valley giant sand-treader cricket in the Plan Area.

Within the Conservation Areas under the worst case scenario, 779 acres of Take of modeled Habitat (3%) could occur. There would be approximately 533 acres (5% of all Core Habitat) of Core Habitat and 246 acres of Other Conserved Habitat (9% of all Other Conserved Habitat) subject to Take Authorization (See Table 9-9 and Table 4-114). Take of sand-treader cricket Habitat within the Conservation Areas must be consistent with the Conservation Objectives for this species to: 1) ensure Conservation of Core Habitat; 2) protect Essential Ecological Processes, including the sand source/sand transport system, needed to maintain sand-treader cricket Habitat; and 3) maintain Biological Corridors and Linkages among conserved populations to provide for population fluctuation and enhance genetic diversity. So, although

some Take could occur within the Conservation Areas, the Conservation Objectives required by the Plan will provide for protection of Habitat to ensure the long-term persistence of this species.

Outside of the Conservation Areas, there are 12,903 acres (48%) of modeled Habitat authorized for Take. The Habitat outside the Conservation Areas is already highly fragmented, surrounded by existing Development, and has a compromised sand source/transport system. The potential for these Habitat areas to provide for the long-term persistence of sand-treader cricket populations is low. These areas are primarily in the remnants of the Big Dune south of Interstate 10, and in the area south of Desert Hot Springs and east of Highway 62. The Big Dune area no longer has a viable sand transport/wind corridor and is highly fragmented by major roads. These fragmented blocks are more susceptible to edge effects, including mortality on roads. The Planning Team carefully considered all available and occupied Habitat for this species and determined that only those areas within the proposed Conservation Areas would provide long-term protection for self-sustaining populations of this cricket. Core Habitat was not delineated in the Big Dune area, as active blowsand areas have been disturbed, and Essential Ecological Processes are already altered and degraded by the Interstate 10 freeway and roads that fragment the dune. The close association of this species with active sand dunes and active sand fields makes the long-term conservation of sand transport systems essential. It was determined that these sand transport systems were irrevocably altered or compromised in the Big Dune area south of Interstate 10.

Although the percentage of sand-treader cricket modeled Habitat that could be lost to development within the next 75 years appears to be substantial, evaluation of the impacts of Take requires an assessment of the quality of this Habitat. The establishment of Conservation Areas where this species is protected is a significant improvement over the piecemeal and fragmenting nature of development patterns within this Habitat occurring now. The actual reduction in Habitat value is expected to be considerably less than indicated by the raw acreage numbers because:

1. Conserved Habitat areas are large enough, 1,200 to over 5,000 acres, to contain self-sustaining populations of sand-treader crickets and incorporate key Habitat elements, including active sand dunes and fields.
2. Take within the Conservation Areas would not eliminate or significantly impact any core populations. Conservation Objectives require any approved Development within Conservation Areas to ensure protection of Core Habitat.
3. As a result of implementing the Conservation Objectives to protect Habitat for this species and provide for connectivity, the Plan would not sever connections between any significant populations. Habitat areas are adequately connected to each other to allow genetic exchange. Biological Corridors and Linkages would be conserved to provide Habitat connectivity from Cabazon and Snow Creek to the east end of the Indio Hills.
4. Potential Development would not adversely impact the Essential Ecological Processes needed to maintain currently viable Habitat. Conservation Areas were carefully designed to incorporate the sand source and sand transport systems.
5. Lands in the MSHCP Reserve System would be managed and monitored to address significant edge effect problems, impacts from OHV trespass, potential stabilization of Habitat from introduction of invasive species, and other stressors to this species,

The issuance of Take Permits, therefore, will not likely jeopardize the continued existence of Coachella Valley sand-treader cricket and the implementation of the MSHCP will provide for the Conservation of the species.

Measures to Avoid, Minimize, and Mitigate Take of Coachella Valley Sand-Treader Cricket

To mitigate the Take of Coachella Valley Sand-treader Cricket, the Permittees will protect and manage, in perpetuity, 12,997 acres of the modeled Habitat for this species. The 5,999 acres of modeled Habitat within Existing Conservation Lands will be monitored and managed to ensure that Conservation Objectives are met. The Plan will thus ensure Conservation, through protection and management, of 6,998 acres of Additional Conservation Lands for this species.

The proposed Conservation Areas in the Plan would protect the Core Habitat areas from Snow Creek to the Thousand Palms Preserve. Core Habitat was designated for this species in the Snow Creek area, the Whitewater Floodplain Preserve, and at the Thousand Palms Preserve, based primarily on the distribution of active blowsand areas. Other Conserved Habitat from a range of environmental conditions within which this cricket is known to occur will be protected in the following Conservation Areas: Willow Hole, Edom Hill, East Indio Hills, and sandy areas around Snow Creek that are within the Santa Rosa and San Jacinto Mountains Conservation Area. Reserve Design criteria used to establish the Conservation Areas require Conservation of Essential Ecological Processes. The MSHCP Reserve System will incorporate and protect additional sand source/sand transport areas for Snow Creek/Windy Point, the Whitewater Floodplain Conservation Area, Willow Hole and Flat Top Mountain, and the Thousand Palms Preserve.

Additionally, the Plan calls for Management and Monitoring Programs to ensure the Conservation of this species, including control of activities that degrade sand-treader cricket Habitat, control of OHV trespass, limits on disturbance during the emergence and breeding seasons, control of invasive species where necessary, and restoration and enhancement of degraded Habitat as necessary according to monitoring results. The Plan also calls for baseline monitoring to better describe the distribution, abundance, and Habitat parameters of the Coachella Valley sand-treader cricket throughout the MSHCP Reserve System.

Overall Impacts to Coachella Valley Giant Sand-Treader Cricket under the Plan

The Planning Team carefully considered all available and occupied Habitat for this species and determined that only those areas within the proposed Conservation Areas would provide long-term protection for self-sustaining populations of this cricket. Core Habitat was not delineated in the Big Dune area, as active blowsand areas have been disturbed, and Essential Ecological Processes are already altered and degraded by the Interstate 10 freeway and roads that fragment the dune. The close association of this species with active sand dunes and active sand fields makes the long-term conservation of sand transport systems essential. It was determined that these sand transport systems were irrevocably altered or compromised in the Big Dune area south of Interstate 10.

The Coachella Valley sand-treader cricket will benefit from the establishment of the MSHCP Reserve System which will include Core Habitat from Snow Creek to the Thousand

Palms Preserve and Other Conserved Habitat from Willow Hole to the East Indio Hills. Implementation of the Plan is expected to provide for persistence of the Coachella Valley sand-treader cricket within the Plan Area, where only 22% of the modeled Habitat is currently protected. The Plan will ensure the Conservation an additional 26% of Habitat and potential Habitat areas. The combination of the overall Conservation measures: species-specific measures such as management to minimize impacts such as OHV trespass and disturbance during the emergence and breeding seasons, fragmentation and edge effects, monitoring to better understand the effects of these impacts on the species, and long-term protection, management, and enhancement of sand-treader cricket Habitat is expected to effectively compensate for potential adverse effects to this species.

9.3.1.5 Species Account: Background

Distribution, Abundance, and Trends. As previously noted, the Coachella Valley giant sand-treader cricket depends on the active dunes and ephemeral sand fields at the west end of the Coachella Valley. They can be found in appropriate Habitat west of Palm Drive at least to Snow Creek Road, adjacent to the Whitewater River and San Gorgonio River washes. Suitable Habitat also occurs within the Whitewater Floodplain Preserve. Despite the low numbers reported below from pit-trap samples at the Thousand Palms Preserve, burrows of these crickets are commonly observed in the more active portions of the aeolian sands in the southern dunes (C. Barrows 1998). The distinctive, cone-shaped excavation tailings of this species' diurnal burrows can be easily identified and used to confirm this species' occurrence at a given location (C. Barrows 1998); these distinctive excavations were common on the Simone Dune at the Thousand Palms Preserve, and at the Snow Creek and Windy Point locations. They were not as common at Willow Hole, and were not observed at a La Quinta site and at the east end of the Indio Hills. The east end of the Indio Hills also includes suitable active blowsand Habitat, and, although comprehensive surveys have not been conducted, this species has not been observed there. Their apparent absence at this location may relate to moisture regimes such that these crickets occur in lower numbers in the drier eastern portion of the Plan Area. Perennial shrubs, including creosote bush, burrobush, honey mesquite, Mormon tea, desert willow, and sandpaper bush, dominate the preferred Habitat of this species in windblown environments. Stabilized sand areas appear to be avoided. Evidence for their affiliation with active, unshielded sand Habitats again comes from trapping results reported by Cameron Barrows (1998). He reports that after more than 900 trap nights, using pitfall traps and drift fences, no sand-treader crickets were captured on a stabilized and previously disturbed sand area of the Thousand Palms Preserve.

The historic range of this species is entirely within the Plan Area, from Fingal's Finger east to the sand dune areas in the vicinity of Indio. Tinkham (1962) describes them as occurring on "sand dune ridges to two miles west of Indio." This description would include portions of the Big Dune area. Information on the occurrence of this species in the remnants of the Big Dune, from Palm Springs east to La Quinta and Indio, is limited, as most of the land is privately owned and has not been accessible for surveys. The species distribution model indicates that potential Habitat occurs on the Big Dune; however, the active blowsand areas preferred by the Coachella Valley giant sand-treader cricket will not persist in the absence of an intact sand transport corridor system. The occupied range for this species has been greatly reduced as a result of Development and sand stabilization.

The Coachella Valley giant sand-treader cricket has its primary period of activity during the spring. They are nocturnal, coming to the surface to forage on detritus blown over the dunes, or to look for mates. During the day they conceal themselves in self-dug burrows from five to 20 meters deep in the sand. These burrows are often associated with the roots of perennial shrubs or are found under boards, rocks, and other hiding places. The life history of these insects is not well known. The adult and juvenile instars disappear during the warm months of the year, suggesting that individuals spend the summer in the egg stage. Activity of small juvenile instars begins in the late fall through early winter. By mid to late spring the adults have disappeared.

Other Associated Covered Species. Within the Plan Area, other species of concern whose Habitat overlaps with that of the Coachella Valley giant sand-treader cricket include Coachella Valley milkvetch, Coachella Valley fringe-toed lizard, flat-tailed horned lizard, Palm Springs pocket mouse, Coachella Valley round-tailed ground squirrel, Coachella Valley Jerusalem cricket, and burrowing owl.

9.3.2 Coachella Valley Jerusalem Cricket *Stenopelmatus cahuilaensis*

Status	**Federal:**	**No official status**
	State:	**No official status**

9.3.2.1 Species Conservation Goals and Objectives

Conserve and manage populations within the MSHCP Reserve System according to the following criteria:

Goal 1: Protect Core Habitat areas that include occupied Habitat, and associated Essential Ecological Processes, allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused disturbance, and edge effects to Core Habitat by conserving contiguous Habitat patches and effective Linkages between patches of Core Habitat.

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Objective 1. Ensure conservation of Core Habitat within the following Conservation Areas:

- Snow Creek/Windy Point Conservation Area

Please refer to Section 4.3 and Table 9-11 for specific acreages to be protected by this Conservation Objective.

Table 9-11: Summary of Habitat within Conservation Areas Coachella Valley Jerusalem Cricket

Conservation Area	*Total Acres of Habitat in Conserv. Area*	*Acres of Disturbance Authorized*	*Acres of Existing Conservation Lands*	*Remaining Acres to be Conserved*	*Total Acres to be Conserved in MSHCP Reserve System*	*Designation*
Cabazon	356	N/A	0	(356) [1]	0	Other Cons. Habitat
Stubbe & Cottonwood Cyns	12	1	8	3	11	Other Cons. Habitat
Snow Creek/ Windy Point	1,690 / 283	150 / 28	187 / 0	1,353 / 255	1,540 / 255	Core / Other Cons. Habitat
Whitewater Canyon	2	1	1	0	1	Other Cons. Habitat
Highway 111/ I-10	372	37	0	335	335	Other Cons. Habitat
Whitewater Floodplain	5,646	311	2,532	2,803	5,335	Other Cons. Habitat
Upper Mission Creek/Big Morongo Canyon	717~~715~~	56~~52~~ [2]	154	507~~509~~	661~~663~~	Other Cons. Habitat
Willow Hole	2,632	239	245	2,148	2,393	Other Cons. Habitat
Long Canyon	110	N/A	0	(110) [1]	0	Other Cons. Habitat
Edom Hill	1,256	104	219	933	1,152	Other Cons. Habitat
Thousand Palms	197	15	51	131	182	Other Cons. Habitat
Santa Rosa & San Jacinto Mtns	199	17	32	150	182	Other Cons. Habitat
Total – All Habitat	*13,472* ~~*13,470*~~	*959*~~*955*~~	*3,429*	*8,618*~~*8,620*~~ *(466)* [1]	*12,047* ~~*12,049*~~	--
Total – Core Habitat	*1,690*	*150*	*187*	*1,353*	*1,540*	--
Total – Other Cons. Habitat	*11,782* ~~*11,780*~~	*809*~~*805*~~	*3,242*	*7,265*~~*7,267*~~ *(466)* [1]	*10,507* ~~*10,509*~~	--

[1] All Habitat within fluvial sand transport area; no Habitat Conservation Objective.

[2] ~~Includes 5 acres of land in the Morongo Wash Special Provisions Area.~~

Goal 2: Protect Other Conserved Habitat to provide sufficient area and variety of Habitat types to accommodate population fluctuations, allow for genetic diversity, and to conserve the range of environmental conditions within which this Jerusalem cricket is known to occur.

Objective 2. Conserve Other Conserved Habitat for this cricket through adherence to other Conservation Objectives (for another species, a natural community, Essential Ecological Process area, Biological Corridor, or Linkage area) in the following Conservation Areas~~ and Special Provisions Area~~:

- Cabazon Conservation Area
- Highway 111/I-10 Conservation Area
- Whitewater Floodplain Conservation Area
- Upper Mission Creek/Big Morongo Canyon Conservation Area
- Willow Hole Conservation Area
- Edom Hill Conservation Area
- ~~Morongo Wash Special Provisions Area Corridor~~

Please refer to Section 4.3 and Table 9-11 for specific acreages to be conserved by other Conservation Objectives.

Goal 3: Protect Essential Ecological Processes, including sand source/transport systems, necessary to maintain Core Habitat and Other Conserved Habitat for this species.

Objective 3. Ensure protection of Essential Ecological Process areas through Conservation Area Conservation Objectives for Essential Ecological Processes.

Goal 4: Maintain Biological Corridors and Linkages among all conserved populations to provide for dispersal and shifts in species distribution over time.

Objective 4. Protect Biological Corridors and Linkages through Conservation Area Conservation Objectives for Biological Corridors and Linkages.

Goal 5: Ensure conservation of the Coachella Valley Jerusalem cricket by maintaining the long-term persistence of self-sustaining populations and conserving Habitat quality through biological monitoring and Adaptive Management in the Plan Area.

Objective 5a. Implement biological monitoring and Adaptive Management actions to ensure self-sustaining populations within each Core Habitat area.

Objective 5b. Establish at least two additional self-sustaining populations of Coachella Valley Jerusalem cricket, if Feasible, in previously occupied habitat.

9.3.2.2 Threats, Limiting Factors, and Adaptive Management

The most significant threats to the Coachella Valley Jerusalem cricket are Habitat fragmentation and OHV use within their Habitat. OHVs damage their Habitat by crushing

underground burrows and eliminating native vegetation. Conversely, clean up and removal of surface debris may not benefit this species, as they use debris piles. This species is apparently limited to sand dunes and sand fields at the west end of the Plan Area where the temperature/moisture gradients are within their tolerance levels. Greg Ballmer, in his report on a trapping survey for the Coachella Valley Jerusalem cricket (1993), has suggested that average annual precipitation and floral community components may be used to predict the occurrence of this species. He suggests that dunes east of Ramon Road (Bob Hope Drive), at the Thousand Palms Preserve, and in Indian Wells/La Quinta (mostly extirpated) appear to be drier than sites where *S. cahuilaensis* was found, as evidenced by the comparative lack of winter/spring annuals and herbaceous perennials. He describes observations of sand near Windy Point that was wet to a depth of several inches following winter storms, while sand at Washington Street was damp to a depth of one to two inches, at most.

The following actions may be needed to ensure species persistence and long-term viability if biological monitoring indicates that such actions are warranted. This list is not comprehensive but identifies some of the known or likely threats to this species. More detailed information on the Management and Monitoring Programs can be found in Section 8.0. Actions may include:

1. Control and manage activities that degrade Coachella Valley Jerusalem cricket Habitat. In particular, these activities include alteration of the natural vegetation, fragmentation, and OHV impacts.
2. Restrict human access to occupied Habitat during the emergence and breeding season from January through March.
3. Identify actions to reduce impacts from, and control where feasible, invasive species if it is determined from monitoring results that there are impacts to Jerusalem cricket Habitat.
4. As part of the Management and Monitoring Programs, better describe the distribution and Habitat characteristics for this species. This will be accomplished in part by collecting field data to evaluate and update models.

9.3.2.3 Species Conservation Analysis

Conservation Area Reserve Design. Habitat for this cricket from Fingal's Finger area east to Edom Hill will be conserved in the proposed Conservation Areas. While not all of these conserved acres provide suitable Habitat for the Jerusalem cricket, they are configured to provide a large, contiguous block of occupied and potential Habitat for this species. A species distribution model was developed with significant help from Greg Ballmer of the Department of Entomology at UC Riverside. The proposed Conservation Areas were delineated to incorporate all known occurrences and the location of populations in Cabazon, Snow Creek/Windy Point, and a recently discovered location on the bluffs on the east side of Whitewater Canyon, within the Upper Mission Creek/Big Morongo Canyon Conservation Area. The Planning Team evaluated Core Habitat areas for this species using the following three criteria: (1) Core Habitat is sufficiently large that it can support a self-sustaining population independent of other Core Habitat areas. In the case of this species, not enough information is available to estimate a viable population, so larger areas were favored; (2) Core Habitat is not fragmented by Development, including roads. Although lightly traveled two-lane roads that have limited potential for

expansion (e.g. Snow Creek Road) are not barriers to this species, two-lane roads with heavy traffic (e.g. Indian Ave) could create significant barriers. Where roads are considered to have a potential fragmenting effect on Core Habitat, the Plan calls for wildlife underpasses when the roads become wide enough to cause potential fragmentation;(3) Core Habitat has intact Essential Ecological Processes, including sand source and sand delivery systems. While this species may not depend on active blowsand areas, long-term maintenance of the sand dunes and sand fields where it occurs was considered essential; and (4) Core Habitat has effective connections to other Biological Corridors and/or Linkages, to allow gene flow among populations.

The Conservation Areas benefit this species by securing the long-term sand source/transport systems for the sand dune and sand fields where it occurs. Collections of this species from vacant lots in Palm Springs (Ballmer 1993) indicate that this species can occur in small parcels of sand Habitat if the natural vegetation exists. However, protection of any individual lots as Habitat for this species would be problematic, as edge effects and unauthorized access would continue to reduce the long-term viability of these sites. The summary of Habitat protection for this species within each of the Conservation Areas evaluated is shown in Table 9-11. The Planning Team evaluated the following Conservation Areas:

Core Habitat Areas:

1. ***Snow Creek/Windy Point.*** According to Greg Ballmer (pers. comm.), the area around Fingal's Finger within this Conservation Area appears to have the highest density for this species within its known distribution. The Plan will protect approximately 1,540 acres of Core Habitat. The two-lane Snow Creek Road was not considered a barrier to movement for this insect because traffic volumes are low; as all of the land surrounding Snow Creek is slated for conservation, no large increase in traffic is expected. Density estimates are not available for this species. Given that this area is the location with the largest number of individuals reported for the Plan Area, and the sand transport system will be conserved, the Planning Team considered this area as significant Core Habitat for the Coachella Valley Jerusalem cricket.

Other Conserved Habitat Areas:

1. ***Highway 111/I-10.*** This area was added to the MSHCP Reserve System primarily as Habitat for the Coachella Valley Jerusalem cricket. There are approximately 372 acres of modeled Habitat here, of which the Plan ensures conservation of approximately 335 acres. Members of the Planning Team met with Greg Ballmer at UC Riverside to request his recommendations for Conservation for this species. The discussion focused on whether this Conservation Area was significant to the Coachella Valley Jerusalem cricket. There are three occurrences within this Conservation Area. The area probably provides both Habitat and an important Linkage to Habitat at Snow Creek to the south and near Whitewater Canyon to the north. An area east of Tipton Road and the freeway rest stop was added as Other Conserved Habitat to this Conservation Area and the MSHCP Reserve System to provide additional protection for this species.
2. ***Whitewater Floodplain.*** The Coachella Valley Jerusalem cricket has not been observed in the vicinity of the Whitewater Floodplain Preserve, and Hawks (1995) suggests that suitable Habitat does not exist in this area. The MSHCP Reserve System includes approximately 5,646 acres of modeled Habitat within this Conservation Area. The Plan

will conserve approximately 5,335 acres of this Habitat. Indian Avenue and any other roads within this Conservation Area were not considered a fragmentation factor for this species so that all of the Habitat within this Conservation Area was considered contiguous. More information is needed about the extent to which this cricket may occur in this area.

3. ***Upper Mission Creek/Big Morongo Canyon***. One known occurrence is located in this Conservation Area from a relatively recent observation of scattered patches of aeolian sand on the bluffs east of Whitewater Canyon within a wind farm area. There is potential for additional locations for this species along this bluff area where scattered sand patches occur. There are approximately 717~~715~~ acres of this Other Conserved Habitat, of which the Plan will conserve approximately 661~~663~~ acres.

4. ***Willow Hole.*** There are no known occurrences for this cricket within the Willow Hole Conservation Area. Greg Ballmer (pers. comm.) has done some searching for this species in the dunes along the fault west of Palm Drive. He has not found *S. cahuilaensis.* He suggested that this area is comparatively drier than the Snow Creek area, which reduces the viability of the Habitat for *S. cahuilaensis.* More information is needed about the extent to which this cricket may occur in this area. Nevertheless, the Plan will conserve approximately 2,393 acres of Other Conserved Habitat here.

5. ***Edom Hill.*** There are no known occurrences for this cricket within the Edom Hill Conservation Area. Like Willow Hole, this area is comparatively drier than the Snow Creek area, which reduces the viability of the Habitat for *S. cahuilaensis.* It is included in the Habitat model because the species has been observed as far east as Thousand Palms in the vicinity of Bob Hope Drive and there is suitable sandy substrate Habitat in this Conservation Area. More information is needed about the extent to which this cricket may occur in this area. The Plan will conserve approximately 1,152 acres of Other Conserved Habitat here**.**

6. ***Other Conservation Areas.*** There are five Conservation Areas with very limited Coachella Valley Jerusalem cricket Habitat: Cabazon with approximately 356 acres, Stubbe and Cottonwood Canyons with approximately 12 acres, Long Canyon with approximately 110 acres, Thousand Palms with approximately 197 acres, and the Santa Rosa and San Jacinto Mountains Conservation Area with approximately 199 acres. The ~~Morongo Wash Special Provisions Area~~Upper Mission Creek/Big Morongo Canyon Conservation Area would preserve approximately 89 acres of Coachella Valley Jerusalem Cricket habitat. The Plan does not set specific Conservation Objectives for the Jerusalem cricket in these areas, but will conserve portions of these Habitat patches incidental to achieving other Conservation Objectives, except in Long Canyon Conservation Area. The sole Conservation Objective for the Long Canyon Conservation Area is to maintain fluvial sand transport.

9.3.2.4 Take Analysis

Significance of the Plan Area to Coachella Valley Jerusalem Cricket

The known range for the Coachella Valley Jerusalem cricket is entirely within the Plan Area. The Coachella Valley Jerusalem cricket has no official state or federal status. It is known from near the Plan boundary in the Cabazon area west of Fingal's Finger to Snow Creek area and

east to Windy Point, and from remnants of sand dune Habitat around the Palm Springs Airport. It has also been found in sandy soils on the ridgeline along the eastern side of Whitewater Canyon. The easternmost known occurrence is a record from the Thousand Palms area in the vicinity of Bob Hope Drive and Interstate 10. Recent surveys by University of California Riverside biologists (University of California Riverside 2004) within the potential Habitat area east of Windy Point have not yielded any crickets. They occur in sandy to somewhat gravelly sandy soils and have been called an obligate sand species (G. Ballmer, pers. comm.). Their abundance at the western edge of the Coachella Valley and their affiliation with cool, moist conditions, has led some to suggest their distribution is limited by temperature and moisture regimes (Tinkham 1968, Hawks 1995).

Effects of Take on the Coachella Valley Jerusalem Cricket

Implementation of the Plan will maintain and increase long-term persistence of the Coachella Valley Jerusalem cricket because unprotected portions of its Habitat, potential Habitat, Essential Ecological Processes for the sand dunes, and Biological Corridors and Linkages will be conserved. The Reserve System would provide protection across an array of Habitat variables, including moisture, soil character, elevation, and vegetation, within the entire range of this subspecies. The extent to which additional populations exist and could be conserved will need to be evaluated on a continuing basis as the Plan progresses. Occurrences not within the proposed Conservation Areas are generally in small, highly fragmented locations, including the Palm Springs Airport (may no longer be extant) and an undeveloped lot in Palm Springs. The Plan also provides for management and monitoring of the species across its entire range.

There are 22,811 acres of modeled Habitat for this species within the Plan Area of which approximately 1,690 acres are identified as Core Habitat. The Plan would ensure Conservation of 1,540 acres (91% of total) of the Core Habitat and 10,507~~10,509~~ acres (89%) of the Other Conserved Habitat for this cricket. The conserved Core Habitat area at Snow Creek would be greater than 1,500 acres. Approximately 3,429 acres (15%) of the modeled Habitat are within Existing Conservation Lands and would be managed as part of the Reserve System. The Plan would also require the long-term protection of 8,618~~8,620~~ acres of Habitat for this species. There are 466 acres that fall within the fluvial sand transport areas. Overall, the Plan would conserve a total of 12,047~~12,049~~ acres (53%) of the modeled Habitat for Coachella Valley Jerusalem cricket in the Plan Area.

Within the Conservation Areas under the worst case scenario, 959~~955~~ acres (7%) of Take of modeled Habitat could occur. There would be approximately 150 acres (9% of total) of Core Habitat and 809~~805~~ acres of Other Conserved Habitat (7% of total) subject to Take Authorization (See Table 9-11 and Table 4-114). Take of Jerusalem cricket Habitat within the Conservation Areas must be consistent with the Conservation Objectives for this species to: 1) ensure Conservation of Core Habitat; 2) protect Essential Ecological Processes needed to maintain Jerusalem cricket Habitat; and 3) maintain Biological Corridors and Linkages among conserved populations to provide for population fluctuation and enhance genetic diversity. So, although some Take could occur within the Conservation Areas, the Conservation Objectives required by the Plan will provide for protection of Habitat to ensure the long-term persistence of this species.

Outside of the Conservation Areas, there are 9,032~~9,034~~ acres (40%) of modeled Habitat

authorized for Take. The Habitat outside the Conservation Areas is already highly fragmented, surrounded by existing Development, and has a compromised sand source/transport system. These areas are primarily in the area north of Interstate 10 at the Highway 111 intersection, south of the Whitewater Floodplain Preserve, and in areas outside the Conservation Area boundary near the Whitewater recharge ponds. There are also remnants of the Big Dune area which no longer has a viable sand transport/wind corridor and is highly fragmented by major roads. These fragmented blocks would make the Jerusalem cricket more susceptible to edge effects, including mortality on roads and predation by feral animals. This fragmentation results in impacts to the Habitat that would reduce the potential for long-term Conservation of Jerusalem cricket populations.

Although the percentage of Jerusalem cricket modeled Habitat that could be lost to development within the next 75 years appears to be substantial, evaluation of the impacts of Take requires an assessment of the quality of this Habitat. The model for this species was developed to describe all potential Habitat to ensure comprehensive reserve design. Surveys by the UC Riverside Center for Conservation Biology in 2003 and 2004 (UC Riverside, Center for Conservation Biology 2005) have reinforced the idea that this species occurs primarily west of Windy Point. The actual reduction in Habitat value is expected to be considerably less than indicated by the raw acreage numbers because:

1. Conserved Habitat areas are large enough to contain self-sustaining populations of Jerusalem crickets and incorporate key Habitat elements, including sandy substrates moisture regimes.
2. Take within the Conservation Areas would not eliminate or significantly impact any core populations. Conservation Objectives require any approved development within Conservation Areas to ensure protection of Core Habitat.
3. As a result of implementing the Conservation Objectives to protect Habitat for this species and provide for connectivity, the Plan would not sever connections between any significant populations. Habitat areas are adequately connected to each other to allow genetic exchange. Biological Corridors and Linkages would be conserved to provide Habitat connectivity from Cabazon and Snow Creek to Whitewater Canyon and Windy Point.
4. Potential Development would not adversely impact the Essential Ecological Processes needed to maintain currently viable Habitat. Conservation Areas were carefully designed to incorporate the sand source and sand transport systems.
5. Lands in the MSHCP Reserve System would be managed and monitored to address significant edge effect problems, potential loss of Habitat from introduction of exotic species, and other stressors to this species,

The issuance of Take Permits, therefore, will not likely jeopardize the continued existence of this species and the implementation of the MSHCP will provide for the Conservation of the Coachella Valley Jerusalem cricket.

<u>Measures to Avoid, Minimize, and Mitigate Take of Coachella Valley Jerusalem Cricket.</u>

To mitigate the Take of Coachella Valley Jerusalem cricket, the Permittees will protect

and manage, in perpetuity, 8,618~~8,620~~ acres of modeled Habitat for this species. The 3,429 acres of modeled Habitat within Existing Conservation Lands will be monitored and managed to ensure that Conservation Objectives are met. The Plan will thus ensure Conservation, through protection and management, of 12,047~~12,049~~ acres of Additional Conservation Lands for this species

The proposed Conservation Areas in the Plan would protect the Core Habitat area from Cabazon to Windy Point within the Snow Creek/Windy Point Conservation Area. Other Conserved Habitat from a range of environmental conditions within which this cricket is known to occur but has not been recently observed will be protected in the following Conservation Areas: Cabazon, Stubbe and Cottonwood Canyons, Whitewater Canyon, Highway 111/I-10, Whitewater Floodplain, Upper Mission Creek/Big Morongo Canyon, Willow Hole, Edom Hill, Thousand Palms, and sandy substrates in the Snow Creek area of the Santa Rosa and San Jacinto Mountains Conservation Area. Reserve Design criteria used to establish the Conservation Areas require Conservation of Essential Ecological Processes. The MSHCP Reserve System will incorporate and protect additional sand source/sand transport areas for Snow Creek/Windy Point.

Additionally, the Plan calls for Management and Monitoring Programs to ensure the Conservation of this species, including control of activities that degrade Jerusalem cricket Habitat, control of invasive species where necessary, and restoration and enhancement of degraded Habitat as necessary according to monitoring results. The Monitoring Program also calls for data gathering to better describe the distribution, abundance, and Habitat parameters of the Coachella Valley Jerusalem cricket within the Plan Area, including update and refinement of the species model.

Overall Impacts to Coachella Valley Jerusalem Cricket under the Plan

The MSHCP Reserve System includes 13 of the 18 (72%) known occurrences, for the Coachella Valley Jerusalem cricket within Conserved Habitat. The Plan would ensure the conservation of a minimum of 1,540 acres of Core Habitat for this species, including Habitat from the vicinity of Fingal's Finger east to Windy Point, including the Snow Creek dune system. Other Conserved Habitat from a range of environmental conditions within which this cricket is known to occur will be protected in the following Conservation Areas: Cabazon, Highway 111/I-10, Whitewater Floodplain, Upper Mission Creek/Big Morongo Canyon, Willow Hole, Edom Hill C, and Santa Rosa and San Jacinto Mountains.

The Coachella Valley Jerusalem cricket will benefit from the establishment of the MSHCP Reserve System which will conserve essential Core Habitat for this species in the Snow Creek/Windy Point area which appears to be the center of their distribution. Implementation of the Plan is expected to provide for Conservation of this rare cricket within the Plan Area, as currently unprotected portions of its Habitat and potential Habitat areas will be conserved. Currently, only 15% of this Habitat is conserved. The combination of the overall Conservation measures; species-specific measures such as management to minimize impacts in Core Habitat, monitoring and niche modeling to better describe the distribution and ecology of this species, and long-term protection, management, and enhancement of Jerusalem cricket Habitat is expected to effectively compensate for potential adverse effects to this species.

9.3.2.5 Species Account: Background

Distribution, Abundance, and Trends. The Coachella Valley Jerusalem cricket is known from the Snow Creek area from Fingal's Finger east to Windy Point, and from remnants of sand dune Habitat around the Palm Springs Airport. The easternmost known occurrence is a record from the Thousand Palms area in the vicinity of Bob Hope Drive and Interstate 10. In spring 2003 surveys by the University of California found this cricket west from Fingal's Finger to nearly the Plan boundary. They occur in sandy to somewhat gravelly sandy soils and have been called an obligate sand species (G. Ballmer, pers. comm.). They do not necessarily require active blowsand Habitat but have been found in loose wind blown drift sands, dunes, and sand in vacant lots if native vegetation exists. They have been found associated with the roots of members of the sunflower family, including *Ambrosia* sp. and *Encelia* sp. (D. Weissman and G. Ballmer, pers. comm.). Dave Hawks and Greg Ballmer excavated one individual from the root zone under a creosote bush (G. Ballmer, pers. comm.).

According to Hawks (1995), these Jerusalem crickets require high humidity; most observations have followed winter and spring storms while the soil substrate remains moist. They are most often located beneath surface debris during the cooler and wetter months of the year. During the summer months, they spend daylight hours in deep burrows in the ground; they may rarely be encountered at the surface during the night (Hawks 1995). Because these Jerusalem crickets have been observed more widely at the western edge of the Coachella Valley and because of their affiliation with cool, moist conditions, it has been suggested that they may be limited in distribution by temperature and moisture regimes (Tinkham 1968, Hawks 1995).

The Coachella Valley Jerusalem cricket feeds at night on roots, tubers, and detritus; they have also been occasionally observed feeding on dead animals and may be cannibalistic. Male and female Jerusalem crickets drum their abdomens against the bottom of their burrows or the ground to attract one another. The female lays small clusters of relatively large eggs in soil pockets. Their complete life cycle may extend three years or more.

Tinkham first described this species in 1968 from collections made in 1962 and after. The type locality of the species is described as "undulating dunes piled up at the northern base of the San Jacinto Mountains," reached by traveling south from the old Palm Springs Depot (10 miles west of Palm Springs). This location is likely at or near the Snow Creek dunes area. The known range also includes portions of what is now northern Palm Springs and Cathedral City. Occurrences where this species has been observed are on some of the lands owned by the BLM in the Windy Point area, and on lands recently purchased by the BLM or by the Friends of the Desert Mountains along Snow Creek Road. In a 1995 survey for this Plan, Dave Hawks (1995) reported finding these crickets only in the vicinity of Fingal's Finger. Cameron Barrows (pers. comm.) has also reported observing these crickets only in the Snow Creek area; this Jerusalem cricket has not been detected on the Thousand Palms Preserve despite trapping efforts in this area (C. Barrows, pers. comm.). They have not been found in the vicinity of the Whitewater Floodplain Preserve and Hawks (1995) suggests that suitable Habitat does not exist in this area. The easternmost occurrence is in the vicinity of Thousand Palms, near Bob Hope Drive and Interstate 10. This location may no longer be extant, as the area is increasingly developed. Greg Ballmer suggests this record is probably an outlier. The lack of observations of this species east of Windy Point suggests that they may not occur in significant numbers in the central Coachella Valley. Greg Ballmer suggests in the ISA review (Noss et al. 2001) that a predicted climatic shift

toward warmer and drier conditions would emphasize the importance of protecting Habitat for this species at the western end of its range, especially along the Whitewater River wash from Palm Springs westward to Fingal's Finger.

In the spring of 2003, biologists from UC Riverside conducted surveys for the Coachella Valley Jerusalem cricket by revisiting previously known locations and new areas. They placed transects along which they surveyed for Jerusalem crickets using several techniques, including shallow pitfall traps (see Table 9-12) and square "ceiling tiles" placed to provide a shelter for these crickets; the latter technique was quite successful according to Tom Prentice (2003), especially when the area under the tile was kept moist. To date, more than 60 crickets have been located, extending the known distribution of this species west nearly to the Plan boundary. At the same time, sites checked within the potential Habitat area east of Windy Point have not yielded any crickets.

Table 9-12: Results of Pitfall Trapping for Coachella Valley Jerusalem Cricket

LOCATION	NUMBER OF CRICKETS				
	OCT.	NOV./ DEC.	JAN./ FEB.	MAR./ APRIL	MAY/ JUNE
DUNES W. OF SNOW CREEK/FINGAL – to near Cabazon[2]	0	0	4	7	3
SAN GORGONIO RIVER WASH - from 1 to 3.7 miles W of Snow Creek Road[1]	3 (89/90)	9 (89/90)	12 (90/91)	3 (90)	3 (90)
DUNES W. OF WINDY POINT - N and S of Highway 111 at Tipton Road[1]	1 (89)	0	1 (90)	1 (89)	0
PALM SPRINGS – San Rafael Road, 0.25 mi. W of Indian Avenue [1]	0	0	1 (90)	0	0
THOUSAND PALMS - 2 mi. E of I-10, S of Ramon Road[1]	0	0	0	0	0
WASHINGTON STREET – 1 mi. N of I-10, near Thousand Palms Preserve[1]	0	0	0	0	0
INDIAN WELLS/LA QUINTA AREA - Miles Avenue[1]	0	0	0	0	-

[1] Results are from Ballmer (1993) and are based on a total or 41 survey dates at 17 trapping sites from 4 February 1989 to 16 March 1991, using from one to five traps at each location. Numbers in parentheses are years that crickets were trapped.

[2] Results are from surveys conducted by Tom Prentice at UC Riverside as part of initial monitoring surveys for the Plan (Center for Conservation Biology, UCR 2004, Prentice 2003).

Other Associated Covered Species. Within the Plan Area, other species of concern whose Habitat overlaps with that of the Coachella Valley Jerusalem cricket include Coachella Valley milkvetch, Coachella Valley fringe-toed lizard, flat-tailed horned lizard, Palm Springs pocket mouse, Coachella Valley round-tailed ground squirrel, Coachella Valley giant sand-treader cricket, and burrowing owl.

9.4 Fish

This section contains a species account and conservation approach, including Habitat parameters and significant threats, for the one fish species proposed for coverage under this Plan, the desert pupfish. Conservation measures specific to the desert pupfish are also included here.

9.4.1 Desert Pupfish *Cyprinodon macularius macularius*

Status	**Federal:**	**Endangered**
	State:	**Endangered**

9.4.1.1 Species Conservation Goals and Objectives

Conserve and manage populations within the MSHCP Reserve System according to the following criteria:

Goal 1: Protect occupied Habitat, and associated Essential Ecological Processes, allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused disturbance, and edge effects to Habitat by conserving contiguous Habitat areas and effective Linkages between Habitat areas.

Objective 1a. Ensure conservation of occupied Habitat within the following Conservation Areas:

- Coachella Valley Stormwater Channel and Delta Conservation Area by maintaining a self-sustaining desert pupfish population in the agricultural drains within the Coachella Valley Stormwater Channel and Delta Conservation Area.
- Dos Palmas Conservation Area, including conservation of known locations.

Please refer to Section 4.3 and Table 9-13 for specific acreages to be protected by this Conservation Objective.

Objective 1b. Ensure maintenance of self-sustaining refugia populations in the following Conservation Areas, consistent with the Desert Pupfish Recovery Plan:

- Thousand Palms Conservation Area
- Dos Palmas Conservation Area

Please refer to Section 4.3 and Table 9-13 for specific acreages to be conserved in refugia populations.

Goal 2: Protect Essential Ecological Processes, which may include hydrological process areas, necessary to maintain Core Habitat, refugia, and agricultural drain Habitat for this species.

Goal 3: Ensure conservation of desert pupfish by maintaining the long-term persistence of self-sustaining populations and conserving Habitat quality through biological monitoring and Adaptive Management actions in the Plan Area.

Objective 3. Implement biological monitoring and Adaptive Management actions. These actions will include Monitoring and Management Programs to be developed by CVWD within one year of Plan approval, to ensure persistence of pupfish populations in the agricultural drains.

Table 9-13: Summary of Habitat within Conservation Areas Desert Pupfish

Conservation Area	***Total Acres of Habitat in Conserv. Area***	***Acres of Disturbance Authorized***	***Acres of Existing Conservation Lands***	***Remaining Acres to be Conserved***	***Total Acres to be Conserved in MSHCP Reserve System***	***Designation***
Thousand Palms	($15m^2$)	N/A	($15m^2$)	0	($15m^2$)	Refugium
Dos Palmas	($30m^2$)	N/A	($30m^2$)	0	($30m^2$)	Core Habitat
CV Stormwater Channel & Delta	25	N/A	0	25	25	Core Habitat
Total – All Habitat	*25.05*	*N/A*	*($45m^2$)*	*25*	*25.05*	--
Total – Core Habitat	*25.05*	*N/A*	*($30m^2$)*	*25*	*25.05*	--
Total – Other Conserved Habitat (Refugium)	*($15m^2$)*	*N/A*	*($15m^2$)*	*0*	*($15m^2$)*	--

9.4.1.2 Threats, Limiting Factors, and Adaptive Management

Currently, the major threat is the presence of exotic fish species, particularly tilapia (*Tilapia* spp.), sailfin molly (*Poecilia latipinna*), and mosquitofish (*Gambusia affinis*) in Habitats occupied by pupfish. These and other introduced fish species affect pupfish populations through predation, competition, and behavioral interference. Introduced mosquitofish are known to contribute to decline of pupfish in the Salton Sea (USFWS 1993, Jennings 1985). Other non-native species that impact pupfish populations include other tilapia (*Sarotherdon* spp.), carp, sailfin molly, and largemouth bass (BLM 1996, USFWS 1993, Schoenherr 1988, Black 1980). In addition, the non-native bullfrog (*Rana catesbeiana*) is a serious predator of pupfish. Introduced plant species, such as salt cedar (*Tamarisk*), also pose a threat to pupfish populations. Evapotranspiration by salt cedar may result in a lack of water at critical times, especially in smaller Habitats where water supply is limited. Salt Creek is particularly vulnerable to the effects of salt cedar. Other threats within the Plan Area include groundwater pumping, dewatering,

water diversion, drain maintenance activities, OHV use, contaminants, the lining of the Coachella Canal, and fluctuations of the Salton Sea. The pupfish requires shallow, slow-moving clear water with a moderate amount of aquatic vegetation and soft substrate. The viable population size is considered to be a minimum of 500 overwintering adults (Ryman and Utter 1987, Soule 1987, Templeton 1990).

If biological monitoring indicates that such actions are warranted, the following actions may be needed to ensure species persistence and long-term viability. This list is not comprehensive but identifies some of the known or likely threats to this species. More detailed information on the Management and Monitoring Programs can be found in Section 8.0. Actions will include:

1. Complete hydrologic studies for the Salt Creek area to determine if the water sources for Salt Creek are adequately protected or if additional water sources may be needed and are available.
2. Ensure agricultural drain maintenance and water supply. This program will include Monitoring and Management Programs, including Adaptive Management, to be developed by CVWD within one year of Plan approval, to ensure persistence of pupfish populations in the agricultural drains (See Section 8.4.5.2). Monitoring will include surveys for pupfish presence in the agricultural drains along with regular sampling of flow, water depth, and selenium concentrations as called for in CVWD's Final Program Environmental Impact Report for Coachella Valley Water Management Plan (Montgomery, Watson and Harza 2002). Upon determination of effects from selenium on desert pupfish reproduction and survival, CVWD will work with the Wildlife Agencies to develop and implement appropriate measures to minimize impacts to pupfish.
3. Control and manage, in cooperation with implementation of the recovery plan, exotic or invasive species in pupfish Habitat, if monitoring identifies this as a threat. At Dos Palmas, non-native fish populations in man-made fishponds that continue to contaminate the Salt Creek drainage should be controlled. Control efforts should also address non-native fish, bullfrogs, and other invasive species that threaten refugia populations. Where non-native fish populations are established in pupfish habitat in the Dos Palmas Conservation Area, CVCC shall develop and submit for review and approval by the Wildlife Agencies, an interim plan within 6 months of Permit issuance that includes measures to control the non-native fish species in these areas present in the ponds at Dos Palmas and/or the surface waters of the Salt Creek watershed. Within 5 years of Permit issuance, CVCC shall develop and submit for the review and approval of the Wildlife Agencies a management strategy for the permanent control of non-native fish within this Conservation Area. Control efforts shall address all non-native fish species. The presence and potential impacts of Asian tapeworm, a potential pupfish parasite, shall be addressed in the Monitoring and Management Programs. Within 5 years of Permit issuance, CVCC shall develop, submit for review and approval by the Wildlife Agencies, and implement a management strategy with the goal of sustaining healthy populations of desert pupfish in the Plan Area in perpetuity.
    a. Remove tamarisk (salt cedar) where it is affecting the amount of water available to pupfish.

4. To the extent possible without restricting CVWD's ability to meet the water related needs of the people at reasonable cost, maintain water levels, water quality, and proper functioning condition of ponds, springs, and drains, to the extent these activities are under Plan authority. CVWD will monitor available technologies to reduce selenium concentrations and re-evaluate the feasibility of such measures if promising methods that could work in the Coachella Valley are identified and warranted by the conditions in the drains.
5. Restore and enhance degraded Habitat as necessary according to monitoring results.
6. Conduct experiments on the timing and mechanics of drain cleaning that would minimize impacts to desert pupfish.
7. Estimate distribution and/or population size of desert pupfish.
8. Survey contaminant levels in the water and in pupfish.

9.4.1.3 Species Conservation Analysis

Conservation Area Reserve Design. The Planning Team did not attempt to delineate Core Habitat for desert pupfish but rather attempted to include all known locations and refugia populations within Conservation Areas. The occupied Habitat in Salt Creek is all within the Dos Palmas ACEC, which is entirely within the Dos Palmas Conservation Area. Most of the land within the ACEC is owned by BLM, the CNLM, or TNC. Some private inholdings remain to be acquired, and would be acquired pursuant to the Plan. Protection of the Salton Sea population will be achieved through a Monitoring and Adaptive Management Program regarding drain maintenance to be developed and implemented by CVWD, with Wildlife Agencies' concurrence.

BLM and TNC prepared a Dos Palmas Ecosystem Management Plan in 1994. BLM and the CNLM now manage the ACEC lands. A primary objective of the Dos Palmas plan is to provide for the protection and enhancement of desert pupfish and rail Habitat. The MSHCP will coordinate with BLM and CNLM regarding implementation.

The amount of Habitat proposed for conservation under the Plan for this species within each of the Conservation Areas is shown in Table 9-13. The Planning Team identified the significant pupfish populations in the following Conservation Areas:

1. ***Coachella Valley Stormwater Channel and Delta.*** The Whitewater River and the agricultural drains as they enter the Salton Sea include approximately 25 acres that have been delineated as Habitat for the desert pupfish (Harza 2002). This is considered as Core Habitat.
2. ***Dos Palmas.*** Native Habitat for desert pupfish within the Dos Palmas Conservation Area occurs at the mouth of Salt Creek as it enters the Salton Sea. There is also a refugium population of pupfish in the man-made ponds east of the preserve residence and in the re-contoured wetlands ponds. The Habitat in this Conservation Area is considered to be Core Habitat.
3. ***Thousand Palms.*** There is a refugium population of desert pupfish in the larger pools around the Thousand Palms oasis area, including the largest pool near the so-called Simone Grove palm oasis. The pupfish in this refugium population were captured in Salt

Creek and transplanted to the Coachella Valley Preserve beginning in 1987. The population is well established and apparently thriving.

9.4.1.4 Take Analysis

Significance of the Plan Area to Desert Pupfish

Although the Plan Area does not include all of the known range for the desert pupfish, it includes a significant portion, including the known locations in upper and lower Salt Creek, the mouth of Salt Creek, shoreline pools and irrigation drains at the north end of the Salton Sea, and various artificial refugia. According to the Desert Pupfish Recovery Plan (USFWS 1993), naturally occurring populations of desert pupfish are now restricted in California to two streams tributary to, and a few shoreline pools and irrigation drains of, the Salton Sea. These naturally occurring populations are within the Plan Area.

This historical distribution of desert pupfish is much reduced from the lower Colorado River in Arizona and California south to Baja and Sonora. Today, outside the Plan Area, desert pupfish occur in San Felipe Creek, San Sebastian Marsh, and southern parts of the Salton Sea. Native populations are gone from Arizona. The desert pupfish is listed as endangered by both the state and federal government. Although it is remarkable tolerant of extremes of temperature, salinity, and dissolved oxygen the species is threatened with extinction throughout its range primarily because of Habitat loss or modification, pollution, and introduced exotic fishes (USFWS 1986).

Effects of Take on the Desert Pupfish

Within the MSHCP Reserve System, significant known Habitat would be protected under Conservation ownership, including the Salt Creek population. The numerical evaluation of the acres of Habitat conserved for this species is a challenge in that the locations where pupfish occur are small pools and agricultural drains, usually much less than one acre in size. The actual number of acres of Habitat for this species has been estimated based on interpretation of aerial images of the conserved locations and refugia. Many of the known locations for desert pupfish are in agricultural drains that release agricultural runoff into the Salton Sea. Within the Plan Area there are 31 known occurrences mapped for desert pupfish. Only 7 of the desert pupfish locations occur within Existing Conservation Lands, primarily at the Dos Palmas Conservation Area. The remaining 24 mapped pupfish locations occur in agricultural drains which empty into the Salton Sea and are included within the Conservation Areas. The Plan requires that the agricultural drain population be conserved through a Management Program that ensures maintenance of agricultural drains in a manner that maintains viable Habitat. Disturbance of the Habitat and potential Take would be permitted in the Salton Sea agricultural drains only as a result of operations and maintenance activities so long as the pupfish population is maintained.

Implementation of the Plan is expected to maintain and enhance population viability of the desert pupfish by helping to implement the Desert Pupfish Recovery Plan (USFWS 1993). The primary objective of the recovery plan is to eliminate threats to extant populations and successfully establish additional populations in secure Habitat, such that the species can be downlisted from endangered to threatened.

The establishment of Conservation Areas where this species is protected is a significant improvement over the current situation where only 23% of desert pupfish known locations are conserved. The actual impacts of Take to this species are expected to be low because:

1. Conserved Habitat areas are large enough to contain self-sustaining populations of desert pupfish and incorporate key Habitat elements, including shoreline pools, vegetation cover, and water quality.
2. Take within the Conservation Areas would not eliminate or significantly impact any desert pupfish populations. Conservation Objectives require any approved disturbance within Conservation Areas to ensure protection of desert pupfish known locations, conservation of newly found locations, and maintenance of refugium populations of the desert pupfish in accordance with the Desert Pupfish Recovery Plan.
3. As a result of implementing the Conservation Objectives to protect Habitat for this species and provide for connectivity, the Plan would not sever connections between any significant populations. Habitat areas from the agricultural drains and shoreline pools around the Salton Sea to Salt Creek are adequately connected to each other to allow genetic exchange.
4. Habitat for desert pupfish would be managed and monitored to address significant stressors for this species, including changes in water quality and potential impacts from introduction of exotic species. Water quality, flow, depth, and selenium concentration will be monitored and managed through Adaptive Management.

The issuance of Take Permits, therefore, will not likely jeopardize the continued existence of desert pupfish and the implementation of the MSHCP will provide for the Conservation of this species.

<u>Measures to Avoid, Minimize, and Mitigate Take of Desert Pupfish</u>

To mitigate the Take of desert pupfish, the Permittees will protect and manage, in perpetuity, 25.05 acres of the modeled Habitat for this species. There is a very small acreage of modeled Habitat, occurring at two refugia populations, within Existing Conservation Lands. In addition, there are approximately 25 acres of desert pupfish Habitat in the agricultural drains (Harza 2002). These locations will continue to be monitored and managed to ensure that Conservation Objectives are met. The Plan will thus ensure Conservation, through protection, restoration, and management, of at least 25 acres of desert pupfish Habitat. In addition, agricultural drains will be managed to enhance the Habitat potential for desert pupfish.

Additionally, the Plan calls for Management and Monitoring Programs to ensure the Conservation of desert pupfish. The Management Program will include control of activities that degrade their Habitat, control of invasive species where necessary, and restoration and enhancement of degraded Habitat as necessary according to monitoring results. The Plan also provides that the Monitoring Program would address the distribution, abundance, and Habitat parameters of the desert pupfish throughout the MSHCP Reserve System.

1. Complete hydrologic studies for the Salt Creek area to determine if the water sources for Salt Creek are adequately protected or if additional water sources may be needed and are available.
2. Ensure agricultural drain maintenance and water supply. CVWD will develop a study to include surveys for pupfish presence in the agricultural drains along with regular sampling of flow, water depth, and selenium concentrations as called for in CVWD's Water Management Plan Programmatic Environmental Impact Report (See Section 4.3.20 and Section 8.4.5.2).
3. Control and manage, in cooperation with implementation of the recovery plan, exotic or invasive species in pupfish Habitat, including tamarisk and other species, if monitoring identifies them as a threat.
4. Maintain water levels, water quality, and proper functioning condition of ponds, springs, and drains, to the extent these activities are under Plan authority.
5. Restore and enhance degraded Habitat as necessary according to monitoring results.
6. Conduct experiments on the timing and mechanics of drain cleaning that would minimize impacts to desert pupfish.
7. Estimate and describe the distribution, abundance, and Habitat parameters of desert pupfish within the Plan Area and survey contaminant levels in the water and in pupfish. Methods for surveying and handling the desert pupfish are described in Section 8.4.5.3.3.

To mitigate impacts from drain maintenance and other operations and maintenance activities, CVWD will establish at least 25 acres of managed replacement Habitat for desert pupfish, on a 1:1 ratio at a site or sites to be determined with input from the Wildlife Agencies. Ongoing maintenance and adjustments will be required, including vegetation control and dike and bank maintenance, to achieve desired Habitat characteristics. Water quality, including selenium concentrations will be maintained at acceptable levels (See Section 4.3.20).

Overall Impacts to Desert Pupfish

Within the Conservation Areas, significant known Habitat would be protected under Conservation ownership, including the Salt Creek population. Habitat for this species within the Plan Area includes most of the known locations, which are in agricultural drains that release agricultural runoff into the Salton Sea. The Plan requires that the agricultural drain population be conserved through a Management Program that ensures maintenance of agricultural drains in a manner that maintains viable Habitat. Disturbance of the Habitat and potential Take would be permitted in the Salton Sea agricultural drains as a result of operations and maintenance activities so long as the pupfish population is maintained.

Implementation of the Plan is expected to maintain and enhance population viability of the desert pupfish by helping to implement the Desert Pupfish Recovery Plan (USFWS 1993). The primary objective of the recovery plan is to eliminate threats to extant populations and successfully establish additional populations in secure Habitat, such that the species can be downlisted from endangered to threatened.

9.4.1.5 Species Account: Background

Distribution, Abundance, and Trends. Historically, desert pupfish occurred in the lower Colorado River in Arizona and California, from about Needles downstream to the Gulf of Mexico and onto its delta in Sonora and Baja. In California, pupfish inhabited springs, seeps, and slow-moving streams in the Salton Sink basin, and backwaters and sloughs along the Colorado River. Desert pupfish also occurred in the Gila River Basin in Arizona and Sonora, including the Gila, Santa Cruz, San Pedro, and Salt Rivers; the Rio Sonoyta of Arizona and Sonora; Puerto Penasco, Sonora; and Laguna Salada basin of Baja California. The Quitobaquito pupfish, found only in Quitobaquito Spring, Arizona, was recognized as a subspecies of desert pupfish; however, a recent phylogenetic study supports the recognition of this pupfish, as well as pupfish from the Rio Sonoyta, as the species *Cyprinodon eremus (*Miller and Fuiman 1987).

In the Salton Sink, desert pupfish populations were remnants of those that inhabited ancient Lake Cahuilla. About 400-500 years ago, the Colorado River was diverted away from the lake and into the Gulf of California, leaving the pupfish isolated in certain springs. After the Salton Sink was flooded in the early 1900s by diversion of the Colorado River, desert pupfish colonized the Salton Sea. The Salton Sea, its tributary streams, irrigation drains, and shoreline pools, supported large pupfish populations until sharp declines began in the mid- to late-1960s. However, a 1991 CDFG survey (Nicol et al. 1991) found pupfish in a majority of irrigation drains, some shoreline pools and several tributaries of the Salton Sea. Currently, California desert pupfish populations are restricted to portions of San Felipe Creek and its associated wetland, San Sebastian Marsh (Imperial County), portions of Salt Creek (Riverside County), some shoreline pools and irrigation drains along the Salton Sea (Imperial and Riverside Counties), and various artificial refugia (Riverside and San Diego Counties).

Naturally occurring populations of desert pupfish have been extirpated from Arizona. However, pupfish have been transplanted to a number of locations within the state. A large population of another desert pupfish subspecies is endemic to Quitobaquito Springs, Organ Pipe National Monument. In Mexico, desert pupfish are found at various localities along Rio Sonoyta, on the Colorado River Delta, and in the Laguna Salada Basin. In Sonoran portion of the Rio Sonoyta, pupfish inhabit several spring-fed marshes. In Baja California, pupfish occur on the Colorado Delta, in Laguna Salada, in a wetland associated with a geothermal power plant, and in a ditch downstream of this marshland.

In the Plan Area, pupfish are found in upper and lower Salt Creek, the mouth of Salt Creek (Sutton 2000), several irrigation drains emptying into the Salton Sea, some shoreline pools, and several refugia: Dos Palmas; the Thousand Palms Preserve; Oasis Springs Ecological Reserve; The Living Desert; and Salton Sea State Recreation Area. The Plan Area contains a substantial portion of remaining pupfish Habitat, including one of only two natural tributary streams, most of the refugia, and some of the shoreline pools and irrigation drains.

A small, but stable, population exists in Salt Creek. The majority of fish inhabit an upstream portion of the creek, but a few pupfish were found at the mouth as recently as 1995 and again in 1999 (Sutton 1999). During 1997 surveys conducted by CDFG, 100 pupfish and 700 mosquitofish were captured in the upstream section of Salt Creek. In recent surveys conducted by CDFG, pupfish were found in approximately 30% of the irrigation drains emptying into the Salton Sea, significantly fewer than in 1991, probably as a result of a substantial increase in

tilapia numbers during the past few years. Pupfish seem to be doing better along the west end of the sea, where Habitat is more suitable. Along the east end of the sea, the substrate in many of the drains consists almost entirely of tilapia nests, and very little aquatic vegetation remains in these drains.

The refugium population of pupfish at Dos Palmas was established in the early 1990s (C. Barrows, pers. comm., 6/30/03) from Thousand Palms fish, which originally came from Salt Creek. All fish transfers were conducted by CDFG (Kim Nicol, pers. comm.). Currently there are three separate locations for pupfish refugia at Dos Palmas -- one is a cement holding tank near the storage shed, one is a pond near the residential/operations facility, and one is one of the enhanced fish ponds.

Adequate water quantity and quality must be maintained in desert streams, springs, irrigation drains, and shoreline pools. Surface and groundwater from upper Salt Creek Canyon and other canyons in the Orocopia and Chocolate Mountains may contribute to the groundwater system. Seepage from the Coachella Canal also contributes to the groundwater in the Salt Creek drainage system. Groundwater pumping, channel erosion, water diversion, contaminants, and other threats must be reduced.

Associated Covered Species. Other species of concern whose Core Habitat overlaps that of the desert pupfish within the Plan Area include California black rail, Yuma clapper rail, and the riparian birds.

9.5 Amphibians

This section contains a species account, including Habitat parameters and significant threats, for the only amphibian proposed for coverage under this Plan, the federal endangered arroyo toad. Conservation measures specific to the arroyo toad are also described below.

9.5.1 Arroyo Toad *Bufo microscaphus californicus*

Status	**Federal:**	**Endangered**
	State:	**Species of Special Concern**

9.5.1.1 Species Conservation Goals and Objectives

Conserve and manage populations within the MSHCP Reserve System according to the following criteria:

Goal 1: Ensure species persistence in the Plan Area by conserving significant populations, consistent with the Arroyo Toad Recovery Plan, and associated Essential Ecological Processes, allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused disturbance, and edge effects by conserving contiguous Habitat patches and effective Linkages between Habitat.

Objective 1. Conserve significant populations and modeled Habitat including at least 2,004 acres within the following Conservation Area:

- Whitewater Canyon Conservation Area

Please refer to Section 4.3 and Table 9-14 for specific acreages to be conserved by other Conservation Objectives.

Goal 2: Protect other potential Habitat to provide sufficient area and variety of Habitat types to accommodate population fluctuations, allow for genetic diversity, and to conserve the range of environmental conditions, within which this toad is known to occur.

Objective 2. Conserve potential Habitat for this toad through adherence to other Conservation Objectives (for another species, a natural community, Essential Ecological Process area, Biological Corridor, or Linkage area) in the following Conservation Areas:

- Snow Creek/Windy Point Conservation Area
- Upper Mission Creek/Big Morongo Canyon Conservation Area

Please refer to Section 4.3 and Table 9-14 for specific acreages to be conserved by other Conservation Objectives.

Table 9-14: Summary of Habitat within Conservation Areas Arroyo Toad

Conservation Area	*Total Acres of Habitat in Conserv. Area*	*Acres of Disturbance Authorized*	*Acres of Existing Conservation Lands*	*Remaining Acres to be Conserved*	*Total Acres Conserved in MSHCP Reserve System*	*Designation*
Whitewater Canyon	2,082	78	1,298	706	2,004	Core Habitat
Upper Mission Creek/ Big Morongo Canyon	3	0	3	0	3	Other Cons. Habitat
Total – All Habitat	*2,085*	*78*	*1,301*	*706*	*2,007*	--
Total – Core Habitat	*2,082*	*78*	*1,298*	*706*	*2,004*	--
Total – Other Cons. Habitat	*3*	*0*	*3*	*0*	*3*	--

Goal 3: Protect Essential Ecological Processes, which may include hydrological regimes, necessary to maintain significant populations and Other Conserved Habitat.

Objective 3. Ensure protection of Essential Ecological Process areas through Conservation Area Conservation Objectives for Essential Ecological Processes.

Goal 4: Ensure conservation of arroyo toad by maintaining the long-term persistence of self-sustaining populations and conserving Habitat quality through biological monitoring and Adaptive Management actions in the Plan Area.

Objective 4. Implement biological monitoring and Adaptive Management actions to ensure self-sustaining populations within each Core Habitat area.

9.5.1.2 Threats, Limiting Factors, and Adaptive Management

Arroyo toad breeding Habitat is created and maintained by the fluctuating hydrological, geological, and ecological processes operating in riparian ecosystems and the adjacent uplands within a Mediterranean climate. These riparian/wash Habitats as well as adjacent upland Habitats are essential for the species' survival. Periodic and unpredictable flooding that reworks stream channels and channel sediments and alters pool location and form, coupled with upper terrace stabilization by vegetation, is required to keep a stream segment suitable for all life stages of the arroyo toad. There are many threats to this species throughout its range, all of which could potentially be a problem to the Whitewater Canyon population. Human activities that affect water quality influence the timing and amount of non-flood flows or frequency and intensity of floods, affect riparian plant communities, or alter sedimentation dynamics can reduce or eliminate the suitability of stream channels for arroyo toad breeding Habitat (USFWS 1998). Mining, especially when it involves dredging, alternation of the hydrological regime, and surface disturbance, is also a threat (Jennings and Hayes 1994); sand and gravel mining is a significant threat (USFWS 1998). The development and alteration of streamside gravel bars and terraces is probably the main factor in the loss of Habitat (Jennings and Hayes 1994). Degradation or loss of surrounding uplands reduces and eliminates foraging and overwintering Habitat. This species is especially vulnerable to predation by exotic fishes and bullfrogs. Exotic plants can also adversely impact the Habitat. The streamside bank and terrace Habitat is popular for human uses such as camping, wading, and OHV use. Arroyo toads crossing or foraging on roads in the Habitat area are also subject to mortality. Cattle grazing is an identified threat to all known remaining populations (Jennings and Hayes 1994, Sweet 1993). Grazing livestock can trample egg clutches, juvenile, and adult toads; alteration of sand bars and stream terraces, siltation, and other impacts to water quality are other problems caused by grazing (USFWS 1998).

The following actions may be needed to ensure species persistence and long-term viability if biological monitoring indicates that such actions are warranted. This list is not comprehensive but identifies some of the known or likely threats to this species. More detailed information on the Management and Monitoring Programs can be found in Section 8.0. Actions may include:

1. Control and manage activities that adversely impact water quality and the hydrological regime in arroyo toad Habitat.
2. Control and manage activities on public conservation lands, such as removal of boulders, OHV use, picnicking or camping in sensitive areas, and livestock grazing that are

impacting arroyo toad Habitat. Also control and manage alteration or disturbance of streamside gravel bars and terraces to protect arroyo toad Habitat.

3. Schedule activities, except emergency response activities, which may cause disturbance to arroyo toad Habitat, to avoid the March 1 to June 30 breeding season.
4. Conduct an educational program about the arroyo toad and its Conservation needs for residents of Whitewater Canyon and the operators of the fish hatchery/trout fishing facility.
5. Coordinate with the private owners of the fish hatchery/trout fishing facility to evaluate stream flow and water quality issues associated with arroyo toad Habitat.
6. Restore degraded Habitat as deemed necessary from the results of the Monitoring Program.
7. Identify actions to reduce impacts from, and control where feasible, invasive species if it is determined from monitoring results that there are impacts to the arroyo toad and its Habitat

9.5.1.3 Species Conservation Analysis

Conservation Area Reserve Design. The Whitewater Canyon is the only known Habitat of the arroyo toad in the Plan Area where its presence has been verified. This population was last observed in 1992. The Whitewater Canyon is open to the public and contains a small residential area, a public trout fishing operation, and Whitewater Canyon Road. These Existing Uses will not be eliminated by the Plan (except to the extent that the trout farm might be acquired from a willing seller) and have the potential to impact the arroyo toad's Habitat in the Whitewater Canyon. The Plan includes acquisition of private land from willing sellers in the Whitewater Canyon and development of management prescriptions for land in public ownership in the canyon to minimize activities deleterious to the arroyo toad and its Habitat.

For each area, see Table 9-14 for a breakdown of Existing Conservation Lands and remaining lands to be conserved.

9.5.1.4 Take Analysis

Significance of the Plan Area to Arroyo Toad

The arroyo toad is a federal Endangered Species and a state Species of Special Concern. It is also a California and Baja endemic. Historically, it occurred from the upper Salinas River in San Luis Obispo County south along the coast to the Rio Santo Domingo system in Baja California, Mexico. Within the Plan Area, there are records for this species in the Whitewater River in Whitewater Canyon, and potential Habitat in Mission Creek and Stubbe Canyon. The Whitewater River population is one of the 15 self-sustaining populations identified in the Arroyo Toad Recovery Plan (USFWS 1999) as necessary for consideration of delisting the species. There are records from six desert side drainages. The species has disappeared from 76% of its historic range as of 1994 (Jennings and Hayes 1994). The northern, central, and eastern portions of the range have lost all of their populations. It is currently known from only a few scattered localities within its historic range. About 90% of the known extant populations occur in areas owned or managed by the USFS (1993a).

Effects of Take on the Arroyo Toad

Implementation of the Plan will conserve and maintain Habitat for arroyo toad in the Whitewater River and benefit this species as unprotected portions of its Habitat, potential Habitat, Essential Ecological Processes including hydrological regimes, and Biological Corridors and Linkages will be conserved. The extent to which the Whitewater River population exists and additional populations exist and could be conserved will need to be evaluated on a continuing basis as the Plan progresses. The Plan also provides for management and monitoring of arroyo toad across its entire range.

There are 2,095 acres of modeled Habitat for this species within the Plan Area of which approximately 2,085 acres are within the Conservation Areas. Of the modeled Habitat within the Conservation Areas, 2,082 acres are identified as Core Habitat. The Plan would ensure Conservation of 2004 acres (96% of total) of the Core Habitat and 3 acres (100%) of the Other Conserved Habitat for this toad. The conserved Core Habitat area in Whitewater Canyon is more than 2,000 acres. Approximately 1,301 acres (62%) of the modeled Habitat are within Existing Conservation Lands and would be managed as part of the Reserve System. The Plan would also require the long-term protection of an additional 706 acres of Habitat for this species. Overall, the Plan would conserve a total of 2,007 acres (96%) of the modeled Habitat for arroyo toad in the Plan Area.

Within the Conservation Areas under the worst case scenario, 78 acres of Take of modeled Habitat (4%) could occur. (See Table 9-14 and Table 4-114). Take of arroyo toad Habitat within the Conservation Areas must be consistent with the Conservation Objectives for this species to: 1) ensure Conservation of Core Habitat and existing populations as well as potential Habitat; 2) protect Essential Ecological Processes needed to maintain toad Habitat, including hydrological regimes; and 3) maintain Biological Corridors and Linkages among conserved populations to provide for population fluctuation and enhance genetic diversity. So, although some Take could occur within the Conservation Areas, the Conservation Objectives required by the Plan will provide for protection of Habitat to ensure the long-term persistence of arroyo toad.

Outside of the Conservation Areas, there are 10 acres of modeled Habitat authorized for Take. The Habitat outside the Conservation Areas is modeled Habitat only that is on the periphery of suitable Habitat for this species.

Although the status of arroyo toad in the Plan Area is uncertain as the species has not been confirmed since 1992, the establishment of Conservation Areas where this species is protected is a significant improvement over the current situation where only 64% of modeled Habitat is conserved. The actual impacts of Take to this species are expected to be very limited because:

1. Conserved Habitat areas are large enough to contain self-sustaining populations of arroyo toad and incorporate key Habitat elements, including breeding pools and foraging areas.
2. Take within the Conservation Areas would not eliminate or significantly impact any known populations. Conservation Objectives require any approved disturbance within Conservation Areas to ensure protection of Core Habitat.

3. As a result of implementing the Conservation Objectives to protect Habitat for this arroyo toad, the Plan would ensure Conservation of existing Habitat, limiting disturbance in Core Habitat areas according to results of the Monitoring Program. The Plan would also ensure Conservation of potential Habitat areas for this species.
4. Potential Development would not adversely impact the Essential Ecological Processes needed to maintain currently viable Habitat. Conservation Areas were carefully designed to incorporate the watershed and hydrological regimes.
5. Lands in the MSHCP Reserve System would be managed and monitored to address significant edge effect problems, potential loss of Habitat from introduction of exotic species, and other stressors to the arroyo toad,

The issuance of Take Permits, therefore, will not likely jeopardize the continued existence of the arroyo toad and the implementation of the MSHCP will provide for the Conservation of the species.

Measures to Avoid, Minimize, and Mitigate Take of Arroyo Toad

To mitigate the Take of arroyo toad, the Permittees will protect and manage, in perpetuity, 706 acres of the modeled Habitat for this species. The 1,301 acres of modeled Habitat within Existing Conservation Lands will be monitored and managed to ensure that Conservation Objectives are met. The Plan will thus ensure Conservation, through protection and management, of 2,007 acres of Habitat for arroyo toad.

The proposed Conservation Areas in the Plan would protect the Core Habitat areas in Whitewater Canyon as well as locations where the species could occur in Mission Creek and Snow Creek.

Additionally, the Plan calls for Management and Monitoring Programs to ensure the Conservation of this species, including control of activities that adversely impact water quality and the hydrological regime, disturbance from recreational activity in sensitive areas, control of invasive species where necessary, and restoration and enhancement of degraded Habitat as necessary according to monitoring results. The Plan also calls for an educational program for residents and visitors in Whitewater Canyon to inform them about the arroyo toad and its Conservation needs.

Overall Impacts to Arroyo Toad

Under the Plan, 96 % of the modeled Habitat of arroyo toad within the Plan Area will be conserved. In addition, potential Habitat in Snow Creek and Mission Creek will be conserved. Potential Habitat in the Palm Canyon area is located on the Agua Caliente Indian Reservation, which is not included in this Plan.

The Arroyo Toad Recovery Plan (USFWS 1999) identifies conserving 15 self-sustaining populations in addition to 19 primary populations in seven areas to secure genetic and phenotypic variation. The Whitewater River population is one of the 15 self-sustaining populations necessary for consideration of delisting the species. Implementation of the Plan is thus expected to maintain and enhance population viability of the arroyo toad by conserving and

managing Habitat in the Whitewater Canyon and protecting a Snow Creek and/or a Mission Creek population should one be located in these areas.

9.5.1.5 Species Account: Background

Distribution, Abundance, and Trends. The arroyo toad has highly specialized Habitat requirements. Arroyo toad breeding sites are known to be streams of second to sixth order with overflow pools, depending somewhat on latitude (Sweet 1992, Griffin 1999). The streams and pools should be free of predatory fish. The adults breed in pools that have little woody vegetation along the margins and are shallow, sand or gravel based. The current velocity is generally low. The breeding pools occur near juvenile and adult Habitat. This Habitat is a shoreline or central bar and stable sandy terraces. The juveniles prefer areas that provide shelter either through drying algal mats or small damp refuges or depressions. The sandy terraces have an overstory of scattered shrubs and trees such as mulefat, California sycamore, Fremont cottonwood, or coast live oak. There is an absence of vegetation at ground level (USFS 1993a, Jennings and Hayes 1994). Arroyo toads have been found up to 1.08 km from water (Griffin 1999).

There is a 1992 record for this species from Whitewater Canyon. It is unknown if it is still extant, although the Habitat is intact. Surveys in Whitewater Canyon in the vicinity of the trout farm by biologists from USGS (USGS 2003) did not locate any arroyo toads. However, it is considered likely that arroyo toads still occur in Whitewater Canyon (A. Backlin, pers. comm.). Mark Jennings (pers. comm.) suggests that the only other likely sites in the Plan Area would be Palm Canyon and Mission Creek. The Habitat in Mission Creek will be conserved as a result of Conservation Objectives for other Covered Species. USFWS has suggested that Snow Creek could also provide appropriate Habitat. This Habitat will be conserved as a result of Conservation Objectives for other species. The Whitewater population represents one of six desert localities of this more typically coastal area species. The current status and viability of the Habitat locations for this species within the Plan Area are unknown at this time. Surveys are needed to determine if the arroyo toad still occurs in Whitewater Canyon and if the species occurs at Snow Creek or Mission Creek. Potential Habitat in Palm Canyon is on land owned by the Agua Caliente Band of Cahuilla Indians, which is not part of this Plan.

Associated Covered Species. Within the Plan Area, other species of concern whose Habitat overlaps with that of the arroyo toad include least Bell's vireo, yellow warbler, yellow-breasted chat, southwestern willow flycatcher, and summer tanager.

9.6 Reptiles

This section contains species accounts, including Species Conservation Goals and Objectives, significant threats, and life history information, for each of the three species of reptile proposed for coverage under this Plan. These species include the desert tortoise, listed as threatened by the federal and state governments, the Coachella Valley fringe-toed lizard, listed as a state Endangered and a federal Threatened Species, and the flat-tailed horned lizard, a species proposed for federal listing. General measures common to all of these reptiles are listed below, and measures specific to a given species are considered in the conservation strategy for each of the species.

1. As part of the Monitoring Program, evaluate the impact of "artificial" perches for predators, including power poles and landscape trees, along the edges or adjacent to Conservation Areas. Some evidence from the Thousand Palms Preserve suggests that predation rates may be increased due to these artificial perches.

9.6.1 Desert Tortoise *Xerobates agassizii* (or *Gopherus agassizii*)

Status Federal: Threatened
State: Threatened

9.6.1.1 Species Conservation Goals and Objectives

Conserve and manage populations within the MSHCP Reserve System according to the following criteria:

Goal 1: Ensure species persistence in the Plan Area by conserving Core Habitat, consistent with the Desert Tortoise Recovery Plan, and associated Essential Ecological Processes, allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused disturbance, and edge effects to Core Habitat by conserving contiguous Habitat patches and effective Linkages between patches of Core Habitat.

Objective 1. Ensure Conservation of Core Habitat within the following Conservation Areas:

- Stubbe and Cottonwood Canyons Conservation Area
- Whitewater Canyon Conservation Area
- Upper Mission Creek/Big Morongo Canyon Conservation Area
- Indio Hills/Joshua Tree National Park Linkage Conservation Area
- Joshua Tree National Park Conservation Area
- Desert Tortoise and Linkage Conservation Area
- Mecca Hills/Orocopia Mountains Conservation Area

Please refer to Section 4.3 and Table 9-15 for specific acreages to be protected by this Conservation Objective.

Goal 2: Protect Other Conserved Habitat to provide sufficient area and variety of Habitat types to accommodate population fluctuations, allow for genetic diversity, and to conserve the range of environmental conditions within which the desert tortoise is known to occur.

Objective 2. Through adherence to other Conservation Objectives (for another species, a natural community, Essential Ecological Process area, Biological Corridor, or Linkage area) conserve 126,431 acres of Other Conserved Habitat for this tortoise in the following Conservation Areas ~~and Special Provisions Area~~:

- Snow Creek/Windy Point Conservation Area
- Hwy 111/I-10 Conservation Area
- ~~Morongo Wash Special Provisions Area~~ Upper Mission Creek/Big Morongo Canyon Conservation Area
- Whitewater Floodplain Conservation Area
- Thousand Palms Conservation Area
- East Indio Hills Conservation Area
- Dos Palmas Conservation Area
- Santa Rosa and San Jacinto Mountains Conservation Area

Please refer to Section 4.3 and Table 9-15 for specific acreages to be protected by this Conservation Objective.

Table 9-15: Summary of Habitat within Conservation Areas Desert Tortoise

Conservation Area	*Total Acres of Habitat in Conserv. Area*	*Acres of Disturbance Authorized*	*Acres of Existing Conservation Lands*	*Remaining Acres to be Conserved*	*Total Acres to be Conserved in MSHCP Reserve System*	*Designation*
Cabazon	3,216	53	42	474 (2,647)[1]	516	Other Cons. Habitat
Stubbe and Cottonwood Canyons	5,735 / 44	253 / 1	3,206 / 37	2,276 / 6	5,482 / 43	Core / Other Cons. Habitat
Snow Creek/ Windy Point	1,559	127	290	1,142	1,432	Other Cons. Habitat
Whitewater Canyon	4,494 / 85	120 / 3	3,290 / 53	1,084 / 29	4,374 / 82	Core / Other Cons. Habitat
Highway 111/ I-10	389	39	0	350	350	Other Cons. Habitat
Whitewater Floodplain	1,110	80	307	723	1,030	Other Cons. Habitat
Upper Mission Creek/ Big Morongo Cyn	28,447 ~~27,676~~	1,320~~1,157~~[2]	17,106	10,021~~9,413~~	27,127~~26,519~~	Core Habitat
Willow Hole	36	4	0	32	32	Other Cons. Habitat
Long Canyon	506	N/A	102	(404)[1]	102	Other Cons. Habitat
West Deception	2,028	118	132	1,063 (715)[1]	1,195	Other Cons. Habitat
Indio Hills/ Joshua Tree National Park Linkage	10,308	859	1,714	7,735	9,449	Core Habitat
East Indio Hills	397	40	0	357	357	Other Cons. Habitat
Joshua Tree National Park	127,161 / 4	1,708 / 0	110,086 / 4	15,367 / 0	125,453 / 4	Core / Other Cons. Habitat
Desert Tortoise and Linkage	89,178 / 4	5,027 / 1	38,903 / 0	45,248 / 3	84,151 / 3	Core / Other Cons. Habitat

Conservation Area	***Total Acres of Habitat in Conserv. Area***	***Acres of Disturbance Authorized***	***Acres of Existing Conservation Lands***	***Remaining Acres to be Conserved***	***Total Acres to be Conserved in MSHCP Reserve System***	***Designation***
Mecca Hills/Orocopia Mountains	112,575	2,624	86,334	23,617	109,951	Core Habitat
Dos Palmas	334	2	317	15	332	Other Cons. Habitat
Santa Rosa & San Jacinto Mountains	125,694	4,741	83,976	36,977	120,953	Other Cons. Habitat
Total – All Habitat	*513,304* ~~*512,533*~~	*17,120*~~*16,957*~~	*345,899*	*146,519* ~~*145,911*~~ *(3,766)* [1]	*492,418* ~~*491,810*~~	--
Total – Core Habitat	*377,898* ~~*377,127*~~	~~*11,748*~~*11,911*	*260,639*	*105,348* ~~*104,740*~~	*365,987* ~~*365,379*~~	--
Total – Other Cons. Habitat	*135,406*	*5,209*	*85,260*	*41,171* *(3,766)*[1]	*126,431*	--

[1] Numbers within parentheses are acres of Habitat in fluvial sand transport areas. The only Conservation Objective in this Conservation Area is to maintain fluvial sand transport. Habitat conservation is not an objective.

~~[2] Includes 291 acres within the Morongo Wash Special Provisions Area.~~

Goal 3: Maintain Biological Corridors and Linkages among all conserved populations.

Objective 3. Note: Additional details on these Biological Corridors and Linkages, and requirements for the installation of wildlife underpasses, are found in the Conservation Area descriptions in Section 4. Key Habitat Linkages and Biological Corridors include the following:

- Stubbe Canyon Wash Biological Corridor
- Whitewater River Biological Corridor
- Highway 62 Biological Corridor
- Interstate 10 Biological Corridors, including:
  a. Corridor 1 centered on Thermal Canyon
  b. Corridor 2 centered on the E. Cactus City Wash and Hazy Gulch culverts
  c. Corridor 3 centered on the Happy Gulch culvert
  d. Corridor 4 centered on the Desperation Arroyo culvert
  e. Corridor 5 centered on the Desperation Arroyo, West Buried Mountain Wash, Buried Mountain Wash, Resurrection Wash, West Saddle Gulch, Saddle Gulch, West Cotton Gulch, Cotton Gulch, East Cotton Gulch, and Paul Gulch culverts
- Possible future wildlife undercrossings along Dillon Road within the Indio Hills/Joshua Tree National Park Linkage Conservation Area if this road is widened to four or more lanes
- Maintain the ability for desert tortoise to cross Indian Avenue and Pierson Boulevard in the Upper Mission Creek/Big Morongo Canyon Conservation Area if these roads are widened

Goal 4: Ensure conservation of the desert tortoise by maintaining the long-term persistence of self-sustaining populations and conserving Habitat quality through biological monitoring and Adaptive Management actions in the Plan Area.

Objective 4. Implement monitoring and Adaptive Management actions to ensure self-sustaining populations within each Core Habitat area.

9.6.1.2 Threats, Limiting Factors, and Adaptive Management

Coyotes (*Canis latrans*), bobcats (*Lynx rufus*), ravens (*Corvus corax*), golden eagles (*Aquila chrysaetos*), and Gila monsters (*Heloderma suspectum*) (which do not occur in the Plan Area) are known predators of either eggs, juveniles, or adults (J. Barrow 1979, Luckenbach 1982, Barrett and Humphrey 1986), and ring-tailed cats (*Bassariscus*), badgers (*Taxidea*), skunks (*Mephitis*, *Spilogale*), kit foxes (*Vulpes*), domestic dogs (*Canis familiaris*), large hawks (*Buteo*), owls (*Athene*), roadrunners (*Geococcyx*), bullsnakes (*Pituophis*), and coachwhip snakes (*Masticophis*) are suspected predators (Ernst, Lovich, and Barbour 1972, Luckenbach 1982). The presence of a high density of local ravens (*Corvus corax*) has a detrimental affect on populations of *X. agassizii* through predation on young desert tortoises (Boarman 1999).

Desert tortoise Habitat can be lost to urbanization and other human-related activities, including OHV use, overgrazing of domestic livestock, and construction of roads and utility corridors. Secondary contributions to degradation include the proliferation of exotic plant species and a higher frequency of anthropogenic fire. Effects of these impacts include alteration or destruction of macro- and micro-vegetation elements, establishment of disclimax plant communities, destruction of soil stabilizers, soil compaction, erosion, and pollution (Lovich 1992). OHV use may contribute to declines of desert tortoise populations directly by crushing individuals (above or below ground), or by collapsing burrows. Vehicular activity may also destroy vegetation used by desert tortoises for food or cover, making Habitat unsuitable for sustaining their populations.

Certain key desert tortoise food plants may comprise over 40% of the cattle diet, and, since cattle are larger and more mobile than tortoises, these plants may be severely depleted with heavy grazing (Berry 1978, Coombs 1979). The Whitewater Grazing Allotment managed by the BLM overlaps significant desert tortoise Habitat in the Whitewater and Painted Hills. Cattle have been observed to step on burrows and cause their collapse in the area, including burrows occupied by desert tortoises or used as nest sites. Recent research by Hal Avery (1998) of the USGS demonstrates conclusively, for the first time, that cattle can out-compete desert tortoises for key forage species. Cattle grazing in the Whitewater Hills desert tortoise Habitat has also lead to visible increases in soil destruction and increased erosion in some areas.

Disease has contributed to the decline of some desert tortoise populations. Wild and captive desert tortoises are afflicted with Upper Respiratory Tract Disease (URTD) in many areas within the geographic range. Jacobson et al. (1991, 1995) isolated a species of *Mycoplasma*, a small bacterium lacking a cell wall, as a potential pathogen causing URTD. Introductions of infected captive tortoises into the desert may have caused the spread of this potentially lethal disease in wild desert tortoise populations. No visible evidence of URTD or shell disease has been observed in desert tortoises in the Whitewater Hills or the Painted Hills (J. Lovich, pers. comm.). A new disease, called shell disease, has recently been reported in tortoises.

Jeff Lovich believes that fire is the biggest threat to the continued survival of desert tortoises in the western Coachella Valley. He reports that the proliferation of exotic annual grasses and forbs, especially Saharan mustard (*Brassica tournefortii*) in the region has dramatically increased the frequency and extent of wildland fires in an ecosystem poorly adapted to perturbations of such periodicity or magnitude (Brooks and Esque 2002). Other than direct mortality, Habitat conversion of desert scrub and semi-desert chaparral to exotic grasslands will diminish the prospects for long-term survival of viable desert tortoise populations.

The following actions may be needed to ensure species persistence and long-term viability if biological monitoring indicates that such actions are warranted. This list is not comprehensive but identifies some of the known or likely threats to this species. More detailed information on the Management and Monitoring Programs can be found in Section 8.0. Actions may include:

1. Control raven predation on desert tortoises in the area if monitoring determines it to be a problem to the growth and maintenance of the tortoise population.
2. Avoid impacts due to overgrazing by domestic animals, soil compaction, and erosion that affect desert tortoise forage.
3. Control activities that may result in crushing of or disturbance to tortoise burrows.
4. Control and manage poaching, illegal collection, and crushing of desert tortoise to minimize impacts.
5. Identify actions to reduce impacts from, and control where feasible, invasive species if it is determined from monitoring results that there are impacts to desert tortoise Habitat or populations. Invasive plant species of concern include Saharan mustard, Mediterranean grass, and other exotic annual grasses and forbs.
6. Develop and implement fire management plans for Conservation Areas where desert tortoise Habitat may be impacted by fire, such as the significant population in the Whitewater Hills area.
7. Determine the need for tortoise fencing along the Interstate 10 corridor in Critical Habitat and install tortoise fencing where deemed necessary in conjunction with new projects.
8. Implement required avoidance, mitigation, and minimization measures.

9.6.1.3 Species Conservation Analysis

Conservation Area Reserve Design. Desert tortoise Habitat is broadly distributed over the Plan Area, but generally the density of desert tortoises is low. The high-density population in the Whitewater Hills occurs in a wind-farm area. Access is limited to maintenance personnel, who have been educated about the importance of avoiding impacts to the desert tortoise. Much of the remainder of the desert tortoise Habitat, however, is in rugged terrain that few people are likely to access. The largest threat may be from Interstate 10 in the Habitat between the Mecca Hills and the Orocopia Mountains and Joshua Tree National Park. Conservation Area management will include monitoring to evaluate edge effects. Such monitoring should be coordinated with monitoring activities proposed by the NECO Plan.

The Planning Team did not attempt to evaluate Core Habitat. Instead, input from individuals with expertise on this species was used to delineate the Core Habitat areas. In particular, Jeff Lovich of the USGS provided review of the map, proposed Conservation Areas, and desert tortoise data on numerous occasions during the process. His recommendations assisted the Planning Team in delineating important Habitat areas and evaluating potential Linkages in the vicinity of the Whitewater Hills, Stubbe and Cottonwood Canyons, Mission Creek, and the Little San Bernardino Mountains. Areas proposed for conservation to benefit desert tortoise in the eastern part of the Plan Area were based on the NECO Plan recommendations for this area. For each area, see Table 9-15 for a breakdown of Existing Conservation Lands and remaining lands to be conserved.

9.6.1.4 Take Analysis

Significance of the Plan Area to Desert Tortoise

The desert tortoise ranges from southern Nevada and extreme southwestern Utah south through southeastern California and southwestern Arizona into northern Mexico. In California, desert tortoises occur in northeastern Los Angeles, eastern Kern, and southeastern Inyo counties, and over most of San Bernardino, Riverside, and Imperial counties. They inhabit a diverse array of desert Habitats including river washes, rocky hillsides and mountains, and flat expanses of creosote bush scrub. The desert tortoise is listed by the State of California and by the USFWS as a threatened species, and it is the official state reptile.

The Plan Area represents a small, but biologically significant portion of the desert tortoise's overall range. Desert tortoises in the foothills of the southeastern San Bernardino Mountains (especially in the Whitewater Hills) represent the western-most reproductively active population of desert tortoises in the Colorado Desert ecosystem (Lovich et al. 1999). Desert tortoise are known in the Plan Area in the foothills of the San Bernardino and Little San Bernardino Mountains, the Painted and Whitewater Hills (in the latter they are common), the San Jacinto and northern Santa Rosa Mountains, and in the eastern part of the Plan Area in the Desert Tortoise and Linkage, Mecca Hills/Orocopia Mountains, and Dos Palmas Conservation Areas.

The Desert Tortoise Recovery Plan (USFWS 1994) was completed in 1994 and the USFWS has designated about six million acres as critical Habitat, most of which is in California, particularly in the Mojave Desert and the Northern and Eastern Colorado Desert. The Desert Tortoise and Linkage Conservation Area includes all the federally designated critical Habitat for desert tortoise within the Plan Area. According to the Desert Tortoise Recovery Plan, maintenance of viable populations within each recovery unit, including the Eastern Colorado Recovery Unit which is partially within the Plan Area, is essential to this species.

Effects of Take on the Desert Tortoise

The primary importance of the proposed MSHCP to desert tortoise is that it provides Conservation for this species at the western limits of its range. The Desert Tortoise and Linkage Conservation Area includes all the federally designated critical Habitat for desert tortoise within the Plan Area. The Plan ensures the long-term conservation of currently unprotected desert tortoise Habitat and provides for connectivity between Habitat areas throughout the Plan Area. In

addition, the Conservation Areas provide protection across an array of Habitat variables, including moisture gradients, soil character, elevation, and vegetation.

There are 571,098 acres of modeled Habitat for this species within the Plan Area of which approximately 377,898~~377,127~~ acres are identified as Core Habitat. The Plan would ensure Conservation of 365,987~~365,379~~ acres (97% of total) of the Core Habitat and 126,431 acres (93%) of the Other Conserved Habitat for the desert tortoise. The conserved Core Habitat areas range in size from 89,178 to over 125,000 acres. Approximately 345,899 acres (67%) of the modeled Habitat are within Existing Conservation Lands and would be managed as part of the Reserve System. The Plan would conserve an additional 146,519~~145,911~~ acres (28%) of the modeled Habitat for desert tortoise in the Plan Area.

Within the Conservation Areas under the worst case scenario, 17,120~~16,957~~ acres of Take of modeled Habitat (3%) could occur. There would be approximately 11,911~~11,748~~ acres (3% of total) of Core Habitat and 5,209 acres of Other Conserved Habitat (4% of total) subject to Take Authorization (See Table 9-15 and Table 4-114). Take of desert tortoise Habitat within the Conservation Areas must be consistent with the Conservation Objectives for this species to: 1) ensure Conservation of Core Habitat consistent with the Desert Tortoise Recovery Plan (USFWS 1994); 2) protect Other Conserved Habitat within a range of environmental conditions and conserve Essential Ecological Processes needed to maintain this Habitat; and 3) maintain Biological Corridors and Linkages among conserved populations to provide for population fluctuation and enhance genetic diversity. So, although some Take could occur within the Conservation Areas, the Conservation Objectives required by the Plan will provide for protection of Habitat to ensure the long-term persistence of this species.

Outside of the Conservation Areas, there are 49,501~~50,272~~ acres (9%) of modeled Habitat authorized for Take. None of this modeled Habitat outside the Conservation Areas is designated critical Habitat for the desert tortoise. The density of desert tortoises in much of the Coachella Valley is very low. Modeled Habitat outside the Conservation Areas is primarily in two areas: 1) in the area east of Highway 62 and south of Desert Hot Springs, and 2) in the area around Dillon Road where it intersects with the Interstate 10 freeway.

The establishment of Conservation Areas where this species is protected is a significant improvement over the piecemeal and fragmenting nature of development patterns that are occurring now within this Habitat. The actual reduction in Habitat value is expected to be considerably less than indicated by the raw acreage numbers because:

1. Conserved Habitat areas are large enough to sustain individuals or populations of desert tortoise and incorporate key Habitat elements.
2. Take within the Conservation Areas would not eliminate or significantly impact any core populations. Conservation Objectives require any approved development within Conservation Areas to ensure protection of Core Habitat.
3. As a result of implementing the Conservation Objectives to protect Habitat for desert tortoise and provide for connectivity, the Plan would not sever connections between any significant populations. Habitat areas are adequately connected to each other to allow genetic exchange. Biological Corridors and Linkages would be conserved to provide Habitat connectivity from Stubbe Canyon under the freeway to Snow Creek, from

Mission Creek under Highway 62, and at numerous locations under Interstate 10 to allow tortoise to move from Joshua Tree National Park into the Orocopia Mountains and Chuckwalla Bench area.

4. Desert tortoise Habitat in the MSHCP Reserve System would be managed and monitored to address impacts to desert tortoise (see Section 9.6.1.2), including fragmentation by roads, potential loss of Habitat from introduction of exotic species, and other potential stressors to this species,

The issuance of Take Permits, therefore, will not likely jeopardize the continued existence of this species and the implementation of the MSHCP will provide for the Conservation of desert tortoise.

Measures to Avoid, Minimize, and Mitigate Take of Desert Tortoise

To mitigate the Take of desert tortoise, the Permittees will protect and manage, in perpetuity, 146,519~~145,911~~ acres of the modeled Habitat for this species. The 345,899 acres of modeled Habitat within Existing Conservation Lands will be monitored and managed to ensure that Conservation Objectives are met. The Plan will thus ensure Conservation, through protection and management, of 492,418~~491,810~~ acres of Reserve Lands for this species.

Under the Plan, 86% of the Habitat for desert tortoise in the Plan Area will be conserved. The conserved areas include 97% of the significant population in the Whitewater Hills, and 97% of the Critical Habitat designated in the area between the Mecca Hills and the Orocopia Mountains and Joshua Tree National Park; this Desert Tortoise and Linkage Conservation Area is consistent with the Critical Habitat designation and with the NECO Plan. Habitat would also be conserved in a range of environmental conditions and would be distributed throughout the Plan Area.

Both inside and outside Conservation Areas, avoidance, minimization, and mitigation measures require relocation of individual tortoises if required surveys locate individuals on the site of Covered Activities. For more information about avoidance, minimization, and mitigation measures see Section 4.4. Under the Plan, Take would be permitted on 49,501~~50,272~~ acres of the naturally occurring Habitat outside the Conservation Areas.

The Plan provides for protection of Biological Corridors and Linkages that will maintain connectivity for desert tortoise from the western limits to the eastern part of the Plan Area. This connectivity will be maintained by existing Biological Corridors including Stubbe Canyon Wash, the Whitewater River, Highway 62, and Interstate 10 between Joshua Tree National Park to the north and the Orocopia Mountains to the south.

Additionally, the Plan provides for Management and Monitoring Programs to ensure the Conservation of this species, including control of activities that degrade desert tortoise Habitat, control of invasive species where necessary, and restoration and enhancement of degraded Habitat as necessary according to monitoring results. The Plan also calls for various monitoring and management actions, including:

1. Control of invasive plant species or impacts from domestic animals if monitoring determines indicates such control is appropriate.
2. Control of raven predation on desert tortoises in the area if monitoring determines it to be a problem to the growth and maintenance of the tortoise population.
3. Control activities that may result in poaching, illegal collection, crushing of or disturbance to tortoises and tortoise burrows.
4. Develop and implement fire management plans for Conservation Areas where desert tortoise Habitat may be impacted by fire, such as the significant population in the Whitewater Hills area.
5. Determine the need for tortoise fencing along the Interstate 10 corridor in Critical Habitat and install tortoise fencing where deemed necessary in conjunction with new projects.

Overall Impacts to Desert Tortoise under the Plan

Implementation of the Plan is expected to maintain and enhance population viability of the desert tortoise in the Plan Area by protecting the populations and additional Habitat within a range of environmental conditions, and by providing connectivity with populations outside the Plan Area. Implementation of the Plan should coordinate with implementation of the NECO Plan.

The desert tortoise will benefit from the establishment of the MSHCP Reserve System wherein 86% of the Habitat for desert tortoise in the Plan Area will be conserved. The conserved areas include 97% of the significant population in the Whitewater Hills, and 97% of the Critical Habitat designated in the area between the Mecca Hills and the Orocopia Mountains and Joshua Tree National Park; this Conservation Area is consistent with the Critical Habitat designation and with the NECO Plan. Plan implementation is expected to provide for Conservation of the desert tortoise within the Plan Area, as currently unprotected portions of its Habitat and potential Habitat areas will be conserved. The combination of the overall Conservation measures; species-specific measures such as management to minimize impacts in tortoise Habitat, monitoring to evaluate potential stressors to desert tortoise, and long-term protection, management, and enhancement of desert tortoise Habitat is expected to effectively compensate for potential adverse effects to this threatened species.

9.6.1.5 Species Account: Background

Distribution, Abundance, and Trends. The desert tortoise is widely distributed through an exceptionally broad array of Habitats that span 1,100 kilometers from northern Sinaloa State, Mexico where it occupies deciduous forest, across the Sonoran (including the Colorado Desert Subdivision in California) and Mojave Deserts, to the edge of the Colorado Plateau in arid southwestern Utah (Ernst et al. 1994, Germano 1994). Populations north and west of the Colorado River were listed as federal threatened in April 1990. The species is listed by California as a Threatened Species, and it is the official state reptile. In California, the desert tortoise is naturally absent from most areas west of the Salton Sea (Luckenbach 1982). Thus the Imperial Valley and portions of the southern Coachella Valley may not support native populations of desert tortoises. Desert tortoises, however, are found naturally along the northern, eastern, and western rim of the Coachella Valley in the foothills of the Little San Bernardino

Mountains, the Painted and Whitewater Hills (in the latter they are common), and the San Jacinto and northern Santa Rosa Mountains.

The Plan Area represents a small, but perhaps biologically significant portion of the desert tortoise's overall range. Desert tortoises in the foothills of the southeastern San Bernardino Mountains (especially in the Whitewater Hills) represent the western-most reproductively active population of desert tortoises in the Colorado Desert ecosystem (Lovich et al. 1999). The western-most records of live tortoises in the San Gorgonio Pass are from T2S, R3E, Sec. 31 near the north end of Verbenia Avenue (J. Lovich, pers. comm.). Significant geographic variation in ecology, morphology, allozymes, plasma proteins markers, gene sequences and mitochondrial DNA has been noted among populations of tortoise rangewide (Weinstein and Berry 1987, Rainboth et al. 1989, Lamb et al. 1989, Glenn et al. 1990, Lamb and Lydeard 1994, Morafka et al. 1994), but no published comparisons have included tortoises from the Coachella Valley.

Range wide, occupied Habitats include desert alluvial fans, washes, canyon bottoms, hillsides, and other steep terrain. In the Whitewater Hills and environs, desert tortoise burrows were found on slopes averaging 17.7^{o} and ranging from 0-45° (Lovich and Daniels 2000). Areas with gravelly or coarse sandy soil are preferred, but desert tortoises can be found in boulder piles in some areas near the Coachella Valley. Desert tortoises have been recorded at elevations of at least 3,510 feet (1,070 m) in some portions of their range. Elevational records for desert tortoises in the Whitewater Hills and Painted Hills average 2,411 feet (735 m) and range from 2,168 to 2,680 feet (661-817 m), based on 150 records of 27 specimens in 1997. In the Santa Rosa Mountains, desert tortoises have been observed at elevations above 3,000 feet (C. Barrows, pers. comm.) The particular Habitat types utilized vary geographically with a preference for rocky slopes in the eastern part of the range (Schamberger and Turner 1986, Barrett 1990). However, it is important to emphasize that desert tortoises can occupy a surprising range of Habitat types.

The spatial distribution of desert tortoises in relation to plant communities is not random (Baxter 1988). High diversity plant ecotones and communities, and possibly soil characteristics, are important features in determining tortoise densities (Wilson and Stager 1992). This may explain the relatively high density of desert tortoises in the Whitewater Hills, as the area is situated in a transition zone between plant communities from the San Bernardino Mountains, the Mojave and Colorado Deserts, and coastal assemblages. The clustered nature of desert tortoise burrows in the western Coachella Valley environs is consistent with the observations of others throughout the range of the tortoise; desert tortoises frequently exhibit a contagious distribution, with clusters of individuals in some areas and large intervening areas of what appears to be suitable Habitat without desert tortoises. Home ranges of desert tortoises vary from about 1 to 642 acres with males typically having larger home ranges than females. In southern Nevada, males had an average home range of 80 acres, while females used 37 acres (data summarized by Luckenbach 1982).

In the western Coachella Valley, the nesting season extends from April through at least July. Of 10 females radio-tracked and x-rayed at weekly intervals from early April through July 1997 in the Whitewater Hills, nine produced 72 eggs in 16 clutches. Seven produced second clutches and one desert tortoise produced a third clutch. Clutch sizes ranged from one to eight (including a single female with one egg in the Painted Hills) with the first clutch averaging 4.33 eggs and the second clutch averaging 5.0 eggs (Lovich et al. 1999). In contrast, during the same time period, only one of eight females tracked and x-rayed in Joshua Tree National Park

produced eggs; a single clutch of 5.0. The difference is attributed to the fact that winter rain produced high biomass of annuals in the Whitewater Hills, whereas desert tortoises in the Park are in the second year of drought conditions.

Associated Covered Species. Other Covered Species with Core Habitat overlapping the modeled Habitat for the desert tortoise include Peninsular bighorn sheep, Palm Springs pocket mouse, burrowing owl, triple-ribbed milkvetch, Little San Bernardino Mountains linanthus, and gray vireo.

9.6.2 Coachella Valley Fringe-Toed Lizard *Uma inornata*

Status	**Federal:**	**Threatened**
	State:	**Endangered**

9.6.2.1 Species Conservation Goals and Objectives

Conserve and manage populations within the MSHCP Reserve System according to the following criteria:

Goal 1: Protect at least four Core Habitat areas that include occupied Habitat, and associated Essential Ecological Processes, allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused disturbance, and edge effects to Core Habitat by conserving contiguous Habitat patches and effective Linkages between patches of Core Habitat.

Objective 1. Ensure conservation of Core Habitat areas including at least 11,245 acres within the following Conservation Areas:

- Snow Creek/Windy Point Conservation Area
- Whitewater Floodplain Conservation Area
- Willow Hole Conservation Area
- Thousand Palms Conservation Area

Please refer to Section 4.3 and Table 9-16 for specific acreages to be protected by this Conservation Objective.

Goal 2: Protect Other Conserved Habitat, to provide sufficient area and variety of Habitat types to accommodate population fluctuations, allow for genetic diversity, and to conserve the range of environmental conditions within which this lizard is known to occur.

Objective 2. Through adherence to other Conservation Objectives (for another species, a natural community, Essential Ecological Process area, Biological Corridor, or Linkage area) conserve Other Conserved Habitat for this lizard in the following Conservation Areas:

- Edom Hill Conservation Area
- East Indio Hills Conservation Area
- Santa Rosa and San Jacinto Mountains Conservation Area

Please refer to Section 4.3 and Table 9-16 for specific acreages to be protected by this Conservation Objective.

Goal 3: Protect Essential Ecological Processes, including sand source/transport systems, necessary to maintain Core Habitat and Other Conserved Habitat for this species.

Objective 3. Ensure protection of Essential Ecological Process areas through Conservation Area Conservation Objectives for Essential Ecological Processes.

Goal 4: Maintain Biological Corridors and Linkages among all conserved populations.

Objective 4. Note: Specific additional details on these Biological Corridors and Linkages, and requirements for the installation of wildlife underpasses, are found in the Conservation Area descriptions in Section 4.0. Key Habitat Linkages and Biological Corridors include the following:

- Whitewater River Biological Corridor
- Mission Creek Biological Corridor
- Willow Wash Biological Corridor
- Possible future wildlife undercrossings at Indian Avenue and Gene Autry Trail in the Whitewater Floodplain Conservation Area
- Possible future widened culverts or undercrossings at Palm Drive
- Possible future widened culverts or undercrossings at Mountain View Road, and Varner Road in the Willow Hole Conservation Area
- Possible future wildlife undercrossings along Ramon Road, Washington Street, and Thousand Palms Canyon Road in the Thousand Palms Conservation Area

Goal 5: Ensure conservation of the Coachella Valley fringe-toed lizard by maintaining the long-term persistence of self-sustaining populations and conserving Habitat quality through biological monitoring and Adaptive Management actions in the Plan Area.

Objective 5. Implement monitoring and Adaptive Management actions to ensure self-sustaining populations within each Core Habitat area.

Table 9-16: Summary of Habitat within Conservation Areas Coachella Valley Fringe-Toed Lizard

Conservation Area	*Total Acres of Habitat in Conserv. Area*	*Acres of Disturbance Authorized*	*Acres of Existing Conservation Lands*	*Remaining Acres to be Conserved*	*Total Acres to be Conserved in MSHCP Reserve System*	*Designation*
Snow Creek/ Windy Point	1,374	130	70	1,174	1,244	Core Habitat
Whitewater Floodplain	5,617	309	2,532	2,777	5,309	Core Habitat
Willow Hole	897 / 857	74 / 86	157 / 0	666 / 771	823 / 771	Core / Other Cons. Habitat
Edom Hill	120	6	58	56	114	Other Cons. Habitat
Thousand Palms	3,962 / 3	93 / 0	3,035 / 2	834 / 1	3,869 / 3	Core / Other Cons. Habitat
East Indio Hills	824	70	123	631	754	Other Cons. Habitat
Santa Rosa & San Jacinto Mountains	122	10	22	90	112	Other Cons. Habitat
Total – All Habitat	*13,776*	*778*	*5,999*	*6,999*	*12,998*	--
Total – Core Habitat	*11,850*	*606*	*5,794*	*5,451*	*11,245*	--
Total – Other Cons. Habitat	*1,926*	*172*	*205*	*1,549*	*1,754*	--

9.6.2.2 Threats, Limiting Factors, and Adaptive Management

Primary threats are loss or degradation of Habitat and the Essential Ecological Processes that sustain that Habitat. Habitat is lost when urban, agricultural, and other types of Development replace suitable with unsuitable Habitat. Habitat is degraded by OHV abuse, illegal dumping, invasion by exotic weeds, and other impacts. The processes that drive the aeolian sand system cannot be disrupted. Floodwaters transport sediment downstream from its source to where it is gradually sorted and the sand is then transported by wind to form dunes. To maintain the Habitat, floodwaters must not be blocked or redirected from the sorting area. There also must be no barriers blocking the movement of wind and its sand load between the sorting area and the Habitat. These barriers impound sand and cause shielding effects, which, eventually, will "extend to the downwind end of the region because of the unidirectional sand movement pattern" (The Nature Conservancy 1985).

Edge effects are related to urban Development adjacent to Habitat. Roads, feral animals, collecting, and other disturbances, increase mortality of Coachella Valley fringe-toed lizards, especially around the perimeter of a Habitat patch. The larger the perimeter is, relative to the

total area (perimeter to area ratio), the greater the potential for negative edge effects from adjacent Development.

The following actions may be needed to ensure species persistence and long-term viability if biological monitoring indicates that such actions are warranted. This list is not comprehensive but identifies some of the known or likely threats to this species. More detailed information on the Management and Monitoring Programs can be found in Section 8.0. Actions may include:

1. Control and manage impacts that degrade Coachella Valley fringe-toed lizard Habitat, including fragmentation by roads, OHV use in protected Habitat (except on designated routes of travel, if any), and other human disturbance.
2. Control human access to occupied Habitat as necessary.
3. Evaluate the need as determined by monitoring for perimeter fencing to keep lizards inside Conservation Areas and away from roadways.
4. Identify actions to reduce impacts from, and control where feasible, invasive species if it is determined from monitoring results that there are impacts to fringe-toed lizard Habitat or populations.
5. Include measures to reduce the impacts to the lizards' food source, harvester ants, including aerial pesticide spraying (in coordination with the California Department of Food and Agriculture) or introduction of exotic species (e.g. fire ants).

9.6.2.3 Species Conservation Analysis

Conservation Area Reserve Design. To ensure long-term viability of the species, multiple Core Habitats were delineated that contained the best-known Habitat and were of the appropriate size and shape. The Planning Team selected Core Habitat from the Habitat model for this species using the following four criteria: (1) Core Habitat is sufficiently large that it can support a viable population independent of other Core Habitat areas; (2) Core Habitat is not fragmented by Development, including roads. Lightly traveled two-lane roads that have limited potential for expansion (e.g. Snow Creek Road) were not considered barriers to this species. Where roads have the potential to fragment Core Habitat, the Plan provides for wildlife underpasses to be constructed when road widening could cause potential fragmentation; (3) Core Habitat has intact Essential Ecological Processes, including sand source and sand delivery systems. This species depends on active blowsand areas, such that long-term maintenance of the sand dunes and sand fields where it occurs was considered essential; and (4) Core Habitat provides suitable areas to act as refugia in the event of large-scale flood events or other extreme conditions (climate change, extended drought).

The Conservation Areas benefit this lizard by securing the long-term sand transport-delivery systems for the Core Habitat and Other Conserved Habitat. At the present time, the sand transport corridors for the Snow Creek area, the Willow Hole area, and for the Thousand Palms Preserve are unprotected; the MSHCP Reserve System will protect these areas. In addition to preserving Core Habitat, Other Conserved Habitat supporting smaller populations is protected in sand source areas. The patchy distribution and relatively small area of the Habitat in the sand

source areas may preclude the presence of long-term viable populations. The MSHCP Reserve System also provides Linkages between Core Habitat areas.

For each area, see Table 9-16 for a breakdown of Existing Conservation Lands and remaining lands to be conserved. The Planning Team identified and assessed the sufficiency of the following Conservation Areas as Core Habitats:

Core Habitat Areas:

1. ***Snow Creek/Windy Point.*** There are approximately 1,374 acres of fringe-toed lizard Habitat modeled here, of which the Plan will conserve approximately 1,244 acres. The sand sources for this area include primarily the Whitewater and San Gorgonio Rivers plus their tributaries, originating in the San Jacinto and San Bernardino Mountains. The Planning Team considered this area as Core Habitat for this lizard.
2. ***Whitewater Floodplain.*** This Conservation Area contains 5,617 acres of fringe-toed lizard Habitat, of which the Plan will conserve 5,309 acres. This Conservation Area includes the existing Whitewater Floodplain Preserve, located in Palm Springs between Indian Avenue and Gene Autry Trail, south of the Southern Pacific railroad and north of the flood control dike that forms the southern edge of the Whitewater River channel. The Conservation Area also includes Habitat west of Indian Avenue and additional Habitat south and east of the existing preserve boundary. Sand for the Conservation Area is supplied primarily by the Whitewater River and its major tributary, the San Gorgonio River, which deposit sand in the floodplain west of the preserve. From there the sand is transported onto and across the Conservation Area by wind. A secondary source is Mission Creek, which enters the floodplain at about the midpoint of the northern border. It augments the sand stock in the eastern half of the Conservation Area. Sand is also supplied to this area from Garnet Wash.

The Whitewater Floodplain Preserve contains the population of *U. inornata* studied most intensively in the Coachella Valley. Allan Muth and Mark Fisher (Muth and Fisher, unpub. data 1985-2003) initiated a long-term demographic study of the species in 1985. They constructed a 2.25-hectare (5.56-acre) plot that lies approximately midway along the east-west axis of the preserve. They enumerated all *U. inornata* on the site, revealing the annual population size from 1985 through 2000. From these data, the geometric mean (= logarithmic mean) density was calculated as 57.6 *U. inornata* per hectare (approximately 23 per acre). Given that the total area of the preserve is 498 hectares (1,230 acres; The Nature Conservancy 1985), then the geometric mean population size of the Whitewater Floodplain Preserve is 28,684 *U. inornata*.

The Muth and Fisher study (Muth and Fisher, unpub. data 1985-2003) encompassed a severe drought from 1985 to 1990 of a magnitude experienced only once before in the 102-year history of climatological data from Palm Springs (U.S. Climatological Records 1898-2000). The population size at the study site dropped to 38 individuals (16.9/ha) in 1990.

Assumptions: Calculating the geometric mean population size of the Whitewater Floodplain Preserve involved the following assumptions:

1. The aeolian sand Habitat at the Whitewater Floodplain Preserve is homogeneous so lizard densities at the study plot will be identical to those throughout the preserve. This is not actually true, as the eastern portions of the preserve have more blowsand than do western portions; hence, lizard densities are probably greater in those eastern portions. However, placing the study plot midway along the east-west axis of the Whitewater Floodplain Preserve should average these differences in the long-term.

2. All individual *U. inornata* seen on the site in a year occupied only the 2.25-hectare study plot, so the density estimates are accurate. The study site population was not closed; individuals immigrated and emigrated. Thus, the densities may represent an overestimate of true densities. They are, however, the best available data for this species. But to err on the side of caution, a very conservative estimate is that the actual density is one-half the density of individuals seen each year on the study plot (M. Fisher, pers. comm.). This more conservative method gives a geometric mean density of 28.8 per hectare and 14,342 *U. inornata* at the Whitewater Floodplain Preserve (95% C.I. = 9,636-21,364 *U. inornata*).

   Immediately west of the existing Whitewater Floodplain Preserve on the west side of Indian Avenue there are about 3,035 acres (1,214 hectares) modeled as fringe-toed lizard Habitat which the Plan will conserve. Wind velocities are greater here than farther east, and following a depositional event, sand is transported away from here faster than it can be replaced by the next event (Turner et al. 1981). Because of this ephemeral nature, there is normally less actual Habitat than is modeled for most of this area. There are, however, some patches of perennial Habitat particularly in the northern portion of this area. These patches extend to the west where they connect with Habitat at Snow Creek/ Windy Point. They are isolated from the preserve for this and the other target animals by Indian Avenue, which is currently under consideration for widening because of high traffic volume. A bridge or very large culverts, installed at the point where the Whitewater River normally flows across Indian Avenue, will allow animal and sand movement below the road while keeping the road open to traffic during flood events. A relatively small patch of Habitat (150 hectares; 371 acres) lies east of Gene Autry Trail and was historically connected with Habitat at the Whitewater Floodplain Preserve. The two-lane road supports heavy traffic and is already scheduled for widening. The Habitat can be connected to the preserve via a bridge or large culverts. The Planning Team did consider this Conservation Area as Core Habitat for the Coachella Valley fringe-toed lizard.

3. ***Willow Hole*.** The Conservation Area includes approximately 1,754 total acres of Habitat within this Conservation Area for the fringe-toed lizard. The Plan will conserve approximately 823 acres of Core Habitat and 771 acres of Other Conserved Habitat in this Conservation Area. There is some fragmentation in this area as a result of roads, including Palm Drive, Mountain View Drive, and Varner Road. These roads likely reduce the unimpeded movement of lizards from one Habitat patch to another. Other fringe-toed lizard Habitat within the Willow Hole Conservation Area is at Flattop Mountain/Stebbins Dune (239 acres) and along the fault line immediately west of Willow Hole (330 acres).

West of Palm Drive, the Habitat occurs primarily south of the San Andreas Fault where sandy deposits from Mission Creek and Big Morongo Wash provide suitable Habitat for the fringe-toed lizard. The mesquite hummocks within the fault line dunes area are perennial Habitat but are only a small portion of the Habitat modeled for that area. The remainder is made up of sand fields that appear more ephemeral than the active sand fields that occur on Flattop Mountain/Stebbins Dune. Additional surveys would be necessary to confirm the status of this lizard in the fault line dunes so this area was considered as Other Conserved Habitat.

On the east side of Palm Drive there are 823 acres of Core Habitat and 51 acres of Other Conserved Habitat to be conserved. This includes the known Habitat north of Varner Road and active sand Habitat south of Varner Road, particularly in the Flattop Mountain/Stebbins Dune area. The Planning Team considered Willow Hole as Core Habitat for fringe-toed lizards for the same reasons it was designated a reserve by the Coachella Valley Fringe-toed Lizard Habitat Conservation Plan (The Nature Conservancy 1985). First, it "exists basically as an independent system replete with its own source and dune system." "The long-term self-perpetuation of the…blowsand ecosystem appears probable." (The Nature Conservancy 1985). Second, this sand source is discrete from other sources, making it unlikely that a catastrophic weather event will destroy all these. And third, as insurance against the loss of Habitat in other reserves from the effects of global climate change, Willow Hole's geographic placement in the Coachella Valley makes it intermediate climatically to the Whitewater Floodplain Conservation Area and the Thousand Palms Conservation Area.

Three sand source areas were identified for the Willow Hole-Edom Hill Preserve/ACEC area. The Morongo Wash supplies sand from the west, and the Willow Hole and Long Canyon watersheds drain through the area from north to south. Morongo Creek carries sediment originating in the Little San Bernardino Mountains in Morongo Canyon. Long Canyon also originates in the Little San Bernardino Mountains. The Willow Hole watershed originates in the western Indio Hills and acts to redeposit sand into the Willow Hole area after being carried out by prevailing winds. Additionally, aerial photographs reveal that the Morongo Wash source is augmented by sediment from Mission Creek, which has the San Bernardino Mountains as its source.

The availability of multiple Habitat patches within the Willow Hole Conservation Area has benefits such that in the event of a population crash from stochastic or climatic events, they may not all be affected at the same magnitude. Thus, the likelihood of the species surviving in at least one Habitat patch is increased. For the long term, connecting these patches is desirable. The Plan proposes possible future widened culverts or undercrossings at Mountain View Road and Varner Road in the Willow Hole Conservation Area, if these roads are widened to four lanes or more. This would involve installing a bridge or wide culvert (≥ 3m wide) under the existing roadway to be used as a corridor by fringe-toed lizards as well as other species. The SAC or other scientists with similar expertise should be involved in the design process.

4. ***Thousand Palms.*** The existing Thousand Palms Preserve and additional Habitat within the Conservation Area includes approximately 3,962 acres of Habitat for the Coachella Valley fringe-toed lizard in the main dune system in the area south of Ramon Road and west of Washington Avenue, and in the area north of Ramon Road, including dunes in Thousand Palms Canyon. The Plan will conserve approximately 3,869 acres of this

Habitat. Floodwaters carry sand-containing sediment from sources in the Indio Hills and in the Little San Bernardino Mountains (via Thousand Palms Canyon) and deposit the sediment on the alluvial fans upwind from the dunes. Strong winds sort and transport sand, forming the active dune fields of the Thousand Palms Preserve. In the CVFTL HCP, Weaver (TNC 1985), refined estimates from Turner et al. (1980) of sand contribution to the aeolian system by flood events. He determined that the majority of aeolian sand within the Thousand Palms Preserve area originated from floodwaters that flowed through Thousand Palms Canyon. More recent studies (Lancaster et al. 1993, Meek and Wasklewicz 1993, Wasklewicz and Meek 1995, Barrows 1996) reexamined these sources and determined that portions of the Indio Hills west of Thousand Palms Canyon contribute the majority of the sand. The Plan will protect both sources. The Indio Hills source is also aided by a flood control project designed to deliver sediment-laden water to the sorting region upwind from the Thousand Palms Preserve. There are no long-term demographic studies for this species for the Thousand Palms Conservation Area, but there are a series of strip transects that give relative abundance of *U. inornata* (Cameron Barrows, pers. comm.). Data from these transects allowed for Habitat quality distinctions with the best Habitat labeled herein as primary, lower quality Habitat as secondary, and all other as non-Habitat. Fringe-toed lizard abundance in secondary Habitat is approximately 1/5 to 1/2 that of primary Habitat (Cameron Barrows, pers. comm.). Measurements from satellite photographs (2000) show approximately 283 to 364 hectares (700 to 900 acres) are primary Habitat, and an additional 405 hectares (1,000 acres) are secondary Habitat. Transects are poor estimators of actual density because they are essentially two-dimensional, and lizards are not marked individually to allow the use of mark-recapture techniques. But the density estimate of Turner et al. (1981) of 45.5 fringe-toed lizards per hectare on primary Habitat here is nearly identical to their estimate (45.0) for a site at the Whitewater Floodplain Preserve. This site is the same as that used by Muth and Fisher. The Planning Team did consider this Conservation Area as Core Habitat for the Coachella Valley fringe-toed lizard.

Other Conserved Habitat Areas:

1. ***Edom Hill.*** This Conservation Area includes scattered sandy substrate Habitat between Willow Hole and the Thousand Palms Preserve in the Indio Hills. There are approximately 120 acres of modeled Habitat, not enough to constitute Core Habitat for this species, of which the Plan will conserve approximately 114 acres. This area does provide slightly higher elevation Habitat and a Linkage between Willow Hole and the Thousand Palms Conservation Area. In addition, the entire Conservation Area is covered by a Conservation Objective to protect either the sand source or sand transport areas. The Planning Team did not consider this area as Core Habitat, but as Other Conserved Habitat for the fringe-toed lizard.

2. ***East Indio Hills.*** There are approximately 824 acres of Habitat modeled at the east end of the Indio Hills, of which approximately 754 acres are conserved under the Plan. Of primary concern here is the health of the sand source system. The “formerly robust” sand source and delivery system from the west (Whitewater River, Mission and Morongo Creeks, etc.) is no longer intact, having been blocked by Development upwind. This leaves sand sources in the adjacent Indio Hills and the Little San Bernardino Mountains to supply all the sand for this area (see ISA report in Appendix I). Because of uncertainty

about the sand source and sand transport system, and because the fringe-toed lizards here do not differ genetically from those elsewhere in the Coachella Valley (Trepanier and Murphy 2001), the Planning Team designated this area as Other Conserved Habitat.

3. ***Santa Rosa and San Jacinto Mountains.*** The Santa Rosa and San Jacinto Mountains Conservation Area has very limited Coachella Valley fringe-toed lizard Habitat, primarily adjacent to the Snow Creek/Windy Point Conservation Area where sandy substrate Habitat occurs along the toe of the San Jacinto Mountains. Of the approximately 122 acres of modeled Habitat, the Plan will conserve approximately 112 acres.

9.6.2.4 Take Analysis

Significance of the Plan Area to Coachella Valley Fringe-Toed Lizard

The Coachella Valley fringe-toed lizard is restricted to the Coachella Valley and was found historically from near Cabazon at the northwestern extreme to near Thermal at the southeastern extreme. This species is endemic to and does not occur outside the Plan Area. The Coachella Valley fringe-toed lizard is listed as a threatened species under FESA and is listed as endangered by the State of California. It is strongly associated with active blowsand Habitats on the floor of the Coachella Valley and once occurred from Cabazon to Indio in what was once an extensive sand dune system. Today less than 5% of the original Habitat for this species remains (Barrows 1996).

Effects of Take on the Coachella Valley Fringe-Toed lizard

The primary importance of the proposed MSHCP to Coachella Valley fringe-toed lizard is that it provides Conservation (including Habitat protection, management and monitoring) of the species across its entire range. The Plan ensures the long-term conservation of Core Habitat and the associated Essential Ecological Processes including the sand transport and delivery system. The Plan also ensures that connectivity between these Habitat areas will be maintained. In addition, the Conservation Areas provide protection across an array of Habitat variables, including moisture, soil character, elevation, and vegetation, within the entire range of this subspecies.

There are 27,070 acres of modeled Habitat for this lizard within the Plan Area of which approximately 11,850 acres are identified as Core Habitat. The Plan would ensure Conservation of 11,245 acres (95% of total) of the Core Habitat and 1,754 acres (91% of total) of the Other Conserved Habitat for the fringe-toed lizard. Each of the four conserved Core Habitat areas would be greater than 1,200 acres. Approximately 5,999 acres (22%) of the modeled Habitat are within Existing Conservation Lands and would be managed as part of the Reserve System. The Plan would conserve an additional 6,999 acres (26%) of the modeled Habitat for Coachella Valley fringe-toed lizard in the Plan Area.

Within the Conservation Areas under the worst case scenario, 778 acres of Take of modeled Habitat (6%) could occur. There would be approximately 606 acres (5% of total) of Core Habitat and 172 acres of Other Conserved Habitat (9% of all Other Conserved Habitat) subject to Take Authorization (See Table 9-16 and Table 4-114). Take of fringe-toed lizard Habitat within the Conservation Areas must be consistent with the Conservation Objectives for

this species to: 1) ensure Conservation of Core Habitat; 2) protect Essential Ecological Processes needed to maintain fringe-toed lizard Habitat; and 3) maintain Biological Corridors and Linkages among conserved populations to provide for population fluctuation and enhance genetic diversity. So, although some Take could occur within the Conservation Areas, the Conservation Objectives required by the Plan will provide for protection of Habitat to ensure the long-term persistence of this species.

Outside of the Conservation Areas, there are 12,903 acres (48%) of modeled Habitat authorized for Take. The Habitat outside the Conservation Areas is already highly fragmented, surrounded by existing Development, and has a compromised sand source/transport system. The potential for this Habitat to provide for the long-term persistence of Coachella Valley fringe-toed lizard populations is low. These areas are primarily in the remnants of the Big Dune south of Interstate 10 east to La Quinta and Indio. There are scattered areas in the vicinity of the Whitewater Floodplain Preserve, including south of the levee that is the preserve's southern boundary. These fragmented blocks are more susceptible to edge effects, including mortality on roads and predation by feral animals.

Although the percentage of fringe-toed lizard modeled Habitat that could be lost to development within the next 75 years appears to be substantial, evaluation of the impacts of Take requires an assessment of the quality of this Habitat. The actual reduction in Habitat value is expected to be considerably less than indicated by the raw acreage numbers because:

1. Conserved Habitat areas are large enough to contain self-sustaining populations of fringe-toed lizards and incorporate key Habitat elements, including sandy substrates and intact sand transport system.
2. Take within the Conservation Areas would not eliminate or significantly impact any core populations. Conservation Objectives require any approved development within Conservation Areas to ensure protection of Core Habitat.
3. As a result of implementing the Conservation Objectives to protect Habitat for this species and provide for connectivity, the Plan would not sever connections between any significant populations. Habitat areas are adequately connected to each other to allow genetic exchange. Biological Corridors and Linkages would be conserved to provide Habitat connectivity from Cabazon and Snow Creek to the east end of the Indio Hills.
4. Potential Development would not adversely impact the Essential Ecological Processes needed to maintain currently viable Habitat. Conservation Areas were carefully designed to incorporate the sand source and sand transport systems.
5. Lands in the MSHCP Reserve System would be managed and monitored to address significant edge effect problems, potential loss of Habitat from introduction of exotic species, and other stressors to this species,

The issuance of Take Permits, therefore, will not likely jeopardize the continued existence of the Coachella Valley fringe-toed lizard and the implementation of the MSHCP will provide for the Conservation of the species.

Measures to Avoid, Minimize, and Mitigate Take of Coachella Valley Fringe-Toed Lizard

To mitigate the Take of Coachella Valley fringe-toed lizard, the Permittees will protect and manage in perpetuity 6,999 acres of the modeled Habitat for this species. The 5,999 acres of modeled Habitat within Existing Conservation Lands will be monitored and managed to ensure that Conservation Objectives are met. The Plan will thus ensure Conservation, through protection and management, of 12,998 acres of Additional Conservation Lands for this species.

The proposed Conservation Areas will ensure that a minimum of 48%, of the occupied and potential Habitat in the entire Plan area will be conserved for the Coachella Valley fringe-toed lizard. Core Habitat was designated for this species in the Snow Creek/Windy Point, Whitewater Floodplain, Willow Hole, and Thousand Palms Conservation Areas, based primarily on the distribution of active blowsand areas. In the area from Fingal's Finger, at the west end of Snow Creek, to Windy Point, 1,374 acres of contiguous Core Habitat have been mapped; at least 1,244 of these acres will be conserved. In the Whitewater Floodplain Conservation Area, 5,617 acres of Core Habitat have been mapped; a minimum of 5,309 of these acres will be conserved. In the Willow Hole Conservation Area, 897 acres of Core Habitat are present with a Conservation Objective to ensure conservation of at least 823 acres of this Habitat. On the Thousand Palms Preserve, 3,869 of the total 3,962 acres of Core Habitat will be conserved, for a total in the Plan Area of 11,850 acres of Core Habitat for this lizard species. Those areas where Take could be permitted for this species, including approximately 778 acres, are primarily in the remnants of the Big Dune south of Interstate 10. The Big Dune area no longer has a viable sand transport/wind corridor. Active blowsand areas have been disturbed, and Essential Ecological Processes are already altered and degraded primarily by the Interstate 10 freeway and four-lane roads that fragment the dune. This Big Dune area is also highly fragmented by major roads. These fragmented blocks are more susceptible to edge effects, including mortality on roads and predation by feral animals.

Additionally, the Plan calls for Management and Monitoring Programs to ensure the Conservation of this species, including control of activities that degrade fringe-toed lizard Habitat such as fragmentation and OHV trespass, control of invasive species where necessary, and evaluation of lizard population parameters according to monitoring results. The Plan also calls for refinement and updating of the model that addresses the distribution and Habitat parameters of the Coachella Valley fringe-toed lizard throughout the Reserve System.

Overall Impacts to Coachella Valley Fringe-toed Lizard under the Plan

Implementation of the Plan will maintain and enhance population viability of the Coachella Valley fringe-toed lizard, as unprotected portions of its Habitat, potential Habitat, and Essential Ecological Processes for the aeolian sand system will be preserved. This Plan builds on the protection established by the Coachella Valley Fringe-toed Lizard HCP (The Nature Conservancy 1985) by protecting significant additional Core Habitat and associated Essential Ecological Processes.

The fringe-toed lizard will benefit from the establishment of the MSHCP Reserve System which will include Core Habitat form Snow Creek to the Thousand Palms Preserve and Other Conserved Habitat from Willow Hole to the East Indio Hills. Implementation of the Plan is expected to provide for persistence of the Coachella Valley fringe-toed lizard within the Plan

Area, where only 22% of the modeled Habitat is currently protected. The Plan will ensure the Conservation an additional 26% of Habitat and potential Habitat areas. The combination of the overall Conservation measures; species-specific measures such as management to minimize impacts such as OHV trespass, fragmentation, and edge effects, monitoring to better understand the effects of these impacts on the species, and long-term protection, management, and enhancement of fringe-toed lizard Habitat is expected to effectively compensate for potential adverse effects to this threatened and endangered species.

9.6.2.5 Species Account: Background

Distribution, Abundance, and Trends. The Coachella Valley fringe-toed lizard is restricted to the Coachella Valley and was found historically from near Cabazon at the northwestern extreme to near Thermal at the southeastern extreme. It is associated with a substrate of aeolian (wind-blown) sand to which it has developed morphological and behavioral adaptations (Heifetz 1941, Stebbins 1944, Norris 1958), and it occurs wherever there are large patches of the appropriate substrate (England and Nelson 1976, LaPre and Cornett 1981, Turner et al. 1981, England 1983, C. Barrows 1997). As Development of the Coachella Valley progressed, fringe-toed lizard Habitat declined from roughly 171,000 acres, historically (The Nature Conservancy 1985) to 63,360 acres in 1980 (Federal Register 1980) to 27,206 acres estimated by the model in 2000.

Coachella Valley fringe-toed lizard abundance, calculated as density, was estimated at several sites considered representative of Habitat in the Coachella Valley by Turner et al. (1981, 1984). These estimates, made from surveys in only one year, ranged from 11 to 45 per hectare (four to 18 per acre) in unstabilized Habitat. However, a long-term demographic study by Muth and Fisher (unpublished data, 1985-2003; pers. comm.) revealed density variations among years from 17 to 149 per hectare (seven to 60 per acre) at one site. Availability of food resources appears causal to these fluctuations in density, as reproduction and mortality are correlated with annual rainfall.

The Coachella Valley fringe-toed lizard is omnivorous, and diet changes as a function of food availability. During normal to wet years, it eats primarily flowers and plant dwelling arthropods. During dry periods, the diet shifts to primarily leaves and ants (Durtsche 1987, 1995). The dietary content differs also between breeding and non-breeding seasons for males, but does not differ significantly for females. During late summer, the diets of the two sexes are indistinguishable (Durtsche 1992).

Coachella Valley fringe-toed lizards differ sexually in their spatial use of the Habitat. Males have a significantly larger home range size than do females. The average sizes are 1,070m² (11,518 ft²) for males and 437m² (4,704 ft²) for females (Horchar 1992). A home range is the area within which an animal conducts its normal daily and seasonal activity. A territory, on the other hand, is a portion of a home range that is defended. Muth and Fisher (pers. comm.) saw no evidence of territoriality in 16 years, contrary to Carpenter's (1963) observations of captive lizards.

Coachella Valley fringe-toed lizards are active from March to mid-November (and sometimes into December when the weather is accommodating), although adults are primarily active from April to October with a peak in May-June (Mayhew 1965, Muth and Fisher, pers.

comm.). Springtime activity is triggered when subsurface temperatures exceed the minimum voluntary temperature at -5 cm (-2 inches) where the lizards hibernate, and end when these temperatures drop below minimum voluntary in the fall (Cowles 1941, Brattstrom 1965, Muth and Fisher 1991). Daily activity is also associated with temperature: Mayhew (1964) found them active when their body temperatures ranged from 25.8-44.0° C (78-111° F); the mean is 38.0° C (100° F). They must have access to cool temperatures to survive midday temperatures during the hottest months. Muth and Fisher (1991) found that surface temperatures in the shade and subsurface temperatures at -5 cm in the sun exceed the critical thermal maximum for the species (Brattstrom 1965). They must burrow 5 cm in the shade or much deeper in the sun to escape these extremes. Not all individuals are active any given day, despite appropriate temperatures. Muth (1987) and Muth and Fisher (1991 and unpubl. data) found that, on average, only 20% of their marked population was active daily, with much individual variation. Inactive individuals must be buried in the shade or at 10 cm or deeper if in the sun. Although Fisher and Muth (pers. comm.) watched them excavate relatively deep burrows in the sun on the hottest days, Pough (1970) states that they do not bury deeper than 3 to 4 cm "even under near-fatal heat stress."

Breeding occurs from late April into August, and eggs are laid from May into September (Mayhew 1965). This prolonged breeding season, along with distinct size classes among hatchlings, the simultaneous presence of enlarged eggs in both oviduct and ovary, and the recurrence of breeding color in individual females suggest they lay multiple clutches per year when food resources are ample (Mayhew 1965, Muth and Fisher, unpubl. data). Young of the year hatch the first week of August at Whitewater Floodplain Reserve, on average (Muth and Fisher, unpubl. data), but a week or two earlier at the Thousand Palms Preserve (Cameron Barrows, pers. comm.) where average temperatures are higher. Growth rate is positively correlated with annual rainfall, and young reach adult size one to two (sometimes three) years after hatching. Fewer females breed during dry years, and they lay fewer egg clutches those years (Muth and Fisher, unpubl. data).

Coachella Valley fringe-toed lizards are known to live eight years in the wild, but annual survivorship is about 35%. Size, sex, or age-related differences in mortality have not been detected (Muth and Fisher 1991). Known predators include larger conspecifics, leopard lizards (*Gambelia wislizenii*), coachwhip snakes (*Masticophis flagellum*), sidewinders (*Crotalus cerastes*), loggerhead shrikes (*Lanius ludovicianus*), and American kestrels (*Falco sparverius*). Coyotes (*Canis latrans*), kit foxes (*Vulpes macrotis*), Coachella Valley round-tailed ground squirrels (*Spermophilus tereticaudus* ssp. *chlorus*), red-tailed hawks (*Buteo jamaicensis*), prairie falcons (*Falco mexicanus*), greater roadrunners (*Geococcyx californianus*), and burrowing owls (*Speotyto cunicularia*) utilize Coachella Valley fringe-toed lizard Habitat and are known to eat lizards.

Trépanier and Murphy (2001) analyzed nine populations of Coachella Valley fringe-toed lizards using mitochondrial DNA and found them to be nearly identical. They found the species to be most similar to its nearby congener, the Colorado Desert fringe-toed lizard, confirming earlier analyses of anatomical characters (Norris 1958, de Querioz 1989) and display behavior (Carpenter 1963). But genetic differences among the nine populations are considerably less than genetic differences among populations of the Colorado Desert fringe-toed lizard, indicating a relatively recent genetic isolation.

Associated Covered Species. Other target species whose Habitat overlaps with that of

the Coachella Valley fringe-toed lizard include the flat-tailed horned lizard, Coachella Valley milkvetch, Palm Springs pocket mouse, Coachella Valley round-tailed ground squirrel, Coachella Valley giant sand-treader cricket, Coachella Valley Jerusalem cricket, and the burrowing owl.

9.6.3 Flat-Tailed Horned Lizard *Phrynosoma mcallii*

Status **Federal:** **No official status**
State: **California Species of Special Concern**

9.6.3.1 Species Conservation Goals and Objectives

Conserve and manage populations within the MSHCP Reserve System according to the following criteria:

Goal 1: Protect Core Habitat areas that include occupied Habitat, and associated Essential Ecological Processes, allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused disturbance, and edge effects to Core Habitat by conserving contiguous Habitat patches and effective Linkages between patches of Core Habitat.

Objective 1. Ensure conservation of Core Habitat areas including at least 4,051 acres within the following Conservation Area:

- Thousand Palms Conservation Area

Please refer to Section 4.3 and Table 9-17 for specific acreages to be protected by this Conservation Objective.

Goal 2: Protect Other Conserved Habitat, to provide sufficient area and variety of Habitat types to accommodate population fluctuations, allow for genetic diversity, and to conserve the range of environmental conditions within which this lizard is known to occur.

Objective 2. Through adherence to other Conservation Objectives (for another species, a natural community, Essential Ecological Process area, Biological Corridor, or Linkage area) conserve 13,025 acres of Other Conserved Habitat for this lizard in the following Conservation Areas:

- Whitewater Floodplain Conservation Area
- Willow Hole Conservation Area
- East Indio Hills Conservation Area
- Dos Palmas Conservation Area
- Santa Rosa and San Jacinto Mountains Conservation Area

Please refer to Section 4.3 and Table 9-17 for specific acreages to be protected by this Conservation Objective.

Table 9-17: Summary of Habitat within Conservation Areas Flat-Tailed Horned Lizard

Conservation Area	*Total Acres of Habitat in Conserv. Area*	*Acres of Disturbance Authorized*	*Acres of Existing Conservation Lands*	*Remaining Acres to be Conserved*	*Total Acres to be Conserved in MSHCP Reserve System*	*Designation*[1]
Snow Creek/ Windy Point	20	2	4	14	18	Potential Other Cons. Habitat
Whitewater Floodplain	3,369 / 2,120	177 / 121	1,598 / 909	1,594 / 1,090	3,192 / 1,999	Pred. / Pot. Other Cons. Habitat
Upper Mission Creek/ Big Morongo Cyn.	96	10	0	86	86	Potential Other Cons. Habitat
Willow Hole	880 / 842	75 / 84	126 / 5	679 / 753	805 / 758	Pred. / Pot. Other Cons. Habitat
Long Canyon	110	N/A	0	(110)[2]	0	Potential Other Cons. Habitat
Edom Hill	276	28	0	248	248	Potential Other Cons. Habitat
Thousand Palms	4,148	97	3,174	877	4,051	Pred. Core Habitat
Thousand Palms	98 / 81	10 / 1	61 / 21	27 / 59	88 / 80	Pred. / Pot. Other Cons. Habitat
East Indio Hills	645	58	67	520	587	Predicted Other Cons. Habitat
Dos Palmas	5,537	403	1,503	3,631	5,134	Predicted Other Cons. Habitat
Santa Rosa / San Jacinto Mtns.	61 / 15	10 / 1	45 / 1	6 / 13	51 / 14	Pred. / Pot. Other Cons. Habitat
Total – All Habitat	*14,738 / 3,560*	*830 / 247*	*6,574 / 940*	*7,334 / 2,263 (110)*[2]	*13,908 / 3,203*	*Predicted / Potential*
Total – Core Habitat	*4,148*	*97*	*3,174*	*877*	*4,051*	*Predicted*
Total – Other Cons. Habitat	*10,590 / 3,560*	*733 / 247*	*3,400 / 940*	*6,457/ 2,263 (110)*[2]	*9,857/ 3,203*	*Predicted / Potential*

[1] The species distribution model for the flat-tailed horned lizard includes predicted ("pred.") Habitat and also potential (Pot.) Habitat. Predicted Habitat includes areas where presence of this species is known or expected based on recent observations. Potential Habitat includes areas where there are historical observations of this species but no recent observations are recorded. See Section 9.6.3.3 for additional information.

[2] Numbers within parentheses are acres of Habitat in fluvial sand transport areas. The only Conservation Objective in this Conservation Area is to maintain fluvial sand transport. Habitat conservation is not an objective.

Goal 3: Protect Essential Ecological Processes, including sand source/transport systems, necessary to maintain Core Habitat and Other Conserved Habitat for this species.

Objective 3. Ensure protection of Essential Ecological Process areas through Conservation Area Conservation Objectives for Essential Ecological Processes.

Goal 4: Maintain Biological Corridors and Linkages among all conserved populations.

Objective 4. Protect Biological Corridors and Linkages through Conservation Area Conservation Objectives for Biological Corridors and Linkages. Key Habitat Linkages and Biological Corridors include the following:

- Whitewater River Biological Corridor
- Mission Creek Biological Corridor
- Morongo Wash Flood Control Corridor
- ~~Morongo Wash Special Provisions Area~~
- Willow Wash Biological Corridor
- Possible future wildlife undercrossings at Indian Avenue and Gene Autry Trail in the Whitewater Floodplain Conservation Area
- Possible future widened culverts or undercrossings at Palm Drive
- Possible future widened culverts or undercrossings at Mountain View Road, and Varner Road in the Willow Hole Conservation Area
- Possible future wildlife undercrossings along Ramon Road, Washington Street, and Thousand Palms Canyon Road in the Thousand Palms Conservation Area

Goal 5: Ensure conservation of the flat-tailed horned lizard by maintaining the long-term persistence of self-sustaining populations and conserving Habitat quality through biological monitoring and Adaptive Management actions in the Plan Area.

Objective 5a. Implement monitoring and Adaptive Management actions to ensure self-sustaining populations within each Core Habitat area.

Objective 5b. Establish at least two additional self-sustaining populations of the flat-tailed horned lizard, if feasible, in previously occupied habitat.

9.6.3.2 Threats, Limiting Factors, and Adaptive Management

Threats to the flat-tailed horned lizard include increased mortality and loss of Habitat. Population viability analysis indicates that populations are particularly sensitive to changes in mortality rate and fecundity. A slight change in mortality or fecundity can lead to extinction (Rorabaugh et al., unpubl. data). Threats to Habitat within the Plan Area include agricultural Development, urban Development, expansion of utility corridors, and OHV use. Here, 84% of the historic Habitat has been lost to urban and agricultural Development (K. Nicol, pers. comm.). This estimate is conservative because much of the remaining Habitat is now discontinuous and fragmented. Roads are known to dramatically increase mortality of desert reptiles, including flat-tailed horned lizards, and may deplete the population for as much as 1 mile from the road edge. Another serious edge effect is predation. This predation could occur from household pets that are

allowed to wander into Habitat from surrounding urban Development. Recent evidence from the Thousand Palms Preserve suggests that predation rates by native predators such as kestrels may be increased due to artificial perches associated with Development (palm trees, power poles). Non-native species, including Saharan mustard (*Brassica tournefortii*) and Russian thistle (*Salsola tragus*) may impact this species as well.

The following actions may be needed to ensure species persistence and long-term viability if biological monitoring indicates that such actions are warranted. This list is not comprehensive but identifies some of the known or likely threats to this species. More detailed information on the Management and Monitoring Programs can be found in Section 8.0. Actions may include:

1. Control and manage impacts that degrade flat-tailed horned lizard Habitat, including fragmentation by roads, OHV use in protected Habitat (except on designated routes of travel, if any), and other human disturbance.
2. Control human access to occupied Habitat as necessary.
3. Consider the need for perimeter fencing to keep lizards in Conservation Areas and away from roadways.
4. Identify actions to reduce impacts from, and control where feasible, invasive species if it is determined from monitoring results that there are impacts to flat-tailed horned lizards.
5. Include measures to reduce the impacts to the lizards' food source, harvester ants, including aerial pesticide spraying (in coordination with the California Department of Food and Agriculture) or introduction of exotic species (e.g. fire ants).

9.6.3.3 Species Conservation Analysis

Conservation Area Reserve Design. The MSHCP Reserve System includes the most viable known Habitat in the Plan Area for the flat-tailed horned lizard. No other unfragmented, occupied Habitat of sufficient size remains in the Plan Area. In addition, potential Habitat across the range of the species is included. Ideally, three or more sites with discrete sand sources and of sufficient size to maintain a viable population should be preserved. Realistically, there are not three such sites remaining that are not already fragmented or otherwise compromised by Development. Thus, the most appropriate measure to meet the Conservation needs of the species is to acquire unprotected Habitat that is still intact and of sufficient size and to ensure that existing Biological Corridors are maintained between local populations. The Conservation Areas benefit this species by securing the long-term sand source–sand transport systems for their preferred Habitat in the dune areas of the western and central Coachella Valley and by securing the unprotected Habitat described above throughout the Plan Area.

The species distribution model for the flat-tailed horned lizard includes predicted Habitat and also potential Habitat. The development of the flat-tailed horned lizard model occurred through a coordinated effort involving members of the SAC, wildlife agency biologists, and other biologists with expertise on flat-tailed horned lizards. The team labeled Habitat where presence of the flat-tailed horned lizard was expected based on recent observations as predicted Habitat. All of the Core Habitat is in this category. Some outlying Habitat, generally above 800 feet in elevation, where historical observations of this lizard are in the database but no recent

observations are recorded, was labeled potential Habitat. Statistics for this species presented in this section and elsewhere include both predicted and potential Habitat.

The Planning Team selected Core Habitat from the Habitat model for this species using the following four criteria: (1) Core Habitat is sufficiently large that it can support a self-sustaining population independent of other Core Habitat areas; (2) Core Habitat is not fragmented by Development, including roads. Although lightly traveled two-lane roads that have limited potential for expansion (e.g. Snow Creek Road) were not considered barriers to this species. Where roads have the potential to fragment Core Habitat, the Plan provides for wildlife underpasses to be constructed when road widening could cause potential fragmentation; (3) Core Habitat has intact processes, including sand source and sand delivery systems; while this species may not depend on active blowsand areas, long-term maintenance of the sand dunes and sand fields where it occurs was considered essential; and (4) Core Habitat provides suitable areas to act as refugia in the event of large-scale flood events or other extreme conditions (climate change, extended drought). For each area, see Table 9-17 for a breakdown of Existing Conservation Lands and remaining lands to be conserved. The Planning Team identified and assessed the sufficiency of the following Conservation Area as Core Habitat:

Core Habitat Areas:

1. ***Thousand Palms.*** The Thousand Palms Preserve includes approximately 3,660 acres of Habitat for flat-tailed horned lizards in the main dune system, in the area south of Ramon Road and west of Washington Avenue, and an additional approximately 610 acres of Habitat elsewhere in the Conservation Area for a total of approximately 4,310 acres. The Plan will conserve approximately 4,051 acres of the Core Habitat. Because Ramon Road and Washington Ave. receive moderate traffic volumes, the main dune system is somewhat isolated from the remaining flat-tailed horned lizard Habitat on the preserve. This lizard has been observed throughout the dune area south of Ramon. Sampling of specific density plots has not been conducted at this preserve. Using the population density estimates for this lizard noted above for the Coachella Valley would suggest that 2,089 individuals per acre (at 0.5/acre per Muth and Fisher (1992)) to 10,027 individuals per acre (at 2.4/acre per Turner and Medica (1982)) could occur within this part of the preserve. The Planning Team included this area as Core Habitat.

   There are no known locations for flat-tailed horned lizards on the Thousand Palms Preserve north of Ramon Road and west of Thousand Palms Canyon Road. The Habitat patch delineated in this area includes approximately 536 acres of potential flat-tailed horned lizard Habitat. Additional surveys would be necessary to determine whether these lizards are present on this part of the preserve.

Other Conserved Habitat:

1. ***Dos Palmas.*** The Dos Palmas area includes approximately 5,537 of occupied and potential Habitat that appears to be of high quality for this species. The Plan will conserve approximately 5,134 acres of this Other Conserved Habitat. Two different records exist for this species at Dos Palmas within the existing Dos Palmas ACEC. Systematic surveys for this lizard have not been completed at Dos Palmas. Distribution and abundance data would be necessary to confirm the significance of this area as Core Habitat. The amount of suitable Habitat and the lack of disturbance would suggest that this could be an important area for flat-tailed horned lizards. However, without sufficient data on the occurrence of this species at Dos Palmas, the Planning Team considered this area as Other Conserved Habitat, not Core Habitat, for the flat-tailed horned lizard.

2. ***Snow Creek/Windy Point.*** The sand sources for this area include primarily the Whitewater and San Gorgonio Rivers, plus their tributaries, originating in the San Jacinto and San Bernardino Mountains. However, no records for the occurrence of the flat-tailed horned lizard are known from the Snow Creek area. This lizard tends to occur at elevations below approximately 800 feet (Mark Fisher, pers. comm.). They are not expected to occur in numbers that would approach a viable population in the Snow Creek area west of Windy Point. There are historical records for this species on the east side of Windy Point in the Whitewater Floodplain Conservation Area (see below).

3. ***Whitewater Floodplain.*** This Conservation Area includes approximately 3,369 acres of predicted and 2,120 acres of potential Other Conserved Habitat for this species, from the area slightly west of Indian Avenue to the eastern boundary of the existing preserve. The Plan will conserve approximately 3,192 acres of predicted Other Conserved Habitat and 1,999 acres of potential Other Conserved Habitat. Both Indian Avenue and Gene Autry Trail were not, in their current condition as two lane roads, considered as significant barriers for this species. There is some additional Habitat on Garnet Hill and in the area east of the CVWD recharge ponds and west of Indian Avenue. The only confirmed record for this species on the Whitewater Floodplain Preserve is from incidental sightings on the fringe-toed lizard study plot by Mark Fisher and Al Muth (pers. comm.) in the years from 1985 to 1994; this lizard has not been observed by Fisher and Muth since 1994. Density estimates for this species have not been made at this location. According to Mark Fisher, a reasonable average density is one individual per acre (pers. comm.). A relatively small patch of Habitat occurs east of Gene Autry Trail, east of the existing preserve, including potential flat-tailed horned lizard Habitat. No known locations for flat-tailed horned lizards have been recorded here. Gene Autry Trail, a two-lane road, has heavy traffic and is already scheduled for widening. The Plan recommends that an undercrossing would be constructed on Gene Autry Trail when it is widened to six lanes. Surveys would need to be done to determine the extent to which this species occurs within this area. The Planning Team considered the modeled Habitat within this Conservation Area as moderate quality Habitat for this lizard; it was not considered as Core Habitat.

4. ***Willow Hole.*** The Willow Hole Conservation Area includes approximately 880 acres of predicted and 842 acres of potential Other Conserved Habitat for this lizard. The Plan will conserve approximately 805 and 758 acres, respectively, of this modeled Habitat. The only known location for this species within the Conservation Area is an observation

by Mark Fisher (pers. comm.) of a few individuals along the power line road on Flat Top Mountain in 1978. Cameron Barrows (pers. comm.) has reported that since 1986 he has not observed any flat-tailed horned lizards during annual monitoring transects for the fringe-toed lizard on the Willow Hole-Edom Hill Preserve. This area provides potential Habitat but was not considered Core Habitat by the Planning Team.

5. ***East Indio Hills.*** There are approximately 645 acres of occupied and potential Habitat for this lizard within this Conservation Area, mostly at the easternmost end of the Indio Hills. A portion of the Habitat on the south side of the Indio Hills has been compromised by recent Development activity. The viability of the sand transport system is also a concern here; the system, which carried sand from Whitewater River, Mission and Morongo Creeks, and others, has been blocked by Development upwind. The remaining sand sources in the Indio Hills and Little San Bernardino Mountains are at least partially compromised by roads. These uncertainties led the Planning Team to be concerned about whether this area provides Core Habitat for flat-tailed horned lizards. The Plan will conserve approximately 587 acres of Other Conserved Habitat for this lizard in this Conservation Area

6. ***Santa Rosa and San Jacinto Mountains.*** The Santa Rosa and San Jacinto Mountains Conservation Area has very limited flat-tailed horned lizard Habitat primarily in the area east of Windy Point where sandy substrate Habitat occurs along the toe of the San Jacinto Mountains. The Windy Point area is at the western limits of this species' known distribution. Of the 76 acres of modeled Habitat, all but 11 acres of Conservation Level 4 private lands are covered by a Conservation Objective for another purpose.

9.6.3.4 Take Analysis

Significance of the Plan Area to the Flat-Tailed Horned Lizard

The Plan Area represents the northernmost and westernmost limits of flat-tailed horned lizard geographic range. The populations in the Coachella Valley are isolated from all other flat-tailed horned lizard populations by agriculture, urban Development, and by the Salton Sea. As a group, the Coachella Valley population can be viewed as a distinct vertebrate population pursuant to FESA. To date, no analyses have been completed to determine if this distinct population differs genetically from the more southeastern populations.

The historic range of this species included suitable Habitat in southeastern California, southwestern Arizona, northwestern Sonora, Mexico, and northeastern Baja California, Mexico. In California, they occurred in the Lower Colorado River Basin and the Salton Basin (Coachella and Imperial Valleys) from Palm Springs south-southeast to the Mexican border - an area of about 3,462 square miles. Historically there were about 694 square miles in the Coachella Valley Plan Area of Riverside County. Currently, less than 50% of the historic Habitat in California remains (Turner et al. 1980).

Effects of Take on the Flat-Tailed Horned Lizard

The primary importance of the proposed MSHCP to the flat-tailed horned lizard is that it provides for long-term Conservation (including Habitat protection, management and monitoring)

of Core Habitat, the associated Essential Ecological Processes, and connectivity between these Habitat areas. In addition, the Conservation Areas provide protection across an array of Habitat variables, including moisture, soil character, elevation, and vegetation.

There are 32,426 acres of predicted modeled Habitat for this species within the Plan Area of which approximately 4,148 acres are identified as Core Habitat. For predicted Habitat, the Plan would ensure Conservation of 4,051 acres (98% of total) of the Core Habitat and 9,857 acres (93% of total) of the Other Conserved Habitat for the flat-tailed horned lizard. The conserved Core Habitat area in the Thousand Palms Conservation Area would be greater than 4,000 acres. Approximately 6,574 acres (20%) of the modeled Habitat are within Existing Conservation Lands and would be managed as part of the Reserve System. The Plan would conserve an additional 7,334 acres (23%) of predicted modeled Habitat for the flat-tailed horned lizard in the Plan Area.

For potential Habitat, there are 5,161 acres of modeled Habitat for this species within the Plan Area. The Plan would ensure Conservation of 3,203 acres (90% of total) of the potential Other Conserved Habitat for the flat-tailed horned lizard. Approximately 940 acres (26%) of the modeled potential Habitat are within Existing Conservation Lands and would be managed as part of the Reserve System. The Plan would conserve an additional 2,263 acres (64%) of potential modeled Habitat for the flat-tailed horned lizard in the Plan Area.

Within the Conservation Areas under the worst case scenario, Take could occur within 830 acres (6%) of predicted Habitat and 247 acres of potential modeled Habitat (7%). There could be Take on approximately 97 acres (2%) of all Core Habitat. Take could also occur within 733 acres of predicted Other Conserved Habitat (7% of total) and 247 acres (7%) of potential Other Conserved Habitat (See Table 9-17 and Table 4-114). Take of flat-tailed horned lizard Habitat within the Conservation Areas must be consistent with the Conservation Objectives for this species to: 1) ensure Conservation of Core Habitat; 2) protect Essential Ecological Processes needed to maintain horned lizard Habitat; and 3) maintain Biological Corridors and Linkages among conserved populations to provide for population fluctuation and enhance genetic diversity. So, although some Take could occur within the Conservation Areas, the Conservation Objectives required by the Plan will provide for protection of Habitat to ensure the long-term persistence of this species.

Outside of the Conservation Areas, there are 16,735 acres (52%) of predicted modeled Habitat authorized for Take. There are an additional 1,483 acres (29%) of potential Habitat authorized for Take. This potential Habitat is not known to be occupied by flat-tailed horned lizards. The Habitat outside the Conservation Areas is already highly fragmented, surrounded by existing Development, and has a compromised sand source/transport system. The potential for these areas to provide for the long-term persistence of flat-tailed horned lizard populations is low. These areas are primarily in the remnants of the Big Dune south of Interstate 10. The Big Dune area no longer has a viable sand transport/wind corridor and is highly fragmented by major roads. These fragmented blocks are more susceptible to edge effects, including mortality on roads and predation by feral animals. The patches of Habitat outside the Conservation Areas occur primarily at the margins of potential Habitat, including south of the Whitewater Floodplain Preserve, east and west of the Thousand Palms Preserve, east of the Salton Sea, and southeast of Box Canyon Road.

Although the percentage of horned lizard modeled Habitat that could be lost to development within the next 75 years appears to be substantial, evaluation of the impacts of Take requires an assessment of the quality of this Habitat. The actual reduction in Habitat value is expected to be considerably less than indicated by the raw acreage numbers because:

1. Conserved Habitat areas are large enough to contain self-sustaining populations of horned lizards and incorporate key Habitat elements, including sandy substrates and foraging areas.
2. Take within the Conservation Areas would not eliminate or significantly impact any core populations. Conservation Objectives require any approved development within Conservation Areas to ensure protection of Core Habitat.
3. As a result of implementing the Conservation Objectives to protect Habitat for this species and provide for connectivity, the Plan would not sever connections between any significant populations. Habitat areas are adequately connected to each other to allow genetic exchange. Biological Corridors and Linkages would be conserved to provide Habitat connectivity from Willow Hole and Thousand Palms to the east end of the Indio Hills.
4. Potential Development would not adversely impact the Essential Ecological Processes needed to maintain currently viable Habitat. Conservation Areas were carefully designed to incorporate the sand source and sand transport systems.
5. Lands in the MSHCP Reserve System would be managed and monitored to address significant edge effects, potential loss of Habitat from introduction of exotic species, and other stressors to this species,

The issuance of Take Permits, therefore, will not likely jeopardize the continued existence of the flat-tailed horned lizard and the implementation of the MSHCP will provide for the Conservation of this species.

Measures to Avoid, Minimize, and Mitigate Take of Flat-Tailed Horned Lizard

To mitigate the Take of flat-tailed horned lizard, the Permittees will protect and manage, in perpetuity, 7,334 acres of the predicted modeled Habitat for this species. The 6,574 acres of modeled Habitat within Existing Conservation Lands will be monitored and managed to ensure that Conservation Objectives are met. The Plan will thus ensure Conservation, through protection and management, of 13,908 acres of Additional Conservation Lands for this species.

The Plan includes a total of 37,587 acres of the predicted and potential Habitat for the flat-tailed horned lizard. Only one area was delineated as Core Habitat for this species, at the Thousand Palms Preserve. On the Thousand Palms Preserve, Foreman (1997) estimated approximately 6,000 acres as suitable Habitat for the flat-tailed horned lizard. The Planning Team for this Plan delineated approximately 4,148 acres as Core Habitat. Conservation Objectives ensure the conservation of at least 4,051 acres in the Thousand Palms Conservation Area.

The Plan also includes protection of Other Conserved Habitat at the Whitewater Floodplain Preserve and on Flat Top Mountain as part of the Willow Hole Conservation Area.

Additional potential Habitat west of Indian Avenue, potential Habitat at Willow Hole, and potential Habitat between Willow Hole, Edom Hill, and the Thousand Palms Preserve would also be conserved. Other Conserved Habitat will also be conserved within the East Indio Hills Conservation Area where this lizard is known to occur. Some Development has occurred in this area in the last two years within flat-tailed horned lizard Habitat, eliminating several known locations on the south side of the Indio Hills. The Habitat for this species that is not within the MSHCP Reserve System is generally highly fragmented in the remnants of the Big Dune, from Palm Springs east to La Quinta and Indio. These are areas where Essential Ecological Processes are already altered and degraded. Take could occur on 51% of the total Habitat, whether confirmed as occupied or not, for this species under the Plan.

Additionally, the Plan calls for Management and Monitoring Programs to ensure the Conservation of this species, including control of activities that degrade horned lizard Habitat, evaluation and management of edge effects and other impacts through Adaptive Management, control of invasive species where necessary, and restoration and enhancement of degraded Habitat as necessary according to monitoring results.

Overall Impacts to Flat-Tailed Horned Lizard under the Plan

Implementation of the Plan is expected to maintain and enhance population viability of the flat-tailed horned lizard as unprotected portions of its Habitat, potential Habitat areas, and Essential Ecological Processes for the sand dunes and fields will be conserved.

The flat-tailed horned lizard will benefit from the establishment of the MSHCP Reserve System which will build on the existing Conservation of 20% of this species Habitat. Plan implementation will ensure Conservation of currently unprotected Core Habitat areas for this lizard. The combination of the overall Conservation measures; species-specific measures such as management to minimize edge effects, fragmentation, and other impacts in flat-tailed horned lizard Habitat, monitoring to better understand the distribution and ecology of this species and the impacts of stressors on this species, and long-term protection, management, and enhancement of its Habitat is expected to effectively compensate for potential adverse effects to the flat-tailed horned lizard.

9.6.3.5 Species Account: Background

Distribution, Abundance, and Trends. The flat-tailed horned lizard is often associated with sand flats and sand dunes, although it is rare on more active dunes. It also occurs far from blowsand on concreted silt and gravel substrates (Beauchamp et al. 1998, Cameron Barrows, pers. comm., Muth and Fisher 1992). In their comparisons of Habitat types, Turner et al. (1980) determined the "best" Habitat consisted of hard packed sand or desert pavement overlain with fine blowsand. The most common perennial plants associated with Habitat for this lizard are creosote bush (*Larrea tridentata*) and white bursage (*Ambrosia dumosa*) (Turner et al. 1980, Muth and Fisher 1992).

Within the Plan Area, the flat-tailed horned lizard occurs at low elevations in the valley. Nearly all sightings in California and Arizona were below 800 feet (250 m) elevation (Mayhew and Carlson 1986, Turner et al. 1980, M. Fisher, pers. comm.). This lizard is found in two protected areas created by the HCP: the Thousand Palms Preserve and the Whitewater

Floodplain Preserve. Another population is known from an unprotected area at the east end of the Indio Hills on the north side of the Coachella Canal. A potential Habitat corridor was identified between the east end of the Indio Hills and the Thousand Palms Preserve. In a survey conducted to evaluate the suitability of this corridor in 1999 it was concluded that the corridor is not presently suitable for flat-tailed horned lizards (Hays, LaPointe, and Wright 1999).

The Plan Area represents the northernmost and westernmost limits of flat-tailed horned lizard geographic range. The populations in the Coachella Valley are isolated from all other flat-tailed horned lizard populations by agriculture, urban Development, and by the Salton Sea. As a group, the Coachella Valley population can be viewed as a distinct vertebrate population pursuant to FESA. To date, no analyses have been completed to determine if this distinct population differs genetically from the more southeastern populations. The historic range of this species included suitable Habitat in southeastern California, southwestern Arizona, northwestern Sonora, Mexico, and northeastern Baja California, Mexico. In California, they occurred in the Lower Colorado River Basin and the Salton Basin (Coachella and Imperial Valleys) from Palm Springs south-southeast to the Mexican border - an area of about 3,462 square miles. Historically there were about 694 square miles in the Coachella Valley Plan Area of Riverside County. Currently, less than 50% of the historic Habitat in California remains (Turner et al. 1980).

The flat-tailed horned lizard lives in low elevation desert characterized by extremely high temperatures and low rainfall and humidity. The flat-tailed horned lizard has a higher preferred body temperature than its congener, the desert horned lizard (*Phrynosoma platyrhinos*) (Brattstrom 1965). This enables the flat-tailed horned lizard to exploit a hotter environment, but at the same time may restrict it to that environment. Thus, there is little overlap in the geographic ranges of the two horned lizards found in the Coachella Valley (flat-tailed horned lizards, *P. mcallii*, and desert horned lizard, *P. platyrhinos*).

Like related species, flat-tailed horned lizards are myrmecophageous; they eat ants. Ants, especially harvester ants, comprise about 98% of their diet. The proportion of ants in the diet is substantially higher in the flat-tailed horned lizard than in any other horned lizard (Pianka and Parker 1975, Turner and Medica 1982).

The flat-tailed horned lizard is relatively active for a desert lizard. More than half (54%) of the day is spent in some kind of activity, including feeding, digging burrows, and running (Muth and Fisher 1992). They eat ants they encounter while moving. They dig burrows to escape hot midday temperatures, and for winter hibernation. Most of the remaining activity involves running to locate food, suitable burrow sites, and mates. The mean home range size is nearly 300,000 sq. ft. (over 6½ acres), a large portion of which is covered daily. When approached by a potential predator, a flat-tailed horned lizard usually stops running and flattens its body against the ground. It relies on cryptic coloration to avoid predation and will usually remain immobile until after the threat has passed. This behavior makes the species difficult to locate in the field; in blowsand Habitats, they may be located by following tracks left in freshly deposited sand (Cameron Barrows, pers. comm.).

Adult flat-tailed horned lizards are obligatory hibernators (Mayhew 1965). They hibernate from mid-November to mid-February in shallow burrows, although at least some juveniles are active on warm days during the winter (Cameron Barrows, pers. comm.). Reproductive activity begins in the spring and the first clutch of eggs hatches in late July. A

second cohort may hatch in September. One or both of these cohorts may not be produced or may not survive if environmental conditions are severe. Females lay about five eggs per clutch, on average. Young grow quickly and reach sexual maturity by one year of age.

About 50% of all individuals survive from one year to the next, with most mortality in mid-summer. Population density estimates range from 0.5 (Muth and Fisher 1992) to 2.4 (Turner and Medica 1982) flat-tailed horned lizards per acre. The lower value may underestimate the true density, and the higher value may overestimate it. In addition, density may vary annually with changes in environmental conditions.

Associated Covered Species. Within the Plan Area, other species of concern whose Habitat overlaps with that of the flat-tailed horned lizard include the Coachella Valley milkvetch, Palm Springs pocket mouse, Coachella Valley fringe-toed lizard, Coachella Valley round-tailed ground squirrel, Coachella Valley giant sand-treader cricket, Coachella Valley Jerusalem cricket, and burrowing owl.

9.7 Birds

This section contains species accounts, including Species Conservation Goals and Objectives, Habitat parameters and significant threats, for each of the eleven bird species proposed for coverage under this Plan. The birds include species that are resident in the Coachella Valley, including the burrowing owl, California black rail, crissal thrasher, and Le Conte's thrasher. A number of the species are migratory, occurring in the Coachella Valley primarily during migration, or during the nesting season. The migratory species include the gray vireo, Yuma clapper rail, and five riparian bird species, including the least Bell's vireo, southwestern willow flycatcher, summer tanager, yellow warbler, and yellow-breasted chat. For the riparian bird species, consideration was given in the Plan to Habitat used for breeding and Habitat used during migration. General measures common to all of these birds are listed below and measures specific to a given species that are not addressed in the general conservation measures are listed as species-specific conservation measures.

1. Avoid impacts to Habitat during nesting season, generally from February through July, for all bird species.

9.7.1 Yuma Clapper Rail *Rallus longirostris yumanensis*

Status **Federal:** **Endangered**
State: **Threatened**

9.7.1.1 Species Conservation Goals and Objectives

Conserve and manage populations within the MSHCP Reserve System according to the following criteria:

Goal 1: Ensure species persistence in the Plan Area by conserving existing populations, restoring degraded Habitat, and establishing additional Habitat as feasible. Conserve Habitat, and associated Essential Ecological Processes, allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused disturbance, and edge effects to Core Habitat by conserving contiguous Habitat patches and effective Linkages between patches of Core Habitat.

Objective 1a. Ensure conservation of Other Conserved Habitat, which consists of known Habitat areas and additional potential Habitat, including at least 744 acres in the following Conservation Areas:

- Dos Palmas Conservation Area
- Coachella Valley Stormwater Channel and Delta Conservation Area

Please refer to Section 4.3 and Table 9-18 for specific acreages to be protected by this Conservation Objective.

Objective 1b. Establish 66 acres of permanent Habitat for Yuma clapper rail in the Coachella Valley Stormwater Channel and Delta Conservation Area to replace the Habitat that is periodically altered by flood control and drain maintenance activities.

Goal 2: Protect Essential Ecological Processes, which may include hydrological regimes, necessary to maintain Core Habitat and Other Conserved Habitat for this species.

Objective 2. Ensure protection of Essential Ecological Process areas through Conservation Area Conservation Objectives for Essential Ecological Processes.

Goal 3: Ensure conservation of Yuma clapper rail by maintaining the long-term persistence of self-sustaining populations and conserving Habitat quality through biological monitoring and Adaptive Management actions in the Plan Area.

Objective 3. Implement biological monitoring and Adaptive Management to ensure self-sustaining populations within each Core Habitat area.

Table 9-18: Summary of Habitat within Conservation Areas Yuma Clapper Rail

Conservation Area	*Total Acres of Habitat in Conserv. Area*	*Acres of Disturbance Authorized*	*Acres of Existing Conservation Lands*	*Remaining Acres to be Conserved*	*Total Acres to be Conserved in MSHCP Reserve System*	*Designation*
Dos Palmas	682	42	267	374	641	Other Cons. Habitat
CV Stormwater Channel & Delta	62	6	4	52	56	Other Cons. Habitat
Total – All Habitat	*744*	*47*	*271*	*426*	*697*	--
Total – Other Cons. Habitat	*744*	*47*	*271*	*426*	*697*	--

9.7.1.2 Threats, Limiting Factors, and Adaptive Management

Water diversions, salt cedar infestations, Habitat manipulation for flood control and chemical contamination (the last two pertain primarily to the Whitewater delta) are the primary threats to Yuma clapper rails within the Plan Area. Another potential threat is the lining of the Coachella Canal; leakage from the Coachella Canal currently provides a portion of the water supply to rail Habitat at the Dos Palmas Preserve/ACEC. There are small amounts of Yuma clapper rail Habitat in the Plan Area, and it is unknown whether the Habitat areas are large enough to sustain a viable population. However, while the amount of Habitat in the Plan Area is relatively small, it is part of a larger network of Habitat in the Salton Sea basin. Even if the Habitat in the Plan Area is not able to support a viable population, it contributes to the larger population within the Salton Sea basin. The Habitat in the Plan Area may also provide important support as other parts of the Salton Sea basin change or undergo active management. Additional surveys are needed as part of Plan implementation to determine patch sizes and whether they are adequate for a self-sustaining population. There are opportunities for Habitat restoration and enhancement in the Plan Area.

The following actions may be needed to ensure species persistence and long-term viability if biological monitoring indicates that such actions are warranted. This list is not comprehensive but identifies some of the known or likely threats to clapper rails. More detailed information on the Management and Monitoring Programs can be found in Section 8.0. Actions may include:

1. Control invasive species, including plant species such as tamarisk and animal species such as non-native ants, brown-headed cowbirds, bullfrogs, and other species that threaten rail Habitat. Crayfish are an exotic species that has become an important component of the diet for Yuma clapper rail in the Salton Sea basin (C. Roberts, pers.

comm.); if monitoring indicates that control of crayfish is necessary, the need to establish other suitable prey for the Yuma clapper rail should be evaluated by the CVCC, Permittees, and the Wildlife Agencies. If the evaluation concludes that a new or enhanced prey base for the Yuma clapper rail is necessary to achieve the goals and objectives of the Plan, a management strategy that includes an implementation schedule will be developed by the CVCC within 12 months of that determination and submitted to the Wildlife Agencies for review and approval.

2. As part of the Monitoring Program, complete hydrologic studies for the Salt Creek area to determine if the water sources for the clapper rail's Habitat are adequately protected or if additional water sources may be needed.
3. To the extent activities are under Plan authority, maintain water levels, water quality, and proper functioning condition of seeps, springs, marshes, and wetlands. Conduct research on the potential impacts of these activities on Yuma clapper rails.
4. Estimate population size or patch occupancy of the Yuma clapper rails in the Plan Area.
5. Restore and enhance Habitat for Yuma clapper rails. This may include enhancing specific features in marshes, such as nesting sites.
6. Evaluate management actions for black rails as to affects on Yuma clapper rails.
7. Research methods of drain maintenance that minimize impacts to Yuma clapper rails.

9.7.1.3 Species Conservation Analysis

Conservation Area Reserve Design. The occupied Habitat in the Dos Palmas area is within the Dos Palmas Preserve/ACEC. Most of the land within the ACEC is owned by either the BLM or TNC/CNLM. Some private inholdings remain to be acquired, and would be acquired pursuant to the Plan as willing sellers and funds are available. The Habitat at the Salton Sea State Recreation Area is managed by State Parks to conserve the species; efforts will be made to coordinate with the recreation area for management of Yuma clapper rail at this location.

The Planning Team did not attempt to estimate population densities or identify acres of Core Habitat for the Yuma clapper rail. The intent was to conserve all known locations and contiguous Habitat. The distribution of clapper rail Habitat by Conservation Area is shown in Table 9-18.

9.7.1.4 Analysis: Impacts of Disturbance

Significance of the Plan Area to Yuma Clapper Rail

The Plan Area is at the northern edge of the Yuma clapper rail distribution. There are records of occurrences from the Whitewater River delta and upstream, in scattered locations, for approximately 10 miles along the Coachella Valley Stormwater Channel, two agricultural drains on the west side of the Salton Sea, at the mouth of Salt Creek, and in the Dos Palmas area. The Yuma clapper rail is a federally listed endangered species and is state listed as threatened. Yuma clapper rails are now and have historically been restricted to the region of the lower Colorado River, the Colorado River delta, and appropriate Habitats surrounding the Salton Sea and in the Whitewater River north of the sea. There are rare records for this species in marshland Habitat

along the eastern shore of the Sea of Cortez. Within this historic range, appropriate Habitat along the lower Colorado River and delta areas has been severely reduced through water diversions and tamarisk/salt cedar infestations.

Effects of Disturbance on the Yuma Clapper Rail

The primary importance of the proposed MSHCP to the Yuma clapper rail is that currently unprotected Habitat will be conserved, additional Habitat will be created, and existing Habitat will be enhanced as a result of the Monitoring and Management Programs.

There are 762 acres of modeled Habitat for this species within the Plan Area of Core Habitat was not designated for this species although all known Habitat was considered as core. The Plan would ensure Conservation of 697 acres (91%) of the Habitat for this rail. Approximately 271 acres (36%) of the modeled Habitat are within Existing Conservation Lands and would be managed as part of the Reserve System. There are 6 known locations for Yuma clapper rail within the Dos Palmas Conservation Area 5 of which are within Existing Conservation Lands. The Plan would conserve a total of 697 acres (94%) of the modeled Habitat for Yuma clapper rail in the Plan Area.

Within the Conservation Areas under the worst case scenario, 47 acres of Disturbance of modeled Habitat (6%) could occur. Disturbance of Yuma clapper rail Habitat within the Conservation Areas must be consistent with the Conservation Objectives for this species to: 1) ensure Conservation of Core Habitat; 2) protect Essential Ecological Processes including the hydrological regime needed to maintain rail Habitat; and 3) maintain Biological Corridors and Linkages among conserved populations to provide for population fluctuation and enhance genetic diversity. So, although some Disturbance could occur within the Conservation Areas, the Conservation Objectives required by the Plan will provide for protection of Habitat to ensure the long-term persistence of this species.

Outside of the Conservation Areas, there are 16 acres of modeled Habitat authorized for Disturbance. There are 14 known locations for this rail, 8 of which are outside the Conservation Areas. The Habitat outside the Conservation Areas occurs along the Coachella Valley Stormwater Channel, north of the Stormwater Channel and Delta Conservation Area boundary. This Habitat is impacted by periodic flood control channel maintenance by CVWD. The impacts to this Habitat will be mitigated by the creation of replacement permanent rail Habitat by CVWD (see below).

The establishment of Conservation Areas where this species is protected is a significant improvement over the current situation where only 33% of the clapper rail's Habitat is protected. The actual impacts of Disturbance to this species are expected to be low because:

1. Conserved Habitat areas are large enough to support part of a self-sustaining metapopulations of Yuma clapper rails and incorporate key Habitat elements, including cattail/bulrush vegetation and foraging areas.
2. Disturbance within the Conservation Areas would not eliminate or significantly impact any core populations. Conservation Objectives require any approved Development or disturbance within Conservation Areas to ensure protection of existing populations.

3. As a result of implementing the Conservation Objectives to protect this species existing populations would be conserved, degraded Habitat would be restored, and additional Habitat would be established. Habitat areas are adequately connected to each other to allow genetic exchange. Biological Corridors and Linkages would be conserved to provide Habitat connectivity.
4. Potential Development would not adversely impact the Essential Ecological Processes needed to maintain currently viable Habitat, including maintenance of water quality, water quantity, and associated hydrological regime that supports the wetland Habitat for clapper rails.
5. Habitat for Yuma clapper rail in the MSHCP Reserve System would be managed and monitored to address significant edge effect problems, potential loss of Habitat from introduction of exotic species, and other stressors to this species,

The issuance of Permits, therefore, will not likely jeopardize the continued existence of the Yuma clapper rail and the implementation of the MSHCP will provide for the Conservation of the species.

Measures to Avoid, Minimize, and Mitigate Disturbance of Yuma Clapper Rail

To mitigate impacts to Yuma clapper rail, the Permittees will protect and manage, in perpetuity, 426 acres of the modeled Habitat for this species. The 271 acres of modeled Habitat within Existing Conservation Lands will be monitored and managed to ensure that Conservation Objectives are met. The Plan will thus ensure Conservation, through protection and management, of 697 acres, or 91%, of the clapper rail Habitat in the Plan Area.

Some temporary impacts to Yuma clapper rail Habitat will be permitted in the course of O&M activities by CVWD. The Coachella Valley Water District (CVWD) will establish 66 acres of permanent Habitat for the California black rail and Yuma clapper rail in this Conservation Area to replace the 41 acres of Habitat in the Coachella Valley Stormwater Channel and the 25 acres of Habitat in the drains that is periodically altered by flood control and drain maintenance activities (See Section 4.3.20). As part of this restoration a plan detailing the location, water supply, and monitoring and management responsibilities, including funding will be developed within two years of permit issuance.

Additionally, the Plan calls for Management and Monitoring Programs to ensure the Conservation of this species, including control of activities that degrade rail Habitat, control of invasive species where necessary, and restoration and enhancement of degraded Habitat as necessary according to monitoring results.

1. If monitoring indicates that control of crayfish is necessary, the need to establish other suitable prey for the Yuma clapper rail should be evaluated. Crayfish, an exotic species, has become an important component of the diet for Yuma clapper rail in the Salton Sea basin (C. Roberts, pers. comm.).
2. As part of the Monitoring Program, complete hydrologic studies for the Salt Creek area to determine if the water sources for the clapper rail's Habitat are adequately protected or if additional water sources may be needed.

3. To the extent activities are under Plan authority, maintain water levels, water quality, and proper functioning condition of seeps, springs, marshes, and wetlands.

The Yuma clapper rail is a Fully Protected Species. Surveys will be required in potential Habitat for this rail before any activity that would impact the Habitat. If rails are found, the Habitat must be avoided or measures approved by The Wildlife Agencies taken to ensure that no take of an individual occurs, other than projects where Fish and Game Code Section 2081.7 is applicable.

Overall Impacts to Yuma Clapper Rail under the Plan

Implementation of the Plan is expected to maintain and enhance population viability of the Yuma clapper rail by protecting its existing Habitat in the Plan Area and restoring and enhancing additional Habitat. The BLM and TNC prepared a Dos Palmas Ecosystem Management Plan in 1994. BLM and the CNLM now manage the ACEC lands. A primary objective of the Dos Palmas plan is to provide for the protection and enhancement of desert pupfish and rail Habitat. Plan implementation will coordinate with BLM and CNLM.

The Yuma clapper rail will benefit from the establishment of the MSHCP Reserve System which will include Habitat in the Dos Palmas and Coachella Valley Stormwater Channel and Delta Conservation Areas. Only 33% of the modeled Habitat for this species is currently conserved. Implementation of the Plan is expected to provide for persistence of this threatened and endangered rail within the Plan Area, as currently unprotected portions of its Habitat and potential Habitat areas will be conserved. The combination of the overall Conservation measures; species-specific measures such as management to minimize impacts to rails and their Habitat, monitoring to better understand the distribution and population status of this species in the Plan Area, and long-term protection, management, and enhancement of Yuma clapper rail Habitat is expected to effectively compensate for potential adverse effects to this bird species.

9.7.1.5 Species Account: Background

Distribution, Abundance, and Trends. Yuma clapper rails are found in marsh Habitats of cattails (*Typha domingensis*) and bullwhip/California bulrush (*Scirpus californicus*). In Habitats found along and adjacent to the lower Colorado River, these rails selected some combination of cattails and bulrush for breeding. There was a post-breeding shift at some sites concurrent with a rise in water level, to higher elevation willows, arrowweed and salt cedar dominated Habitats. Common reed (*Phragmites communis*) was also used as Habitat, but usually occurred in areas too dry for breeding and foraging. Water depth appears to be an important Habitat characteristic, with average preferred depths varying from 6.5 cm to 20 cm, depending on the study site. In deeper water, a residual mat of decaying vegetation was important to allow the rails to have access and use throughout their home range. The rails also preferred Habitat edges and generally less dense Habitat to facilitate mobility and access. Home ranges for male birds were found to average 7.7 +/- 5.9 ha, and for females 9.9 +/- 9.6 ha.

The Salton Sea and Whitewater River Habitats are potentially impacted by chemical contaminants, salt cedar infestations, and flood control channel maintenance. The Yuma clapper rail occurs at the Salton Sea State Recreation Area at the mouth of Salt Creek. Yuma clapper rails occur within the Dos Palmas marshland complex in unknown numbers. The Dos Palmas

area may have particular importance in that it may be one of the few occupied sites throughout this bird's entire range that is relatively free of chemical contaminants. Both Dos Palmas and the Whitewater River delta/Salton Sea could, if managed appropriately, provide additional Habitat to what already exists there. The population size of Yuma clapper rails within this area is not known, nor is the trend in its population numbers, but it is likely that this population will require immigration from occupied Habitat to the south to maintain long term viability.

Associated Covered Species. California black rails are often found in association with Yuma clapper rail Habitat. Conservation measures for one species will benefit the other. Desert pupfish and riparian birds may be found in associated wetland Habitat.

9.7.2 California Black Rail *Laterallus jamaicensis*

Status	**Federal:**	**No official status**
	State:	**Threatened**

9.7.2.1 Species Conservation Goals and Objectives

Conserve and manage populations within the MSHCP Reserve System according to the following criteria:

Goal 1: Ensure species persistence in the Plan Area by conserving existing populations, restoring degraded Habitat, and establishing additional Habitat. Conserve Habitat, and associated Essential Ecological Processes, allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused disturbance, and edge effects to Core Habitat by conserving contiguous Habitat patches and effective Linkages between patches of Core Habitat.

Objective 1a. Ensure conservation of Other Conserved Habitat, which consists of known Habitat areas and additional potential Habitat, including at least 616 acres in the following Conservation Areas:

- Dos Palmas Conservation Area
- Coachella Valley Stormwater Channel and Delta Conservation Area

Please refer to Section 4.3 and Table 9-19 for specific acreages to be protected by this Conservation Objective.

Objective 1b. Establish 66 acres of permanent Habitat for California black rail in the Coachella Valley Stormwater Channel and Delta Conservation Area to replace the Habitat that is periodically altered by flood control and drain maintenance activities.

Table 9-19: Summary of Habitat within Conservation Areas California Black Rail

Conservation Area	*Total Acres of Habitat in Conserv. Area*	*Acres of Disturbance Authorized*	*Acres of Existing Conservation Lands*	*Remaining Acres to be Conserved*	*Total Acres of Habitat to be Conserved in MSHCP Reserve System*	*Designation*
Dos Palmas	597	37	226	334	560	Other Cons. Habitat
CV Stormwater Channel & Delta	62	6	4	52	56	Other Cons. Habitat
Total – All Habitat	*659*	*43*	*230*	*386*	*616*	--
Total - Other Cons. Habitat	*659*	*43*	*230*	*386*	*616*	--

Goal 2. Protect Essential Ecological Processes, which may include hydrological regimes, necessary to maintain Core Habitat and Other Conserved Habitat for this species.

Objective 2. Ensure protection of Essential Ecological Process areas through Conservation Area Conservation Objectives for Essential Ecological Processes.

Goal 3. Ensure conservation of California black rail by maintaining the long-term persistence of self-sustaining populations and conserving Habitat quality through biological monitoring and Adaptive Management actions in the Plan Area.

Objective 3. Implement biological monitoring and Adaptive Management to ensure self-sustaining populations within each Habitat area.

9.7.2.2 Threats, Limiting Factors, and Adaptive Management

Threats to the California black rails' continued occurrence within the Plan Area include water diversions that reduce marsh Habitat, including the lining of the earthen Coachella canal above Dos Palmas; Habitat modification for flood control at the Whitewater River delta; tamarisk infestations which degrade and dry up marsh Habitat; and predation from exotic bullfrogs. Even with appropriate Habitat management practices, the California black rail population within the Plan Area is small and will probably require immigration from Habitats outside the area being addressed in this Plan to maintain long-term viability.

Based on limited knowledge about the status of this species in the Plan Area and known threats, the following actions may be needed to ensure species persistence and long-term viability if biological monitoring indicates that such actions are warranted. This list is not

comprehensive but identifies some of the known or likely threats to black rails. More detailed information on the Management and Monitoring Programs can be found in Section 8.0. Actions may include:

1. Control invasive species, including plant species such as tamarisk and animal species such as non-native ants, brown-headed cowbirds, bullfrogs, crayfish, and other species that threaten black rail Habitat.
2. As part of the Monitoring Program, complete hydrologic studies for the Salt Creek area to determine if the water sources for the black rail's Habitat are adequately protected or if additional water sources may be needed.
3. To the extent activities are under Plan authority, maintain water levels, water quality, and proper functioning condition of seeps, springs, marshes, and wetlands.

BLM and TNC prepared a Dos Palmas Ecosystem Management Plan in 1994. BLM and CNLM now manage the ACEC lands. A primary objective of the Dos Palmas plan is to provide for the protection and enhancement of desert pupfish and rail Habitat. Plan implementation will involve coordination with BLM and CNLM.

9.7.2.3 Species Conservation Analysis

Conservation Area Reserve Design. The occupied Habitat in the Dos Palmas area is within the Dos Palmas ACEC. Most of the land within the ACEC is owned by either the BLM or TNC/CNLM. Some private inholdings remain to be acquired, and would be acquired pursuant to the Plan as willing sellers and funds are available. Two of the three known locations in the Dos Palmas Conservation Area are on private land; the third is on BLM land. Habitat at the Salton Sea State Recreation Area is managed for the Conservation of the species by State Parks. Protection and enhancement of the Coachella Valley Stormwater Channel and Delta population depends on achieving an agreement with CVWD regarding flood control channel maintenance. One black rail known occurrence is within the Coachella Valley Stormwater Channel and Delta on IID land. Additional information on dispersal distances is needed to evaluate configuration issues and whether the Conservation Areas for this species are currently too far apart to provide any connection.

The BLM and TNC prepared a Dos Palmas Ecosystem Management Plan in 1994. BLM and CNLM now manage the ACEC lands. A primary objective of the Dos Palmas plan is to provide for the protection and enhancement of desert pupfish and rail Habitat. The Plan will coordinate with BLM and CNLM in its implementation. Coordination with State Parks with regard to management of rail Habitat at the Salton Sea State Recreation Area will also be a part of Plan implementation.

The Planning Team did not attempt to estimate population densities or identify acres of Core Habitat for the California black rail. The intent was to conserve all known locations and contiguous Habitat. The distribution of California black rail Habitat by Conservation Area is shown in Table 9-19.

9.7.2.4 Disturbance Analysis

Significance of the Plan Area to California Black Rail

Historically, California black rails occurred along the Pacific coast from Bahia San Quintin in Baja California to San Diego, Los Angeles and north to San Francisco. Inland, these rails occurred from the delta of the Colorado River north to the central valley of California and on to eastern Oregon marshlands. Today, the coastal and inland wetlands are greatly reduced from their historic range.

A desert stronghold for this species appears to be along the lower Colorado River where over a hundred birds have been observed repeatedly during censuses in recent years. California black rails are known to occur within the Salt Creek watershed of the Dos Palmas region, both in the wetlands in the Dos Palmas Springs area and at the mouth of Salt Creek. No accurate numbers are available. There is also a record from the Whitewater delta area at the north end of the Salton Sea. Appropriate management of both Dos Palmas and the Whitewater delta could expand existing Habitat for this species.

Effects of Disturbance on the California Black Rail

The primary importance of the proposed MSHCP to the California black rail is that currently unprotected Habitat will be conserved, additional Habitat will be created, and existing Habitat will be enhanced as a result of the Monitoring and Management Programs.

There are 675 acres of modeled Habitat for this species within the Plan Area of Core Habitat was not designated for this species although all known Habitat was considered as core. The Plan would ensure Conservation of 616 acres (91%) of the Habitat for this rail. Approximately 230 acres (34%) of the modeled Habitat are within Existing Conservation Lands and would be managed as part of the Reserve System. Overall, the Plan would conserve a total of 616 acres (91%) of the modeled Habitat for California black rail in the Plan Area.

Within the Conservation Areas under the worst case scenario, 43 acres of Disturbance of modeled Habitat (7%) could occur. Disturbance of California black rail Habitat within the Conservation Areas must be consistent with the Conservation Objectives for this species to: 1) ensure Conservation of Core Habitat; 2) protect Essential Ecological Processes including the hydrological regime needed to maintain rail Habitat; and 3) maintain Biological Corridors and Linkages among conserved populations to provide for population fluctuation and enhance genetic diversity. So, although some Disturbance could occur within the Conservation Areas, the Conservation Objectives required by the Plan will provide for protection of Habitat to ensure the long-term persistence of black rails.

Outside of the Conservation Areas, there are 16 acres of modeled Habitat authorized for Disturbance. The Habitat outside the Conservation Areas is located along the Coachella Valley Stormwater Channel in an area of potential Habitat where the occurrence of black rails has not been confirmed. As with the Yuma clapper rail, the impacts to this Habitat as a result of flood control channel maintenance will be mitigated by the establishment of replacement permanent rail Habitat by CVWD (see below).

The establishment of Conservation Areas where this species is protected is a significant improvement over the current situation where only 33% of the black rail's Habitat is protected. The actual impacts of Disturbance to this species are expected to be low because:

1. Conserved Habitat areas are large enough to support, to the extent they occur, self-sustaining metapopulations of California black rails and incorporate key Habitat elements, including bulrush-dominated vegetation and foraging areas.
2. Disturbance within the Conservation Areas would not eliminate or significantly impact any core populations. Conservation Objectives require any approved Development or disturbance within Conservation Areas to ensure protection of existing populations.
3. As a result of implementing the Conservation Objectives to protect this species existing populations would be conserved, degraded Habitat would be restored, and additional Habitat would be established. Habitat areas are adequately connected to each other to allow genetic exchange. Biological Corridors and Linkages would be conserved to provide Habitat connectivity.
4. Potential Development would not adversely impact the Essential Ecological Processes needed to maintain currently viable Habitat, including maintenance of water quality, water quantity, and associated hydrological regime that supports the wetland Habitat for black rails.
5. Habitat for California black rail in the MSHCP Reserve System would be managed and monitored to address significant edge effect problems, potential loss of Habitat from introduction of exotic species, and other stressors to this species.

The issuance of Permits, therefore, will not likely jeopardize the continued existence of the California black rail and the implementation of the MSHCP will provide for the Conservation of the species.

<u>Measures to Avoid, Minimize, and Mitigate Disturbance of California Black Rail</u>

To mitigate the Disturbance of California black rail, the Permittees will protect and manage, in perpetuity, 659 acres of the modeled Habitat for this species. The 230 acres of modeled Habitat within Existing Conservation Lands will be monitored and managed to ensure that Conservation Objectives are met. The Plan will thus ensure Conservation, through protection and management, of 616 acres of Additional Conservation Lands for this species

Under the Plan, approximately 616 acres, or 91%, of the Habitat for this rail in the Plan Area will be conserved. All of the four known locations within the Plan Area are within the Coachella Valley Stormwater Channel and Delta or Dos Palmas Conservation Areas. Some temporary impacts to California black rail Habitat will be permitted in the course of O&M activities by CVWD. CVWD will establish and maintain 66 acres of Habitat for rails in the Coachella Valley Stormwater Channel and Delta Conservation Area (See Section 4.3.20 and Section 9.7.1.4 above for Yuma clapper rail).

Additionally, the Plan calls for Management and Monitoring Programs to ensure the Conservation of this species, including control of activities that degrade rail Habitat, control of

invasive species where necessary, and restoration and enhancement of degraded Habitat as necessary according to monitoring results.

1. As part of the Monitoring Program, complete hydrologic studies for the Salt Creek area to determine if the water sources for the black rail's Habitat are adequately protected or if additional water sources may be needed.
2. To the extent activities are under Plan authority, maintain water levels, water quality, and proper functioning condition of seeps, springs, marshes, and wetlands.

The California black rail is a Fully Protected Species. Surveys will be required in potential Habitat for this rail before any activity that would impact the Habitat. If rails are found, the Habitat must be avoided or measures approved by The Wildlife Agencies taken to ensure that no take of an individual occurs, other than projects where Fish and Game Code Section 2081.7 is applicable.

Overall Impacts to California Black Rail under the Plan

Implementation of the Plan is expected to maintain and enhance population viability of the California black rail by protecting its existing Habitat in the Plan Area and restoring and enhancing additional Habitat.

The California black rail will benefit from the establishment of the MSHCP Reserve System which will include Habitat in the Dos Palmas and Coachella Valley Stormwater Channel and Delta Conservation Areas. Only 33% of the modeled Habitat for this species is currently conserved. Implementation of the Plan is expected to provide for persistence of this threatened and endangered rail within the Plan Area, as currently unprotected portions of its Habitat and potential Habitat areas will be conserved. The combination of the overall Conservation measures; species-specific measures such as management to minimize impacts to rails and their Habitat, monitoring to better understand the distribution and population status of this species in the Plan Area, and long-term protection, management, and enhancement of California black rail Habitat is expected to effectively compensate for potential adverse effects to this bird species.

9.7.2.5 Species Account: Background

Distribution, Abundance, and Trends. California black rails are birds of dense coastal and inland marsh Habitat. Based on radio telemetry data gathered on the lower Colorado River, California black rails selected Habitat dominated by California bulrush (*Scirpus californicus*) and three square bulrush (*S. americanus*). They either avoided cattails (*Typha domingensis*) or utilized cattail Habitat in proportion to its availability. However, nests were often constructed of cattail leaf blades, even though cattails were rarely the dominant vegetation type surrounding the nest. Preferred Habitat sites had a shallow water depth of <2.5 cm, with 25% of the substrate covered in water. They preferred areas closer to the shoreline than would have been expected in random distribution.

Depending on sex and time of year, home range size in appropriate Habitat along the lower Colorado River varied from 0.43 to 0.55 hectares, which are three to four times smaller than those described for the eastern black rail and may result from more stable water levels than

found in tidal Habitats. The rails were found to be entirely diurnal in their activity and resident year-round.

California black rails are omnivorous, eating both invertebrates and bulrush seeds. Predators include house cats, short-eared owls, northern harriers, great blue herons, great egrets, and exotic bullfrogs.

Associated Covered Species. California black rails are often found in association with Yuma clapper rail Habitat. Conservation measures for one species will benefit the other species; however, additional information is needed on how these two species partition the Habitat. Other associated species may include riparian birds and desert pupfish.

9.7.3 Burrowing Owl *Athene cunicularia*

Status	**Federal:**	**Species of Concern (No official status)**
	State:	**Species of Special Concern**

9.7.3.1 Species Conservation Goals and Objectives

Conserve and manage populations within the MSHCP Reserve System according to the following criteria:

Goal 1: Ensure species persistence throughout its current range in the Plan Area by conserving burrowing owl Habitat, across the range of this species, and associated Essential Ecological Processes, allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused disturbance, and edge effects to Core Habitat by conserving contiguous Habitat patches and effective Linkages between patches of Core Habitat.

Objective 1. Ensure conservation of occupied burrowing owl burrows within the following Conservation Areas:

- Stubbe and Cottonwood Canyons Conservation Area
- Snow Creek/Windy Point Conservation Area
- Whitewater Floodplain Conservation Area
- Upper Mission Creek/Big Morongo Canyon Conservation Area
- Willow Hole Conservation Area
- Edom Hill Conservation Area
- Thousand Palms Conservation Area
- Coachella Valley Stormwater Channel and Delta Conservation Area
- Santa Rosa and San Jacinto Mountains Conservation Area

A summary of known occurrences of the burrowing owl within Conservation Areas is given in Table 9-20.

Table 9-20: Summary of Known Occurrences within Conservation Areas Burrowing Owl

Conservation Area	*Total in Plan Area*	*Disturbance Authorized (outside Conserv. Area)*	*Total Within Existing Conservation Lands*	*Remaining to be Conserved*	*Total Conserved in MSHCP Reserve System*
Burrowing Owl known occurrences[1]	74	33	23	18	41

[1] These are observations of this species at a given location. Each occurrence may represent one or more individual burrowing owls.

Goal 2: Protect Other Conserved Habitat, to provide sufficient area and variety of Habitat types to accommodate population fluctuations, allow for genetic diversity, and to conserve the range of environmental conditions within which this owl is known to occur.

Objective 2a. Through adherence to other Conservation Objectives (for another species, a natural community, Essential Ecological Process Area, Biological Corridor, or Linkage area) conserve Other Conserved Habitat for this owl in the following Conservation Areas:

- Cabazon Conservation Area
- Stubbe and Cottonwood Canyons Conservation Area
- Snow Creek/Windy Point Conservation Area
- Whitewater Floodplain Conservation Area
- Willow Hole Conservation Area
- Edom Hill Conservation Area
- Thousand Palms Conservation Area
- Indio Hills Palms Conservation Area
- Coachella Valley Stormwater Channel and Delta Conservation Area
- Santa Rosa and San Jacinto Mountains Conservation Area

Objective 2b. Implement avoidance, minimization, and mitigation measures as described in Section 4.4.

Goal 3: Ensure conservation of burrowing owl by maintaining the long-term persistence of self-sustaining populations or metapopulations and conserving Habitat quality through biological monitoring and Adaptive Management actions in the Plan Area.

Objective 3. Implement Management and Monitoring Programs to ensure self-sustaining populations within each Core Habitat area.

9.7.3.2 Threats, Limiting Factors, and Adaptive Management

The most significant threat to the continued persistence of the burrowing owl is destruction of Habitat. Their ground nesting habit also leaves them susceptible to predation by domestic cats and dogs. Individuals may be killed on roadways while foraging at night. Other studies indicated that road mortality can be a significant factor for this species; vehicle collisions caused three of five known deaths in one study (Konrad and Gilmer 1984) and 37% of known mortality in another (Haug and Oliphant 1987). In agricultural areas, levees and irrigation dikes where rodent burrows are present can provide a suitable nest site. In these areas, burrowing owls can be threatened by disturbance as a result of maintenance activities along dikes and levees and by poisoning from pesticide use or rodent poisoning campaigns. OHV activity is a threat to the Habitat of this species, as their burrows can be crushed and their nest sites disturbed. Illegal trash dumping has also been observed to impact burrowing owls (K. Corey, pers. comm.).

The open burrows on the ground occupied by burrowing owls make them particularly exposed and vulnerable to predation by domestic pets and to disturbance from human activities. Coordination with the agricultural community could provide an opportunity to enhance burrowing owl populations; this coordination might include the installation of artificial nest burrows. Burrowing owl populations are also being addressed in other regional planning efforts, including planning for the Salton Sea, now in progress. Coordination with these plans, including the monitoring programs, will facilitate Conservation planning for this species in the vicinity of the Salton Sea.

The following actions may be needed to ensure species persistence and long-term viability if biological monitoring indicates that such actions are warranted. This list is not comprehensive but identifies some of the known or likely threats to this species. More detailed information on the Management and Monitoring Programs can be found in Section 8.0. Actions may include:

1. Control and manage activities that degrade burrowing owl Habitat. In particular, those activities that result in frightening birds away from their nests or that may crush burrows, including OHV travel in their Habitat, and other human disturbance, will be controlled through fencing and patrolling.
2. Consider whether a restriction on human access to occupied Habitat during the breeding season is appropriate, from monitoring information. Burrowing owls, especially those in “colonies” during the breeding season, are vulnerable to disturbance (Haug, Millsap, and Martell 1993).
3. Identify actions to reduce impacts from, and control where feasible, invasive species if it is determined from monitoring results that there are impacts to burrowing owls.
4. Encourage the presence of burrowing owls in agricultural areas by allowing them to remain at burrows established in levees and dikes. Maintenance schedules for these levees should avoid the breeding season from March to July. Caution in use of pesticides in the vicinity of burrowing owl burrows is also important. Other measures that may enhance potential Habitat in agricultural areas should be evaluated. Proactive Habitat enhancement in agricultural areas could benefit burrowing owls if they are using berms along agricultural drains.

5. Evaluate the need and potential for, and impacts of, establishment of artificial burrows in Conservation Areas after more information on current population status is obtained.

9.7.3.3 Species Conservation Analysis

Conservation Area Reserve Design. The determination of available Habitat for burrowing owls within the proposed Conservation Areas is limited in that the Planning Team determined that development of a model for this species would be of limited value. While Habitat for this species has not been modeled, burrowing owls have been observed in sandy substrate areas that are also occupied by other Covered Species, including the Coachella Valley round-tailed ground squirrel, Coachella Valley milkvetch, and Palm Springs pocket mouse. The Conservation Areas benefit this species by securing the occupied and potential Habitat and foraging areas surrounding burrow sites to allow burrowing owls to persist, away from the impacts of roads and human activity.

The Planning Team did not attempt to estimate population density for burrowing owls. As previously noted, data on the number of individuals that could occur in the Coachella Valley is limited. Additional information on home range size and Habitat requirements for burrowing owls in desert environments is needed. Burrowing owls occupy a broad array of Habitats and have been observed in areas from the sand dunes at Willow Hole, adjacent to urban areas in open creosote bush, in the wash in Mission Creek, in Bear Creek Canyon in La Quinta and Magnesia Canyon in Rancho Mirage, and in agricultural areas around the Salton Sea. The focus in this Plan was to include areas of contiguous Habitat in areas where burrowing owls are known to occur.

9.7.3.4 Take Analysis

Significance of the Plan Area to Burrowing Owl

The burrowing owl has a broad distribution that includes open country in eastern Washington and Oregon, southern, central and eastern California, central and eastern Montana, southern Idaho, Utah, Nevada, Arizona, Wyoming, Colorado, New Mexico, North Dakota, South Dakota, Nebraska, western and central Kansas, western and central Oklahoma, western Minnesota, northwestern Iowa and western Texas (Klute et al. 2003), parts of central Canada, and into Mexico and the drier regions of Central and South America. In Southern California, it is known from lowlands over much of the region, particularly in agricultural areas. The burrowing owl is a federal Species of Concern and a California Species of Special Concern.

According to a USFWS Status Report and Conservation Plan for Burrowing Owls (USFWS 2002), "California supports one of the largest resident and winter populations of burrowing owls within the United States. The distribution of burrowing owls has changed considerably since introduction of industrial agriculture and increased urbanization, reflecting both losses and gains in local populations. Surveys conducted during 1991 to 1993 reported greater than 9,000 breeding pairs. Most of the burrowing owls occurred in the Imperial and Central Valleys, primarily in agricultural areas." Research and surveys indicate that in California burrowing owl populations are declining in areas with the greatest urban growth while larger populations occur in areas of intensive agriculture (e.g., Gervais et al. 2003, Rosenberg and Haley 2003), or designated open space. DeSante and Ruhlen (1995) determined that throughout

their survey area within California that nearly 60% of the breeding groups of owls mapped in the 1980s had disappeared by the early 1990s.

Within the Plan Area, burrowing owls are scattered in low numbers on natural desert terrain throughout the lowlands. However, this species is greatly reduced in numbers throughout its range (DeSante et al. 1991, 1992), including the Coachella Valley. In a 2003 evaluation by CDFG the 74 known locations for this Plan were noted and an observation that "an estimated 10 to 20 breeding pairs are scattered over the lower end of the valley and on some of the preserves . . . " is reported (C. Barrows, pers. comm., in CDFG 2003). As a subset of the 9,000 breeding pairs reported by USFWS (2002), the Coachella Valley population is low. The known locations in the database developed for this Plan do not include any locations in the agricultural areas of the Coachella Valley. Breeding burrowing owls are known to occur in the Snow Creek/Windy Point Conservation Area, Whitewater Floodplain Conservation Area, the Upper Mission Creek/Big Morongo Canyon Conservation Area, the Willow Hole and Edom Hill Conservation Areas, and the Thousand Palms Conservation Area.

Effects of Take on the Burrowing Owl

The primary importance of the proposed MSHCP to burrowing owl is that it provides Conservation (including Habitat protection, management and monitoring) of the species to the extent it occurs in the Coachella Valley. The Plan ensures the long-term Conservation of previously unprotected Habitat, the associated Essential Ecological Processes, and connectivity between these Habitat areas. In addition, the Conservation Areas provide protection of currently unprotected burrow sites, foraging areas, and potential Habitat areas.

A species Habitat distribution model was not developed for the burrowing owl. The effects of Take can be evaluated in part by analysis of the known occurrences within the Plan Area. There are 74 known locations for this species within the Plan Area. There are 23 known locations (31%) within Existing Conservation Lands which would be managed as part of the Reserve System. Acquisition of additional Reserve Lands would protect the remaining 18 known locations (24%). Overall, the Plan would ensure Conservation of 41 of these known locations (55%) within the Reserve System.

Within the Conservation Areas the Plan would ensure Conservation of known burrow sites for burrowing owls. Throughout the Plan Area, the protected known locations include those in the Whitewater Floodplain Preserve, the Mission Creek area west of Highway 62, the Willow Hole-Edom Hill Preserve/ACEC area, and the Thousand Palms Preserve. Conserved populations should be protected from edge effects, from OHV impacts, and from any activities that may result in disturbance to owl burrows.

Outside of the Conservation Areas, there are 33 known locations authorized for Take. The Habitat outside the Conservation Areas is already highly fragmented and is surrounded by existing Development. The potential for these Habitat areas to provide for the long-term persistence of burrowing owls is low. These areas are primarily in areas of marginal or fragmented Habitat, such as in the area south of Desert Hot Springs and east of Highway 62. These fragmented blocks are more susceptible to edge effects, including mortality on roads and predation by feral animals. Roads and low-density residential Development generally fragment the area near Desert Hot Springs.

Although the percentage of burrowing owl locations that could be lost to development within the next 75 years appears to be substantial, evaluation of the impacts of Take requires an assessment of the quality of this Habitat. The establishment of Conservation Areas where this species is protected is a significant improvement over the current situation of unprotected Habitat. The actual reduction in Habitat value is expected to be considerably less than indicated by the known location numbers because:

1. Conserved Habitat areas are large enough to contain a self-sustaining metapopulation of burrowing owls and incorporate key Habitat elements, including burrows and foraging areas.
2. Take within the Conservation Areas would not eliminate or significantly impact any individual burrowing owls. Objectives require any approved development within Conservation Areas to conserve occupied burrows according to measures described in Section 4.4.
3. Potential Development would not adversely impact the Essential Ecological Processes needed to maintain currently viable Habitat. Conservation Areas were carefully designed to incorporate the sand source and sand transport systems.
4. Lands in the MSHCP Reserve System would be managed and monitored to address significant edge effect problems, potential loss of Habitat from introduction of exotic species, and other stressors to this species.

The issuance of Take Permits, therefore, will not likely jeopardize the continued existence of the burrowing owl in the Plan Area and the implementation of the MSHCP will provide for the Conservation of the species.

Measures to Avoid, Minimize, and Mitigate Take of Burrowing Owl

To mitigate the Take of burrowing owl, the Permittees will protect and manage, in perpetuity, 41 of the 74 known locations within the MSHCP Reserve System. Although modeled Habitat was not described for the burrowing owl, the reserve design process focused on inclusion of areas of contiguous Habitat in areas where burrowing owls are known to occur. This contiguous Habitat would also provide adequate foraging areas.

The Plan would ensure conservation of known burrow sites for burrowing owls. Throughout the Plan Area, the protected known locations include those in the Snow Creek area, the Whitewater Floodplain Preserve, the Mission Creek area west of Highway 62, the Willow Hole-Edom Hill Preserve/ACEC area, the Thousand Palms Preserve, including the sand source area, and significant portions of the Indio Hills, the Mecca Hills, and Dos Palmas. Conserved populations would be protected from edge effects, from OHV impacts, and from any activities that may result in disturbance to owl burrows.

The Plan requires avoidance, minimization, and mitigation measures for burrowing owls (see Section 4.4). For projects subject to CEQA, surveys for the presence of burrowing owls in the Conservation Areas, using an accepted protocol, are required. Occupied burrows would have to be avoided until the young owls are no longer dependent on the burrow. These measures also require County Flood, CVWD, and IID to inventory burrowing owls along levees, berms, and

dikes and to develop measures to minimize impacts to any burrowing owls on their respective lands within the Plan Area.

Additionally, the Plan calls for Management and Monitoring Programs to ensure the Conservation of this species, including control of activities that degrade burrowing owl Habitat, control of invasive species where necessary, and potential for establishment of artificial burrows in Conservation Areas, based on analysis of impacts and current population status.

Overall Impacts to Burrowing Owl under the Plan

The Plan would ensure Conservation of known burrow sites for burrowing owls. Throughout the Plan Area, the protected known locations include those in the Snow Creek area, the Whitewater Floodplain Preserve, the Mission Creek area west of Highway 62, the Willow Hole-Edom Hill Preserve/ACEC area, the Thousand Palms Preserve, including the sand source area, and significant portions of the Indio Hills and the Mecca Hills. Other potential Habitat areas would be conserved in the Dos Palmas area, the Coachella Valley Stormwater Channel and Delta, and the Desert Tortoise and Linkage Conservation Areas. Burrowing owls would be protected from edge effects, from OHV impacts, and from any activities that may result in disturbance to owl burrows.

The burrowing owl will benefit from the establishment of the MSHCP Reserve System including valley floor Habitats where they occur. Implementation of the Plan is expected to provide for persistence of the burrowing owl within the Plan Area, as currently unprotected portions of its Habitat, burrow sites, foraging areas, and potential Habitat areas will be conserved. The combination of the overall Conservation measures; species-specific measures such as avoidance of active burrows during the breeding season; efforts by flood control and water districts to inventory and minimize impacts to burrowing owls; and long-term protection, management, and enhancement of burrowing owl Habitat is expected to effectively compensate for potential adverse effects to burrowing owls.

9.7.3.5 Species Account: Background

Distribution, Abundance, and Trends. The burrowing owl has a broad distribution that includes open country throughout the Midwest and western United States, Texas and southern Florida, parts of central Canada, and into Mexico and the drier regions of Central and South America. In Southern California, it is known from lowlands over much of the region, particularly in agricultural areas. This species is greatly reduced in numbers throughout its range (DeSante et al. 1991, 1992).

Within the Plan Area, burrowing owls are scattered in low numbers on open terrain throughout the lowlands. They occur in open desert areas, in fallow fields, along irrigation dikes and levees, wherever burrows (generally dug by ground squirrels) are available away from intense human activity. They can occur adjacent to residential Development, as evidenced by regular observations of these owls in sandy substrates along Washington Avenue in Bermuda Dunes (prior to development of empty lots) (Cameron Barrows, pers. comm.), and around the Palm Springs Airport (J. Cornett, pers. comm.).

Burrowing owls are notably common in Imperial County, along roads and levees in the agricultural areas. They may occur along roads and levees in agricultural areas at the eastern end

of the Coachella Valley, within the Plan Area. However, efforts to locate reliable records for burrowing owls in these agricultural areas met with limited success. Biologists from CDFG and CVWD who routinely visit the agricultural drains and associated levees around the Salton Sea reported only one burrowing owl observation (S. Keeney (CDFG) and R. Thiery (CVWD, pers. comm.).

An influx of wintering burrowing owls may occur in the Coachella Valley. The known location information for this species does not allow a determination of wintering birds, as the month of observation is not consistently reported. For the 40 known locations, four report only the year of observation, four are listed as observations during the winter months (December to February), and the remaining are from observations in the spring and summer months, which probably indicate resident birds, potentially on breeding territories.

Burrowing owls occupy burrows dug by others, primarily ground squirrels. If left undisturbed, they will use the same burrow year after year for nesting. A clutch of seven to nine eggs is laid between March and July. Both parents take part in incubation for about 28 days. The young emerge from the nest and spend daylight hours at the burrow entrance with one or both adults. Their distress call is a low rattle, said to be a mimic of a rattlesnake. The burrows selected by these owls are typically abandoned rodent burrows, however, they also commonly use old pipes, culverts or other debris that simulates a hole in the ground.

Though their occurrence, distribution, and Habitat preferences in the Coachella Valley are not well documented, burrowing owls are well studied elsewhere. Aspects of their biology that have been well documented include their food habits (Maser et al. 1971, Brown et al. 1986, Green et al. 1993) and their nesting requirements (Gleason and Johnson 1985, MacCracken et al. 1985, Rich 1986).

Burrowing owls follow a crepuscular habit, being most active during the early morning and evening hours. They are often observed perched on fence posts or utility wires. They typically live 8 years or more. Their diet is predominantly large insects and small rodents, but they will also take small birds, reptiles, amphibians, fish, scorpions, and other available prey. One study found that during the breeding season they feed on both vertebrates (mainly rodents) and invertebrates (mainly beetles) (Belthoff et al 1995). This study also noted that factors that provide for recruitment of young into the breeding population are important to reversing population declines in this species. These factors include post-fledging behavior, dispersal, and survival of young burrowing owls.

The number of burrowing owl pairs that occur in the Plan Area is not known. The relative population size and distribution of burrowing owls is highly variable, depending on local conditions of burrow and food availability. In a summary of the relative distribution and abundance of burrowing owls in California, DeSante et al. (1996) report that burrowing owls often move their breeding locations over short (less than two to three km) distances from year to year, but do not appear to move over large distances. They designated “breeding groups” according to the following standard, “any location of known or presumed breeding burrowing owls found to lie within 3.0 km of any other location in continuous breeding Habitat, or within 2.0 km of any other location from which it was separated by non-breeding Habitat, was considered to be part of the same breeding group . . . most owl pairs were found to lie either well

within 2 km or well over 3 km of each other." Further research would be necessary to determine if this standard applies to burrowing owls in the Coachella Valley.

9.7.4 Southwestern Willow Flycatcher *Empidonax traillii extimus*

Status **Federal:** **Endangered**
State: **Endangered**

9.7.4.1 Species Conservation Goals and Objectives

Conserve and manage populations within the MSHCP Reserve System according to the following criteria:

Goal 1: Ensure species persistence in the Plan Area by conserving existing breeding Habitat and an assemblage of native Habitats that are likely important for migration. Conserve Habitat, and associated Essential Ecological Processes, allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused disturbance, and edge effects to Core Habitat by conserving contiguous Habitat patches and effective Linkages between patches of Core Habitat.

Objective 1a. Ensure conservation of the riparian natural communities that this flycatcher depends on, Sonoran cottonwood-willow riparian forest, southern arroyo willow riparian forest, southern sycamore-alder riparian woodland, mesquite hummocks (migration), desert dry wash woodland (migration), desert saltbush scrub (migration), desert sink scrub (migration), mesquite bosque (migration), coastal and valley freshwater marsh (migration), arrowweed scrub (migration), and cismontane alkali marsh (migration), in the following Conservation Areas ~~and Special Provisions Area:~~

- Cabazon Conservation Area
- Stubbe and Cottonwood Canyons Conservation Area
- Whitewater Canyon Conservation Area
- Upper Mission Creek/Big Morongo Canyon Conservation Area
- ~~Morongo Wash Special Provisions Area~~
- Willow Hole Conservation Area
- Thousand Palms Conservation Area
- Indio Hills Palms Conservation Area
- Joshua Tree National Park Conservation Area
- Desert Tortoise and Linkage Conservation Area
- Mecca Hills/Orocopia Mountains Conservation Area
- Dos Palmas Conservation Area
- Coachella Valley Stormwater Channel and Delta Conservation Area
- Santa Rosa and San Jacinto Mountains Conservation Area

Please refer to Section 4.3 and Tables 9-21a and 9-21b for specific acreages to be protected by this Conservation Objective.

Objective 1b. Ensure that CVWD will establish permanent riparian Habitat, including at least 44 acres of Sonoran cottonwood-willow riparian forest in the Coachella Valley Stormwater Channel and Delta Conservation Area, to replace the Habitat that is periodically altered by flood control maintenance activities. This Habitat will provide for the conservation of this natural community and the riparian birds covered by the Plan.

Goal 2: Protect Essential Ecological Processes, including hydrological regimes, necessary to maintain Habitat for this species.

Objective 2. Ensure protection of Essential Ecological Process areas through Conservation Area Conservation Objectives for Essential Ecological Processes.

Goal 3: Ensure conservation of the southwestern willow flycatcher by maintaining the long-term persistence of self-sustaining populations or metapopulations and conserving Habitat quality through biological monitoring and Adaptive Management actions in the Plan Area.

Objective 3. Implement biological monitoring and Adaptive Management to ensure persistence of this flycatcher in the Plan area.

Table 9-21a: Summary of Habitat within Conservation Areas Southwestern Willow Flycatcher – Breeding Habitat

Conservation Area	*Total Acres of Habitat in Conserv. Areas*	*Acres of Disturbance Authorized*	*Acres of Existing Conservation Lands*	*Remaining Acres to be Conserved*	*Total Acres to be Conserved in MSHCP Reserve System*
Cabazon	87	1	78	8	86
Stubbe & Cottonwood Canyons	266	2	241	23	264
Whitewater Canyon	167	11	60	96	156
Upper Mission Ck./ Big Morongo Canyon	204	14	62	128	190
Willow Hole	1	0	1	0	1
Thousand Palms	141	0	141	0	141
Indio Hills Palms	93	5	46	42	88

Conservation Area	***Total Acres of Habitat in Conserv. Areas***	***Acres of Disturbance Authorized***	***Acres of Existing Conservation Lands***	***Remaining Acres to be Conserved***	***Total Acres to be Conserved in MSHCP Reserve System***
East Indio Hills	0	0	0	0	0
Joshua Tree Nat'l Park	5	0	5	0	5
Desert Tortoise & Linkage	0	0	0	0	0
Mecca Hills/ Orocopia Mtns.	1	0	1	0	1
Dos Palmas	125	6	69	50	119
CV Storm-water Channel & Delta	8	1	0	7	7
Santa Rosa & San Jacinto Mountains	1,574	69	822	683	1,505
Total – Breeding Habitat	*2,672*	*109*	*1,526*	*1,037*	*2,563*

Table 9-21b: Summary of Habitat within Conservation Areas Southwestern Willow Flycatcher – Migratory Habitat

Conservation Area	*Total Acres of Habitat in Conserv Areas*	*Acres of Disturbance Authorized*	*Acres of Existing Conservation Lands*	*Remaining Acres to be Conserved*	*Total Acres to be Conserved in MSHCP Reserve System*
Cabazon	13	1	0	12	12
Stubbe & Cottonwood Canyons	289	26	34	229	263
Whitewater Canyon	0	0	0	0	0
Upper Mission Creek/ Big Morongo Canyon	258	15	112	131	243
Willow Hole	294	28	16	250	266
Thousand Palms	805	4	767	34	801
Indio Hills Palms	83	4	43	36	79
East Indio Hills	47	5	0	42	42
Joshua Tree National Park	2,195	13	2,063	119	2,182
Desert Tortoise & Linkage	13,564	764	5,920	6,880	12,800
Mecca Hills/ Orocopia Mountains	9,435	319	6,241	2,875	9,116
Dos Palmas	10,184	644	3,745	5,795	9,540
CV Stormwater Channel & Delta	2,047	183	214	1,650	1,864
Santa Rosa & San Jacinto Mountains	3,963	325	2,157	1,481	3,638
Total – Migratory Habitat	*43,177*	*2,331*	*21,312*	*19,534*	*40,846*

9.7.4.2 Threats, Limiting Factors, and Adaptive Management

The most significant threats to the southwestern willow flycatcher in the Plan Area are extensive loss and modification of riparian Habitats upon which they depend and nest parasitism by the brown-headed cowbird. Other factors that have contributed to their decline include disturbance of riparian Habitat by cattle, fragmentation of breeding areas, flood control activities, invasion of non-native plants in riparian Habitats, degradation of Habitat as a result of edge effects related to urbanization and other human activities, and sand/gravel mining. Other localized threats may include changes in fire frequency and concentrated human access within some of the riparian areas. For example, the Whitewater River area near Bonnie Bell appears to be heavily used by people. Brown-headed cowbird parasitism rates of southwestern willow

flycatcher nests has been reported as ranging from 50% to 80% in California, to 100% in the Grand. The decline in breeding populations of the southwestern willow flycatcher, along with other small, insectivorous, open-cup nesting birds -- among them the yellow warbler and least Bell's vireo -- is well documented. It has been reported (Unitt 1987) from historical and contemporary records that the southwestern willow flycatcher has declined precipitously throughout its range in the last 50 years. Parent birds in parasitized nests either desert the nest or raise the young cowbird at the expense of their own young. Human activities attract cowbirds, thereby increasing the threat to southwestern willow flycatchers. Reduction of cowbird populations in southwestern willow flycatcher Habitat has been shown to substantially benefit this species, along with other riparian bird species. The predominance of golf courses and agricultural areas, which both provide Habitat for the cowbird, may make control of this non-native bird difficult.

The following actions may be needed to ensure species persistence and long-term viability if biological monitoring indicates that such actions are warranted. This list is not comprehensive but identifies some of the known or likely threats to this species. More detailed information on the Management and Monitoring Programs can be found in Section 8.0. Actions may include:

1. Control and manage activities that degrade southwestern willow flycatcher Habitat in conserved areas. These activities include brown-headed cowbird nest parasitism, clearing or alteration of riparian vegetation, persistence or invasion of exotic plant species, human disturbance, edge effects, and predation of adults and nests by domestic animals.
2. Restrict human access to southwestern willow flycatcher-occupied Habitat during the breeding season, from May 1 to September 15.
3. Enhance Habitat through the restoration of disturbed Habitats or the creation of new Habitat where feasible. In particular, removal of tamarisk from existing riparian areas would enhance Habitat for southwestern willow flycatcher and other riparian birds. Any Habitat restoration should balance management of southwestern willow flycatcher Habitat with management actions for other riparian-dependent species by ensuring a mix of vegetation successional stages in riparian Habitats.
4. Maintain upland buffers for all occupied Habitat. Buffers should be a minimum of 50 feet wide. Access to surface water is important for this species within the Habitat area.

9.7.4.3 Species Conservation Analysis

Conservation Area Reserve Design. The configuration of proposed Conservation Areas will benefit the southwestern willow flycatcher as suitable Habitat, including riparian areas, on public lands is often adjoining or surrounded by existing Conservation Areas. The Mission Creek site is conserved and managed by the Wildlands Conservancy; it is surrounded by BLM Wilderness such that all the riparian Habitat will be conserved. Habitat in Whitewater Canyon is partly on BLM land and partly on private land. Acquisition of the private lands from willing sellers will facilitate management of activities in the area that could impact the riparian Habitat; however, there is access to the area from Whitewater Road, and it is impractical to completely exclude access to the Conservation Area. A management plan for the area will need to be developed within three years of Plan approval to guide management actions to protect the

riparian Habitat. Chino Canyon is currently privately owned; however, discussions are in progress with the landowner for acquisition of the riparian area. Willow Hole is part of a BLM ACEC and includes adjacent lands owned by CVMC and CNLM.

The Planning Team did not attempt to describe Core Habitat for this species. With very limited Habitat available for this flycatcher, all locations were considered as part of a metapopulation. Hence, all available riparian Habitat for breeding and Habitat which may be used in migration were included in the MSHCP Reserve System. The presence of potential breeding Habitat for this species within each of the Conservation Areas is shown in Table 9-21a; migratory Habitat is shown in Table 9-21b.

9.7.4.4 Take Analysis

Significance of the Plan Area to Southwestern Willow Flycatcher

The southwestern willow flycatcher occurs in the Plan Area as a likely breeding bird, and as a migrant. Given the limited availability of suitable riparian Habitat in the Plan Area, their status here could be described as part of a metapopulation. The extent of breeding in the Plan Area is not known as only Mission Creek has been confirmed as a breeding location (R. McKernan, pers. comm.). Breeding Habitat is present in a number of the Conservation Areas and the willow flycatcher is considered as breeding species within the Plan Area. Throughout its range, the majority of sites where this species occurs are comprised of small numbers of flycatchers (Marshall 2000). The significance of small populations which may be part of a larger metapopulation, as regional sources of colonizers, at least is some years, is noted as a reason to ensure Conservation of these sites (Marshall 2000). The willow flycatchers in the Coachella Valley are probably part of such a metapopulation. This subspecies of the willow flycatcher is listed as endangered by both the state and federal governments. Within the Plan Area it has been recorded in riparian Habitat from Whitewater Canyon and Mission Creek, Thousand Palms Oasis, Cottonwood Spring in Joshua Tree National Park, and Dos Palmas. Outside the Plan Area their breeding range includes dense riparian forests and woodlands in Southern California, southern Nevada, Arizona, New Mexico, Utah, western Texas, and northern Baja California and Sonora.

Effects of Take on the Southwestern Willow Flycatcher

The primary importance of the proposed MSHCP to the southwestern willow flycatcher is that it provides Conservation (including Habitat protection, management and monitoring) of breeding Habitat and Habitat used by this species in migration. The Plan ensures the long-term conservation of breeding and migratory Habitat as well as the associated Essential Ecological Processes, including the hydrological regimes that support riparian vegetation.

Breeding Habitat. With respect to breeding Habitat, there are 2,730 acres of modeled Habitat for the southwestern willow flycatcher within the Plan Area. Approximately 2,672 acres of this modeled breeding Habitat occur within the Conservation Areas and the Plan would ensure Conservation of 2,563 of these acres (94% of the total modeled Habitat). Approximately 1,526 acres (56%) of the modeled Habitat are within Existing Conservation Lands and would be managed as part of the Reserve System. The Plan would conserve an additional 1,037 acres (38%) of the modeled breeding Habitat for southwestern willow flycatcher.

Within the Conservation Areas under the worst case scenario, 109 acres of Take of modeled breeding Habitat (4%) could occur (See Table 9-21a and Table 4-114). Take of willow flycatcher breeding Habitat within the Conservation Areas must be consistent with the Conservation Objectives for this species to: 1) ensure Conservation of Core Habitat; 2) protect Essential Ecological Processes needed to maintain willow flycatcher Habitat; and 3) maintain Biological Corridors and Linkages among conserved populations to provide for population fluctuation and enhance genetic diversity. So, although some Take could occur within the Conservation Areas, the Conservation Objectives required by the Plan will provide for protection of Habitat to ensure the long-term persistence of this species.

Outside of the Conservation Areas, there are 59 acres (2%) of modeled Habitat authorized for Take. Some of this acreage occurs as small fragments of marginal Habitat at the margins of suitable riparian areas. Some of this acreage occurs along the Coachella Valley Stormwater Channel north of the Conservation Area boundary. Impacts to Habitat along this portion of the Stormwater channel will be mitigated by establishment of replacement permanent riparian forest by CVWD (see below).

Migratory Habitat. There are 57,589 acres of modeled migratory Habitat for the southwestern willow flycatcher within the Plan Area. Approximately 43,177 acres of this modeled migratory Habitat occur within the Conservation Areas and the Plan would ensure Conservation of 40,846 of these acres (71% of the total modeled Habitat). Approximately 21,312 acres (37%) of the modeled migratory Habitat are within Existing Conservation Lands and would be managed as part of the Reserve System. The Plan would conserve an additional 19,534 acres (34%) of the modeled migratory Habitat for southwestern willow flycatcher.

Within the Conservation Areas under the worst case scenario, 2,331 acres of Take of modeled migratory Habitat (4%) could occur (See Table 9-21b and Table 4-114). Take of willow flycatcher migratory Habitat within the Conservation Areas must be consistent with the Conservation Objectives for this species to: 1) ensure Conservation of riparian Habitat, and 2) protect Essential Ecological Processes including hydrological regimes needed to maintain riparian Habitat. So, although some Take could occur within the Conservation Areas, the Conservation Objectives required by the Plan will provide for protection of Habitat to ensure the long-term persistence of this species.

Outside of the Conservation Areas, there are 13,040 acres (23%) of modeled migratory Habitat authorized for Take. The migratory Habitat outside the Conservation Areas consists of slivers of Habitat, including desert dry wash woodland, along various washes from Desert Hot Springs area to the margins of the Cathedral City and Rancho Mirage cove areas and around Deep Canyon in Palm Desert. Larger patches of migratory Habitat occur northwest of the Salton Sea in desert saltbush scrub and desert sink scrub, natural communities used by willow flycatchers in migration that are highly fragmented in a matrix of agriculture, and in the eastern part of the Plan Area south of Interstate 10.

Although the percentage of southwestern willow flycatcher modeled migratory Habitat that could be lost to development within the next 75 years appears to be substantial, evaluation of the impacts of Take requires an assessment of the quality of this Habitat. The establishment of Conservation Areas where this species is protected is a significant improvement over the piecemeal and fragmenting nature of development patterns within this Habitat occurring now.

The actual reduction in Habitat value is expected to be considerably less than indicated by the raw acreage numbers because:

1. Conserved Habitat areas are large enough to contain self-sustaining metapopulations populations of willow flycatchers and incorporate key Habitat elements, including riparian Habitat for breeding and desert dry wash woodland and other Habitats for migration.
2. Take within the Conservation Areas would not eliminate or significantly impact any core populations. Conservation Objectives require any approved development within Conservation Areas to ensure protection of Core Habitat.
3. As a result of implementing the Conservation Objectives to protect riparian natural communities the Plan would ensure that there is no net loss of wetland Habitats. For all riparian natural communities where disturbance is authorized by the Plan, an equivalent number of acres as that subject to disturbance would be replaced.
4. Potential Development would not adversely impact the Essential Ecological Processes needed to maintain currently viable Habitat. Conservation Areas were carefully designed to protect the watershed for riparian Habitat, desert dry wash woodland, and other Habitats for this species.
5. Lands in the MSHCP Reserve System would be managed and monitored to address significant edge effect problems, potential loss of Habitat from introduction of exotic species, and other stressors to this species,

The issuance of Take Permits, therefore, will not likely jeopardize the continued existence of the southwestern willow flycatcher and the implementation of the MSHCP will provide for the Conservation of the species.

<u>Measures to Avoid, Minimize, and Mitigate Take of Southwestern Willow Flycatcher</u>

To mitigate the Take of southwest willow flycatcher, the Permittees will protect and manage, in perpetuity, 1,037 acres of the modeled breeding Habitat and 19,534 acres of migratory Habitat for this species. The 1,526 acres of breeding Habitat and 21,312 acres of migratory modeled Habitat within Existing Conservation Lands will be monitored and managed to ensure that Conservation Objectives are met. The Plan will thus ensure Conservation, through protection and management, of 2,563 acres of breeding Habitat and 40,846 acres of migratory Habitat for this species.

Existing Conservation Areas within the Plan boundary currently protect 38% of the Habitat for the southwestern willow flycatcher. The Conservation Areas in the Plan would protect 94% of the occupied and potential breeding Habitat and 71% of the potential migratory Habitat for this species. The Conservation Areas include the potential breeding Habitat for southwestern willow flycatchers in Whitewater Canyon, Chino Canyon, the Thousand Palms Preserve, the Whitewater River mouth near the Salton Sea, Cottonwood Springs in Joshua Tree National Park, and Dos Palmas. The Plan includes 100% of the known breeding locations for this flycatcher. Other suitable Habitat for breeding sites in the Plan Area occurs in Palm Canyon, Murray Canyon, and Andreas Canyon on the Agua Caliente Indian Reservation; portions of these canyons are currently protected as part of the Indian Canyons Heritage Park. Though nesting has

not been confirmed in Andreas Canyons, southwestern willow flycatchers are known to occur in this location. The Agua Caliente are preparing a separate MSHCP for reservation lands.

The model for the southwestern willow flycatcher, and other riparian birds, includes Habitat used in migration, including desert dry wash woodland and desert saltbush scrub. A complete list of the natural communities that may be used in migration is given in the description of model parameters in the Appendix I. Other natural Habitat used by southwestern willow flycatchers in migration or foraging will be conserved in Stubbe and Cottonwood Canyons, Oasis de los Osos, Snow Creek and Falls Creek in the Snow Creek/Windy Point Conservation Area, Mission Creek, the Thousand Palms Preserve, the Coachella Valley Stormwater Channel and Delta near the Salton Sea, Dos Palmas, and Cottonwood Spring in Joshua Tree National Park Conservation Area. Habitat disturbance, subject to the conditions of any required streambed alteration or Section 404 permits, would be allowed in those portions of these natural communities not conserved by the Plan.

Where disturbance of a given number acres of riparian natural communities is authorized, an equivalent number of acres would be replaced to ensure that the no net loss occurs and the Conservation Objective is achieved.

CVWD will establish 44 acres of permanent Sonoran cottonwood-willow riparian forest in the Coachella Valley Stormwater Channel and Delta Conservation area as described in Section 4.3.20 to replace riparian Habitat that is periodically altered by flood control maintenance activities. Temporary Habitat disturbance for flood control channel maintenance purposes would be permitted by the Plan in the Coachella Valley Stormwater Channel.

Additionally, the Plan calls for Management and Monitoring Programs to ensure the Conservation of this species, including control of activities that degrade southwestern willow flycatcher Habitat, control of invasive species such as tamarisk and brown-headed cowbirds where necessary, and restoration and enhancement of degraded Habitat as necessary according to monitoring results. The Plan also limits human access to flycatcher occupied Habitat during the breeding season.

Overall Impacts to Southwestern Willow Flycatcher

Implementation of the Plan is expected to maintain and enhance population viability of the southwestern willow flycatcher by protecting Habitat for potential nesting and conserving Habitat known to be used in migration. The Plan will also enhance riparian Habitat through implementation of management prescriptions to remove non-native tamarisk and other invasive species. An agreement with CVWD regarding creation of riparian vegetation along the Whitewater River could result in enhanced Habitat for flycatchers as well. Another benefit is the focus of attention on the presence of brown-headed cowbirds, including Adaptive Management activities to control their impacts to riparian birds such as the southwestern willow flycatcher.

9.7.4.5 Species Account: Background

Distribution, Abundance, and Trends. The southwestern willow flycatcher is restricted to dense riparian woodlands and forests along the river and stream systems of Southern California, primarily in Kern, San Diego, San Bernardino, and Riverside Counties. Their breeding range also includes southern Nevada, Arizona, New Mexico, Utah, western Texas, and possibly southwestern Colorado. They are reported as breeding birds in Mexico, in extreme northern Baja California and Sonora. They winter in Mexico, Central America, and northern South America. This flycatcher can be found at sites where a dense growth of willows (*Salix* sp.), *Baccharis*, arrowweed (*Pluchea* sp.), or other plants occurs in thickets. These thickets are often associated with a scattered overstory of cottonwood (*Populus fremontii*) and other riparian trees. This species has also been found nesting in Southern California in relatively narrow bands of riparian Habitat and can utilize extremely small remnant riparian areas (one medium size willow tree) during migration (T. Newkirk-Gonzales, pers. comm.).

The historic range of the southwestern willow flycatcher in California included riparian areas throughout the southern third of the state; it was reported as common in the Los Angeles basin, the San Bernardino/Riverside area, and in San Diego County. It was also a common breeder along the lower Colorado River, near Yuma, Arizona. Currently, stable nesting groups are reported from only two locations, along the South Fork of the Kern River and along the Santa Margarita River on Camp Pendleton. Elsewhere, they exist only in small, scattered, remnant, and isolated populations. Major causes of the decline are cowbird parasitism and destruction or disturbance in riparian Habitats.

In surveys by biologists from the University of California, Riverside, Center for Conservation Biology (Center for Conservation Biology, University of California, Riverside 2004) willow flycatchers were detected at Cottonwood Springs in Joshua Tree National Park, Dos Palmas Preserve, Mission Creek, Thousand Palms Oasis, and Whitewater Canyon. It is not known whether these individuals were *Empidonax traillii extimus*, the subspecies that breeds in southern California (Unitt 1987; Sedgwick 2000), or whether they were a different subspecies that occurs as migrants in southern California but breed farther north (e.g. *E. t. brewsteri*). Incidental willow flycatchers, likely early fall migrants, were also recorded at Chino Canyon, Cottonwood Springs, Dos Palmas Preserve, and Mission Creek during vegetation surveys in August (Center for Conservation Biology, University of California, Riverside 2004).

The breeding status of the southwestern willow flycatcher within the Plan Area is not well known. Of the known locations at which this species has been observed, only one, Mission Creek, was confirmed as supporting breeding birds (R. McKernan, pers. comm.). In 2003, a possible pair and a singing male willow flycatcher were observed at each of two locations, Thousand Palms Oasis and Mission Creek, but breeding could not be confirmed (Center for Conservation Biology, University of California, Riverside 2004). Suitable breeding Habitat is present in a number of locations where riparian Habitat exists, in Chino, Andreas, Murray, Palm, Millard, and Whitewater Canyons, and possibly in Stubbe and Cottonwood Canyons. Suitable breeding Habitat may also occur at Oasis de los Osos, along the Whitewater River near the Salton Sea, at the Thousand Palms Preserve, and at Dos Palmas Preserve/ACEC.

Southwestern willow flycatchers also migrate through the Plan Area en route to other breeding areas. In migration, they may use desert fan palm oasis woodland, mesquite hummocks,

mesquite bosque, arrowweed scrub, desert dry wash woodland, southern sycamore-alder riparian woodland, Sonoran cottonwood-willow riparian forest, and southern arroyo willow riparian forest.

The birds begin to arrive in Southern California to breed late in the spring, generally from May 15 through the summer months, until August. Males establish and defend territories beginning shortly after arrival in mid-May. Most birds begin nesting within one week after pair formation, which occurs 10 to 14 days after their arrival. The young fledge in early July and begin to disperse approximately two weeks after leaving the nest.

They construct their nests in dense thickets of willows, mulefat, and other trees and shrubs approximately 4 to 7 meters in height. They virtually always nest near surface water or saturated soil. They have not been found nesting in Habitats where the riparian zone is very narrow, or where the distance between willow patches and individual shrubs is great. The southwestern willow flycatcher is an insectivore, foraging within and above dense riparian vegetation, sometimes adjacent to nest sites.

Associated Covered Species. Other riparian species occurring in similar Habitat, including the yellow-breasted chat, summer tanager, least Bell's vireo, and yellow warbler, will benefit from conservation and Adaptive Management actions for southwestern willow flycatcher. Riparian bird species will be considered as a guild in the Plan with regard to their general presence in riparian areas. However, each of these riparian bird species may require slightly different structural features or successional stages for optimal breeding Habitat, which may require different management strategies.

9.7.5 Crissal Thrasher *Toxostoma crissali*

Status	**Federal:**	**No official status**
	State:	**Species of Special Concern**

9.7.5.1 Species Conservation Goals and Objectives

Conserve and manage populations within the MSHCP Reserve System according to the following criteria:

Goal 1: Protect at least two Core Habitat areas that include occupied Habitat, and associated Essential Ecological Processes, allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused disturbance, and edge effects to Core Habitat by conserving contiguous Habitat patches and effective Linkages between patches of Core Habitat.

Objective 1a. Ensure conservation of Core Habitat including at least 1,307 acres in the following Conservation Areas:

- Dos Palmas Conservation Area
- Coachella Valley Stormwater Channel and Delta Conservation Area

Please refer to Section 4.3 and Table 9-22 for specific acreages to be protected by this Conservation Objective.

Objective 1b. Ensure implementation of avoidance, mitigation, and minimization measures as described in Section 4.4.

Goal 2: Protect Other Conserved Habitat, to provide sufficient area and variety of Habitat types to accommodate population fluctuations, allow for genetic diversity, and to conserve the range of environmental conditions within which this thrasher is known to occur.

Objective 2. Through adherence to other Conservation Objectives (for another species, a natural community, Essential Ecological Process area, Biological Corridor, or Linkage area) conserve Other Conserved Habitat for this thrasher in the following Conservation Areas:

- Willow Hole Conservation Area
- Thousand Palms Conservation Area
- Indio Hills Palms Conservation Area
- East Indio Hills Conservation Area

Please refer to Section 4.3 and Table 9-22 for specific acreages to be protected by this Conservation Objective.

Goal 3: Protect Essential Ecological Processes, which may include hydrological regimes necessary to maintain Habitat for this species.

Goal 4: Maintain Biological Corridors and Linkages among all conserved populations.

Goal 5: Ensure conservation of the crissal thrasher by maintaining the long-term persistence of self-sustaining populations and conserving Habitat quality through biological monitoring and Adaptive Management actions in the Plan Area.

Objective 5. Implement biological monitoring and Adaptive Management to ensure self-sustaining populations within each Core Habitat area.

Table 9-22: Summary of Habitat within Conservation Areas Crissal Thrasher

Conservation Area	*Total Acres of Habitat*	*Acres of Disturbance Authorized*	*Acres of Existing Conservation Lands*	*Remaining Acres to be Conserved*	*Total Acres Conserved in MSHCP Reserve System*	*Designation*
Willow Hole	294	28	16	250	266	Other Cons. Habitat
Thousand Palms	58	0	58	0	58	Other Cons. Habitat
Indio Hills Palms	3	1	1	1	2	Other Cons. Habitat
East Indio Hills	47	5	0	42	42	Other Cons. Habitat
Dos Palmas	536	38	155	343	498	Core Habitat
CV Stormwater Channel & Delta	896	87	28	781	809	Core Habitat
Total – All Habitat	*1,834*	*159*	*258*	*1,418*	*1,676*	--
Total – Core Habitat	*1,432*	*125*	*183*	*1,124*	*1,307*	--
Total – Other Cons. Habitat	*402*	*34*	*75*	*293*	*368*	--

9.7.5.2 Threats, Limiting Factors, and Adaptive Management

Threats to the crissal thrasher's continued occurrence within the Plan Area include the loss of Habitat to agriculture and urbanization, groundwater overdraft that reduces available water for honey mesquite; water diversions that reduce water availability; Habitat modification for flood control at the Whitewater River delta; tamarisk infestations which degrade and dry up desert saltbush scrub, mesquite bosque, and mesquite hummocks Habitat; and significant fragmentation of available Habitat. Fragmentation increases edge effects, including predation from domestic pets, road mortality, and exotic species invasions. Brown-headed Cowbirds are not known to pose a threat to crissal thrasher. Even with appropriate Habitat management practices, the crissal thrasher population within the Plan Area is small and will probably require immigration from Habitats outside the area being addressed in this Plan to maintain long-term viability.

The following actions may be needed to ensure species persistence and long-term viability if biological monitoring indicates that such actions are warranted. This list is not comprehensive but identifies some of the known or likely threats to this species. More detailed information on the Management and Monitoring Programs can be found in Section 8.0. Actions may include:

1. Evaluate the impacts of groundwater management on crissal thrasher Habitat, particularly mesquite areas, to determine if the water sources for this Habitat are adequately protected or if additional water sources may be needed.
2. Control invasive species if it is determined from the monitoring results that they impact thrasher Habitat. This may include cooperation with the Dos Palmas Ecosystem Management Plan.
3. Schedule activities that may cause disturbance to nesting crissal thrashers to avoid the breeding season from January 15 through June 15 or until the young have fledged.
4. Establish a research element as part of the Monitoring Program that addresses the distribution of the species, its home range size, dispersal distances and barriers to dispersal, and its population density throughout the Plan Area.

9.7.5.3 Species Conservation Analysis

Conservation Area Reserve Design. The distribution of Habitat for the crissal thrasher is quite patchy, particularly in the vicinity of the Salton Sea where areas occupied by mesquite hummocks and desert saltbush scrub are highly fragmented. The MSHCP Reserve System includes areas of contiguous mesquite hummocks Habitat at Willow Hole and the Thousand Palms Preserve, and mesquite hummocks, arrowweed scrub, and desert saltbush scrub Habitat at Dos Palmas and the Whitewater River delta area.

The Planning Team did not attempt to assess population status as a means of identifying Core Habitat for this species. Instead, the Plan includes the largest acreages of contiguous mesquite hummocks, desert saltbush scrub, and desert sink scrub Habitat available in the Plan Area, primarily in the Dos Palmas and Coachella Valley Stormwater Channel and Delta Conservation Areas. In particular, the Coachella Valley Stormwater Channel and Delta Conservation Area was configured to include the maximum amount of Habitat for crissal thrashers; this included intact stands of desert saltbush scrub and desert sink scrub in the area around Johnson Street south of Highway 111. For each area, see Table 9-22 for a breakdown of Existing Conservation Lands and remaining lands to be conserved.

Core Habitat Areas:

1. ***Dos Palmas.*** The Dos Palmas area includes approximately 536 acres that have been delineated, based on vegetation, as modeled Habitat for the crissal thrasher. The Plan will conserve approximately 498 acres of the Core Habitat in this Conservation Area. The presence of both mesquite hummocks and desert saltbush scrub make this area particularly suitable for this species. Additional information on crissal thrasher occurrence and distribution is still needed for this Conservation Area.
2. ***Coachella Valley Stormwater Channel and Delta.*** There are approximately 896 acres of modeled Habitat for this species within this Conservation Area, of which the Plan will conserve approximately 809 acres. The Habitat in this Conservation area is narrow with a high edge to area ratio. More information is needed on the distribution of the crissal thrasher here.

Other Conserved Habitat Areas:

1. ***Willow Hole.*** The Plan includes approximately 294 total acres of modeled Habitat within this Conservation Area, of which the Plan will conserve approximately 266 acres. However, no observations of crissal thrashers have been reported within this area. The modeled Habitat in this Conservation Area is based on the potential for crissal thrasher to occur here, given the presence of mesquite hummocks. Additional information on the occurrence and distribution of crissal thrasher in this area is needed.
2. ***Thousand Palms.*** The Plan includes approximately 58 acres of crissal thrasher Habitat modeled in this Conservation Area, primarily in mesquite hummocks and mesquite associated with Thousand Palms Oasis. All 58 acres of this Habitat are already protected. More information is needed about the Habitat preferences and distribution of this thrasher within this Conservation Area.
3. ***Indio Hills Palms.*** This Conservation Area was considered as potential Habitat for the crissal thrasher and contains approximately 3 acres of modeled Habitat. The Plan ensures the protection of at least 2 acres of crissal thrasher Habitat in this Conservation Area. Mesquite areas along the toe of slope of the Indio Hills and associated with the palm oases in this Conservation Area could be Habitat for crissal thrasher.
4. ***East Indio Hills.*** This Conservation Area was considered as potential Habitat for the crissal thrasher and contains approximately 47 acres of modeled Habitat. The Plan protects approximately 42 acres of crissal thrasher Habitat in this Conservation Area. Adjacent Development in this area may increase edge effects for this species within this Conservation Area.

9.7.5.4 Take Analysis

Significance of the Plan Area to Crissal Thrasher

The crissal thrasher is found in the Plan Area from the area around Dos Palmas and the Salton Sea. Throughout its range, crissal thrasher is known as a resident of dense thickets and woodlands of shrubs or low trees in desert riparian and desert wash Habitats. It ranges from southeastern California to southern Nevada, southwestern Utah, and western Texas southward. The crissal thrasher has no official state or federal status although it is considered a Species of Special Concern in California. It also occurs in the eastern Mojave Desert and in the Imperial and Borrego Valleys, but its numbers have declined in recent decades (Grinnell and Miller 1944, Remsen 1978, Garrett and Dunn 1981).

Effects of Take on the Crissal Thrasher

Conservation of Habitat blocks of adequate size for this species is difficult, as the natural communities it depends on, mesquite hummocks, desert saltbush scrub, and desert sink scrub, are highly fragmented in the Plan Area and its home range size and Habitat use are not well known. The Planning Team attempted to include all the available Habitat for this species that was not highly fragmented. The Plan ensures the long-term Conservation including Habitat protection, management, and monitoring for crissal thrasher. It includes conservation of Essential Ecological

Processes, including the hydrological regimes that support mesquite hummock and mesquite bosque vegetation.

There are 6,852 acres of modeled Habitat for the crissal thrasher within the Plan Area of which approximately 1,432 acres are identified as Core Habitat. The Plan would ensure Conservation of 1,307 acres (91% of total) of the Core Habitat and 368 acres (92% of total) of the Other Conserved Habitat for crissal thrasher. Each of the conserved Core Habitat areas would be greater than 400 acres. Approximately 258 acres (4%) of the modeled Habitat are within Existing Conservation Lands and would be managed as part of the Reserve System. The Plan would conserve an additional 1,418 acres (21%) of the modeled Habitat for crissal thrasher in the Plan Area.

Within the Conservation Areas under the worst case scenario, 159 acres of Take of modeled crissal thrasher Habitat (2%) could occur (See Table 9-22 and Table 4-114). Take of crissal thrasher Habitat within the Conservation Areas must be consistent with the Conservation Objectives for this species to: 1) ensure Conservation of Core Habitat; 2) protect Essential Ecological Processes including hydrological regimes needed to maintain crissal thrasher Habitat; 3) maintain Biological Corridors and Linkages among conserved populations to provide for population fluctuation and enhance genetic diversity; and 4) implement biological monitoring and Adaptive Management to ensure long-term persistence of this species. In addition, avoidance, minimization, and mitigation measures for crissal thrasher would be adhered to. So, although some Take could occur within the Conservation Areas, the Conservation Objectives required by the Plan will provide for protection of Habitat to ensure the long-term persistence of crissal thrasher.

Outside of the Conservation Areas, there are 5,013 acres (73%) of modeled Habitat authorized for Take. The modeled Habitat for crissal thrasher outside the Conservation Areas is primarily remnant patches of mesquite and desert saltbush scrub surrounded by agricultural areas in the eastern Coachella Valley. These mesquite patches and fragments of desert saltbush scrub were not included in the Conservation Area because of the high degree of fragmentation and the associated edge effects.

The raw acreage numbers and percentage of indicate a substantial acreage of crissal thrasher modeled Habitat that could be lost to development within the next 75 years. Evaluation of the impacts of Take requires an assessment of the quality of this Habitat. The establishment of Conservation Areas where this species is protected is a significant improvement over the piecemeal fragments of Habitat, only 4% of modeled Habitat that is currently conserved. The actual reduction in Habitat value is expected to be considerably less because:

1. Conserved Habitat areas are large enough to contain self-sustaining metapopulations populations of crissal thrashers and incorporate key Habitat elements, including mesquite hummocks, mesquite bosque, and desert saltbush scrub.
2. Take within the Conservation Areas would not eliminate or significantly impact any core populations. Conservation Objectives require any approved development within Conservation Areas to ensure protection of Core Habitat.
3. As a result of implementing the Conservation Objectives Core Habitat for crissal thrasher allowing evolutionary processes and natural population fluctuations to occur will be

conserved. Minimize fragmentation, human-caused disturbance, and edge effects to Core Habitat by conserving contiguous Habitat patches and effective linkages between patches of Core Habitat.

4. Potential Development would not adversely impact the Essential Ecological Processes needed to maintain currently viable Habitat. Implementing Conservation Objectives will ensure that hydrological regimes that support the mesquite Habitats for crissal thrashers are maintained.

5. Lands in the MSHCP Reserve System would be managed and monitored to address significant edge effect problems, invasive species, and other stressors to this species,

The issuance of Take Permits, therefore, will not likely jeopardize the continued existence of the crissal thrasher and the implementation of the MSHCP will provide for the Conservation of the species.

Measures to Avoid, Minimize, and Mitigate Take of Crissal Thrasher

The Permittees will protect and manage, in perpetuity, 1,418 acres of the modeled Habitat to mitigate the Take of crissal thrasher. The 258 acres of modeled Habitat within Existing Conservation Lands will be monitored and managed to ensure that Conservation Objectives are met. The Plan will thus ensure Conservation, through protection and management, of 1,676 acres of crissal thrasher Habitat in the MSHCP Reserve System.

As part of the avoidance, minimization, and mitigation measures required by the Plan, construction activities in the Cabazon, Willow Hole, Thousand Palms, Indio Hills Palms, East Indio Hills, Dos Palmas, Coachella Valley Stormwater Channel and Delta, and Santa Rosa and San Jacinto Mountains Conservation Areas will avoid mesquite hummocks and mesquite bosque to the maximum extent Feasible.

To address specific impacts to mesquite hummocks, which could provide Habitat for crissal thrasher, the Plan requires restoration of mesquite Habitat in the East Indio Hills Conservation Area. This restoration would result in a minimum of 40 acres, and as many as 80 acres, of additional mesquite hummock Habitat. In addition, CVWD will restore 40 acres of permanent mesquite hummocks, if feasible, on their lands in the East Indio Hills Conservation Area as described in Section 4.3.15.

Existing Conservation Areas within the Plan boundary currently protect only 4% of the Habitat for the crissal thrasher. The Conservation Areas in the Plan would protect 28% of the occupied and potential Habitat for this species. The Conservation Areas include the Core Habitat for crissal thrasher in the Dos Palmas and Coachella Valley Stormwater Channel and Delta Conservation Areas. The Conservation Areas include 5 of the 15 known occurrences for this bird, including known locations on the Thousand Palms Preserve, the Whitewater River delta near the Salton Sea, and at Dos Palmas. Other suitable Habitat for this species in the Plan Area occurs and will be conserved in the Willow Hole, Thousand Palms, Indio Hills Palms, and East Indio Hill Conservation Areas.

Additionally, the Plan calls for Management and Monitoring Programs to ensure the Conservation of this species, including control of activities that degrade crissal thrasher Habitat,

control of invasive species if monitoring results indicate it is necessary, and restoration and enhancement of degraded Habitat as necessary according to monitoring results. The Plan calls for evaluation of groundwater management on crissal thrasher Habitat in mesquite areas as described in Section 9.7.5.2. The Plan also provides for a research element as part of the Monitoring Program that addresses the distribution of the species, its home range size, dispersal distances and barriers to dispersal, and its population density throughout the Plan Area.

Overall Impacts to Crissal Thrasher

The proposed Conservation Areas in the Plan include approximately 1,834 acres of modeled Habitat for the crissal thrasher, 27% of the available Habitat in the Plan Area. The Conservation Areas include 5 of the 15 known occurrences for this bird, including known locations on the Thousand Palms Preserve, the Whitewater River delta near the Salton Sea, and at Dos Palmas. Conservation of Habitat blocks of adequate size for this species is difficult, as the natural communities it depends on, mesquite hummocks, desert saltbush scrub, and desert sink scrub, are highly fragmented in the Plan Area and its home range size and Habitat use are not well known. The Planning Team attempted to include all the available Habitat for this species that was not highly fragmented.

The crissal thrasher will benefit from the establishment of the MSHCP Reserve System which will include Conservation of Habitat in the Dos Palmas and Coachella Valley Stormwater Channel and Delta Conservation Areas where they are known to occur. Only 4% of the modeled Habitat for this species is currently conserved. Implementation of the Plan is expected to provide for Conservation of the crissal thrasher within the Plan Area, as currently unprotected portions of its Habitat and potential Habitat areas will be conserved. Because much of its Habitat was already fragmented and reduced to small patches, the potential for Habitat Conservation for this species was already compromised prior to this Plan. The combination of the overall Conservation measures; species-specific measures such as management to minimize impacts to thrashers and their Habitat, monitoring to better understand the distribution and population status of this species in the Plan Area, and long-term protection, management, and enhancement of crissal thrasher Habitat is expected to effectively compensate for potential adverse effects to this bird species.

9.7.5.5 Species Account: Background

Distribution, Abundance, and Trends. The crissal thrasher is a ground-dwelling relative of the mockingbird that occurs in the Plan Area. The distribution of Habitat for the crissal thrasher is quite patchy, particularly in the vicinity of the Salton Sea where areas occupied by mesquite hummocks and desert saltbush scrub are highly fragmented. They occupy arid Habitats and are year-round residents in the MSHCP area, though they may make seasonal elevation migrations (up to 40 km) (Sheppard 1996). Crissal Thrashers are associated with desert washes, riparian brush and mesquite thickets at lower elevations and dense scrub in arroyos at higher elevations (Cody 1999). In the Coachella Valley (low elevation) the species occurs in areas dominated by mesquite hummocks and thickets with acacias, arrowweed, and in desert saltbush scrub (Hanna 1933). The species commonly nests in mesquite (Gilman 1902, Hanna 1933).

The mean territory size for crissal thrasher in the Granite Mountains was estimated to be 4.92 ha, although the defended area is thought to be larger (Cody 1999). Like the Le Conte's thrasher, crissal thrashers are secretive, feeding under the cover of dense vegetation making them difficult to locate with the exception of singing males that often perch on taller vegetation. Crissal thrashers have dark brown bodies with a dark chestnut crissum (the feathers also known as the undertail coverts) and lack the contrast between the tail and body seen in Le Conte's thrashers.

The nest of crissal thrasher an open cup rather large twiggy nest built low to the ground and well hidden in dense mesquite or other thick desert vegetation. Crissal thrasher clutch size is typically two to three eggs with an incubation time of 14 days and fledging after 11 to 13 days (Erhlich et al. 1988).

The crissal Thrasher seldom flies in the open, but moves furtively among streamside mesquite thickets, willows, and other tangles. This bird resembles the California Thrasher in its habit of gathering food by hacking the ground with its heavy curved bill, but their ranges do not overlap. Except during the hottest months and briefly after molting, it delivers its loud melodious song year-round. Crissal thrashers will sing year-round, although peak singing activity occurs during the mating season, from February through April. Singing may occur throughout the day, but is most common in the morning (0700-0730), at noon (1100-1300), and in the late afternoon (1630-1800). During late summer crissal thrashers may be less territorial as juveniles are dispersing and as some adults make short distance movements, so less singing occurs. The peak for mating and vocalizations for crissal thrashers appears to be between February and April (Center for Conservation Biology, University of California, Riverside 2004).

Associated Covered Species. Crissal thrashers are found in Habitat that also may be used by riparian bird species during migration, including the least Bell's vireo, summer tanager, yellow warbler, yellow-breasted chat, and southwestern willow flycatcher. Conservation measures for one species will benefit the other, however, additional information is needed on how these two species partition the Habitat. In mesquite hummock areas, Coachella Valley round-tailed ground squirrels would occur with crissal thrashers. Other species including the Coachella Valley fringe-toed lizard, flat-tailed horned lizard, and Palm Springs pocket mouse may occur within the same Habitat as the crissal thrasher.

9.7.6 Le Conte's Thrasher *Toxostoma lecontei*

Status	**Federal:**	**No official status**
	State:	**Species of Special Concern**

9.7.6.1 Species Conservation Goals and Objectives

Conserve and manage populations within the MSHCP Reserve System according to the following criteria:

Goal 1: Ensure species persistence in the Plan Area by conserving large enough areas to support a self-sustaining population (or metapopulation), including required Habitat across a

range of environmental conditions. Conserve Habitat, and associated Essential Ecological Processes, allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused disturbance, and edge effects to Core Habitat by conserving contiguous Habitat patches and effective Linkages between patches of Core Habitat.

Objective 1a. Conserve Habitat in the following Conservation Areas~~ and Special Provisions Area~~:

- Cabazon Conservation Area
- Stubbe and Cottonwood Canyons Conservation Area
- Snow Creek/Windy Point Conservation Area
- Whitewater Canyon Conservation Area
- Highway 111/I-10 Conservation Area
- Whitewater Floodplain Conservation Area
- Upper Mission Creek/Big Morongo Canyon Conservation Area
- ~~Morongo Wash Special Provisions Area~~
- Willow Hole Conservation Area
- Edom Hill Conservation Area
- Thousand Palms Conservation Area
- Indio Hills/Joshua Tree National Park Linkage Conservation Area
- Indio Hills Palms Conservation Area
- East Indio Hills Conservation Area
- Joshua Tree National Park Conservation Area
- Desert Tortoise and Linkage Conservation Area
- Mecca Hills/Orocopia Mountains Conservation Area
- Dos Palmas Conservation Area
- Coachella Valley Stormwater Channel and Delta Conservation Area
- Santa Rosa and San Jacinto Mountains Conservation Area
- Dos Palmas Conservation Area

Please refer to Section 4.3 and Table 9-23 for specific acreages to be protected by this Conservation Objective.

Objective 1b. Ensure conservation of Le Conte's thrasher nest sites through avoidance, minimization, and mitigation measures described in Section 4.4.

Goal 2: Ensure conservation of Le Conte's thrasher by maintaining the long-term persistence of self-sustaining populations and conserving Habitat quality through biological monitoring and Adaptive Management actions in the Plan Area.

Objective 2. Implement Monitoring and Adaptive Management actions to ensure self-sustaining populations within each Core Habitat area.

Table 9-23: Summary of Habitat within Conservation Areas Le Conte's Thrasher

Conservation Area	*Total Acres of Habitat In Conserv Areas*	*Acres of Disturbance Authorized*	*Acres of Existing Conservation Lands*	*Remaining Acres to be Conserved*	*Total Acres to be Conserved in MSHCP Reserve System*	*Designation*
Cabazon	4,083	N/A	42	(4,041)[1]	42	Other Cons. Habitat
Stubbe & Cottonwood Canyons	1,265	123	31	1,111	1,142	Other Cons. Habitat
Snow Creek/ Windy Point	2,788	248	312	2,228	2,540	Other Cons. Habitat
Whitewater Canyon	6	1	0	5	5	Other Cons. Habitat
Highway 111/ I-10	389	39	0	350	350	Other Cons. Habitat
Whitewater Floodplain	7,308	442	2,893	3,974	6,867	Other Cons. Habitat
Upper Mission Creek/Big Morongo Canyon	3,898~~3,727~~	349~~437~~[2]	537	3,012~~2,753~~	3,549~~3,290~~	Other Cons. Habitat
Willow Hole	5,392	464	749	4,179	4,928	Other Cons. Habitat
Long Canyon	712	N/A	12	(700)[1]	12	Other Cons. Habitat
Edom Hill	2,582	228	299	2,055	2,354	Other Cons. Habitat
Thousand Palms	11,058	552[3]	6,627	3,879	10,506	Other Cons. Habitat
West Deception	1,393	N/A	0	(1,393)[1]	0	Other Cons. Habitat

Table 9-23 (cont.)						
Conservation Area	***Total Acres of Habitat In Conserv Areas***	***Acres of Disturbance Authorized***	***Acres of Existing Conservation Lands***	***Remaining Acres to be Conserved***	***Total Acres to be Conserved in MSHCP Reserve System***	***Designation***
Indio Hills/ Joshua Tree N.P. Linkage	6,396	606	333	5,457	5,790	Other Cons. Habitat
Indio Hills Palms	106	1	98	7	105	Other Cons. Habitat
East Indio Hills	2,142	157	571	1,414	1,985	Other Cons. Habitat
Joshua Tree National Park	4,330	25	4,083	222	4,305	Other Cons. Habitat
Desert Tortoise & Linkage	49,414	2,843	20,982	25,589	46,571	Other Cons. Habitat
Mecca Hills/ Orocopia Mountains	17,467	652	10,949	5,866	16,815	Other Cons. Habitat
Dos Palmas	14,882	743	7,450	6,689	14,139	Other Cons. Habitat
CV Stormwater Channel & Delta	784	78	0	706	706	Other Cons. Habitat
Santa Rosa & San Jacinto Mountains	11,093	1,087	3,284	6,722	10,006	Other Cons. Habitat
Total – All Habitat	*147,488~~147,317~~*	*8,639~~8,727~~*	*59,252*	*73,463~~73,204~~ (6,134)[1]*	*132,715~~132,456~~*	--
Totals – Other Conserved Habitat	*147,488~~147,317~~*	*8,639~~8,727~~*	*59,252*	*73,463(6,134)[1]*	*132,715 ~~132,456~~*	--

[1] Numbers within parentheses are acres of Habitat in fluvial sand transport areas. The only Conservation Objective in this Conservation Area is to maintain fluvial sand transport. Habitat conservation is not an objective.

[2] ~~Includes 311 acres within the Morongo Wash Special Provisions Area.~~

[3] Of this Authorized Take, 147 acres can be used only in Section 8, T4S R6E.

9.7.6.2 Threats, Limiting Factors, and Adaptive Management

The primary threat to the species is loss of Habitat due to conversion to urban, agricultural, or other uses, or the degradation of Habitat from OHV use, fire, and pesticide use near agricultural areas. Other threats may include shooting, collisions with cars, and the predation of young by house cats.

The following actions may be needed to ensure species persistence and long-term viability if biological monitoring indicates that such actions are warranted. This list is not comprehensive but identifies some of the known or likely threats to this species. More detailed information on the Management and Monitoring Programs can be found in Section 8.0. Actions may include:

1. Control and manage activities that degrade Le Conte's thrasher Habitat. In particular, OHV activity can destroy nesting substrate and creosote bushes used for nesting. Similarly, shooting should not be allowed, as the Le Conte's thrasher is the largest and most conspicuous species in creosote scrub Habitat at certain times of the year.
2. Control invasive species if it is determined from the monitoring results that they impact thrasher Habitat. Although brood parasitism by the brown-headed cowbird has not been documented in the literature, 11 of 11 Le Conte's thrasher pairs accepted artificially introduced cowbird eggs in a study. Cowbird control should be considered if monitoring indicates it is a problem.
3. As part of the Monitoring Program, establish a research element that addresses the distribution of the species, its home range size, dispersal distances and barriers to dispersal, and its population density throughout the Plan Area.

9.7.6.3 Species Conservation Analysis

Conservation Area Reserve Design. As previously noted, Habitat needs and population numbers for this bird are poorly known. Additional Habitat surveys are needed to determine the distribution and abundance of Le Conte's thrashers within the Plan Area. The Plan provides for large blocks of Habitat that supports Le Conte's thrashers, in the San Gorgonio Pass area around Stubbe Canyon east to Whitewater Canyon, in the Snow Creek area, in the Mission Creek area, along Mission Creek and Big Morongo wash, in the Willow Hole to Edom Hill area, in the Thousand Palms Preserve and sand source area, and in the Shaver's Valley and Dos Palmas areas in the eastern portion of the Plan Area. This Conservation Area configuration would also maintain connectivity with populations to the east of the Plan Area in the Colorado Desert and, potentially, to the north of the Plan Area in the Mojave Desert. Within the Conservation Areas, management actions to reduce edge effects will be significant for this species (see discussion in Section 8.0 under Management Program).

With so little data available on the distribution and abundance of this species within the Plan Area, the Planning Team did not attempt to quantitatively assess Core Habitat. A model was completed for this species and areas of Other Conserved Habitat were identified. The emphasis in Conservation planning for this species was to include large blocks of potential Habitat in proposed Conservation Areas where suitable Le Conte's thrasher Habitat exists. With so little data on the occurrence of Le Conte's thrashers in the Conservation Areas, the Planning Team

opted to take a conservative approach and recommend conservation of all areas where suitable Habitat for this species is present. For each area, see Table 9-23 for a breakdown of Existing Conservation Lands and remaining lands to be conserved. The Planning Team identified and assessed the sufficiency of the following Conservation Areas as Other Conserved Habitat:

Other Conserved Habitat Areas:

1. ***Cabazon.*** There are approximately 4,083 acres of modeled Habitat for this thrasher in the Cabazon Conservation Area. The Plan will conserve approximately 42 acres of Other Conserved Habitat here.
2. ***Stubbe and Cottonwood Canyons.*** This Conservation Area includes approximately 1,265 acres of modeled Habitat. The Plan will conserve approximately 1,142 acres of Other Conserved Habitat here. The area has not been surveyed for this species and no known occurrences have been reported from this Conservation Area.
3. ***Snow Creek/Windy Point.*** There are approximately 2,788 acres of Le Conte's thrasher Habitat modeled in this Conservation Area, of which the Plan will conserve approximately 2,540 acres. Occurrence information and density estimates are not available for this thrasher in the Snow Creek area.
4. ***Whitewater Canyon.*** This Conservation Area includes limited potential Habitat below the toe of slope for a total of approximately 6 acres of modeled Habitat, of which approximately 5 acres will be conserved.
5. ***Highway 111/I-10 Conservation Area.*** This area was added to the Plan primarily as Habitat for the Coachella Valley Jerusalem cricket. This area includes approximately 389 acres of modeled Habitat for Le Conte's thrasher, of which approximately 350 acres will be conserved. The area, however, has not been surveyed for this species and no known occurrences have been reported from this Conservation Area.
6. ***Whitewater Floodplain.*** The Conservation Area includes approximately 7,308 acres of modeled Habitat for this thrasher, of which approximately 6,867 acres will be conserved under the Plan. The largest patch of Habitat within this Conservation Area is the existing Whitewater Floodplain Preserve and additional Habitat south and east of the existing preserve boundary.
7. ***Upper Mission Creek/Big Morongo Canyon.*** The Conservation Area includes approximately 3,898~~3,727~~ acres of modeled Habitat for this thrasher, of which approximately 3,549~~3,290~~ acres will be conserved under the Plan. Information on the occurrence and distribution of Le Conte's thrasher in the upper Mission Creek area is very limited. Although suitable Habitat for this species certainly occurs within this Conservation Area, it has not been well surveyed.
8. ~~***Morongo Wash Special Provisions Area Corridor***. The Morongo Wash Special Provisions Area is within the Upper Mission Creek/Big Morongo Canyon Conservation Area. The Special Provisions Area includes approximately 1,839 total acres of modeled Habitat. The Plan will conserve the entire 1,529 acres of this Habitat.~~
9. ***Willow Hole.*** The Conservation Area includes approximately 5,392 total acres of modeled Habitat within this Conservation Area. The Plan will conserve approximately 4,928 acres of this Habitat.

10. ***Edom Hill.*** This Conservation Area includes scattered Habitat totaling approximately 2,582 acres between Willow Hole and the Thousand Palms Preserve in the Indio Hills. The Plan will conserve approximately 2,354 acres of this Habitat.

11. ***Thousand Palms.*** The Conservation Area includes approximately 11,058 acres of Le Conte's thrasher Habitat modeled in this Conservation Area. The Plan will conserve approximately 10,506 acres of this Habitat.

12. ***Indio Hills/Joshua Tree National Park Linkage.*** The Conservation Area includes approximately 6,396 acres of modeled Habitat for the Le Conte's thrasher. The Plan will conserve approximately 5,790 acres of this Habitat. This area could provide a refugium in that some of the potential Habitat occurs at elevations from 1,000 to 1,120 feet, well above the 200 to 600 foot elevation at other known occurrences on the Thousand Palms Preserve.

13. ***Indio Hills Palms*.** This Conservation Area was considered as potential Habitat for the Le Conte's thrasher and contains approximately 106 acres of modeled Habitat. The Plan will conserve approximately 105 acres of this Habitat.

14. ***East Indio Hills*.** This Conservation Area was considered as potential Habitat for the Le Conte's thrasher and contains approximately 2,142 acres of modeled Habitat. The Plan will conserve approximately 1,985 acres of this Habitat.

15. ***Joshua Tree National Park.*** The Conservation Area includes approximately 4,330 acres of modeled Habitat for the Le Conte's thrasher. The Plan will conserve approximately 4,305 acres of this Habitat.

16. ***Desert Tortoise and Linkage.*** The Conservation Area includes approximately 49,414 acres of modeled Habitat for the Le Conte's thrasher. The Plan will conserve approximately 46,571 acres of this Habitat.

17. ***Mecca Hills/Orocopia Mountains.*** The Conservation Area includes approximately 17,467 acres of modeled Habitat for the Le Conte's thrasher. The Plan will conserve approximately 16,815 acres of this Habitat.

18. ***Dos Palmas.*** The Dos Palmas area includes approximately 14,882 acres that have been delineated, based on topography and vegetation, as modeled Habitat for the Le Conte's thrasher. The Plan will conserve approximately 14,139 acres of this Habitat.

19. ***Coachella Valley Stormwater Channel and Delta.*** There are approximately 784 acres of modeled Habitat for this species within this Conservation Area. The Plan will conserve approximately 706 acres of this Habitat.

20. ***Santa Rosa and San Jacinto Mountains.*** There are approximately 11,093 acres of modeled Habitat for this species within this Conservation Area. The Plan will conserve approximately 10,006 acres of this Habitat.

9.7.6.4 Take Analysis

<u>Significance of the Plan Area to Le Conte's Thrasher</u>

The Le Conte's thrasher appears to occur at low densities in suitable Habitat throughout the Plan Area. This species has no official federal or state status although it is considered as a

Species of Special Concern by the State of California. Le Conte's thrasher is an uncommon resident of the deserts of the American southwest and northwestern Mexico. It is found in the San Joaquin Valley and in the Mojave and Colorado Deserts of California and Nevada southward into northeastern Baja California, and farther south into central and coastal Baja California. It also occurs in the Sonoran Desert from extreme southwest Utah and western Arizona south into western Sonora, Mexico. Within this range, distribution is patchy. The elevational distribution is generally between sea level and 1,150 meters, though in Death Valley it occurs down to -81 meters, and in the Mojave Desert it is known up to approximately 1,600 meters. The species requires undisturbed substrate for foraging under desert shrubs. Agriculture and urban Development have eliminated considerable former Habitat in the San Joaquin Valley, portions of the Mojave Desert, Imperial and Coachella Valleys, the Las Vegas area, and south and west of Phoenix. Based on false-infrared satellite imagery of 243 historic localities in the U.S. as of 1993, at least 26% no longer had suitable Habitat patches within 3 km. Within the Plan Area, Le Conte's thrashers are known to occur in the Upper Mission Creek/Big Morongo Canyon, Whitewater Floodplain, Willow Hole, Edom Hill, Thousand Palms, and Desert Tortoise and Linkage Conservation Areas.

Effects of Take on the Le Conte's Thrasher

The Plan ensures long-term Conservation including Habitat protection, management, and monitoring for Le Conte's thrasher.

There are 243,242 acres of modeled Habitat for Le Conte's thrasher within the Plan Area. Core Habitat was not designated for this species given the limited knowledge about its Habitat and distribution in the Plan Area. The Plan would ensure Conservation of approximately 132,715~~132,456~~ acres (54% of total) of this modeled Habitat. Approximately 59,252 acres (24%) of the modeled Habitat are within Existing Conservation Lands and would be managed as part of the Reserve System. The Plan would conserve an additional 73,463~~73,204~~ acres (30%) of the modeled Habitat for Le Conte's thrasher in the Plan Area. Of the 33 known locations for this species in the Plan Area, 19 are within the Conservation Areas.

Within the Conservation Areas under the worst case scenario, 8,639~~8,727~~ acres of Take of modeled Le Conte's thrasher Habitat (4%) could occur (See Table 9-23 and Table 4-114). Take of Le Conte's thrasher Habitat within the Conservation Areas must be consistent with the Conservation Objectives for this species to: 1) ensure Conservation of Habitat for Le Conte's thrasher across a range of environmental conditions; 2) Ensure conservation of Le Conte's thrasher nest sites through avoidance, minimization, and mitigation measures as described in Section 4.4.3) implement biological monitoring and Adaptive Management to ensure long-term persistence of this species. So, although some Take could occur within the Conservation Areas, the Conservation Objectives required by the Plan will provide for protection of Habitat to ensure the long-term persistence of this thrasher.

Outside of the Conservation Areas, there are 87,235~~87,406~~ acres (36%) of modeled Habitat for Le Conte's thrasher that are authorized for Take. Those areas where Take could be permitted for this species are primarily locations in the area west of Desert Hot Springs and scattered locations in the urbanized areas of Indio and Palms Springs. Roads and urban Development already fragment a significant portion of the Take area. The modeled Habitat for Le Conte's thrasher outside the Conservation Areas is east of Highway 62 and surrounding

Desert Hot Springs, in marginal patches of Habitat along Interstate 10 throughout the Plan Area, east of Dillon Road, along the eastern shore of Salton Sea, and in desert saltbush scrub interspersed with agriculture. These acres were not included in the Conservation Area because of the small patch size, high degree of fragmentation, and the associated edge effects.

The raw acreage numbers and percentage of indicate a substantial acreage of Le Conte's thrasher modeled Habitat that could be lost to development within the next 75 years. Evaluation of the impacts of Take requires an assessment of the quality of this Habitat. The actual reduction in Habitat value is expected to be considerably less because:

1. Conserved Habitat areas are large enough to contain self-sustaining metapopulations of Le Conte's thrashers and incorporate key Habitat elements, including washes, higher cholla cactus density, and alluvial fans.
2. Take within the Conservation Areas would not eliminate or significantly impact any core populations. Conservation Objectives require that a large enough area for the species be protected within Conservation Areas.
3. As a result of implementing the Conservation Objectives Other Conserved Habitat for Le Conte's thrasher will be conserved. The Plan will minimize fragmentation, human-caused disturbance, and edge effects to this Habitat by conserving contiguous Habitat patches and effective linkages between patches.
4. Lands in the MSHCP Reserve System would be managed and monitored to address significant edge effect problems, invasive species, and other stressors to this species.

The issuance of Take Permits, therefore, will not likely jeopardize the continued existence of the Le Conte's thrasher and the implementation of the MSHCP will provide for the Conservation of the species.

Measures to Avoid, Minimize, and Mitigate Take of Le Conte's Thrasher

The Permittees will protect and manage, in perpetuity, 73,463~~73,204~~ acres of the modeled Habitat to mitigate the Take of Le Conte's thrasher. The 59,252 acres of modeled Habitat within Existing Conservation Lands will be monitored and managed to ensure that Conservation Objectives are met. The Plan will thus ensure Conservation, through protection and management, of 132,715~~132,456~~ acres (54%) of Le Conte's thrasher Habitat in the MSHCP Reserve System.

As part of the avoidance, minimization, and mitigation measures required by the Plan, construction activities in all the Conservation Areas will avoid Le Conte's thrasher nesting sites as described in Section 4.4.

Under the Plan, 19 of the 33 known occurrences for this species in the Plan Area will be conserved. Habitat would also be conserved in a range of environmental conditions from Snow Creek in the west of the Plan Area to the Shavers Valley area in the extreme east of the Plan Area. The Conservation Areas which provide Other Conserved Habitat for Le Conte's thrasher are Stubbe and Cottonwood Canyons, Snow Creek/Windy Point, Whitewater Canyon, Highway 111/I-10, Whitewater Floodplain, Upper Mission Creek/Big Morongo Canyon, Mission

Creek/Morongo Wash, Willow Hole, Edom Hill, Thousand Palms, Indio Hills/Joshua Tree National Park Linkage, Indio Hills Palms, East Indio Hills, Joshua Tree National Park, Desert Tortoise and Linkage, Mecca Hills/Orocopia Mountains, Dos Palmas, Coachella Valley Stormwater Channel and Delta, and the Santa Rosa and San Jacinto Mountains.

Within the Conservation Areas, Essential Habitat will be avoided to the Maximum Extent Feasible. Thus, implementation of the Plan will maintain and enhance population viability of the species by protecting large Habitat areas that otherwise would be subject to conversion to other uses.

Additionally, the Plan calls for Management and Monitoring Programs to ensure the Conservation of this species, including control of activities that degrade Le Conte's thrasher Habitat, control of invasive species if monitoring results indicate it is necessary, and restoration and enhancement of degraded Habitat as necessary according to monitoring results. The Plan also provides for a research element as part of the Monitoring Program that addresses the distribution of this thrasher, its home range size, dispersal distances and barriers to dispersal, and its population density throughout the Plan Area.

Overall Impacts to Le Conte's Thrasher

As a result of this Plan, 54% of the modeled Habitat for this species in the Plan Area will be conserved. Habitat would be conserved in a range of environmental conditions from Snow Creek in the west of the Plan Area to the Shavers Valley area in the extreme east of the Plan Area. The Conservation Areas which provide Other Conserved Habitat for Le Conte's thrasher are Stubbe and Cottonwood Canyons, Snow Creek/Windy Point, Whitewater Canyon, Highway 111/I-10, Whitewater Floodplain, Upper Mission Creek/Big Morongo Canyon, Mission Creek/Morongo Wash, Willow Hole, Edom Hill, Thousand Palms, Indio Hills/Joshua Tree National Park Linkage, Indio Hills Palms, East Indio Hills, Joshua Tree National Park, Desert Tortoise and Linkage, Mecca Hills/Orocopia Mountains, Dos Palmas, Coachella Valley Stormwater Channel and Delta, and the Santa Rosa and San Jacinto Mountains. Those areas where Take could be permitted for this species are primarily locations in the area west of Desert Hot Springs and scattered locations in the urbanized areas of Indio and Palms Springs. Roads and urban Development already fragment a significant portion of the Take area. Thus, implementation of the Plan will maintain and enhance population viability of the species by protecting large Habitat areas that otherwise would be subject to conversion to other uses.

The Le Conte's thrasher will benefit from the establishment of the MSHCP Reserve System which will include Conservation of Habitat in from the western to the eastern limits of the Plan Area. Only 24% of the modeled Habitat for this species is currently conserved. Implementation of the Plan is expected to provide for Conservation of the Le Conte's thrasher within the Plan Area, as currently unprotected portions of its Habitat and potential Habitat areas will be conserved. The combination of the overall Conservation measures; species-specific measures such as management to minimize impacts to thrashers and their Habitat, monitoring to better understand the distribution and population status of this species in the Plan Area, and long-term protection, management, and enhancement of Le Conte's thrasher Habitat is expected to effectively compensate for potential adverse effects to this bird species.

9.7.6.5 Species Account: Background

Distribution, Abundance, and Trends. The Le Conte's thrasher's typical Habitat consists of sparsely vegetated desert flats, dunes, alluvial fans, or gently rolling hills having a high proportion of one or more species of saltbush (*Atriplex* spp.) and/or cylindrical cholla cactus (*Opuntia* spp.) 0.9 - 1.9 meters high. It also occupies other desert Habitats with similar structural profiles but lacking saltbush/shadscale or cholla cactus. In its typical Habitat, shrubs are well scattered with contiguous or closed cover usually less than 15 meters in any direction, even along the sides of arroyos. Based on what is known of the species' Habitat requirements throughout its range, it may be reasonable to assume that desert dry wash woodland bordered by mixed woody and succulent scrub community or Sonoran creosote bush scrub below toe of slope provides suitable Habitat. Within the Habitat, the ground is generally bare or with sparse patches of grasses and annuals forming low ground cover (average height less than 30 cm.). This thrasher is rarely found in Habitats consisting entirely of creosote bush (*Larrea*). The majority of shrubs rarely exceed 2.5 meters in height, except for isolated desert trees, yuccas, or tall, thin shrubs such as ocotillo. Substrates are typically sandy and rarely composed of a large proportion of rock or of deep silty clays. The Habitat requires accumulated leaf litter under most plants as diurnal cover for most arthropod prey. Surface water rarely exists anywhere within several kilometers of most territories except temporarily, following infrequent rains.

Typical territories rarely have topographical relief greater than 10 - 20 meters, although many broad canyon floors with large flood plains and poorly vegetated sides are acceptable. Narrow, boulder-strewn canyons with little or no sand deposition are used infrequently. The species commonly uses small arroyos, depressions, or streambeds traversing more level terrain with associated larger saltbush/shadscale and other desert shrubs. It also uses the vegetated margins of large, rolling sand dunes. Crissal and California thrashers prefer nearly continuous cover of shrub or riparian vegetation; both occupy Habitats with far more contiguous or closed cover that is far denser and usually taller than any vegetation typically inhabited by Le Conte's thrasher.

For nesting, Le Conte's thrasher prefers thick, dense, and thorny shrubs or cholla cactus. Cholla cactus and saltbush were used in 85% of 289 nest sites throughout the distribution of the species. The remaining 15% were in a large variety of desert shrubs, small trees, and yucca.

Within the Plan Area, there are historical records in the CNDDB and a few recent records. Historic records (date of record follows the location in parentheses) include the mouth of Whitewater Canyon (1930), Desert Hot Springs (1968), Edom Hill (1984), Andreas Canyon alluvial fan (1923), Mecca (1908), Indio (1924), Cabazon (1916), Whitewater River east of Palm Springs Airport (1920), 2 miles west of Thousand Palms (1921), Palm Canyon wash (1923), Whitewater River in Indian Wells (1919), and Shavers Valley (1986). Many of these areas have been impacted by Development. Records since 1990 include four records for the Desert Hot Springs area, two of which are west of Highway 62, a record for the area below Cottonwood Canyon (west of Whitewater Canyon), a record for the area south of I-10 and west of Gene Autry Trail, a record for the Willow Hole ACEC area, a record for Pushwalla Canyon, a record for the Thousand Palms Oasis area, and a record for Indian Wells. These historical and current records suggest a widespread distribution of the species in the Plan Area, where there is appropriate Habitat. This would include most of the non-mountainous areas that have not been disturbed by urbanization or agriculture.

No data are available on population density in the Plan Area. However, average density in Maricopa, California was 4.63 pairs/km^2. Other density estimates have ranged from less than one pair per square kilometer to 1.7 pairs/km^2. Other estimates have been 6 pairs/mi^2, or 2.3 pairs/km^2 (Engels 1940), and 10 pairs/mi^2, or 3.86 pairs/km^2, in one study area in the San Joaquin Valley and 0 – 5 pairs/mi^2, or 0 - 1.93/km^2, throughout the range (Sheppard 1970). The home range limits vary with time and interactions with neighbors, if any; pairs may occupy about 40 - 100 ha in aggregate over a period of a few years.

Associated Covered Species: Le Conte's thrashers are found in Habitat that also may be used by riparian bird species during migration, primarily desert dry wash woodland, including the least Bell's vireo, summer tanager, yellow warbler, yellow-breasted chat, and southwestern willow flycatcher. They also may be associated with crissal thrasher, desert tortoise, Palm Springs pocket mouse, Coachella Valley round-tailed ground squirrel, flat-tailed horned lizard, and Coachella Valley milkvetch among other species.

9.7.7 Least Bell's Vireo *Vireo bellii pusillus*

Status	**Federal:**	**Endangered**
	State:	**Endangered**

9.7.7.1 Species Conservation Goals and Objectives

Conserve and manage populations within the MSHCP Reserve System according to the following criteria:

Goal 1: Ensure species persistence in the Plan Area by conserving existing breeding Habitat and an assemblage of native Habitats that are likely important for migration. Conserve Habitat, and associated Essential Ecological Processes, allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused disturbance, and edge effects to Core Habitat by conserving contiguous Habitat patches and effective Linkages between patches of Core Habitat.

Objective 1a. Ensure conservation of the riparian natural communities that this vireo depends on, Sonoran cottonwood-willow riparian forest, southern arroyo willow riparian forest, southern sycamore-alder riparian woodland, mesquite hummocks (migration), desert dry wash woodland (migration), desert saltbush scrub (migration), desert sink scrub (migration), mesquite bosque (migration), coastal and valley freshwater marsh (migration), arrowweed Scrub (migration), and cismontane alkali marsh (migration), in the following Conservation Areas:

- Cabazon Conservation Area
- Stubbe and Cottonwood Canyons Conservation Area
- Snow Creek/Windy Point Conservation Area
- Whitewater Canyon Conservation Area
- Upper Mission Creek/Big Morongo Canyon Conservation Area

- Willow Hole Conservation Area
- Thousand Palms Conservation Area
- Indio Hills Palms Conservation Area
- Joshua Tree National Park Conservation Area
- Desert Tortoise and Linkage Conservation Area
- Mecca Hills/Orocopia Mountains Conservation Area
- Dos Palmas Conservation Area
- Coachella Valley Stormwater Channel & Delta Conservation Area
- Santa Rosa and San Jacinto Mountains Conservation Area

Please refer to Section 4.3 and Table 9-24a and 9-24b for specific acreages to be protected by this Conservation Objective.

Objective 1b. Ensure that CVWD will establish permanent riparian Habitat, including at least 44 acres of Sonoran cottonwood-willow riparian forest in the Coachella Valley Stormwater Channel and Delta Conservation Area, to replace the Habitat that is periodically altered by flood control maintenance activities. This Habitat will provide for the conservation of the riparian birds covered by the Plan.

Table 9-24a: Summary of Habitat within Conservation Areas Least Bell's Vireo – Breeding Habitat

Conservation Area	*Total Acres of Habitat in Conserv. Areas*	*Acres of Disturbance Authorized*	*Acres of Existing Conservation Lands*	*Remaining Acres to be Conserved*	*Total Acres to be Conserved in MSHCP Reserve System*
Cabazon	100	2	78	20	98
Stubbe & Cottonwood Canyons	266	2	241	23	264
Whitewater Canyon	167	11	60	96	156
Upper Mission Creek/ Big Morongo Canyon	204	14	62	128	190
Willow Hole	126	11	17	98	115
Thousand Palms	198	0	198	0	198
Indio Hills Palms	97	5	47	45	92
East Indio Hills	39	4	0	35	35
Joshua Tree National Park	5	0	5	0	5
Desert Tortoise & Linkage	0	0	0	0	0
Mecca Hills/ Orocopia Mountains	1	0	1	0	1

Conservation Area	*Total Acres of Habitat in Conserv. Areas*	*Acres of Disturbance Authorized*	*Acres of Existing Conservation Lands*	*Remaining Acres to be Conserved*	*Total Acres to be Conserved in MSHCP Reserve System*
Dos Palmas	182	8	98	76	174
CV Stormwater Channel & Delta	82	8	0	74	74
Santa Rosa & San Jacinto Mountains	1,579	70	822	687	1,509
Total – Breeding Habitat	*3,046*	*135*	*1,629*	*1,282*	*2,911*

Table 9-24b: Summary of Habitat within Conservation Areas Least Bell's Vireo – Migratory Habitat

Conservation Area	*Total Acres of Habitat in Conserv. Areas*	*Acres of Disturbance Authorized*	*Acres of Existing Conservation Lands*	*Remaining Acres to be Conserved*	*Total Acres to be Conserved in MSHCP Reserve System*
Cabazon	0	0	0	0	0
Stubbe & Cottonwood Canyons	289	26	34	229	263
Whitewater Canyon	0	0	0	0	0
Upper Mission Creek/ Big Morongo Canyon	278~~258~~	17~~15~~	112	149~~131~~	261~~243~~
Willow Hole	169	17	0	152	152
Thousand Palms	748	4	710	34	744
Indio Hills Palms	79	4	42	33	75
East Indio Hills	8	1	0	7	7
Joshua Tree National Park	2,195	13	2,063	119	2,182
Desert Tortoise & Linkage	13,564	764	5,920	6,880	12,800
Mecca Hills/ Orocopia Mountains	9,435	319	6,241	2,875	9,116
Dos Palmas	10,129	641	3,716	5,772	9,488
CV Stormwater Channel & Delta	1,983	177	214	1,592	1,806

Conservation Area	*Total Acres of Habitat in Conserv. Areas*	*Acres of Disturbance Authorized*	*Acres of Existing Conservation Lands*	*Remaining Acres to be Conserved*	*Total Acres to be Conserved in MSHCP Reserve System*
Santa Rosa & San Jacinto Mountains	3,958	324	2,157	1,477	3,634
Total – Migratory Habitat	*42,835~~42,815~~*	*2,307~~2,305~~*	*21,209*	*19,319~~19,301~~*	*40,528~~40,510~~*

Goal 2: Protect Essential Ecological Processes, including hydrological regimes, necessary to maintain breeding and migration Habitat for this species.

Objective 2. Ensure protection of Essential Ecological Process areas through Conservation Area Conservation Objectives for Essential Ecological Processes.

Goal 3: Ensure conservation of the least Bell's vireo by maintaining the long-term persistence of self-sustaining populations or metapopulations and conserving Habitat quality through biological monitoring and Adaptive Management actions in the Plan Area.

Objective 3. Implement biological monitoring and Adaptive Management to ensure persistence of this vireo in the Plan area.

9.7.7.2 Threats, Limiting Factors, and Adaptive Management

The most significant threats to the least Bell's vireo in the Plan Area are nest parasitism by the brown-headed cowbird, invasion of non-native plants in riparian Habitats, destruction of Habitat as a result of flood control activities, and degradation of Habitat as a result of edge effects related to human activities. Brown-headed cowbird parasitism has been described as a primary cause for the decline of least Bell's vireos in Central and Northern California as well as in Southern California. The decline in breeding populations of lowland riparian passerine species, including the least Bell's vireo, along with other small, insectivorous, open-cup nesting birds -- among them the yellow warbler and southwestern willow flycatcher -- is well documented. It has been suggested that because the least Bell's vireo is most restricted to lowland riparian forests where cowbird parasitism is likely to be greatest, this species has suffered the largest aggregate reduction in numbers. Parasitized vireo pairs either desert the nest or raise the young cowbird at the expense of their own young. Human activities, including golf courses and agriculture, attract cowbirds, thereby increasing the threat to least Bell's vireos. Reduction of cowbird populations in least Bell's vireo Habitat has been shown to substantially benefit this species. The predominance of golf courses and agricultural areas, which both provide Habitat for the cowbird, may make control of this non-native bird difficult.

The following actions may be needed to ensure species persistence and long-term viability if biological monitoring indicates that such actions are warranted. This list is not comprehensive but identifies some of the known or likely threats to this species. More detailed

information on the Management and Monitoring Programs can be found in Section 8.0. Actions may include:

1. Control and manage activities that degrade least Bell's vireo Habitat in conserved areas. These activities include brown-headed cowbird nest parasitism, clearing or alteration of riparian vegetation, persistence or invasion of exotic plant species, human disturbance, edge effects, and predation of adults and nests by domestic animals.
2. Restrict human access to least Bell's vireo occupied Habitat during the breeding season, from March 15 to September 15.
3. Enhance Habitat through the restoration of disturbed Habitats or the creation of new Habitat where feasible. In particular, removal of tamarisk from existing riparian areas would enhance Habitat for least Bell's vireos and other riparian birds. Any Habitat restoration should balance management of least Bell's vireo Habitat with management actions for other riparian-dependent species by ensuring a mix of vegetation successional stages in riparian Habitats.
4. Maintain upland buffers for all occupied Habitat. Buffers should be a minimum of 50 feet wide wherever feasible.

9.7.7.3 Species Conservation Analysis

Conservation Area Reserve Design. The configuration of Conservation Areas is generally beneficial to the Conservation of the least Bell's vireo, as existing Conservation Areas often surround occupied Habitat on public lands. The Mission Creek site is conserved and managed by the Wildlands Conservancy; it is surrounded by BLM Wilderness. Habitat in Whitewater Canyon is partly on BLM land and partly on private land. Acquisition of the private lands from willing sellers will facilitate management of activities in the area that could impact the riparian Habitat; however, there is access to the area from Whitewater Road, and it is impractical to completely exclude access to the proposed Conservation Area in Whitewater Canyon. Management prescriptions need to be incorporated in the BLM's Whitewater Canyon ACEC management plan. Chino Canyon is currently privately owned; however, discussions are in progress with the landowner for acquisition of the riparian area. Willow Hole is part of a BLM ACEC and includes adjacent lands owned by the CVMC.

1. The Planning Team did not attempt to estimate population density to evaluate Core Habitat for this species. With very limited Habitat available for this vireo, all locations were considered as part of a metapopulation. Hence, all available riparian Habitat for breeding and Habitat which may be used in migration were included in the MSHCP Reserve System. The presence of potential breeding Habitat for this species within each of the Conservation Areas is shown in Table 9-24a; migratory Habitat is shown in Table 9-24b.

9.7.7.4 Take Analysis

Significance of the Plan Area to Least Bell's Vireo

The least Bell's vireo was formerly known to inhabit dense willow thickets along streams throughout California's Sacramento and San Joaquin Valleys, from Red Bluff south, from coastal areas inland to the foothills of the Sierra Nevada, and in Owens and Death Valleys. This subspecies is endemic to California and northern Baja California. Currently, U.S. populations are known only from Santa Barbara County and Southern California. Major causes of the decline are cowbird parasitism and destruction of riparian Habitats. Breeding pairs have been observed in the counties of Monterey, San Benito, Inyo, Santa Barbara, San Bernardino, Ventura, Los Angeles, Orange, Riverside, and San Diego, with the highest concentration in San Diego County along the Santa Margarita River (Small 1996). In San Diego County, however, significant population increases in the period from 1986 to 1996 are primarily due to management of local cowbird populations (USFWS 1998).

Currently available census data indicate that most of the populations of this species have undergone tremendous growth. The population in southern California has increased from an estimated 300 pairs in 1986 to an estimated 1,346 pairs in 1996 (USFWS 1998).

Within the Plan Area, The least Bell's vireo is known to occur as a breeding bird in Chino Canyon and in Andreas Canyon. Other suitable breeding Habitat may occur in Millard Canyon, Whitewater Canyon, Mission Creek, Palm Canyon, Murray Canyon, at Oasis de los Osos, at the Willow Hole-Edom Hill Preserve/ACEC, along the Whitewater River near the Salton Sea, and at Dos Palmas. As with other riparian bird species, least Bell's vireos within the Coachella Valley are probably part of a metapopulation and as such are an important element of the avian community.

Effects of Take on the Least Bell's Vireo

The primary importance of the proposed MSHCP to the least Bell's vireo is that it provides Conservation (including Habitat protection, management, and monitoring) of breeding and migratory Habitat. The Plan ensures the long-term conservation and enhancement of breeding and migratory Habitat as well as the associated Essential Ecological Processes, including the hydrological regimes that support riparian vegetation.

Breeding Habitat. With respect to breeding Habitat, there are 3,675 acres of modeled Habitat for the least Bell's vireo within the Plan Area. Approximately 3,046 acres of this modeled breeding Habitat occur within the Conservation Areas and the Plan would ensure Conservation of 2,911 of these acres (96% of the total modeled Habitat). Approximately 1,629 acres (44%) of the modeled Habitat are within Existing Conservation Lands and would be managed as part of the Reserve System. The Plan would conserve an additional 1,282 acres (35%) of the modeled breeding Habitat for least Bell's vireo.

Within the Conservation Areas under the worst case scenario, 135 acres of Take of modeled breeding Habitat (4%) could occur (See Table 9-24a and Table 4-114). Take of least Bell's vireo breeding Habitat within the Conservation Areas must be consistent with the Conservation Objectives for this species to: 1) ensure Conservation of breeding and migratory Habitat; 2) protect Essential Ecological Processes, including hydrological regimes, needed to

maintain vireo Habitat; and 3) implement the Monitoring Program and Adaptive Management actions to ensure Conservation of this species. So, although some Take could occur within the Conservation Areas, the Conservation Objectives required by the Plan will provide for protection of Habitat to ensure the long-term persistence of this species.

Outside of the Conservation Areas, there are 626 acres (17%) of modeled breeding Habitat authorized for Take. The area of breeding Habitat outside the Conservation Areas is primarily mesquite hummocks that remain as small fragments in a matrix of agriculture. Mesquite hummocks outside the Conservation Areas also occur west of Dos Palmas ACEC, and west of Dillon Road. These acres were not included in the Conservation Area because of the small patch size, high degree of fragmentation, and the associated edge effects.

Migratory Habitat. There are 56,643 acres of modeled migratory Habitat for the least Bell's vireo within the Plan Area. Approximately 42,835~~42,815~~ acres of this modeled migratory Habitat occur within the Conservation Areas and the Plan would ensure Conservation of 40,528~~40,510~~ of these acres (72% of the total modeled Habitat). Approximately 21,209 acres (37%) of the modeled Habitat are within Existing Conservation Lands and would be managed as part of the Reserve System. The Plan would conserve an additional 19,319~~19,301~~ acres (34%) of the modeled migratory Habitat for least Bell's vireo.

Within the Conservation Areas under the worst case scenario, 2,307~~2,305~~ acres of Take of modeled migratory Habitat (4%) could occur (See Table 9-24b and Table 4-114). Take of least Bell's vireo migratory Habitat within the Conservation Areas must be consistent with the Conservation Objectives for this species as noted above.

Outside of the Conservation Areas, there are 12,470 acres (22%) of modeled migratory Habitat authorized for Take. Portions of the natural communities included in the migratory Habitat model for least Bell's vireo in marginal or fragmented areas of desert dry wash woodland, mesquite hummocks, desert saltbush scrub, and desert sink scrub. The desert saltbush scrub and desert sink scrub occur in patches in the agricultural areas north of the Salton Sea and along the west shore of the Sea.

The evaluation of impacts of Take for least Bell's vireo requires an assessment of the quality of the affected Habitat. The actual reduction in Habitat value is expected to be considerably less than indicated by the raw acreage numbers because:

1. Conserved Habitat areas are large enough to contain self-sustaining metapopulations populations of least Bell's vireo and incorporate key Habitat elements, including riparian Habitat for breeding and desert dry wash woodland and other Habitats for migration.
2. Take within the Conservation Areas would not eliminate or significantly impact any breeding Habitat. Conservation Objectives require any approved development within Conservation Areas to ensure protection of breeding Habitat.
3. As a result of implementing the Conservation Objectives to protect riparian natural communities the Plan would ensure that there is no net loss of wetland Habitats. For all riparian natural communities where disturbance is authorized by the Plan, an equivalent number of acres as that subject to disturbance would be replaced.
4. Potential Development would not adversely impact the Essential Ecological Processes

needed to maintain currently viable Habitat. Conservation Areas were carefully designed to protect the watershed for riparian Habitat, desert dry wash woodland, and other Habitats for this species.

5. Lands in the MSHCP Reserve System would be managed and monitored to address significant edge effect problems, potential loss of Habitat from introduction of exotic species, and other stressors to this species,

The issuance of Take Permits, therefore, will not likely jeopardize the continued existence of the least Bell's vireo and the implementation of the MSHCP will provide for the Conservation of the species.

Measures to Avoid, Minimize, and Mitigate Take of Least Bell's Vireo

To mitigate the Take of least Bell's vireo, the Permittees will protect and manage, in perpetuity, 1,282 acres of the modeled breeding Habitat and 19,319~~19,301~~ acres of migratory Habitat for this species. The 1,629 acres of breeding Habitat and 21,209 acres of migratory modeled Habitat within Existing Conservation Lands will be monitored and managed to ensure that Conservation Objectives are met. The Plan will thus ensure Conservation, through protection and management, of 2,911 acres of breeding Habitat and 40,528~~40,510~~ acres of migratory Habitat for this species.

Existing Conservation Areas within the Plan boundary currently protect 38% of the Habitat for the least Bell's vireo. The Conservation Areas in the Plan would protect 79% of the occupied and potential breeding Habitat and 72% of the potential migratory Habitat for this species. The Conservation Areas include the known breeding Habitat for least Bell's vireo in Chino Canyon, and potential breeding Habitat at Whitewater Canyon, Mission Creek, the Thousand Palms Preserve, the Whitewater River mouth near the Salton Sea, Cottonwood Springs in Joshua Tree National Park, and Dos Palmas. The Reserve System will include 24 of the 37 known locations for this vireo. Other suitable Habitat for breeding sites in the Plan Area occurs in Palm Canyon, Murray Canyon, and Andreas Canyon on the Agua Caliente Indian Reservation; portions of these canyons are currently protected as part of the Indian Canyons Heritage Park.

The model for the least Bell's vireo, and other riparian birds, includes Habitat used in migration, including desert dry wash woodland and desert saltbush scrub. A complete list of the natural communities that may be used in migration is given in the description of model parameters in Appendix I. Other natural Habitat used by this vireo in migration or foraging will be conserved in Stubbe and Cottonwood Canyons, Oasis de los Osos, Snow Creek and Falls Creek in the Snow Creek/Windy Point Conservation Area, Mission Creek, the Thousand Palms Preserve, the Coachella Valley Stormwater Channel and Delta near the Salton Sea, Dos Palmas, and Cottonwood Spring in Joshua Tree National Park Conservation Area. Habitat disturbance, subject to the conditions of any required streambed alteration or Section 404 permits, would be allowed in those portions of these natural communities not conserved by the Plan.

Where disturbance of a given number acres of riparian natural communities is authorized, an equivalent number of acres would be replaced to ensure that the no net loss occurs and the Conservation Objective is achieved.

CVWD will establish 44 acres of permanent Sonoran cottonwood-willow riparian forest in the Coachella Valley Stormwater Channel and Delta Conservation Area as described in Section 4.3.20 to replace riparian Habitat that is periodically altered by flood control maintenance activities. Temporary Habitat disturbance for flood control channel maintenance purposes would be permitted by the Plan in the Coachella Valley Stormwater Channel.

Additionally, the Plan calls for Management and Monitoring Programs to ensure the Conservation of this species, including control of activities that degrade vireo Habitat, control of invasive species such as tamarisk and brown-headed cowbirds where necessary, and restoration and enhancement of degraded Habitat as necessary according to monitoring results. The Plan also limits human access to Bell's vireo occupied Habitat during the breeding season.

Overall Impacts to Least Bell's Vireo

As shown in Table 9-24a, the MSHCP Reserve System would protect 84% of the potential and known breeding Habitat for this species. All of the known breeding locations for this species (with the exception of one limited precision record from Cabazon, reported by Grinnell in 1913) would be protected. The proposed Conservation Areas include the important breeding Habitat for least Bell's vireo in riparian woodland and forest communities and desert fan palm oasis woodland. An aspect of the statistics in Tables 9-24a and Table 9-24b bears explanation. The model for the least Bell's vireo, and other riparian birds, includes Habitat used in migration, including desert dry wash woodland, mesquite bosque and hummocks, and desert saltbush scrub. Not all of the Habitat in these natural communities will be protected in the proposed Conservation Areas. Habitat disturbance, subject to the conditions of any required streambed alteration or Section 404 permits, would be allowed in those portions of these natural communities not conserved by the Plan. Proposed Conservation Areas include riparian Habitat in Whitewater Canyon, Chino Canyon, and Willow Hole/Edom Hill ACEC where the species has been known to breed. Other natural Habitat used by least Bell's vireo in migration or foraging will be conserved in Stubbe and Cottonwood Canyons, Oasis de los Osos, Snow/Falls Creek, Mission Creek, the Thousand Palms Preserve, the Whitewater River delta near the Salton Sea, Dos Palmas, and Cottonwood Spring in Joshua Tree National Park. In total, the Plan would conserve 72% of the Habitat potentially used in migration by least Bell's vireo, according to the model. Temporary Habitat disturbance for flood control channel maintenance purposes would be permitted by the Plan in the Coachella Valley Stormwater channel. CVWD will establish offsite replacement riparian Habitat as described in Section 4.3.21.

Implementation of the Plan is expected to maintain and enhance population viability of the least Bell's vireo by protecting its known breeding locations in the Plan Area and conserving Habitats that may be used in migration. The Plan will also enhance riparian Habitat through implementation of management prescriptions to remove non-native tamarisk and other invasive species from riparian areas. An agreement with CVWD will result in creation of additional riparian vegetation along the Coachella Valley Stormwater channel.

9.7.7.5 Species Account: Background

Distribution, Abundance, and Trends. The least Bell's vireo inhabits riparian woodland Habitats along the riverine systems of Southern California, primarily in San Diego, Santa Barbara, and Riverside Counties. They also breed in northern Baja California and are seen

in migration in southern Baja California. This vireo species occurs at sites with two primary features: (1) a dense shrub cover within 1 to 2 meters (3 to 6 feet) off the ground, where nests are typically placed, and (2) a dense, stratified canopy for foraging (Goldwasser 1981, USFWS 1998). Typical riparian Habitats are those which may include cottonwoods (*Populus fremontii*), oak woodlands, and a dense understory of species such as willow (*Salix* spp.), mulefat (*Baccharis salicifolia*), and California wild rose (*Rosa californica*); in desert areas, arrow-weed (*Pluchea sericea*) and wild grape (*Vitis girdiana*) may be dominant species in these riparian woodlands.

The least Bell's vireo is known to occur as a breeding bird in Chino Canyon and in Andreas Canyon. Other suitable breeding Habitat may occur in Millard Canyon, Whitewater Canyon, Mission Creek, Palm Canyon, Murray Canyon, at Oasis de los Osos, at the Willow Hole-Edom Hill Preserve/ACEC, along the Whitewater River near the Salton Sea, and at Dos Palmas. Breeding and other Habitat in Andreas, Palm, and Murray Canyons is on the Agua Caliente Indian Reservation; the canyons are part of the Indian Canyons Heritage Park and are not included in this Plan. Some least Bell's vireos, particularly if sighted near the Salton Sea or at other locations on the valley floor, could be subspecies *arizonae*, but the Plan will address all least Bell's vireo Habitat as if occupied by subspecies *pusillus*.

Least Bell's vireos also migrate through the Plan Area en route to other breeding areas. In migration, they may use desert fan palm oasis woodland, mesquite hummocks, mesquite bosque, arrowweed scrub, desert dry wash woodland, southern sycamore-alder riparian woodland, Sonoran cottonwood-willow riparian forest, and southern arroyo willow riparian forest.

The least Bell's vireos typically arrive in Southern California to breed from mid-March to early April and remain until late September. Most birds spend the winter in southern Baja California and Mexico. During the breeding season, male vireos establish and defend territories; they maintain a stubborn attachment to these sites throughout the breeding season. Nests are constructed in dense thickets of willow or mulefat, one to two meters from the ground. These vireos may also make their nests in other riparian tree and shrub species.

Associated Covered Species. Other riparian species that occur in similar Habitat, including the yellow-breasted chat, southwestern willow flycatcher, summer tanager, and yellow warbler, will benefit from conservation and Adaptive Management actions for least Bell's vireo. Riparian bird species will be considered as a guild in the Plan with regard to their general presence in riparian areas. However, each of these riparian bird species may require slightly different structural features or successional stages for optimal breeding Habitat, which may require different management strategies.

9.7.8 Gray Vireo
Vireo vicinior

Status **Federal:** **No official Status**
State: **Species of Special Concern**

9.7.8.1 Species Conservation Goals and Objectives

Conserve and manage populations within the MSHCP Reserve System according to the following criteria:

Goal 1: Ensure species persistence in the Plan Area by conserving large enough areas to support a self-sustaining population. Conserve Habitat, and associated Essential Ecological Processes, allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused disturbance, and edge effects to Core Habitat by conserving contiguous Habitat patches and effective Linkages between patches of Core Habitat.

Objective 1. Conserve occupied or potential Habitat, including Other Conserved Habitat, within the following Conservation Areas:

- Whitewater Canyon Conservation Area
- Joshua Tree National Park Conservation Area
- Santa Rosa and San Jacinto Mountains Conservation Area

Please refer to Section 4.3 and Table 9-25 for specific acreages to be protected by this Conservation Objective.

Table 9-25: Summary of Habitat within Conservation Areas
Gray Vireo

Conservation Area	*Total Acres of Habitat*	*Acres of Disturbance Authorized*	*Acres of Existing Conservation Lands*	*Remaining Acres to be Conserved*	*Total Acres Conserved in MSHCP Reserve System*	*Designation*
Cabazon	26	N/A	0	(26) [1]	0	Other Cons. Habitat
Stubbe & Cottonwood Canyons	9	0	9	0	9	Other Cons. Habitat
Snow Creek/ Windy Point	6	1	1	4	5	Other Cons. Habitat
Whitewater Canyon	4,927	19	4,739	169	4,908	Other Cons. Habitat
Upper Mission Creek/ Big	14	0	14	0	14	Other Cons. Habitat

Conservation Area	***Total Acres of Habitat***	***Acres of Disturbance Authorized***	***Acres of Existing Conservation Lands***	***Remaining Acres to be Conserved***	***Total Acres Conserved in MSHCP Reserve System***	***Designation***
Morongo Canyon						
Joshua Tree National Park	30,653	134	29,311	1,208	30,519	Other Cons. Habitat
Santa Rosa & San Jacinto Mountains	67,401	1,312	54,276	11,813	66,089	Other Cons. Habitat
Total – All Habitat	*103,036*	*1,466*	*88,350*	*13,194 (26)*[1]	*101,544*	--
Total – Other Cons. Habitat	*103,036*	*1,466*	*88,350*	*13,194 (26)*[1]	*101,544*	--

[1] Numbers within parentheses are acres of Habitat in fluvial sand transport areas. The only Conservation Objective in this Conservation Area is to maintain fluvial sand transport. Habitat conservation is not an objective.

Goal 2: Ensure conservation of gray vireo by maintaining the long-term persistence of self-sustaining populations and conserving Habitat quality through biological monitoring and Adaptive Management actions in the Plan Area.

Objective 2. Implement biological monitoring and Adaptive Management to ensure persistence of this vireo within the Plan Area.

9.7.8.2 Threats, Limiting Factors, and Adaptive Management

The reasons for the decline in gray vireo populations in recent decades are not well understood. One major cause of this decline may be parasitism by the brown-headed cowbird. Remsen (1978) has described the gray vireo as highly susceptible to cowbird parasitism. Human activities, including residential Development, golf courses and agriculture, attract cowbirds thereby increasing this potential threat to gray vireos. Reduction of cowbird populations in gray vireo Habitat may substantially benefit this species. Another possible cause for their decline could be Habitat changes and senescence of the vegetation due to fire suppression activities since the turn of the century. Research is needed to determine the causes of this species' decline.

The following actions may be needed to ensure species persistence and long-term viability if biological monitoring indicates that such actions are warranted. This list is not comprehensive but identifies some of the known or likely threats to the gray vireo. More detailed information on the Management and Monitoring Programs can be found in Section 8.0. Actions may include:

1. Determine the distribution and abundance of the gray vireo throughout the Plan Area. This would include coordination with Joshua Tree National Park biologists to conduct surveys for this species in appropriate Habitat within the park.

2. Control brown-headed cowbird nest parasitism if it is deemed to be a significant factor in the decline of this species. Any sign of parasitism or regular observations of cowbirds in breeding Habitat may warrant a cowbird control effort. Control invasive species if it is determined from the monitoring results that they impact gray vireo Habitat.
3. Coordinate with USFS, BLM, and NPS regarding appropriate management prescriptions for pinyon-juniper woodland and chaparral Habitats. Consideration should be given to the use of prescribed fire and/or standards for controlling wildfires to maintain or restore gray vireo Habitat.

9.7.8.3 Species Conservation Analysis

Conservation Area Configuration Issues. The configuration of proposed Conservation Areas in the Santa Rosa and San Jacinto Mountains is beneficial to the Conservation of gray vireos, as all potential Habitat is included, with the exception of areas where residential Development occurs on private lands in the Pinyon Flat area. Most of the potential Habitat for this species occurs on public lands managed by the USFS and includes contiguous blocks of Habitat. All of the potential Habitat in Joshua Tree National Park is surrounded by other protected areas of the park. Nearly 5,000 acres of potential Habitat occur in the Whitewater Canyon Conservation Area on BLM and USFS lands in the San Gorgonio Wilderness. The Habitat needs and population numbers for this bird are poorly known. Additional Habitat surveys are needed to determine whether viable populations exist within the Plan Area. More information will need to be gathered as part of Plan implementation to determine where occupied Habitat for this species occurs and to establish Adaptive Management goals that will maintain its Habitat.

With so little known about this species, the Planning Team did not attempt to identify Core Habitat within the Plan Area. The emphasis in Conservation planning for this species was to include large blocks of potential Habitat in proposed Conservation Areas where suitable gray vireo Habitat exists. Virtually all potential Habitat for this species will be conserved within the MSHCP Reserve System. For each area, see Table 9-25 for a breakdown of Existing Conservation Lands and remaining lands to be conserved. The Planning Team identified the following Conservation Areas as Other Conserved Habitat:

1. ***Whitewater Canyon.*** This Conservation Area includes approximately 4,927 acres of modeled gray vireo Habitat, of which approximately 4,908 acres will be conserved under the Plan.
2. ***Joshua Tree National Park.*** The Joshua Tree National Park Conservation Area includes approximately 30,653 acres that have been delineated, based on topography and vegetation, as modeled Habitat for the gray vireo. Approximately 30,519 acres of this potential Habitat will be conserved under the Plan.
3. ***Santa Rosa and San Jacinto Mountains.*** There are approximately 67,401 acres of modeled Habitat for this species within this Conservation Area, of which approximately 66,089 acres will be protected under the Plan. In this Conservation Area, breeding gray vireos are known from the San Jacinto and Santa Rosa Mountains, from Mountain Center to Pinyon Flat and Sugarloaf Mountain.

9.7.8.4 Take Analysis

Significance of the Plan Area to Gray Vireo

Within the Plan Area, the occurrence and status of the gray vireo is little known. The summer range of the gray vireo was formerly more widespread, with breeding birds recorded at many locations on the desert slopes of San Bernardino, Riverside and San Diego Counties, in the Walker Pass area of Kern County, in Joshua Tree National Park, and in the northern and western foothills of the San Gabriel Mountains. The gray vireo is also known as a migrant in Whitewater Canyon (McCaskie 1963, Garrett and Dunn 1981). This vireo has no official state or federal status although it is considered a Species of Special Concern by the State of California.

Effects of Take on the Gray Vireo

The primary importance of the proposed MSHCP to the gray vireo is that it provides Conservation (including Habitat protection, management, and monitoring) of Habitat where gray vireos are known to occur as well as additional potential Habitat. The Plan ensures the long-term conservation and enhancement of breeding and migratory Habitat through implementation of management prescriptions.

There are 105,562 acres of modeled Habitat for the gray vireo within the Plan Area. Approximately 103,036 acres of this modeled Habitat occur within the Conservation Areas and the Plan would ensure Conservation of 101,544 of these acres (96% of the total modeled Habitat). The two known occurrences for the gray vireo are both within the Santa Rosa and San Jacinto Mountains Conservation Area. Approximately 88,350 acres (84%) of the modeled Habitat are within Existing Conservation Lands and would be managed as part of the Reserve System. The Plan would conserve an additional 13,194 acres (12%) of the modeled Habitat for the gray vireo.

Within the Conservation Areas under the worst case scenario, 1,466 acres of Take of modeled Habitat (1%) could occur (See Table 9-25 and Table 4-114). Take of gray vireo Habitat within the Conservation Areas must be consistent with the Conservation Objectives for this species to: 1) ensure Conservation of occupied and potential Habitat; 2) evaluate the need for management prescriptions for pinyon-juniper woodland and chaparral Habitat; and 3) implement the Monitoring Program and Adaptive Management actions to ensure Conservation of this species. So, although some Take could occur within the Conservation Areas, the Conservation Objectives required by the Plan will provide for protection of Habitat to ensure the long-term persistence of the gray vireo.

Outside of the Conservation Areas, there are 2,447 acres (2%) of modeled Habitat authorized for Take. The majority of the acreage is comprised of the undeveloped areas within the existing low density residential areas in the Pinyon Flat/Pinyon Crest communities along Highway 74, other developed areas, Highway 74 itself as well as an extensive road network in this area.

The evaluation of impacts of Take for gray vireo requires is limited by the available data on this species occurrence in the Plan Area. The impact of potential Take of gray vireos is expected to be reduced because:

1. Conserved Habitat areas are large enough to support a self-sustaining metapopulation of gray vireos and incorporate key Habitat elements.
2. Take within the Conservation Areas would not eliminate or significantly impact any known gray vireo Habitat. Conservation Objectives require any approved development within Conservation Areas to ensure protection of occupied Habitat.
3. As a result of implementing the Conservation Objectives for the natural communities within gray vireo Habitat.
4. Lands in the MSHCP Reserve System would be managed and monitored to address significant uncertainties about this species, including distribution and abundance, Habitat preferences, and potential stressors to gray vireo,

The issuance of Take Permits, therefore, will not likely jeopardize the continued existence of the gray vireo and the implementation of the MSHCP will provide for the Conservation of the species.

Measures to Avoid, Minimize, and Mitigate Take of Gray Vireo

To mitigate the Take of gray vireo, the Permittees will protect and manage, in perpetuity, 13,194 acres of occupied and potential Habitat. The 88,350 acres of occupied and potential Habitat within Existing Conservation Lands will be monitored and managed to ensure that Conservation Objectives are met. The Plan will thus ensure Conservation, through protection and management, of a total of 101,544 acres of modeled Habitat for this species.

Existing Conservation Areas within the Plan boundary currently protect 84% of the modeled Habitat for the gray vireo. Both of the two known locations for gray vireo in the Plan Area would be conserved. Natural Habitat used by this vireo in migration or foraging will be conserved in Whitewater Canyon, Joshua Tree National Park Conservation Area, and the Santa Rosa and San Jacinto Mountains.

Additionally, the Plan calls for Management and Monitoring Programs to ensure the Conservation of this species, including control of activities that degrade vireo habitat, and control of invasive species such as brown-headed cowbird if they are determined through monitoring to be a threat. The Monitoring Program will also include data collection to determine the distribution and abundance of the gray vireo in suitable Habitat in the Plan Area.

The Plan also provides for coordinated management efforts to maintain and enhance or restore gray vireo Habitat. The Habitat preferences of the gray vireo and the reasons for its apparent decline are not known. Additional data from the Monitoring Program will contribute to informed management efforts to enhance gray vireo Habitat areas.

Overall Impacts to Gray Vireo

As shown in Table 9-25, the Plan would protect 96% of the potential Habitat for this species. All of the known locations for this species would be protected under this Plan. Habitat would also be conserved in a range of environmental conditions from Cabazon in the west end of

the Plan Area to the Joshua Tree National Park in the north and east ends of the Plan Area. The Conservation Areas that provide significant acres of Habitat for gray vireo are Whitewater Canyon, Joshua Tree National Park, and the Santa Rosa and San Jacinto Mountains. Other Conservation Areas that contain very small acres of potential gray vireo Habitat are Cabazon, Stubbe and Cottonwood Canyons, Snow Creek/Windy Point, and Upper Mission Creek/Big Morongo Canyon. Those limited areas where Incidental Take could be permitted for this species are primarily locations in the already developed area around Pinyon Flat in the Santa Rosa Mountains.

Implementation of the Plan will maintain and enhance population viability of the gray vireo by protecting additional potential Habitat for this species. The Plan will also enhance gray vireo Habitat through implementation of management prescriptions, which could include control of brown-headed cowbird parasitism and prescribed burning to revitalize Habitat. Implementation for this species will include research to determine the extent of its occurrence within the Plan Area and Habitat management needs.

9.7.8.5 Species Account: Background

Distribution, Abundance, and Trends. The gray vireo is a small passerine about the size of a house sparrow that inhabits arid, shrub-covered slopes in pinyon-juniper, juniper, and chamise-redshank chaparral Habitats on foothills and mesas. Suitable Habitat typically occurs from 2,000 to 6,500 feet (600-2,000 m) (Zeiner et al. 1990). In its preferred Habitat it is found in areas with sparse to moderate cover and scattered small trees. Although junipers are the dominant trees in gray vireo Habitat, oaks may also be common.

The summer range of the gray vireo is from New Mexico, southern Nevada, southern Utah, southern Colorado, western Texas, Arizona, and southeastern California. This species winters primarily south of the Mexican border and in southwestern Arizona. In California, breeding gray vireos are known from the northeastern slopes of the San Bernardino Mountains in the vicinity of Rose Mine and Round Valley, in the San Jacinto and Santa Rosa Mountains from Mountain Center to Pinyon Flat and Sugarloaf Mountain, and on the southern slopes of the Laguna Mountains near Campo and Kitchen Creek. It is also known from the mountains of the eastern Mojave Desert, including the Grapevine, Kinston, Clark and New York Mountains.

Descriptions by Grinnell and Swarth (1913) indicate that the gray vireo was a common summer resident on the slopes of the Santa Rosa and San Jacinto Mountains. Their observation sites include a ridge at 4,200 feet near Potrero Spring and north of Asbestos Mountain, and down to 3,000 feet near the head of Palm Canyon. Along the trail from Vandeventer Flat to Pinyon Flat, “many birds” were noted at 3,000 to 4,500 feet, as far east as Omstott Creek, which coincided with the limit of *Adenostoma* species. Based on known territory size and amount of suitable Habitat, they estimated that 480 pairs were present. While it is not known how many birds may still exist in the area, sightings are rare. One pair was present near Pinyon Flats in 1977 (Goldwasser 1978a). One to four pairs were observed south of Highway 74 near the Santa Rosa Peak Road in 1979, and a nesting pair was observed in there in 1981 (R. McKernan, pers. comm.). According to USFS records (Freeman, pers. comm.), one individual was seen in Pinyon Flat in July 1997. According to Garrett and Dunn (1981), much fieldwork is needed to document the extent and causes of decline of this formerly more widespread species. Regular surveys for this species have not been conducted in the Plan Area.

The gray vireo usually arrives from its wintering areas in Mexico from the end of March to early May. It generally departs by the end of August. The nest of the gray vireo is an open cup of plant fibers, bits of leaves, spider silk, and bark strips, often hung from twigs or a forked branch in a shrub or small tree, usually two to eight feet above ground (Zeiner et al. 1990). Eggs are laid from mid-May to mid-June. Gray vireos feed by gleaning insects and invertebrates from bushes and small trees. In New Mexico, territories encompass 100 acres or more (Schwarz 1991).

Associated Covered Species. Another Covered Species that occurs in similar Habitat is the Peninsular bighorn sheep, which occurs in pinyon-juniper dominated woodlands up to about 4,000 feet. Desert tortoise may also occur in the same Habitat at elevations to approximately 3,800 feet.

9.7.9 Yellow Warbler *Dendroica petechia brewsteri*

Status	**Federal:**	**No official status**
	State:	**Species of Special Concern**

9.7.9.1 Species Conservation Goals and Objectives

Conserve and manage populations within the MSHCP Reserve System according to the following criteria:

Goal 1: Ensure species persistence in the Plan Area by conserving existing breeding Habitat and an assemblage of native Habitats that are likely important for migration. Conserve Habitat, and associated Essential Ecological Processes, allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused disturbance, and edge effects to Core Habitat by conserving contiguous Habitat patches and effective Linkages between patches of Core Habitat.

Objective 1a. Ensure conservation of the riparian natural communities that this warbler depends on, Sonoran cottonwood-willow riparian forest, southern arroyo willow riparian forest, southern sycamore-alder riparian woodland, mesquite hummocks (migration), desert dry wash woodland (migration), desert saltbush scrub (migration), desert sink scrub (migration), mesquite bosque (migration), coastal and valley freshwater marsh (migration), arrowweed scrub (migration), and cismontane alkali marsh (migration), in the following Conservation Areas:

- Cabazon Conservation Area
- Stubbe and Cottonwood Canyons Conservation Area
- Snow Creek/Windy Point Conservation Area
- Whitewater Canyon Conservation Area
- Upper Mission Creek/Big Morongo Canyon Conservation Area
- Willow Hole Conservation Area
- Thousand Palms Conservation Area

- Indio Hills Palms Conservation Area
- Joshua Tree National Park Conservation Area
- Desert Tortoise and Linkage Conservation Area
- Mecca Hills/Orocopia Mountains Conservation Area
- Dos Palmas Conservation Area
- Coachella Valley Stormwater Channel & Delta Conservation Area
- Santa Rosa and San Jacinto Mountains Conservation Area

Please refer to Section 4.3 and Tables 9-26a and 9-26b for specific acreages to be protected by this Conservation Objective.

Objective 1b. Ensure that CVWD will establish permanent riparian Habitat, including at least 44 acres of Sonoran cottonwood-willow riparian forest in the Coachella Valley Stormwater Channel and Delta Conservation Area, to replace the Habitat that is periodically altered by flood control maintenance activities. This Habitat will provide for the conservation of the riparian birds covered by the Plan.

Goal 2: Protect Essential Ecological Processes, including hydrological regimes, necessary to maintain Core Habitat and Other Conserved Habitat for this species.

Objective 2. Ensure protection of Essential Ecological Process areas through Conservation Area Conservation Objectives for Essential Ecological Processes.

Goal 3: Ensure conservation of the yellow warbler by maintaining the long-term persistence of self-sustaining populations or metapopulations and conserving Habitat quality through biological monitoring and Adaptive Management actions in the Plan Area.

Objective 3. Implement biological monitoring and Adaptive Management to ensure persistence of this warbler in the Plan area.

Table 9-26a: Summary of Habitat within Conservation Areas Yellow Warbler – Breeding Habitat

Conservation Area	*Total Acres of Habitat in Conserv. Area*	*Acres of Disturbance Authorized*	*Acres of Existing Conservation Lands*	*Remaining Acres to be Conserved*	*Total Acres to be Conserved in MSHCP Reserve System*
Cabazon	87	1	78	8	86
Stubbe & Cottonwood Canyons	266	2	241	23	264
Whitewater Canyon	167	11	60	96	156
Upper Mission Ck./ Big Morongo Canyon	204	14	62	128	190
Willow Hole	1	0	1	0	1
Thousand Palms	141	0	141	0	141
Indio Hills Palms	93	5	46	42	88
East Indio Hills	0	0	0	0	0
Joshua Tree National Park	5	0	5	0	5
Desert Tortoise & Linkage	0	0	0	0	0
Mecca Hills/ Orocopia Mtns.	1	0	1	0	1
Dos Palmas	125	6	69	50	119
CV Storm-water Channel & Delta	8	1	0	7	7
Santa Rosa & San Jacinto Mountains	1,574	69	822	683	1,505
Total – Breeding Habitat	*2,672*	*109*	*1,526*	*1,037*	*2,563*

Table 9-26b: Summary of Habitat within Conservation Areas Yellow Warbler – Migratory Habitat

Conservation Area	*Total Acres of Habitat in Conserv. Area*	*Acres of Disturbance Authorized*	*Acres of Existing Conservation Lands*	*Remaining Acres to be Conserved*	*Total Acres to be Conserved in MSHCP Reserve System*
Cabazon	13	1	0	12	12
Stubbe & Cottonwood Canyons	289	26	34	229	263
Whitewater Canyon	0	0	0	0	0
Upper Mission Creek/ Big Morongo Canyon	278~~258~~	17~~15~~	112	149~~131~~	261~~243~~
Willow Hole	294	28	16	250	266
Thousand Palms	805	4	767	34	801
Indio Hills Palms	83	4	43	36	79
East Indio Hills	47	5	0	42	42
Joshua Tree National Park	2,195	13	2,063	119	2,182
Desert Tortoise & Linkage	13,564	764	5,920	6,880	12,800
Mecca Hills/ Orocopia Mountains	9,435	319	6,241	2,875	9,116
Dos Palmas	10,184	644	3,745	5,795	9,540
CV Stormwater Channel & Delta	2,047	183	214	1,650	1,864
Santa Rosa & San Jacinto Mountains	3,963	325	2,157	1,481	3,638
Total – Migratory Habitat	*43,197~~43,177~~*	*2,333~~2,331~~*	*21,312~~21,312~~*	*19,552~~19,534~~*	*40,864~~40,846~~*

9.7.9.2 Threats, Limiting Factors, and Adaptive Management

The primary threats to the yellow warbler in the Plan Area are cowbird parasitism and destruction or degradation of Habitat from flood control and other human activities. Cowbird parasitism is well documented, and the yellow warbler is one of the most common hosts. One cowbird may lay an egg in up to 12 different nests in a breeding season, and yellow warblers lay a single clutch per season. Human activities, including golf courses and agriculture, attract cowbirds, thereby increasing the threat to yellow warblers.

The following actions may be needed to ensure species persistence and long-term viability if biological monitoring indicates that such actions are warranted. This list is not comprehensive but identifies some of the known or likely threats to this warbler. More detailed information on the Management and Monitoring Programs can be found in Section 8.0. Actions may include:

1. Restrict activities that degrade yellow warbler Habitat in conserved areas. These activities include clearing or alteration of riparian vegetation, invasion of exotic plant species, human disturbance, brown-headed cowbird parasitism, and predation of adults and nests by domestic animals.
2. Restrict human access to yellow warbler occupied Habitat during the breeding season.
3. Enhance Habitat through the restoration of disturbed Habitats or the creation of new Habitat where feasible. Any Habitat restoration should balance management of yellow warbler Habitat with management actions for other riparian-dependent species by ensuring a mix of vegetation successional stages in riparian Habitats.
4. Maintain upland buffers for all occupied Habitat. Buffers should be a minimum of 50 feet wide wherever feasible.

9.7.9.3 Species Conservation Analysis

Conservation Area Reserve Design. The configuration of Conservation Areas is beneficial to the Conservation of the yellow warbler, as existing Conservation Areas often surround occupied Habitat on public lands. The Mission Creek site is conserved and managed by the Wildlands Conservancy; it is surrounded by BLM Wilderness. Habitat in Whitewater Canyon is partly on BLM land and partly on private land. Acquisition of the private lands from willing sellers will facilitate management of activities in the area that could impact the riparian Habitat; however, there is access to the area from Whitewater Road, and it is impractical to completely exclude access to the proposed Conservation Area in Whitewater Canyon. Management prescriptions need to be incorporated in the BLM's Whitewater Canyon ACEC management plan. Chino Canyon is currently privately owned; however, discussions are in progress with the landowner for acquisition of the riparian area. Willow Hole is part of a BLM ACEC and includes adjacent lands owned by CVMC and CNLM.

9.7.9.4 Take Analysis

Significance of the Plan Area to Yellow Warbler

Within the Plan Area, the yellow warbler is known or believed to occur as a breeding bird at Whitewater Canyon, Mission Creek, Chino Canyon, in the Whitewater River near the Salton Sea, and at Cottonwood Spring in Joshua Tree National Park. Many yellow warblers also migrate through the Plan Area en route to other breeding areas. The yellow warbler occurs in riparian areas throughout Alaska, Canada, the United States, and parts of Mexico. The yellow warbler has no official federal status and is considered a Species of Special Concern by the State of California.

While the amount of Habitat in the Plan Area is relatively small, it is part of a larger network of Habitat in the Colorado Desert. Even if the Habitat in the Plan Area is not able to support a viable population, it contributes to the larger metapopulation. Populations in the southwest have declined dramatically in recent years in lowland areas of southern California, the Colorado River, the Sacramento, and San Joaquin Valleys (Lowther et al. 1999).

Effects of Take on the Yellow Warbler

The primary importance of the proposed MSHCP to the yellow warbler is that it provides Conservation (including Habitat protection, management, and monitoring) of breeding Habitat and Habitat used by this species in migration. The Plan ensures the long-term conservation of breeding and migratory Habitat as well as the associated Essential Ecological Processes, including the hydrological regimes that support riparian vegetation.

Breeding Habitat. With respect to breeding Habitat, there are 2,730 acres of modeled Habitat for the yellow warbler within the Plan Area. Approximately 2,672 acres of this modeled breeding Habitat occur within the Conservation Areas and the Plan would ensure Conservation of 2,563 of these acres (94% of the total modeled Habitat). Approximately 1,526 acres (56%) of the modeled Habitat are within Existing Conservation Lands and would be managed as part of the Reserve System. The Plan would conserve an additional 1,037 acres (38%) of the modeled breeding Habitat for yellow warbler.

There are 23 known occurrences for the yellow warbler in the Plan Area and 17 of these locations are within the Conservation Areas. Nine of these known occurrences were unprotected in 1996. These known locations may include an observation of one or more individuals. They are not separated here as to breeding or migration.

Within the Conservation Areas under the worst case scenario, 109 acres of Take of modeled breeding Habitat (4%) could occur (See Table 9-21a and Table 4-114). Take of yellow warbler breeding Habitat within the Conservation Areas must be consistent with the Conservation Objectives for this species to: 1) ensure Conservation of Core Habitat; 2) protect Essential Ecological Processes needed to maintain yellow warbler Habitat; and 3) maintain Biological Corridors and Linkages among conserved populations to provide for population fluctuation and enhance genetic diversity. So, although some Take could occur within the Conservation Areas, the Conservation Objectives required by the Plan will provide for protection of Habitat to ensure the long-term persistence of this species.

Outside of the Conservation Areas, there are 59 acres (2%) of modeled Habitat authorized for Take. As the species distribution model for the yellow warbler is the same as for the southwestern willow flycatcher, the areas affected are the same. Some of this acreage occurs as small slivers of Habitat at the margins of suitable riparian areas. Some of this acreage occurs along the Coachella Valley Stormwater Channel north of the Conservation Area boundary. Impacts to Habitat along this portion of the Stormwater channel will be mitigated by establishment of replacement permanent riparian forest by CVWD (see below).

Migratory Habitat. There are 57,589 acres of modeled migratory Habitat for the yellow warbler within the Plan Area. Approximately 43,197~~43,177~~ acres of this modeled migratory Habitat occur within the Conservation Areas and the Plan would ensure Conservation of

40,864~~40,846~~ of these acres (71% of the total modeled Habitat). Approximately 21,312 acres (37%) of the modeled migratory Habitat are within Existing Conservation Lands and would be managed as part of the Reserve System. The Plan would conserve an additional 19,552~~19,534~~ acres (34%) of the modeled migratory Habitat for yellow warbler.

Within the Conservation Areas under the worst case scenario, 2,333~~2,331~~ acres of Take of modeled migratory Habitat (4%) could occur (See Table 9-21b and Table 4-114). Take of yellow warbler migratory Habitat within the Conservation Areas must be consistent with the Conservation Objectives for this species to: 1) ensure Conservation of riparian Habitat, and 2) protect Essential Ecological Processes including hydrological regimes needed to maintain riparian Habitat. So, although some Take could occur within the Conservation Areas, the Conservation Objectives required by the Plan will provide for protection of Habitat to ensure the long-term persistence of the yellow warbler.

Outside of the Conservation Areas, there are 13,020~~13,040~~ acres (23%) of modeled migratory Habitat authorized for Take. The modeled yellow warbler migratory Habitat outside the Conservation Areas includes: 1) desert dry wash woodland west of Thermal Canyon and east of Dillon Road in an area fragmented by the I-10 freeway; 2) small patches of desert saltbush scrub and mesquite hummocks surrounded by agriculture north and west of the Salton Sea; 3) slivers of Habitat, including desert dry wash woodland, along various washes from Desert Hot Springs area to the margins of the Cathedral City and Rancho Mirage cove areas and around Deep Canyon in Palm Desert. These are areas with existing impacts from fragmentation, edge effects, and associated disturbance.

The model for the yellow warbler, and other riparian birds, includes Habitat used in migration, including desert dry wash woodland, mesquite bosque, mesquite hummocks, and desert saltbush scrub. Not all of the Habitat in these natural communities will be protected in the proposed Conservation Areas. Habitat disturbance, subject to the conditions of any required streambed alteration or Section 404 permits, would be allowed in those portions of these natural communities not conserved by the Plan.

Evaluation of the impacts of Take of yellow warbler migratory Habitat that could be lost to Development within the next 75 years requires an assessment of the quality of this Habitat. The establishment of Conservation Areas where this species is protected is a significant improvement over the current unprotected status where only 67% of riparian Habitat in the Plan Area is protected. The actual reduction in Habitat value is expected to be considerably less than indicated by the raw acreage numbers because:

1. Conserved Habitat areas are large enough to contain self-sustaining metapopulations of yellow warblers and to incorporate key Habitat elements, including riparian Habitat for breeding and desert dry wash woodland and other Habitats for migration.
2. As a result of implementing the Conservation Objectives to protect riparian natural communities the Plan would ensure that there is no net loss of wetland Habitats. For all riparian natural communities where disturbance is authorized by the Plan, an equivalent number of acres as that subject to disturbance would be replaced.
3. Potential Development would not adversely impact the Essential Ecological Processes needed to maintain currently viable Habitat. Conservation Areas were carefully designed

to protect the watershed for riparian Habitat, desert dry wash woodland, and other Habitats used by yellow warblers.

4. Lands in the MSHCP Reserve System would be managed and monitored to address significant edge effect problems, impacts from introduced exotic species, and other stressors to yellow warblers,

The issuance of Take Permits, therefore, will not likely jeopardize the continued existence of the yellow warbler and the implementation of the MSHCP will provide for the Conservation of the species.

Measures to Avoid, Minimize, and Mitigate Take of Yellow Warbler

To mitigate the Take of yellow warbler, the Permittees will protect and manage, in perpetuity, 1,037 acres of the modeled breeding Habitat and 19,552~~19,534~~ acres of migratory Habitat for this species. The 1,526 acres of breeding Habitat and 21,312 acres of migratory modeled Habitat within Existing Conservation Lands will be monitored and managed to ensure that Conservation Objectives are met. The Plan will thus ensure Conservation, through protection and management, of 2,563 acres of breeding Habitat and 40,864~~40,846~~ acres of migratory Habitat for yellow warblers.

Existing Conservation Areas within the Plan boundary currently protect 38% of the Habitat for the yellow warbler. The Conservation Areas in the Plan would protect 94% of the occupied and potential breeding Habitat and 71% of the potential migratory Habitat for this species. The Conservation Areas include the potential breeding Habitat for yellow warblers in Whitewater Canyon, Chino Canyon, the Thousand Palms Preserve, the Whitewater River mouth near the Salton Sea, Cottonwood Springs in Joshua Tree National Park, and Dos Palmas. The Plan includes 74% of the known occurrences for this warbler. Other suitable Habitat for breeding sites in the Plan Area occurs in Palm Canyon, Murray Canyon, and Andreas Canyon on the Agua Caliente Indian Reservation; portions of these canyons are currently protected as part of the Indian Canyons Heritage Park. The Agua Caliente are preparing a separate MSHCP for reservation lands.

The model for the yellow warbler, and other riparian birds, includes Habitat used in migration, including desert dry wash woodland and desert saltbush scrub. Other natural Habitat used by yellow warblers in migration or foraging will be conserved in Stubbe and Cottonwood Canyons, Oasis de los Osos, Snow Creek and Falls Creek in the Snow Creek/Windy Point Conservation Area, Mission Creek, the Thousand Palms Preserve, the Coachella Valley Stormwater Channel and Delta near the Salton Sea, Dos Palmas, and Cottonwood Spring in Joshua Tree National Park Conservation Area. Habitat disturbance, subject to the conditions of any required streambed alteration or Section 404 permits, would be allowed in those portions of these natural communities not conserved by the Plan. However, where disturbance of a given number acres of riparian natural communities is authorized, an equivalent number of acres would be replaced to ensure that the no net loss occurs and the Conservation Objective is achieved.

CVWD will establish 44 acres of permanent Sonoran cottonwood-willow riparian forest in the Coachella Valley Stormwater Channel and Delta Conservation area as described in Section 4.3.20 to replace riparian Habitat that is periodically altered by flood control maintenance

activities. Temporary Habitat disturbance for flood control channel maintenance purposes would be permitted by the Plan in the Coachella Valley Stormwater Channel.

Additionally, the Plan calls for Management and Monitoring Programs to ensure the Conservation of this species, including control of activities that degrade yellow warbler Habitat, control of invasive species such as tamarisk and brown-headed cowbirds where necessary, and restoration and enhancement of degraded Habitat as necessary according to monitoring results. The Plan also limits human access to yellow warbler occupied Habitat during the breeding season.

Overall Impacts to Yellow Warbler

Implementation of the Plan is expected to maintain and enhance population viability of the yellow warbler by protecting Habitat for potential nesting and conserving Habitat known to be used in migration. The Plan will also enhance riparian Habitat through implementation of management prescriptions to remove non-native tamarisk and other invasive species. An agreement with CVWD regarding creation of riparian vegetation along the Whitewater River could result in enhanced Habitat for warblers and other riparian birds as well. Another benefit is the focus of attention on the presence of brown-headed cowbirds, including Adaptive Management activities to control their impacts to riparian birds such as the yellow warbler.

The Plan would protect potential Habitat for yellow warbler, including 94% of the potential breeding Habitat. All of the known locations for this species and 71% of the Habitat that may be used in migration would be protected. The proposed Conservation Areas include the important breeding Habitat for yellow warbler in riparian woodland and forest communities and desert fan palm oasis woodland. Proposed Conservation Areas include riparian Habitat in Whitewater Canyon, Mission Creek, Chino Canyon, the Whitewater River near the Salton Sea, and Cottonwood Spring in Joshua Tree National Park where the species has been known to breed. Other natural Habitat used by yellow warbler in migration or foraging will be conserved in Stubbe and Cottonwood Canyons, Oasis de los Osos, Snow/Falls Creek, Mission Creek, the Thousand Palms Preserve, the Whitewater River delta near the Salton Sea, Dos Palmas, and Cottonwood Spring in Joshua Tree National Park. The other known breeding site in the Coachella Valley is Andreas Canyon. This site is on the Agua Caliente Indian Reservation and is currently protected as part of the Indian Canyons Heritage Park. The Agua Caliente are preparing a separate MSHCP for the reservation.

9.7.9.5 Species Account: Background

Distribution, Abundance, and Trends. The yellow warbler occurs in riparian areas throughout Alaska, Canada, the United States, and parts of Mexico. A tropical subspecies occurs in Central and South America. The yellow warbler prefers wetlands and mature riparian woodlands dominated by cottonwoods, alders, and willows. It also uses well-watered, second growth woodlands and gardens. The yellow warbler winters south to the Bahamas, Central America and South America to Peru, Bolivia, and Brazil. The species breeds throughout the United States and Canada. The population is fluctuating in North America, declining in some areas and increasing in others. It was once a locally abundant summer resident in riparian areas throughout California. Currently, populations are reduced and locally extirpated (e.g., Sacramento Valley and San Joaquin Valley). This species was once a common resident in San

Francisco, however, there are no recent breeding records for that area. Breeding populations in Marin County have declined, but the species is still common in Santa Cruz County. Numbers have also declined in Siskiyou County, but are steady in some areas of the Sierra Nevada. Yellow warblers are common along streams below about 8,000 feet in the eastern Sierra Nevada. The yellow warbler has declined significantly as a breeding bird in the coastal lowlands of Southern California and is believed to be extirpated from the Colorado River. Destruction of riparian Habitats and cowbird parasitism are the major causes of the decline.

The yellow warbler is known or believed to occur as a breeding bird at Whitewater Canyon, Mission Creek, Chino Canyon, Andreas Canyon, in the Whitewater River near the Salton Sea, and at Cottonwood Spring in Joshua Tree National Park. Many yellow warblers also migrate through the Plan Area en route to other breeding areas. In migration, the yellow warbler may use desert fan palm oasis woodland, mesquite hummocks, mesquite bosque, arrowweed scrub, desert dry wash woodland, desert sink scrub, desert saltbush scrub, southern sycamore-alder riparian woodland, Sonoran cottonwood-willow riparian forest, coastal and valley freshwater marsh, and cismontane alkali marsh in the Plan Area. The species would also use urban areas in migration. No conservation measures are proposed in urban areas; however, it is anticipated that suitable landscape trees and shrubs will continue to thrive in urban areas.

Yellow warblers typically arrive from their wintering areas from late March to May. They tend to nest in locations of intermediate height and shrub density. The nest is built in an upright fork or crotch of a large tree, or sometimes a sapling or bush, generally 6 to 8 feet above the ground. The nest is a well-formed cup of interwoven plant fibers and down, fine grasses, lichens, mosses, spider silk, hairs, etc. Usually four to five eggs are laid in spring or early summer. Incubation is 11 days, and the young leave the nest at 9 to 12 days old. The yellow warbler feeds on caterpillars, cankerworms, moth larvae, bark beetles, borers, weevils, small moths, aphids, grasshoppers, and spiders, and occasionally feeds on a few species of berries.

Associated Covered Species. Other riparian species that occur in similar Habitat, including the least Bell's vireo, southwestern willow flycatcher, summer tanager, and yellow-breasted chat, will benefit from conservation and Adaptive Management actions for the yellow warbler. Riparian bird species will be considered as a guild in the Plan with regard to their general presence in riparian areas. However, each of these riparian bird species may require slightly different structural features or successional stages for optimal breeding Habitat, which may require different management strategies.

9.7.10 Yellow-Breasted Chat *Icteria virens*

Status Federal: **No official status**
State: **Species of Special Concern**

9.7.10.1 Species Conservation Goals and Objectives

Conserve and manage populations within the MSHCP Reserve System according to the following criteria:

Goal 1: Ensure species persistence in the Plan Area by conserving existing breeding Habitat and an assemblage of native Habitats that are likely important for migration. Conserve Habitat, and associated Essential Ecological Processes, allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused disturbance, and edge effects to Core Habitat by conserving contiguous Habitat patches and effective Linkages between patches of Core Habitat.

Objective 1. Ensure conservation of the riparian natural communities that this warbler depends on, Sonoran cottonwood-willow riparian forest, southern arroyo willow riparian forest, southern sycamore-alder riparian woodland, mesquite hummocks (migration), desert dry wash woodland (migration), desert saltbush scrub (migration), desert sink scrub (migration), mesquite bosque (migration), coastal and valley freshwater marsh (migration), arrowweed scrub (migration), and cismontane alkali marsh (migration), in the following Conservation Areas:

- Cabazon Conservation Area
- Stubbe and Cottonwood Canyons Conservation Area
- Snow Creek/Windy Point Conservation Area
- Whitewater Canyon Conservation Area
- Upper Mission Creek/Big Morongo Canyon Conservation Area
- Willow Hole Conservation Area
- Thousand Palms Conservation Area
- Indio Hills Palms Conservation Area
- Joshua Tree National Park Conservation Area
- Desert Tortoise and Linkage Conservation Area
- Mecca Hills/Orocopia Mountains Conservation Area
- Dos Palmas Conservation Area
- Coachella Valley Stormwater Channel & Delta Conservation Area
- Santa Rosa and San Jacinto Mountains Conservation Area

Please refer to Section 4.3 and Tables 9-27a and 9-27b for specific acreages to be protected by this Conservation Objective.

Objective 1b: Ensure that CVWD will establish permanent riparian Habitat including at least 44 acres of Sonoran cottonwood-willow riparian forest in the Coachella Valley Stormwater Channel and Delta Conservation Area to replace Habitat that is periodically altered by flood control maintenance activities. This Habitat will provide for the Conservation of the riparian birds covered by the Plan.

Goal 2. Protect Essential Ecological Processes, including hydrological regimes, necessary to maintain Core Habitat and Other Conserved Habitat for this warbler.

Objective 2. Ensure protection of Essential Ecological Process areas through Conservation Area Conservation Objectives for Essential Ecological Processes.

Goal 3: Ensure conservation of yellow-breasted chat by maintaining the long-term persistence of self-sustaining populations or metapopulations and conserving Habitat quality through biological monitoring and Adaptive Management actions in the Plan Area.

Objective 3. Implement biological monitoring and Adaptive Management to ensure persistence of this chat in the Plan Area.

Table 9-27a: Summary of Habitat within Conservation Areas Yellow-Breasted Chat – Breeding Habitat

Conservation Area	*Total Acres of Habitat in Conserv. Area*	*Acres of Disturbance Authorized*	*Acres of Existing Conservation Lands*	*Remaining Acres to be Conserved*	*Total Acres to be Conserved in MSHCP Reserve System*
Cabazon	87	1	78	8	86
Stubbe & Cottonwood Canyons	266	2	241	23	264
Whitewater Canyon	167	11	60	96	156
Upper Mission Creek/ Big Morongo Canyon	204	14	62	128	190
Willow Hole	1	0	1	0	1
Thousand Palms	141	0	141	0	141
Indio Hills Palms	93	5	46	42	88
East Indio Hills	0	0	0	0	0
Joshua Tree National Park	5	0	5	0	5
Desert Tortoise & Linkage	0	0	0	0	0
Mecca Hills/ Orocopia Mountains	1	0	1	0	1
Dos Palmas	404	19	212	173	385
CV Stormwater Channel & Delta	8	1	0	7	7
Santa Rosa & San Jacinto Mountains	1,574	69	822	683	1,505
Total – Breeding Habitat	*2,951*	*122*	*1,669*	*1,160*	*2,829*

Table 9-27b: Summary of Habitat within Conservation Areas Yellow-Breasted Chat – Migratory Habitat

Conservation Area	*Total Acres of Habitat in Conserv. Area*	*Acres of Disturbance Authorized*	*Acres of Existing Conservation Lands*	*Remaining Acres to be Conserved*	*Total Acres to be Conserved in MSHCP Reserve System*
Cabazon	13	1	0	12	12
Stubbe & Cottonwood Canyons	289	26	34	229	263
Whitewater Canyon	0	0	0	0	0
Upper Mission Ck/ Big Morongo Canyon	278~~258~~	17~~15~~	112	149~~131~~	261~~243~~
Willow Hole	294	28	16	250	266
Thousand Palms	805	4	767	34	801
Indio Hills Palms	83	4	43	36	79
East Indio Hills	47	5	0	42	42
Joshua Tree National Park	2,195	13	2,063	119	2,182
Desert Tortoise & Linkage	13,564	764	5,920	6,880	12,800
Mecca Hills/ Orocopia Mountains	9,435	319	6,241	2,875	9,116
Dos Palmas	9,908	631	3,602	5,675	9,277
CV Storm-water Channel & Delta	2,047	183	214	1,650	1,864
Santa Rosa & San Jacinto Mountains	3,963	325	2,157	1,481	3,638
Total – Migratory Habitat	*42,921~~42,901~~*	*2,320~~2,318~~*	*21,169*	*19,432~~19,414~~*	*40,601~~40,583~~*

9.7.10.2 Threats, Limiting Factors, and Adaptive Management

The primary threat to the yellow-breasted chat in the Plan Area is destruction or degradation of Habitat from flood control and other human activities. The extent to which this species is impacted by cowbird parasitism is not known.

Current knowledge about occurrence and the ecology of this species in the Plan Area is limited but given known threats, the following actions may be needed to ensure species persistence and long-term viability if biological monitoring indicates that such actions are warranted. This list is not comprehensive but identifies some of the known or likely threats to this species. More detailed information on the Management and Monitoring Programs can be found in Section 8.0. Actions may include:

1. Restrict activities that degrade yellow-breasted chat Habitat in conserved areas. These activities include clearing or alteration of riparian vegetation, invasion of exotic plant species, human disturbance, brown-headed cowbird parasitism, and predation of adults and nests by domestic animals.
2. Restrict human access to yellow-breasted chat occupied Habitat during the breeding season.
3. Enhance Habitat through the restoration of disturbed Habitats or the creation of new Habitat where feasible. Any Habitat restoration should balance management of yellow-breasted chat Habitat with management actions for other riparian-dependent species by ensuring a mix of vegetation successional stages in riparian Habitats.
4. Maintain upland buffers for all occupied Habitat. Buffers should be a minimum of 50 feet wide wherever feasible.

9.7.10.3 Species Conservation Analysis

Conservation Area Configuration Issues. The configuration of Conservation Areas is generally beneficial to the Conservation of the yellow-breasted chat, as existing Conservation Areas often surround occupied Habitat on public lands. The Mission Creek site is conserved and managed by the Wildlands Conservancy; it is surrounded by BLM Wilderness. Habitat in Whitewater Canyon is partly on BLM land and partly on private land. Acquisition of the private lands from willing sellers will facilitate management of activities in the area that could impact the riparian Habitat; however, there is access to the area from Whitewater Road, and it is impractical to completely exclude access to the proposed Conservation Area in Whitewater Canyon. Management prescriptions need to be incorporated in the BLM's Whitewater Canyon ACEC management plan. Chino Canyon is currently privately owned; however, discussions are in progress with the landowner for acquisition of the riparian area. Willow Hole is part of a BLM ACEC and includes adjacent lands owned by CVMC.

The Planning Team did not attempt to delineate Core Habitat for this species. With very limited Habitat available for this chat, all locations were considered as part of a metapopulation. Hence, all available riparian Habitat for breeding and Habitat which may be used in migration were included in the MSHCP Reserve System. The presence of potential breeding Habitat for

this species within each of the Conservation Areas is shown in Table 9-27a; migratory Habitat is shown in Table 9-27b.

9.7.10.4 Take Analysis

Significance of the Plan Area to Yellow-Breasted Chat

The yellow-breasted chat occurs in the Plan Area as a likely breeding bird, and as a migrant. Given the limited availability of suitable riparian Habitat in the Plan Area, their status here could be described as part of a metapopulation. The extent of breeding in the Plan Area is not known as only Mission Creek has been confirmed as a breeding location (R. McKernan, pers. comm.). This chat is considered a California Species of Special Concern but has no official federal status. Within the Plan Area it has been recorded in riparian Habitat from Whitewater Canyon and Mission Creek, Thousand Palms Oasis, Cottonwood Spring in Joshua Tree National Park, and Dos Palmas.

Outside the Plan Area the yellow-breasted chat is found throughout most of the United States, southern Canada, parts of Mexico, and south to Panama in the appropriate Habitat. In southern California the species breeds locally on the coast and very locally inland and at lower elevations nearly throughout the region (Garrett and Dunn 1981).

Effects of Take on the Yellow-Breasted chat

The primary importance of the proposed MSHCP to the yellow-breasted chat is that it provides Conservation (including Habitat protection, management and monitoring) of breeding Habitat and Habitat used by this species in migration. The Plan ensures the long-term conservation of breeding and migratory Habitat as well as the associated Essential Ecological Processes, including the hydrological regimes that support riparian vegetation.

Breeding Habitat. With respect to breeding Habitat, there are 3,007 acres of modeled Habitat for the yellow-breasted chat within the Plan Area. Approximately 2,951 acres of this modeled breeding Habitat occur within the Conservation Areas and the Plan would ensure Conservation of 2,829 of these acres (94% of the total modeled Habitat). Approximately 1,669 acres (55%) of the modeled Habitat are within Existing Conservation Lands and would be managed as part of the Reserve System. The Plan would conserve an additional 1,160 acres (38%) of the modeled breeding Habitat for yellow-breasted chat.

Within the Conservation Areas under the worst case scenario, 122 acres of Take of modeled breeding Habitat (4%) could occur (See Table 9-21a and Table 4-114). Take of yellow-breasted chat breeding Habitat within the Conservation Areas must be consistent with the Conservation Objectives for this species to: 1) ensure Conservation of Core Habitat; 2) protect Essential Ecological Processes needed to maintain chat Habitat; and 3) maintain Biological Corridors and Linkages among conserved populations to provide for population fluctuation and enhance genetic diversity. So, although some Take could occur within the Conservation Areas, the Conservation Objectives required by the Plan will provide for protection of Habitat to ensure the long-term persistence of this species.

Outside of the Conservation Areas, there are 58 acres (2%) of modeled Habitat authorized for Take. Some of this acreage occurs as small slivers of Habitat at the margins of suitable riparian areas. Some of this acreage occurs along the Coachella Valley Stormwater Channel north of the Conservation Area boundary. Impacts to Habitat along this portion of the stormwater channel will be mitigated by establishment of replacement permanent riparian forest by CVWD (see below).

Migratory Habitat. There are 57,312 acres of modeled migratory Habitat for the yellow-breasted chat within the Plan Area. Approximately 42,921~~42,901~~ acres of this modeled migratory Habitat occur within the Conservation Areas and the Plan would ensure Conservation of 40,601~~40,583~~ of these acres (71%) of the total modeled Habitat. Approximately 21,169 acres (37%) of the modeled Habitat are within Existing Conservation Lands and would be managed as part of the Reserve System. The Plan would conserve an additional 19,432~~19,414~~ acres (34%) of the modeled migratory Habitat for yellow-breasted chat.

Within the Conservation Areas under the worst case scenario, 2,320~~2,318~~ acres of Take of modeled migratory Habitat (4%) could occur (See Table 9-21b and Table 4-114). Take of yellow-breasted chat migratory Habitat within the Conservation Areas must be consistent with the Conservation Objectives for this species to: 1) ensure Conservation of riparian Habitat, and 2) protect Essential Ecological Processes including hydrological regimes needed to maintain riparian Habitat. So, although some Take could occur within the Conservation Areas, the Conservation Objectives required by the Plan will provide for protection of Habitat to ensure the long-term persistence of this species.

Outside of the Conservation Areas, there are 13,020~~13,040~~ acres (23%) of modeled migratory Habitat authorized for Take. The migratory Habitat outside the Conservation Areas consists of slivers of Habitat, including desert dry wash woodland, along various washes from Desert Hot Springs area to the margins of the Cathedral City and Rancho Mirage cove areas and around Deep Canyon in Palm Desert. Larger patches of migratory Habitat occur northwest of the Salton Sea in desert saltbush scrub and desert sink scrub that is highly fragmented in a matrix of agriculture, and in the eastern part of the Plan Area south of Interstate 10.

Although the percentage of yellow-breasted chat modeled Habitat that could be lost to development within the next 75 years appears to be substantial, evaluation of the impacts of Take requires an assessment of the quality of this Habitat. The establishment of Conservation Areas where this species is protected is a significant improvement over the piecemeal and fragmenting nature of development patterns within this Habitat occurring now. The actual reduction in Habitat value is expected to be considerably less than indicated by the raw acreage numbers because:

1. Conserved Habitat areas are large enough to contain self-sustaining metapopulations populations of chats and incorporate key Habitat elements, including riparian Habitat for breeding and desert dry wash woodland and other Habitats for migration.
2. Take within the Conservation Areas would not eliminate or significantly impact any core populations. Conservation Objectives require any approved development within Conservation Areas to ensure protection of Core Habitat.

3. As a result of implementing the Conservation Objectives to protect riparian natural communities the Plan would ensure that there is no net loss of wetland Habitats. For all riparian natural communities where disturbance is authorized by the Plan, an equivalent number of acres as that subject to disturbance would be replaced.
4. Potential Development would not adversely impact the Essential Ecological Processes needed to maintain currently viable Habitat. Conservation Areas were carefully designed to protect the watershed for riparian Habitat, desert dry wash woodland, and other Habitats for this species.
5. Lands in the MSHCP Reserve System would be managed and monitored to address significant edge effect problems, potential loss of Habitat from introduction of exotic species, and other stressors to this species,

The issuance of Take Permits, therefore, will not likely jeopardize the continued existence of the yellow-breasted chat and the implementation of the MSHCP will provide for the Conservation of the species.

Measures to Avoid, Minimize, and Mitigate Take of Yellow-Breasted Chat

To mitigate the Take of the yellow-breasted chat, the Permittees will protect and manage, in perpetuity, 1,160 acres of the modeled breeding Habitat and 19,432~~19,414~~ acres of migratory Habitat for this species. The 1,669 acres of breeding Habitat and 21,169 acres of migratory modeled Habitat within Existing Conservation Lands will be monitored and managed to ensure that Conservation Objectives are met. The Plan will thus ensure Conservation, through protection and management, of 2,829 acres of breeding Habitat and 40,601~~40,583~~ acres of migratory Habitat for this species.

Existing Conservation Areas within the Plan boundary currently protect 38% of the Habitat for the yellow-breasted chat. The Conservation Areas in the Plan would protect 94% of the occupied and potential breeding Habitat and 71% of the potential migratory Habitat for this species. The Conservation Areas include the potential breeding Habitat for yellow-breasted chat in Whitewater Canyon, Chino Canyon, the Thousand Palms Preserve, the Whitewater River mouth near the Salton Sea, Cottonwood Springs in Joshua Tree National Park, and Dos Palmas. The Plan includes 100% of the known breeding locations for this chat. Other suitable Habitat for breeding sites in the Plan Area occurs in Palm Canyon, Murray Canyon, and Andreas Canyon on the Agua Caliente Indian Reservation; portions of these canyons are currently protected as part of the Indian Canyons Heritage Park. The Agua Caliente are preparing a separate MSHCP for reservation lands.

The model for the yellow-breasted chat, and other riparian birds, includes Habitat used in migration, including desert dry wash woodland and desert saltbush scrub. A complete list of the natural communities that may be used in migration is given in the description of model parameters in Appendix I. Other natural Habitat used by yellow-breasted chat in migration or foraging will be conserved in Stubbe and Cottonwood Canyons, Oasis de los Osos, Snow Creek and Falls Creek in the Snow Creek/Windy Point Conservation Area, Mission Creek, the Thousand Palms Preserve, the Coachella Valley Stormwater Channel and Delta near the Salton Sea, Dos Palmas, and Cottonwood Spring in Joshua Tree National Park Conservation Area. Habitat disturbance, subject to the conditions of any required streambed alteration or Section 404

permits, would be allowed in those portions of these natural communities not conserved by the Plan.

Where disturbance of a given number acres of riparian natural communities is authorized, an equivalent number of acres would be replaced to ensure that the no net loss occurs and the Conservation Objective is achieved.

CVWD will establish 44 acres of permanent Sonoran cottonwood-willow riparian forest in the Coachella Valley Stormwater Channel and Delta Conservation area as described in Section 4.3.20 to replace riparian Habitat that is periodically altered by flood control maintenance activities. Temporary Habitat disturbance for flood control channel maintenance purposes would be permitted by the Plan in the Coachella Valley Stormwater Channel.

Additionally, the Plan calls for Management and Monitoring Programs to ensure the Conservation of this species, including control of activities that degrade yellow-breasted chat Habitat, control of invasive species such as tamarisk and brown-headed cowbirds where necessary, and restoration and enhancement of degraded Habitat as necessary according to monitoring results.

Overall Impacts to Yellow-Breasted chat

Implementation of the Plan is expected to maintain and enhance population viability of the yellow-breasted chat by protecting Habitat for potential nesting and conserving Habitat known to be used in migration. The Plan will also enhance riparian Habitat through implementation of management prescriptions to remove non-native tamarisk and other invasive species. An agreement with CVWD regarding creation of riparian vegetation along the Whitewater River could result in enhanced Habitat for chats as well. Another benefit is the focus of attention on the presence of brown-headed cowbirds, including Adaptive Management activities to control their impacts to riparian birds such as the yellow-breasted chat.

9.7.10.5 Species Account: Background

Distribution, Abundance, and Trends. The yellow-breasted chat is found throughout most of the United States, southern Canada, parts of Mexico, and south to Panama in the appropriate Habitat. It is more often heard than seen, preferring to stay under cover in dense riparian thickets. The yellow-breasted chat nests in dense riparian thickets and brushy tangles in the lower portions of foothill canyons and in the lowlands. Its nest is a cup of dried leaves, coarse straw, and bark, lined with grasses, fine plant stems and leaves, built low in a bush, vine, or briar; there are typically three to five eggs laid from early May to mid-July. It is primarily an insect eater but also eats wild berries and wild grapes.

This species is known to breed or is likely to breed in Whitewater Canyon, Mission Creek, Chino Canyon, and the Whitewater River between Mecca and the Salton Sea. It is possible that it breeds elsewhere in the Plan Area as well. In migration, the yellow-breasted chat may use desert fan palm oasis woodland, mesquite hummocks, mesquite bosque, arrowweed scrub, desert dry wash woodland, desert sink scrub, desert saltbush scrub, southern sycamore-alder riparian woodland, Sonoran cottonwood-willow riparian forest, coastal and valley freshwater marsh, and cismontane alkali marsh in the Plan Area. It has been observed at Dos

Palmas, the Thousand Palms Preserve, and Willow Hole. It has also been observed in Andreas Canyon on the Agua Caliente Indian Reservation. Individuals observed in these locations may have been in migration to other breeding areas outside the Plan Area.

The yellow-breasted chat is in a general state of decline. The primary threat is loss of Habitat, mainly due to flood control activities; the chat is also subject to cowbird parasitism. Human activities, including golf courses and agriculture, attract cowbirds, thereby increasing the threat to the species.

Associated Covered Species. Other riparian species that occur in similar Habitat, including the least Bell's vireo, yellow-breasted chat, summer tanager, and yellow warbler, will benefit from conservation and Adaptive Management actions for the yellow-breasted chat. Riparian bird species will be considered as a guild in the Plan with regard to their general presence in riparian areas. However, each of these riparian bird species may require slightly different structural features or successional stages for optimal breeding Habitat, which may require different management strategies.

9.7.11 Summer Tanager *Piranga rubra cooperi*

Status	**Federal:**	**No official status**
	State:	**Species of Special Concern**

9.7.11.1 Species Conservation Goals and Objectives

Conserve and manage populations within the MSHCP Reserve System according to the following criteria:

Goal 1: Ensure species persistence in the Plan Area by conserving existing breeding Habitat and an assemblage of native Habitats that are likely important for migration. Conserve Habitat, and associated Essential Ecological Processes, allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused disturbance, and edge effects to Core Habitat by conserving contiguous Habitat patches and effective Linkages between patches of Core Habitat.

Objective 1a. Ensure conservation of the riparian natural communities that this tanager depends on, Sonoran cottonwood-willow riparian forest, southern arroyo willow riparian forest, southern sycamore-alder riparian woodland, mesquite hummocks (migration), desert dry wash woodland (migration), desert saltbush scrub (migration), desert sink scrub (migration), mesquite bosque (migration), coastal and valley freshwater marsh (migration), arrowweed scrub (migration), and cismontane alkali marsh (migration), in the following Conservation Areas:

- Cabazon Conservation Area
- Stubbe and Cottonwood Canyons Conservation Area
- Snow Creek/Windy Point Conservation Area
- Whitewater Canyon Conservation Area

- Upper Mission Creek/Big Morongo Canyon Conservation Area
- Willow Hole Conservation Area
- Thousand Palms Conservation Area
- Indio Hills Palms Conservation Area
- Joshua Tree National Park Conservation Area
- Desert Tortoise and Linkage Conservation Area
- Mecca Hills/Orocopia Mountains Conservation Area
- Dos Palmas Conservation Area
- Coachella Valley Stormwater Channel & Delta Conservation Area
- Santa Rosa and San Jacinto Mountains Conservation Area

Please refer to Section 4.3 and Tables 9-28a and 9-28b for specific acreages to be protected by this Conservation Objective.

Objective 1b. Ensure that CVWD will establish permanent riparian Habitat, including at least 44 acres of Sonoran cotton-wood-willow riparian forest in the Coachella Valley Stormwater Channel and Delta Conservation Area, to replace the Habitat that is periodically altered by flood control maintenance activities. This Habitat will provide for the Conservation of the riparian birds covered by the Plan.

Goal 2: Protect Essential Ecological Processes, including hydrological regimes, necessary to maintain Core Habitat and Other Conserved Habitat for this species.

Objective 2. Ensure protection of Essential Ecological Process areas through Conservation Area Conservation Objectives for Essential Ecological Processes.

Goal 3: Ensure conservation of summer tanager by maintaining the long-term persistence of self-sustaining populations or metapopulations and conserving Habitat quality through biological monitoring and Adaptive Management actions in the Plan Area.

Objective 3. Implement biological monitoring and Adaptive Management to ensure persistence of this warbler in the Plan area.

9.7.11.2 Threats, Limiting Factors, and Adaptive Management

The major threat for summer tanagers is loss of Habitat due to human activity, including flood control. Cowbird parasitism may be a contributing factor, although parasitism of summer tanager nests appears to vary significantly by geographic area. In southern Illinois, 11 of 13 nests observed were parasitized, while in the South Fork Kern River Valley only one of 16 nests was subject to parasitism. The extent of cowbird parasitism in the Plan Area is not known. Collisions with wind turbines and other towers during migration could also be a source of mortality. In Leon County, Florida, 146 summer tanagers were killed at a television tower during spring migration. The actuality or potential of mortality from wind turbines, communication towers, and transmission towers in the Plan Area is not known. Overall, in California, the population of summer tanagers has declined severely in response to elimination of riparian willow and cottonwood forest. The species is designated a Species of Special Concern by the state.

Table 9-28a: Summary of Habitat within Conservation Areas Summer Tanager – Breeding Habitat

Conservation Area	*Total Acres of Habitat in Conserv. Areas*	*Acres of Disturbance Authorized*	*Acres of Existing Conservation Lands*	*Remaining Acres to be Conserved*	*Total Acres to be Conserved in MSHCP Reserve System*
Cabazon	87	1	78	8	86
Stubbe & Cottonwood Canyons	266	2	241	23	264
Whitewater Canyon	167	11	60	96	156
Upper Mission Creek/ Big Morongo Canyon	204	14	62	128	190
Willow Hole	1	0	1	0	1
Thousand Palms	141	0	141	0	141
Indio Hills Palms	93	5	46	42	88
East Indio Hills	0	0	0	0	0
Joshua Tree National Park	5	0	5	0	5
Desert Tortoise & Linkage	0	0	0	0	0
Mecca Hills/ Orocopia Mtns.	1	0	1	0	1
Dos Palmas	125	6	69	50	119
CV Storm-water Channel & Delta	8	1	0	7	7
Santa Rosa & San Jacinto Mountains	1,574	69	822	683	1,505
Total – Breeding Habitat	*2,672*	*109*	*1,526*	*1,037*	*2,563*

Table 9-28b: Summary of Habitat within Conservation Areas Summer Tanager – Migratory Habitat

Conservation Area	*Total Acres of Habitat in Conserv. Areas*	*Acres of Disturbance Authorized*	*Acres of Existing Conservation Lands*	*Remaining Acres to be Conserved*	*Total Acres to be Conserved in MSHCP Reserve System*
Cabazon	13	1	0	12	12
Stubbe & Cottonwood Canyons	289	26	34	229	263
Whitewater Canyon	0	0	0	0	0
Upper Mission Creek /Big Morongo Canyon	278~~258~~	17~~15~~	112	149~~131~~	261~~243~~
Willow Hole	294	28	16	250	266
Thousand Palms	805	4	767	34	801
Indio Hills Palms	83	4	43	36	79
East Indio Hills	47	5	0	42	42
Joshua Tree National Park	2,195	13	2,063	119	2,182
Desert Tortoise & Linkage	13,564	764	5,920	6,880	12,800
Mecca Hills/ Orocopia Mountains	9,435	319	6,241	2,875	9,116
Dos Palmas	10,184	644	3,745	5,795	9,540
CV Stormwater Channel & Delta	2,047	183	214	1,650	1,864
Santa Rosa & San Jacinto Mountains	3,963	325	2,157	1,481	3,638
Total – Migratory Habitat	*43,197~~43,177~~*	*2,333~~2,331~~*	*21,312~~21,312~~*	*19,552~~19,534~~*	*40,864~~40,846~~*

The following actions may be needed to ensure species persistence and long-term viability if biological monitoring indicates that such actions are warranted. This list is not comprehensive but identifies some of the known or likely threats to the summer tanager. More detailed information on the Management and Monitoring Programs can be found in Section 8.0. Actions may include:

1. Control and manage activities that degrade summer tanager Habitat in conserved areas. These activities include clearing or alteration of riparian vegetation, invasion of exotic plant species, human disturbance, brown-headed cowbird parasitism, and predation of adults and nests by domestic animals.
2. Restrict human access to summer tanager occupied Habitat during the breeding season.
3. Enhance Habitat through the restoration of disturbed Habitats or the creation of new Habitat where feasible. Any Habitat restoration should balance management of summer tanager Habitat with management actions for other riparian-dependent species by ensuring a mix of vegetation successional stages in riparian Habitats.
4. Maintain upland buffers for all occupied Habitat. Buffers should be a minimum of 50 feet wide wherever feasible.
5. Determine the effects of upstream diversions on the maintenance of the riparian Habitat in the Whitewater Canyon.

9.7.11.3 Species Conservation Analysis

Conservation Area Reserve Design. The configuration of Conservation Areas is generally beneficial to the Conservation of the summer tanager, as existing Conservation Areas often surround occupied Habitat on public lands. The Mission Creek site is conserved and managed by the Wildlands Conservancy; it is surrounded by BLM Wilderness. Habitat in Whitewater Canyon is partly on BLM land and partly on private land. Acquisition of the private lands from willing sellers will facilitate management of activities in the area that could impact the riparian Habitat; however, there is access to the area from Whitewater Road, and it is impractical to completely exclude access to the proposed Conservation Area in Whitewater Canyon. Management prescriptions need to be incorporated in the BLM's Whitewater Canyon ACEC management plan. Chino Canyon is currently privately owned; however, discussions are in progress with the landowner for acquisition of the riparian area. Willow Hole is part of a BLM ACEC and includes adjacent lands owned by the CVMC.

Consideration should be given to the management of riparian areas with regard to the successional stages that benefit each of the five riparian bird species included in this Plan. Summer tanagers typically nest in a later successional stage of riparian Habitat with large cottonwood trees. Along the Whitewater River, restoration and management of Habitat for the summer tanager may result in less desirable Habitat for other riparian birds that prefer earlier successional stages. Appropriate Habitat for the summer tanager in areas proposed for restoration along the Whitewater River may not be readily achievable and may constrain the amount of optimum Habitat for other, more sensitive species.

The Planning Team did not attempt to describe Core Habitat for this species. With very limited Habitat available for this tanager, as with other riparian birds, all locations were

considered as part of a metapopulation. Hence, all available riparian Habitat for breeding and Habitat which may be used in migration were included in the MSHCP Reserve System. The presence of potential breeding Habitat for this species within each of the Conservation Areas is shown in Table 9-28a; migratory Habitat is shown in Table 9-28b.

9.7.11.4 Take Analysis

Significance of the Plan Area to Summer Tanager

Within the Plan Area, the summer tanager is known or believed to occur as a breeding bird at Whitewater Canyon and Mission Creek. Summer tanagers also migrate through the Plan Area en route to other breeding areas. The summer tanager breeds across the southern United States, from California as far north as the Kern River valley to Florida, and in the eastern United States, as far north as 40° N. Two subspecies are currently recognized. One, *P. r. cooperi*, breeds in the southwest from California to west Texas and northern Mexico. The other, *P. r. rubra*, occupies the remainder of the range to the east. The western subspecies inhabits riparian woodlands and, at higher elevations, woodlands dominated by mesquite and salt cedar. The summer tanager winters from central Mexico south through Central America to Bolivia and Brazil. It occurs in small numbers in winter in Southern California, southern Arizona and in southern Florida. The summer tanager has no federal status and is considered a California Species of Special Concern.

Effects of Take on the Summer Tanager

The primary importance of the proposed MSHCP to the summer tanager is that it provides Conservation (including Habitat protection, management, and monitoring) of breeding Habitat and Habitat used by this species in migration. The Plan ensures the long-term conservation of breeding and migratory Habitat as well as the associated Essential Ecological Processes, including the hydrological regimes that support riparian vegetation.

Breeding Habitat. With respect to breeding Habitat, there are 2,730 acres of modeled Habitat for the summer tanager within the Plan Area. Approximately 2,672 acres of this modeled breeding Habitat occur within the Conservation Areas and the Plan would ensure Conservation of 2,563 of these acres (94% of the total modeled Habitat). Approximately 1,526 acres (56%) of the modeled Habitat are within Existing Conservation Lands and would be managed as part of the Reserve System. The Plan would conserve an additional 1,037 acres (38%) of the modeled breeding Habitat for summer tanager.

There are 23 known occurrences for the summer tanager in the Plan Area and 17 of these locations are within the Conservation Areas. Nine of these known occurrences were unprotected in 1996. These known locations may include an observation of one or more individuals. They are not separated here as to breeding or migration.

Within the Conservation Areas under the worst case scenario, 109 acres of Take of modeled breeding Habitat (4%) could occur (See Table 9-21a and Table 4-114). Take of summer tanager breeding Habitat within the Conservation Areas must be consistent with the Conservation Objectives for this species to: 1) ensure Conservation of Core Habitat; 2) protect Essential Ecological Processes needed to maintain summer tanager Habitat; and 3) maintain

Biological Corridors and Linkages among conserved populations to provide for population fluctuation and enhance genetic diversity. So, although some Take could occur within the Conservation Areas, the Conservation Objectives required by the Plan will provide for protection of Habitat to ensure the long-term persistence of this species.

Outside of the Conservation Areas, there are 59 acres (2%) of modeled Habitat authorized for Take. As the species distribution model for the summer tanager is the same as for the southwestern willow flycatcher, the areas affected are the same. Some of this acreage occurs as small slivers of Habitat at the margins of suitable riparian areas. Some of this acreage occurs along the Coachella Valley Stormwater Channel north of the Conservation Area boundary. Impacts to Habitat along this portion of the Stormwater channel will be mitigated by establishment of replacement permanent riparian forest by CVWD (see below).

Migratory Habitat. There are 57,589 acres of modeled migratory Habitat for the summer tanager within the Plan Area. Approximately 43,197~~43,177~~ acres of this modeled migratory Habitat occur within the Conservation Areas and the Plan would ensure Conservation of 40,864~~40,846~~ of these acres (71% of the total modeled Habitat). Approximately 21,312 acres (37%) of the modeled migratory Habitat are within Existing Conservation Lands and would be managed as part of the Reserve System. The Plan would conserve an additional 19,552~~19,534~~ acres (34%) of the modeled migratory Habitat for summer tanager.

Within the Conservation Areas under the worst case scenario, 2,333~~2,331~~ acres of Take of modeled migratory Habitat (4%) could occur (See Table 9-21b and Table 4-114). Take of summer tanager migratory Habitat within the Conservation Areas must be consistent with the Conservation Objectives for this species to: 1) ensure Conservation of riparian Habitat, and 2) protect Essential Ecological Processes including hydrological regimes needed to maintain riparian Habitat. So, although some Take could occur within the Conservation Areas, the Conservation Objectives required by the Plan will provide for protection of Habitat to ensure the long-term persistence of the summer tanager.

Outside of the Conservation Areas, there are 13,020~~13,040~~ acres (23%) of modeled migratory Habitat authorized for Take. The modeled summer tanager migratory Habitat outside the Conservation Areas includes desert dry wash woodland west of Thermal Canyon and east of Dillon Road in an area fragmented by the I-10 freeway and small slivers of Habitat, including desert dry wash woodland, along various washes from Desert Hot Springs area to the margins of the Cathedral City and Rancho Mirage cove areas and around Deep Canyon in Palm Desert. Larger patches of migratory Habitat occur northwest of the Salton Sea in desert saltbush scrub and desert sink scrub, natural communities used by summer tanagers in migration that are highly fragmented in a matrix of agriculture, and in the eastern part of the Plan Area south of Interstate 10.

The model for the summer tanager, and other riparian birds, includes Habitat used in migration, including desert dry wash woodland, mesquite bosque, mesquite hummocks, and desert saltbush scrub. Not all of the Habitat in these natural communities will be protected in the proposed Conservation Areas. Habitat disturbance, subject to the conditions of any required streambed alteration or Section 404 permits, would be allowed in those portions of these natural communities not conserved by the Plan.

Evaluation of the impacts of Take of summer tanager migratory Habitat that could be lost to Development within the next 75 years requires an assessment of the quality of this Habitat. The establishment of Conservation Areas where this species is protected is a significant improvement over the current unprotected status of 67% of riparian Habitat in the Plan Area. The actual reduction in Habitat value is expected to be considerably less than indicated by the raw acreage numbers because:

1. Conserved Habitat areas are large enough to contain self-sustaining metapopulations of summer tanagers and to incorporate key Habitat elements, including riparian Habitat for breeding and desert dry wash woodland and other Habitats for migration.
2. As a result of implementing the Conservation Objectives to protect riparian natural communities the Plan would ensure that there is no net loss of wetland Habitats. For all riparian natural communities where disturbance is authorized by the Plan, an equivalent number of acres as that subject to disturbance would be replaced.
3. Potential Development would not adversely impact the Essential Ecological Processes needed to maintain currently viable Habitat. Conservation Areas were carefully designed to protect the watershed for riparian Habitat, desert dry wash woodland, and other Habitats used by summer tanagers.
4. Lands in the MSHCP Reserve System would be managed and monitored to address significant edge effect problems, impacts from introduced exotic species, and other stressors to summer tanagers,

The issuance of Take Permits, therefore, will not likely jeopardize the continued existence of the summer tanager and the implementation of the MSHCP will provide for the Conservation of the species.

Measures to Avoid, Minimize, and Mitigate Take of Summer Tanager

To mitigate the Take of summer tanager, the Permittees will protect and manage, in perpetuity, 1,037 acres of the modeled breeding Habitat and 19,552~~19,534~~ acres of migratory Habitat for this tanager. The 1,526 acres of breeding Habitat and 21,312 acres of migratory modeled Habitat within Existing Conservation Lands will be monitored and managed to ensure that Conservation Objectives are met. The Plan will thus ensure Conservation, through protection and management, of 2,563 acres of breeding Habitat and 40,864~~40,846~~ acres of migratory Habitat for summer tanagers.

Existing Conservation Areas within the Plan boundary currently protect 38% of the Habitat for the summer tanager. The Conservation Areas in the Plan would protect 94% of the occupied and potential breeding Habitat and 71% of the potential migratory Habitat for this species. The Conservation Areas include the potential breeding Habitat for summer tanagers in Whitewater Canyon, Chino Canyon, the Thousand Palms Preserve, the Whitewater River mouth near the Salton Sea, Cottonwood Springs in Joshua Tree National Park, and Dos Palmas. The Plan includes 71% of the known occurrences for the summer tanager. Other suitable Habitat for breeding sites in the Plan Area occurs in Palm Canyon, Murray Canyon, and Andreas Canyon on the Agua Caliente Indian Reservation; portions of these canyons are currently protected as part

of the Indian Canyons Heritage Park. The Agua Caliente are preparing a separate MSHCP for reservation lands.

The model for the summer tanager, and other riparian birds, includes Habitat used in migration, including desert dry wash woodland and desert saltbush scrub. Other natural Habitat used by summer tanagers in migration or foraging will be conserved in Stubbe and Cottonwood Canyons, Oasis de los Osos, Snow Creek and Falls Creek in the Snow Creek/Windy Point Conservation Area, Mission Creek, the Thousand Palms Preserve, the Coachella Valley Stormwater Channel and Delta near the Salton Sea, Dos Palmas, and Cottonwood Spring in Joshua Tree National Park Conservation Area. Habitat disturbance, subject to the conditions of any required streambed alteration or Section 404 permits, would be allowed in those portions of these natural communities not conserved by the Plan. However, where disturbance of a given number acres of riparian natural communities is authorized, an equivalent number of acres would be replaced to ensure that the no net loss occurs and the Conservation Objective is achieved.

CVWD will establish 44 acres of permanent Sonoran cottonwood-willow riparian forest in the Coachella Valley Stormwater Channel and Delta Conservation Area as described in Section 4.3.20 to replace riparian Habitat that is periodically altered by flood control maintenance activities. Temporary Habitat disturbance for flood control channel maintenance purposes would be permitted by the Plan in the Coachella Valley Stormwater Channel.

Additionally, the Plan calls for Management and Monitoring Programs to ensure the Conservation of this species, including control of activities that degrade summer tanager Habitat, control of invasive species such as tamarisk and brown-headed cowbirds where necessary, and restoration and enhancement of degraded Habitat as necessary according to monitoring results. The Plan also limits human access to summer tanager occupied Habitat during the breeding season.

Overall Impacts to Summer Tanager

Implementation of the Plan is expected to maintain and enhance population viability of the summer tanager by protecting Habitat for potential nesting and conserving Habitat known to be used in migration. The Plan will also enhance riparian Habitat through implementation of management prescriptions to remove non-native tamarisk and other invasive species. An agreement with CVWD regarding creation of riparian vegetation along the Whitewater River could result in enhanced Habitat for summer tanagers and other riparian birds as well. Another benefit is the focus of attention on the presence of brown-headed cowbirds, including Adaptive Management activities to control their impacts to riparian birds such as the summer tanager.

The Plan would protect potential Habitat for summer tanagers, including 94% of the potential breeding Habitat and 71% of the Habitat that may be used in migration. The proposed Conservation Areas include the important riparian communities and desert fan palm oasis woodland. Proposed Conservation Areas include riparian Habitat in Whitewater Canyon, Mission Creek, Chino Canyon, the Whitewater River near the Salton Sea, and Cottonwood Spring in Joshua Tree National Park. Migratory Habitat will be conserved in Stubbe and Cottonwood Canyons, Oasis de los Osos, Snow/Falls Creek, Mission Creek, the Thousand Palms Preserve, the Whitewater River delta near the Salton Sea, Dos Palmas, and Cottonwood Spring in Joshua Tree National Park.

9.7.11.5 Species Account: Background

Distribution, Abundance, and Trends. The North American breeding population of summer tanagers has remained generally stable since the mid-1970s, although some populations in the eastern United States and along the Colorado River have declined. It was formerly considered common in the lower Colorado River valley by Grinnell (1914), but only 216 individuals were estimated to be present by 1976 (Rosenberg et al. 1991). Habitat destruction is the likely cause of the decrease.

Little is known of the breeding biology of the species. Summer tanagers nest in mature riparian groves dominated by cottonwoods and willows. Early arrivals from wintering grounds may appear in late March, but the main migration is April through early May. Nesting is primarily May through June. The nest is built on a horizontal limb of large trees including cottonwoods, usually 10 to 35 feet above the ground, and often over an opening such as a creek bed. The nest is a loosely built, shallow cup of weed stems, leaves, bark, and grasses, lined with fine grasses. From three to five, but usually four eggs are laid. Incubation is approximately 12 days. Tanagers eat insects, including bees and wasps, and small wild fruits.

This species is known or suspected to nest in the Plan Area in Mission Creek, the Whitewater Canyon, and Palm Canyon, and also migrates through the area on its way to more coastal and northern Habitats. There are also records from the Whitewater River delta and the Thousand Palms Preserve, but whether it nests in these areas or only uses them in migration is not known.

Associated Covered Species. Other riparian species that occur in similar Habitat, including least Bell's vireo, yellow-breasted chat, southwestern willow flycatcher, and yellow warbler, will benefit from conservation and Adaptive Management actions for summer tanager. Riparian bird species will be considered as a guild in the Plan with regard to their general presence in riparian areas. However, each of these riparian bird species may require slightly different structural features or successional stages for optimal breeding Habitat, which may require different management strategies.

9.8 Mammals

This section contains species accounts, including Species Conservation Goals and Objectives, Habitat parameters, and significant threats, for each of the four mammal species proposed for coverage under this Plan. The mammals include the federal endangered Peninsular bighorn sheep and three small mammals with no formal status, the Palm Springs pocket mouse, the Coachella Valley round-tailed ground squirrel, which has recently been given federal candidate for listing status, and the southern yellow bat. Measures specific to a given species that are not addressed in the general conservation approach (See Section 9.0) are listed as species-specific conservation measures.

9.8.1 Southern Yellow Bat *Lasiurus ega*

Status **Federal:** **No official status**
State: **Species of Special Concern**

9.8.1.1 Species Conservation Goals and Objectives

Conserve and manage populations within the MSHCP Reserve System according to the following criteria:

Goal 1: Conserve existing, naturally occurring, occupied Habitat and additional potential Habitat (presumed to be occupied), and associated Essential Ecological Processes, allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused disturbance, and edge effects to Core Habitat by conserving contiguous Habitat patches and effective Linkages between patches of Core Habitat.

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Objective 1. Ensure conservation of the natural community that this species depends on, desert fan palm oasis woodland, within the following Conservation Areas:

- Whitewater Canyon Conservation Area
- Willow Hole Conservation Area
- Thousand Palms Conservation Area
- Indio Hills Palms Conservation Area
- Joshua Tree National Park Conservation Area
- Mecca Hills/Orocopia Mountains Conservation Area
- Dos Palmas Conservation Area
- Santa Rosa and San Jacinto Mountains Conservation Area

Please refer to Section 4.3 and Table 9-29 for specific acreages to be protected by this Conservation Objective.

Goal 2: Protect Essential Ecological Processes, including hydrological regimes, necessary to maintain desert fan palm oasis woodland and Other Conserved Habitat for this species.

Objective 2. Ensure protection of Essential Ecological Process areas through Conservation Area Conservation Objectives for Essential Ecological Processes.

Goal 3: Ensure conservation of southern yellow bat by maintaining the long-term persistence of self-sustaining populations and conserving Habitat quality through biological monitoring and Adaptive Management actions in the Plan Area.

Objective 3. Implement biological monitoring and Adaptive Management to ensure persistence of the yellow bat in the Plan area.

Table 9-29: Summary of Habitat within Conservation Areas Southern Yellow Bat

Conservation Area	*Total Acres of Habitat in Conserv. Areas*	*Acres of Disturbance Authorized*	*Acres of Existing Conservation Lands*	*Remaining Acres to be Conserved*	*Total Acres to be Conserved in MSHCP Reserve System*	*Designation*
Whitewater Canyon	1	0	1	0	1	Other Cons. Habitat
Willow Hole	20	2	1	17	18	Other Cons. Habitat
Thousand Palms	137	0	137	0	137	Other Cons. Habitat
Indio Hills Palms	93	5	46	42	88	Other Cons. Habitat
Joshua Tree National Park	5	0	5	0	5	Other Cons. Habitat
Mecca Hills/ Orocopia Mountains	1	0	1	0	1	Other Cons. Habitat
Dos Palmas	125	6	69	50	119	Other Cons. Habitat
Santa Rosa & San Jacinto Mountains	934	53	400	481	881	Other Cons. Habitat
Total – All Habitat	*1,316*	*66*	*660*	*590*	*1,250*	--
Total – Other Cons. Habitat	*1,316*	*66*	*660*	*590*	*1,250*	--

9.8.1.2 Threats, Limiting Factors, and Adaptive Management

The most serious threat to this species is the loss of Habitat created by dead palm fronds on standing live palm trees. This can result from fire or pruning when trees are used for landscape purposes. If loss of fronds occurs in the spring before the young can fly, it could result in the loss of a year's reproduction. Fires may be naturally occurring from lightning or may be the result of vandalism. Small colonies may be lost in residential areas or resorts and golf courses where the fronds from the trees are trimmed. Pesticides may impact food availability for this species, particularly where agricultural areas occur adjacent to roosting Habitat.

The following actions may be needed to ensure species persistence and long-term viability if biological monitoring indicates that such actions are warranted. This list is not comprehensive but identifies some of the known or likely threats to this species. More detailed

information on the Management and Monitoring Programs can be found in Section 8.0. Actions may include:

1. Control and manage activities that degrade yellow bat Habitat. In particular, control and manage those activities that result in disturbance or alteration to the vegetation structure of desert fan palm oases and the skirts of dead fronds on individual palm trees. Measures, such as prohibiting trimming palm fronds above 12 feet from ground level on Reserve Lands during the yellow bat breeding season to the extent the CVCC has control, shall be implemented.
2. Control invasive species if it is determined from the monitoring results that they impact yellow bat Habitat.
3. Assess, as part of the Monitoring and Management Programs, whether a fire management plan is needed to reduce or avoid the impact of fire on this species. The Plan must also recognize that fire may be part of the ecology of *Washingtonia filifera* and may be beneficial.
4. Restore and enhance degraded Habitat as necessary according to monitoring results.
5. As part of the Monitoring Program, gather data on the distribution and Habitat parameters of the southern yellow bat throughout the MSHCP Reserve System.

9.8.1.3 Species Conservation Analysis

Conservation Area Reserve Design. The potential Habitat for the southern yellow bat is widely dispersed in the Plan Area. Naturally occurring palm oases are found along the San Andreas Fault in the Indio Hills area and at Dos Palmas. Palm oases are also found in canyons and associated with seeps in the San Jacinto and Santa Rosa Mountains, in the Mecca Hills, and in Cottonwood Canyon in Joshua Tree National Park. The Conservation Area system for this species will include most of the palm oases along the San Andreas Fault and all of the oases occurring in the San Jacinto and Santa Rosa Mountains (except for those on the Agua Caliente Indian Reservation), in the Mecca Hills, and in Cottonwood Canyon in Joshua Tree National Park. This Conservation Area configuration should not affect the ability of the species to disperse relative to existing conditions. Because this species moves locally in groups from one palm grove to the next (Wildlife Society 1996), the proximity of groves to each other could be important. There is no information, however, on the dispersal distance for the species; therefore, this needs to be determined. The Plan will seek to improve existing conditions by encouraging landowners where other palms occur to leave dead palm fronds intact to maintain viable Habitat.

The Planning Team did not attempt to describe Core Habitat for this species. Instead, all available desert fan palm oasis woodland Habitat was included in the MSHCP Reserve System. With very little data available on the occurrence of this species within these palm oases, it was not possible for the Planning Team to evaluate and determine Core Habitat. Available Habitat within the palm oases was considered as Other Conserved Habitat. The presence of Other Conserved Habitat for this species within each of the Conservation Areas is shown in Table 9-29.

9.8.1.4 Take Analysis

Significance of the Plan Area to Southern Yellow Bat

The southern yellow bat occurs in extreme southeastern California, the southwest to Texas and the northwestern portion of Mexico, including Baja (Burt and Grossenheider 1976). In California this bat, also known as the southwestern yellow bat is known only from Riverside, Imperial, and San Diego Counties south to the Mexican border. It has been recorded below 2000 feet (600 meters) in valley foothill riparian, desert riparian, desert dry wash woodland, and palm oasis Habitats (CDFG 1988-1990). Due to a lack of data, the breeding status of the yellow bat in California is uncertain. The southern yellow bat is a California Species of Special Concern although it has no official federal status. Its range may be expanding due to the use of palm trees for landscaping.

The yellow bat is believed to occur throughout the Coachella Valley in palm oases and in residential areas with untrimmed palm trees. There is no estimate of the population size of this species in the Plan Area. However, the Coachella Valley is probably very important to this species, as it has a significant number of the native palm oases in southeastern California. While very few surveys have been conducted for the species in the Plan Area, it is known to occur at the Thousand Palms Preserve (K. Nicol, pers. comm.), Dos Palmas Preserve/ACEC (C. Barrows, pers. comm.), and on the Applegarth Ranch (K. Nicol, pers. comm.) in the Thermal area.

Effects of Take on the Southern Yellow Bat

The focus of Conservation efforts for the southern yellow bat is to ensure conservation of a primary Habitat area, the desert fan palm oases. The Plan ensures the long-term Conservation including Habitat protection, management, and monitoring for southern yellow bat. It includes Conservation of Essential Ecological Processes, including the hydrological regimes that support desert fan palm oases.

There are 1,329 acres of modeled Habitat for the southern yellow bat within the Plan Area. Core Habitat was not designated for this species. The Plan would ensure Conservation of a total of 1,250 acres (94%) of the modeled Habitat or Other Conserved Habitat for southern yellow bat. Approximately 660 acres (50%) of the modeled Habitat are within Existing Conservation Lands and would be managed as part of the Reserve System. The Plan would conserve an additional 590 acres (44%) of the modeled Habitat for southern yellow bat in the Plan Area. There are three known locations for this species, two of which are on Existing Conservation Lands within the Conservation Areas. The third known location is in a palm oasis on land held for conservation by a non-profit land trust.

Within the Conservation Areas under the worst case scenario, 66 acres of Take of modeled southern yellow bat Habitat (5%) could occur (See Table 9-29 and Table 4-114). Take of southern yellow bat Habitat within the Conservation Areas must be consistent with the Conservation Objectives for this species to: 1) ensure Conservation of existing occupied Habitat and additional potential Habitat; 2) protect Essential Ecological Processes including hydrological regimes needed to maintain desert fan palm oasis woodlands as southern yellow bat Habitat; 3) implement biological monitoring and Adaptive Management to ensure Conservation of Habitat quality and long-term persistence of this species. So, although some Take could occur within the

Conservation Areas, the actual impacts to desert fan palm oases are likely to be minimal. The Conservation Objectives required by the Plan will provide for protection of Habitat to ensure the Conservation of southern yellow bat.

Outside of the Conservation Areas, there are 12 acres (<1%) of modeled Habitat authorized for Take. One of the known locations occurs on a privately held parcel near Thermal, California, which includes a planted oasis of *Washingtonia filifera* fan palms. This property is very near the Santa Rosa and San Jacinto Mountains Conservation Area, but is not within a proposed Conservation Area. Southern yellow bats were mist netted at this location in 1999. This oasis is currently held for conservation by a local land trust, the Friends of the Desert Mountains.

The establishment of Conservation Areas where yellow bats would be protected is a significant improvement over the current situation. The impacts of potential Take for this species is expected to be very low because:

1. Conserved Habitat areas are large enough to contain self-sustaining metapopulations populations of southern yellow bats and incorporate key Habitat elements, including desert fan palm oases, riparian areas, roost sites, and foraging areas.
2. Take within the Conservation Areas would not eliminate or significantly impact any known populations. Conservation Objectives specifically require Conservation of desert fan palm oasis woodland as Habitat for southern yellow bats.
3. Potential Development would not adversely impact the Essential Ecological Processes needed to maintain currently viable Habitat. Implementing Conservation Objectives will ensure that hydrological groundwater regimes that support the desert fan palm oasis woodland as Habitat for southern yellow bats are maintained.
4. Habitat for the yellow bat in the MSHCP Reserve System would be managed and monitored to address activities that result in disturbance or alteration of the vegetation structure in palm oases, potential impacts from invasive species, the potential need for a fire management plan, and other stressors to this species, The Plan also provides for specific data gathering on the distribution and Habitat parameters of this species as part of the Monitoring Program.

The issuance of Take Permits, therefore, will not likely jeopardize the continued existence of the southern yellow bat and the implementation of the MSHCP will provide for the Conservation of the species.

<u>Measures to Avoid, Minimize, and Mitigate Take of Southern Yellow Bat</u>

The Permittees will protect and manage, in perpetuity, 590 acres of the modeled Habitat to mitigate the Take of southern yellow bat. The 660 acres of modeled Habitat within Existing Conservation Lands will be monitored and managed to ensure that Conservation Objectives are met. The Plan will thus ensure Conservation, through protection and management, of 1,250 acres of southern yellow bat Habitat in the MSHCP Reserve System.

Existing Conservation Areas within the Plan boundary currently protect only 50% of the Habitat for the southern yellow bat. The Conservation Areas in the Plan would protect an

additional 44% of the occupied and potential Habitat for this species. To address specific impacts to desert fan palm oasis woodlands, which provide Habitat for southern yellow bat, the Plan requires Conservation of this natural community in the Whitewater Canyon, Willow Hole, Thousand Palms, Indio Hills Palms, Joshua Tree National Park, Mecca Hills/Orocopia Mountains, Dos Palmas, and Santa Rosa and San Jacinto Mountains Conservation Areas. The Conservation Areas include 2 of the 3 known occurrences for this bat. The third known occurrence is on privately held conservation land outside the Conservation Areas.

Additionally, the Plan calls for Management and Monitoring Programs to ensure the Conservation of this species, including control of activities that degrade southern yellow bat Habitat, control of invasive species if monitoring results indicate it is necessary, and restoration and enhancement of degraded Habitat as necessary according to monitoring results. The Plan calls for evaluation of groundwater management on southern yellow bat Habitat in mesquite areas as described in Section 9.7.5.2. The Plan also provides for data gathering as part of the Monitoring Program that addresses the distribution and Habitat parameters of this little known bat species throughout the Plan Area.

Overall Impacts to Southern Yellow Bat

Under the Plan, 94% of the approximately 1,329 acres of naturally occurring Habitat of the species in the Plan Area will be conserved. The conserved area includes all of the known occupied, naturally-occurring Habitat. It should be noted that a significant amount of potential Habitat occurs on the Agua Caliente Indian Reservation and is not part of this Plan. The Agua Caliente Band of Cahuilla Indians is preparing its own MSHCP, and potential conservation on reservation lands will be addressed in that plan. Under the Plan, Take would be permitted on 82 acres, or 6%, of the naturally occurring Habitat outside the Conservation Areas.

Implementation of the Plan will maintain and enhance population viability of the southern yellow bat by conserving its palm oasis Habitat, providing increased study of the ecology of the species, and by encouraging private landowners to manage potential Habitat in landscaped areas to maintain Habitat values.

9.8.1.5 Species Account: Background

Distribution, Abundance, and Trends. The southern yellow bat roosts in trees, primarily palm trees. It appears to prefer the dead fronds of palm trees. It feeds on flying insects such as beetles and true bugs, and forages over water and among trees. This species is thought to be non-colonial, although aggregations of up to 15 have been found in the same roost site. Yellow bats probably do not hibernate; activity has been observed year-round in both the southern and northern portions of the range. This species probably forms small maternity groups in trees and palms. Pregnancy occurs from April to June, with lactation occurring in June and July. Females carry from one to four embryos. In Texas, bat pups have been found on fronds that have been trimmed from trees (Mirowsky 1997). There is very little information available on the life history of this species.

Associated Covered Species. Because riparian birds may also use palm oases in migration, protection of the oases for the southern yellow bat may benefit least Bell's vireo, southwestern willow flycatcher, yellow-breasted chat, summer tanager, and yellow warbler.

9.8.2 Coachella Valley Round-Tailed Ground Squirrel *Spermophilus tereticaudus chlorus*

Status **Federal:** **Candidate**
State: **Species of Special Concern**

9.8.2.1 Species Conservation Goals and Objectives

Conserve and manage populations within the MSHCP Reserve System according to the following criteria:

Goal 1: Protect Core Habitat areas that include occupied Habitat, and associated Essential Ecological Processes, allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused disturbance, and edge effects to Core Habitat by conserving contiguous Habitat patches and effective Linkages between patches of Core Habitat.

Objective 1. Ensure conservation of Core Habitat within the following Conservation Areas:

- Snow Creek/Windy Point Conservation Area
- Whitewater Floodplain Conservation Area
- Willow Hole Conservation Area
- Thousand Palms Conservation Area

Please refer to Section 4.3 and Table 9-30 for specific acreages to be protected by this Conservation Objective.

Goal 2: Protect Other Conserved Habitat to provide sufficient area and variety of Habitat types to accommodate for population fluctuations, allow for and genetic diversity, and to conserve the range of environmental conditions within which this ground squirrel is known to occur.

Objective 2. Conserve Other Conserved Habitat for this ground squirrel through adherence to other Conservation Objectives (for another species, a natural community, Essential Ecological Process area, Biological Corridor, or Linkage area) in the following Conservation Areas:

- Cabazon Conservation Area
- Stubbe and Cottonwood Canyons Conservation Area
- Whitewater Canyon Conservation Area
- Highway 111/I-10 Conservation Area
- Upper Mission Creek/Big Morongo Canyon Conservation Area
- Edom Hill Conservation Area
- Thousand Palms Conservation Area
- Indio Hills/Joshua Tree National Park Linkage Conservation Area
- Indio Hills Palms Conservation Area
- East Indio Hills Conservation Area

- Joshua Tree National Park Conservation Area
- sert Tortoise and Linkage Conservation Area
- Mecca Hills/Orocopia Mountains Conservation Area
- Dos Palmas Conservation Area
- Coachella Valley Stormwater Channel and Delta Conservation Area
- Santa Rosa and San Jacinto Mountains Conservation Area

Please refer to Section 4.3 and Table 9-30 for specific acreages to be conserved by other Conservation Objectives.

Goal 3: Protect Essential Ecological Processes, including sand source/transport systems, necessary to maintain Core Habitat and Other Conserved Habitat for this species.

Objective 3. Ensure protection of Essential Ecological Process areas through Conservation Area Conservation Objectives for Essential Ecological Processes.

Goal 4: Maintain Biological Corridors and Linkages among all conserved populations.

Objective 4. Note: Specific additional details on these Biological Corridors and Linkages, and requirements for the installation of wildlife underpasses, are found in the Conservation Area descriptions in Section 4.3. Key Habitat Linkages and Biological Corridors include the following:

- Fornat Wash Biological Corridor
- Stubbe Canyon Wash Biological Corridor
- Whitewater River Biological Corridor
- Mission Creek Biological Corridor
- Willow Wash Biological Corridor, which maintains potential Habitat connectivity for Coachella Valley round-tailed ground squirrel between the Willow Hole and Whitewater Floodplain Conservation Areas
- Possible future wildlife undercrossings at Indian Avenue and Gene Autry Trail in the Whitewater Floodplain Conservation Area
- Possible future widened culverts or undercrossings at Palm Drive
- Possible future widened culverts or undercrossings at Mountain View Road, and Varner Road in the Willow Hole Conservation Area
- Possible future wildlife undercrossings along Ramon Road, Washington Street, and Thousand Palms Canyon Road in the Thousand Palms Conservation Area

Goal 5: Ensure conservation of the Coachella Valley round-tailed ground squirrel by maintaining the long-term persistence of self-sustaining populations and conserving Habitat quality through biological monitoring and Adaptive Management actions in the Plan Area.

Objective 5: Implement monitoring and Adaptive Management actions to ensure self-sustaining populations within each Core Habitat area.

Table 9-30: Summary of Habitat within Conservation Areas Coachella Valley Round-Tailed Ground Squirrel

Conservation Area	*Total Acres of Habitat in Conserv. Areas*	*Acres of Disturbance Authorized*	*Acres of Existing Conserv. Lands*	*Remaining Acres to be Conserved*	*Total Acres to be Conserved in MSHCP Reserve System*	*Designation*
Cabazon	934	0	24	(910)[1]	24	Other Cons. Habitat
Stubbe & Cottonwood Canyons	421	40	21	360	381	Other Cons. Habitat
Snow Creek/ Windy Point	2,814	245	360	2,209	2,569	Core Habitat
Whitewater Canyon	110	9	18	83	101	Other Cons. Habitat
Hwy 111/I-10	389	39	0	350	350	Other Cons. Habitat
Whitewater Floodplain	6,115 / 40	346 / 4	2,655 / 0	3,114 / 36	5,769 / 36	Core / Other Cons. Habitat
Upper Mission Creek/Big Morongo Canyon	2,773~~2,636~~	21~~248~~	160	2,352~~2,228~~	2,512~~2,388~~	Other Cons. Habitat
Willow Hole	3,146 / 1,518	260 / 151	551 / 11	2,335 / 1,356	2,886 / 1,367	Core / Other Cons. Habitat
Long Canyon	769	0	101	(668)[1]	101	Other Cons. Habitat
Edom Hill	1,835	158	254	1,423	1,677	Other Cons. Habitat
Thousand Palms	8,513 / 532	468[2]/ 26	5,071 / 275	2,974 / 231	8,045 / 506	Core / Other Cons. Habitat
West Deception	1,533	0	10	(1,523)[1]	10	Other Cons. Habitat
Indio Hills/Joshua Tree National Park Linkage	165	17	0	148	148	Other Cons. Habitat
Indio Hills Palms	145	9	59	77	136	Other Cons. Habitat
East Indio Hills	1,476	112	360	1,004	1,364	Other Cons. Habitat
Joshua Tree National Park	2	1	0	1	1	Other Cons. Habitat
Desert Tortoise & Linkage	43	4	1	38	39	Other Cons. Habitat
Mecca Hills/Orocopia Mountains	240	1	232	7	239	Other Cons. Habitat
Dos Palmas	4,490	186	2,631	1,673	4,304	Other Cons. Habitat

Conservation Area	*Total Acres of Habitat in Conserv. Areas*	*Acres of Disturbance Authorized*	*Acres of Existing Conserv. Lands*	*Remaining Acres to be Conserved*	*Total Acres to be Conserved in MSHCP Reserve System*	*Designation*
Coachella Valley Storm-water Channel & Delta	211	19	20	172	192	Other Cons. Habitat
Santa Rosa & San Jacinto Mountains	1,328	135	543	650	1,193	Other Cons. Habitat
Total – All Habitat	*39,542~~39,405~~*	*2,491~~2,478~~*	*13,357*	*20,593~~20,469~~ (3,101)*[1]	*33,950~~33,826~~*	--
Total – Core Habitat	*20,588*	*1,319*[2]	*8,637*	*10,632*	*19,269*	--
Total – Other Cons. Habitat	*18,954~~18,817~~*	*1,172~~1,159~~*	*4,720*	*9,661~~9,837~~ (3,101)*[1]	*14,681~~14,557~~*	--

[1] Numbers within parentheses are acres of Habitat in fluvial sand transport areas. The only Conservation Objective in this Conservation Area is to maintain fluvial sand transport. Habitat Conservation is not an objective.

[2] Of this Authorized Take, 147 acres can only be used in Section 8, T4S, R6E of the Thousand Palms Conservation Area.

9.8.2.2 Threats, Limiting Factors, and Adaptive Management

Threats to the Coachella Valley round-tailed ground squirrel in the Plan Area include loss of Habitat as a result of urbanization and agricultural Development, including the loss of mesquite hummocks due to lowered water tables, and related impacts. As ground dwelling small mammals, they are susceptible to impacts from OHVs and other surface disturbances that could crush their burrows. At the urban interface, impacts from domestic pets (cats and dogs) and small predator populations could pose a threat. As they seem to prefer open areas with adequate visibility, invasive exotic plants such as Saharan mustard (*Brassica tournefortii*) and Russian thistle (*Salsola tragus*) may reduce Habitat suitability. This species has been observed crossing two- and four-lane roads; in high traffic areas, however, roads within suitable Habitat could increase mortality significantly. While the Coachella Valley round-tailed ground squirrel does not require active blowsand areas, maintenance of their Habitat will depend on protection of ecosystem processes associated with sand dunes.

The following actions may be needed to ensure species persistence and long-term viability if biological monitoring indicates that such actions are warranted. This list is not comprehensive but identifies some of the known or likely threats to ground squirrels. More detailed information on the Management and Monitoring Programs can be found in Section 8.0. Actions may include:

1. Control and manage activities that degrade ground squirrel Habitat. In particular, control and manage those activities that result in sand compaction and vegetation destruction, or which may crush their burrows, including OHV travel within Core Habitat (except on designated routes of travel, if any); vegetation manipulation or clearing; and other human disturbance. Fencing, patrol and enforcement may be necessary to accomplish this goal.

2. Control invasive species if it is determined from the monitoring results that there are impacts to the ground squirrel or its Habitat.
3. Restore and enhance degraded Habitat as necessary according to monitoring results. This may include restoration of mesquite hummocks if research and monitoring results indicate restoration is warranted.
4. As part of the Monitoring Program, establish a research element that addresses the distribution, abundance, and Habitat parameters of the Coachella Valley round-tailed ground squirrel throughout the MSHCP Reserve System.

9.8.2.3 Species Conservation Analysis

Conservation Area Reserve Design. The Coachella Valley round-tailed ground squirrel occurs throughout the Plan Area, and at least some potential Habitat for this species occurs in all the Conservation Areas. The proposed Conservation Areas in the MSHCP Reserve System include those areas judged by the Planning Team to be the most viable known Habitat for this species, from the Snow Creek area east to Dos Palmas. The Planning Team selected Core Habitat from the Habitat model for this species using the following four criteria: (1) Core Habitat is sufficiently large that it can support a self-sustaining population independent of other Core Habitat areas, and the presence of this species in sufficient numbers to constitute a persistent population has been confirmed; (2) Core Habitat is not fragmented by Development, including roads, in such a way to isolate populations. In addition to creating barriers to dispersal for this species, roads can contribute to edge effects, including exotic plant species that colonize disturbed areas; (3) Core Habitat has intact Essential Ecological Processes, including sand source and sand delivery systems. While this species does not appear to require, or even prefer, active blowsand, natural disturbance from aeolian and fluvial processes (wind and flooding) may be necessary to maintain the Habitat and was considered essential; and (4) Core Habitat has effective connections to other Biological Corridors and/or Linkages, to allow gene flow among populations. For more detail on the process used to identify Conserved Habitat for this species, see Section 3.2.2.3 and 3.6 in Appendix I.

Core Habitat Areas:

1. ***Snow Creek/Windy Point.*** There are approximately 2,814 acres of ground squirrel Habitat modeled in this Conservation Area, of which approximately 2,569 acres will be conserved under the Plan. In a limited survey for this species in June 1997 (K. Barrows et al. 1997) approximately 20 individuals were observed on the west side of Snow Creek Road. Another survey by Katie Barrows on July 1, 1996 (K. Barrows, pers. comm.) reported approximately 30 squirrels on both sides of Snow Creek Road. Specific density estimates, however, are not available for the Coachella Valley round-tailed ground squirrel in the Snow Creek area. The only density estimates for this species are from Ryan (1968), for sand dunes and creosote flats in Palm Desert on the Deep Canyon floodplain, which range from 2.2 to 2.3 animals per acre, depending on the time of year. For this species, Snow Creek Road was not considered a significant impediment to movement of ground squirrels from one side to the other due to the relatively low traffic volume. The Coachella Valley round-tailed ground squirrel has been observed crossing Snow Creek Road (K. Barrows, pers. comm.). Because much of the existing land on either side of Snow Creek Road is currently held by public and private conservation

groups, the traffic levels are not expected to increase greatly. The Planning Team considered this Conservation Area as Core Habitat for the Coachella Valley round-tailed ground squirrel.

2. ***Whitewater Floodplain.*** Nearly all of the land included in this Conservation Area is potential Habitat for the Coachella Valley round-tailed ground squirrel. The Plan includes approximately 6,115 acres of Core Habitat on the existing preserve and throughout the Conservation Area, of which the Plan will conserve approximately 5,769 acres. The largest patch of Habitat within this Conservation Area is the existing Whitewater Floodplain Preserve and additional Habitat south and east of the existing preserve boundary. The Coachella Valley round-tailed ground squirrel occurs on the northern portion of the preserve, within the hummocky dunes on the fringe-toed lizard study plot (M. Fisher and A. Muth, pers. comm.). The area along the southern portion of the preserve supports good numbers of this species as well (K. Barrows 1995). In surveys for the Plan in 1995, 54 individuals were detected along four transects on the Whitewater Floodplain Preserve, south of the fringe-toed lizard study plot**.** The Planning Team did consider this area as Core Habitat for the Coachella Valley round-tailed ground squirrel.

3. ***Willow Hole.*** The Willow Hole Preserve area includes Habitat primarily south of the San Andreas Fault where sandy deposits from Mission Creek and Big Morongo Wash provide suitable sand dune and sand hummock Habitat for the Coachella Valley round-tailed ground squirrel. Data for the presence of this round-tailed ground squirrel in the Willow Hole vicinity come from the surveys of Dodero (1995) and K. Barrows (1995) who both reported the Habitat to be of high quality and the density of squirrels to be high. Cameron Barrows (pers. comm.) has also reported that he observes a high density of ground squirrels in the mesquite dune areas of the Willow Hole-Edom Hill Preserve/ACEC during annual monitoring transects for the fringe-toed lizard. This area provides suitable Habitat and was considered as Core Habitat. The Planning Team recommends an undercrossing be included in any future widening of Varner Road to allow animals to cross from Willow Hole and Edom Hill areas to Stebbins Dune and Flat Top Mountain on the south side of Varner. An undercrossing or culvert on Mountain View would also provide better connectivity. The Habitat east of Palm Drive, including Habitat west of Mountain View and south of Varner, constitutes 3,146 acres of essentially contiguous Core Habitat. The Conservation Objective is to conserve at least 2,880 acres of Core Habitat in this eastern portion of the Conservation Area. Additional survey data are needed to determine the status of ground squirrels west of Palm Drive. This Habitat patch was considered as Other Conserved Habitat. In addition to Core Habitat, at least 1,367 acres of Other Conserved Habitat will be protected.

4. ***Thousand Palms.*** The Plan includes approximately 8,513 acres of ground squirrel Habitat modeled in this Conservation Area, of which the Plan will conserve approximately 8,045 acres. In addition to Core Habitat, at least 506 acres of Other Conserved Habitat will be protected. There are two Core Habitat areas on the existing Thousand Palms Preserve. One of these Core Habitat areas includes the main dune system in the area south of Ramon Road and west of Washington Avenue. It also includes the area designated for acquisition to protect the sand transport system west of the preserve. The ground squirrels seem to prefer the more hummocky areas with regularly spaced creosote bushes or other vegetation that occur west, north, and east of the most active blowsand areas. The second Core Habitat area includes the sand dune Habitat north of Thousand Palms oasis and north of the Indio Hills (north of Ramon Road

and west of Thousand Palms Canyon Road) where 3,320 acres of ground squirrel Habitat occur. These two Core Habitat areas are separated by approximately 2 miles of undisturbed Habitat not modeled for this species. While Coachella Valley round-tailed ground squirrels would not be expected to be resident in this intervening Habitat, it does not represent a barrier to genetic exchange over time. The Coachella Valley round-tailed ground squirrel also is scattered throughout much of the preserve where sandy substrates occur. Cameron Barrows (pers. comm.) describes their density here as low to moderate by comparison to the higher densities at Willow Hole. Once again, the Planning Team considered this area as Core Habitat also.

Other Conserved Habitat Areas

1. ***Cabazon.*** There are approximately 934 acres of modeled Habitat for this ground squirrel in the Cabazon Conservation Area. Approximately 24 acres of this Habitat is already conserved as Existing Conservation Land. Observations of this species in this Conservation Area are limited to historical records prior to 1970. The remaining 910 acres are within the Essential Ecological Process fluvial sand transport area, which is not covered by a specific Conservation Objective. Because of existing land use patterns and associated edge effects in these areas, they would be unsuitable for Habitat protection through acquisition.

2. ***Stubbe and Cottonwood Canyons.*** This Conservation Area includes very limited, scattered sandy substrate for a total of approximately 421 acres of modeled Habitat, of which the Plan will conserve approximately 381 acres. The area has not been surveyed for this species and no known occurrences have been reported from this Conservation Area. The area was not considered as large enough to provide Core Habitat for the ground squirrel.

3. ***Whitewater Canyon.*** This Conservation Area includes very limited, scattered sandy substrate for a total of approximately 110 acres of modeled Habitat, of which the Plan will conserve approximately 101 acres. The substrates in this Conservation Area are more gravelly, stony, or cobbly than at other locations and would not be expected to support more than low numbers of ground squirrels.

4. ***Highway 111/I-10.*** This area was added to the Plan primarily as Habitat for the Coachella Valley Jerusalem cricket. This area includes approximately 389 acres of modeled Habitat for Coachella Valley round-tailed ground squirrels, of which approximately 350 acres will be conserved under the Plan. The area has not been surveyed for this species and no known occurrences have been reported from this Conservation Area. The area was not considered large enough to provide Core Habitat for the ground squirrel.

5. ***Long Canyon, West Deception Canyon.*** These Conservation Areas do not have specific Conservation Objectives for species Habitat. These two Conservation Areas include approximately 769 acres and 1,533 acres of modeled ground squirrel Habitat, respectively. These acres are within the Essential Ecological Process fluvial sand transport area, which is not covered by a specific Conservation Objective. Because of existing land use patterns and associated edge effects in these areas, they would be unsuitable for Habitat protection through acquisition.

6. ***Upper Mission Creek/Big Morongo Canyon.*** The Plan includes approximately 2,773~~2,636~~ acres of modeled Habitat for this ground squirrel in this Conservation Area,

of which approximately 2,512~~2,388~~ acres will be conserved under the Plan. Information on the occurrence and distribution of this ground squirrel in the upper Mission Creek area is very limited. Although suitable Habitat for this species certainly occurs within this Conservation Area, it is mostly in scattered small patches. There is one recorded occurrence for this species, in sandy substrate west of Big Morongo wash. Habitat along this narrow corridor was too limited, with potentially high edge effects, to be considered as Core Habitat by the Planning Team. The Planning Team did not designate Core Habitat in this Conservation Area.

8. ***Edom Hill.*** This Conservation Area includes scattered sandy substrate Habitat between Willow Hole and the Thousand Palms Preserve in the Indio Hills. There are approximately 1,835 acres of modeled Habitat, of which approximately 1,677 acres will be conserved under the Plan. There is one known occurrence within this Conservation Area, an observation in May 1999 by Matt McDonald (1999).

9. ***Indio Hills/Joshua Tree National Park Linkage.*** The Plan includes approximately 165 acres of potential Habitat for the Coachella Valley round-tailed ground squirrel in this Conservation Area, of which the Plan will conserve approximately 148 acres. Known occurrences for this species have not, however, been recorded in this Conservation Area. The soils in this area, particularly north of Dillon Road, are more compacted and gravelly, stony, or cobbly than at other locations and would not be expected to support more than low numbers of ground squirrels.

   This area could provide a refugium in that some of the potential Habitat occurs at elevations from 1,000 to 1,120 feet, well above the 200 to 600 foot elevation at other known occurrences on the Thousand Palms Preserve. Dillon Road probably allows for some safe crossing by this species. Should traffic volumes increase significantly on Dillon Road, a culvert or other undercrossing could be necessary to maintain a connection with the Thousand Palms Conservation Area.

10. ***East Indio Hills.*** This Conservation Area contains approximately 1,476 acres of Other Conserved Habitat, of which the Plan will conserve approximately 1,364 acres. The Habitat at the most eastern end of the Indio Hills, particularly along the north-facing slope is very suitable for this species. Surveys in 1995 (K. Barrows 1995) and casual observations between 1987 and the present (K. Barrows, pers. comm.) found this species to be relatively common in this area. A report of surveys by Matt McDonald (1999) of USFWS in the spring and summer of 1999 described the density of ground squirrels in mesquite hummocks west and east of Dillon Road as high. However, due to the size and impacts from adjacent Development, this area was not considered as Core Habitat but as Other Conserved Habitat for this species within this Conservation Area.

11. ***Mecca Hills/Orocopia Mountains.*** This Conservation Area includes approximately 240 acres of modeled Habitat for the Coachella Valley round-tailed ground squirrel, of which approximately 239 acres will be conserved under the Plan. Known occurrences for this species have not been reported for this Conservation Area. The soils in this area are generally gravelly or cobbly and would not be expected to support more than low numbers of ground squirrels.

12. ***Dos Palmas.*** The Dos Palmas area includes approximately 4,490 acres that have been delineated, based on soil types and vegetation, as modeled Habitat for the Coachella Valley round-tailed ground squirrel, of which the Plan will conserve 4,304 acres. The closest known occurrence is from an observation by Robert McKernan (pers. comm.) in

the vicinity of the Coachella Canal west of Dos Palmas, outside this Conservation Area. More distribution and occurrence data would be necessary to confirm the potential for this area to constitute Core Habitat.

13. ***Coachella Valley Stormwater Channel and Delta.*** There are approximately 211 acres of modeled Habitat for this species within this Conservation Area, of which the Plan will conserve approximately 192 acres. Known occurrences of this species in this Conservation Area include an observation from July 2001 by Ken Corey (2001) of USFWS. The Habitat in this Conservation area is narrow with a high edge to area ratio. More information is needed on the distribution of the Coachella Valley round-tailed ground squirrel here.

14. ***Santa Rosa and San Jacinto Mountains.*** There are approximately 1,328 acres of modeled Habitat for this species within this Conservation Area, of which the Plan will conserve approximately 1,193 acres. Most of the modeled Habitat for this ground squirrel is located in the Snow Creek/Windy Point Conservation Area where bighorn sheep Habitat overlaps the sand dune areas.

15. ***Other Conservation Areas.*** There are three Conservation Areas with very limited Coachella Valley round-tailed ground squirrel Habitat, Indio Hills Palms with 145 acres, Joshua Tree National Park with 2 acres, and Desert Tortoise and Linkage with 43 acres.

9.8.2.4 Take Analysis

Significance of the Plan Area to Coachella Valley Round-Tailed Ground Squirrel

The Coachella Valley round-tailed ground squirrel is a subspecies of the more widely distributed round-tailed ground squirrel (*Spermophilus tereticaudus)* that inhabits desert areas of the southwestern United States and northwestern Mexico.

The Plan Area includes all of the known range for the Coachella Valley subspecies of the more widely distributed round-tailed ground squirrel. This subspecies is endemic to the Plan Area. The Coachella Valley round-tailed ground squirrel is a candidate for listing under FESA and is considered a species of special concern by the State of California. The Coachella Valley round-tailed ground squirrel is associated with sandy substrates, including sand areas within creosote bush and alkali sink scrub (Ingles 1965) and mesquite hummocks. The range for this subspecies essentially corresponds with the valley floor of the Coachella Valley. Within the Plan Area, the current and historical distribution for the Coachella Valley round-tailed ground squirrel is from San Gorgonio Pass to the vicinity of the Salton Sea (Grinnell and Dixon 1918, Hall 1981). Individuals of this species have been observed at the south end of La Quinta near Jefferson Avenue and along the Coachella Canal near Box Canyon. The range of this species in the eastern part of the Plan Area is not well known.

Effects of Take on the Coachella Valley Round-Tailed Ground Squirrel

The primary importance of the proposed MSHCP to Coachella Valley round-tailed ground squirrel is that it provides Conservation (including Habitat protection, management and monitoring) of the species across its entire range. The Plan ensures the long-term conservation of Core Habitat, the associated Essential Ecological Processes, and connectivity between these Habitat areas. In addition, the Conservation Areas provide protection across an array of Habitat variables, including moisture, soil character, elevation, vegetation, within the entire range of this subspecies.

There are 101,723 acres of modeled Habitat for this species within the Plan Area of which approximately 20,588 acres are identified as Core Habitat. The Plan would ensure Conservation of 94% (19,269 acres) of the Core Habitat and 77% (14,681~~14,557~~ acres) of the Other Conserved Habitat for this ground squirrel. Each of the conserved Core Habitat areas would be greater than 2,000 acres. Approximately 13,357 acres (13%) of the modeled Habitat are within Existing Conservation Lands and would be managed as part of the Reserve System. Overall, the Plan would conserve an additional 33,950~~33,826~~ acres (33%) of the modeled Habitat for Coachella Valley round-tailed ground squirrel in the Plan Area.

Within the Conservation Areas under the worst case scenario, 2,491~~2,478~~ acres of Take of modeled Habitat (2%) could occur. There would be approximately 1,319 acres (6% of all Core Habitat) of Core Habitat and 1,172~~1,159~~ acres of Other Conserved Habitat (6% of all Other Conserved Habitat) subject to Take Authorization (See Table 9-30 and Table 4-114). Take of ground squirrel Habitat within the Conservation Areas must be consistent with the Conservation Objectives for this species to: 1) ensure Conservation of Core Habitat; 2) protect Essential Ecological Processes needed to maintain ground squirrel Habitat; and 3) maintain Biological Corridors and Linkages among conserved populations to provide for population fluctuation and enhance genetic diversity. So, although some Take could occur within the Conservation Areas, the Conservation Objectives required by the Plan will provide for protection of Habitat to ensure the long-term persistence of this species.

Outside of the Conservation Areas, there are 58,628~~58,765~~ acres of modeled Habitat authorized for Take. The Habitat outside the Conservation Areas is already highly fragmented, surrounded by existing Development, and has a compromised sand source/transport system. The potential for this compromised Habitat to provide for the long-term persistence of ground squirrel populations is low. These areas are primarily in the remnants of the Big Dune south of Interstate 10, and in the area south of Desert Hot Springs and east of Highway 62. The Big Dune area no longer has a viable sand transport/wind corridor and is highly fragmented by major roads. These fragmented blocks are more susceptible to edge effects, including mortality on roads and predation by feral animals. Roads and low-density residential Development generally fragment the area near Desert Hot Springs. Modeled Habitat not included in the Conservation Areas in the area east of Highway 62 includes coarser soils and an apparently lower density of ground squirrels. Observations of Coachella Valley round-tailed ground squirrels in the area are limited to one observation (K. Barrows et al. 1997) of one individual south of Dillon Road, just west of Big Morongo Canyon wash and four individuals at the Mission Springs Water District water treatment facility.

Although the percentage of ground squirrel modeled Habitat that could be lost to

development within the next 75 years appears to be substantial, evaluation of the impacts of Take requires an assessment of the quality of this Habitat. The establishment of Conservation Areas where this species is protected is a significant improvement over the piecemeal and fragmenting nature of development patterns within this Habitat occurring now. The actual reduction in Habitat value is expected to be considerably less than indicated by the raw acreage numbers because:

1. Conserved Habitat areas are large enough to contain self-sustaining populations of ground squirrels and incorporate key Habitat elements, including sandy substrates and hummocks.
2. Take within the Conservation Areas would not eliminate or significantly impact any core populations. Conservation Objectives require any approved development within Conservation Areas to ensure protection of Core Habitat.
3. As a result of implementing the Conservation Objectives to protect Habitat for this species and provide for connectivity, the Plan would not sever connections between any significant populations. Habitat areas are adequately connected to each other to allow genetic exchange. Biological Corridors and Linkages would be conserved to provide Habitat connectivity from Cabazon and Snow Creek to the east end of the Indio Hills.
4. Potential Development would not adversely impact the Essential Ecological Processes needed to maintain currently viable Habitat. Conservation Areas were carefully designed to incorporate the sand source and sand transport systems.
5. Lands in the MSHCP Reserve System would be managed and monitored to address significant edge effect problems, potential loss of Habitat from introduction of exotic species, and other stressors to this species,

The issuance of Incidental Take Permits, therefore, will not likely jeopardize the continued existence of this species and the implementation of the MSHCP will provide for the Conservation of the species.

Measures to Avoid, Minimize, and Mitigate Take of Coachella Valley Round-Tailed Ground Squirrel

To mitigate the Take of Coachella Valley round-tailed ground squirrel, the Plan will ensure the protection and management, in perpetuity, of 20,593~~20,469~~ acres of the modeled Habitat for this species. The 13,357 acres of modeled Habitat within Existing Conservation Lands will be monitored and managed to ensure that Conservation Objectives are met. The Plan will thus ensure Conservation, through protection and management, of 33,950~~33,826~~ acres of Additional Conservation Lands for this species.

The proposed Conservation Areas in the Plan would protect the Core Habitat areas from Cabazon to Windy Point, including Snow Creek; the Willow Hole area, including additional Habitat west of Palm Drive and on Flat Top Mountain; and all of the occupied and potential Habitat on the Thousand Palms Preserve. In addition, occupied Habitat that met the Core Habitat standard set by the Planning Team, and which provides significant Habitat for this ground squirrel, will be conserved at the Whitewater Floodplain Preserve. Other Conserved Habitat from a range of environmental conditions within which this ground squirrel is known to occur will be

protected in the following Conservation Areas: Cabazon, Stubbe and Cottonwood Canyons, Whitewater Canyon, Highway 111/I-10, Upper Mission Creek/Big Morongo Canyon, Mission Creek/Morongo Wash, Edom Hill, Indio Hills/Joshua Tree National Park Linkage, Indio Hills Palms, East Indio Hills, Joshua Tree National Park, Desert Tortoise and Linkage, Mecca Hills/Orocopia Mountains, Dos Palmas, Coachella Valley Stormwater Channel and Delta, and the Santa Rosa and San Jacinto Mountains. Reserve Design criteria used to establish the Conservation Areas require Conservation of Essential Ecological Processes. The MSHCP Reserve System will incorporate and protect additional sand source/sand transport areas for Snow Creek/Windy Point, the Whitewater Floodplain Conservation Area, Willow Hole and Flat Top Mountain, and the Thousand Palms Preserve.

Additionally, the Plan calls for Management and Monitoring Programs to ensure the Conservation of this species, including control of activities that degrade ground squirrel Habitat, control of invasive species where necessary, and restoration and enhancement of degraded Habitat as necessary according to monitoring results. The Plan also calls for a research element that addresses the distribution, abundance, and Habitat parameters of the Coachella Valley round-tailed ground squirrel throughout the MSHCP Reserve System.

Coachella Valley round-tailed ground squirrel Habitat occupancy rates are substantially higher in mesquite hummocks than other Habitat types (Center for Conservation Biology, University of California, Riverside 2004, L. Ball, pers. comm.). It is therefore desirable to preserve the mesquite hummock areas. Substantial stands of mesquite hummocks and dunes are conserved within the Willow Hole and Thousand Palms Conservation Areas. The Plan includes provisions relative to Conservation of mesquite hummocks to: 1) monitor groundwater to determine whether substantial lowering of the water table occurs. Should monitoring detect such a substantial lowering, appropriate Adaptive Management actions will be taken (See Section 8.0); 2) monitor groundwater levels in the Willow Hole and Thousand Palms Conservation Areas and ameliorate the effects of substantial lowering of the water table on mesquite hummocks and associated Covered Species as a Changed Circumstance; 3) as a Permittee, CVWD will enhance and manage Coachella Valley round-tailed ground squirrel Habitat on land it owns in the East Indio Hills Conservation Area to mitigate and provide for the conservation of impacts to this species from CVWD's operation and management activities in the Coachella Valley Stormwater Channel and Delta Conservation Area. (See Section 4.3.16 for additional details). CVWD will restore and enhance mesquite and Coachella Valley round-tailed ground squirrel Habitat on site in the East Indio Hills Conservation Area if a study determines restoration to be feasible; 4) the potential for mesquite hummock restoration and enhancement will be evaluated through monitoring and Adaptive Management and will be considered in the context of Conservation Objectives for all Covered Species and natural communities.

Overall Impacts to Coachella Valley Round-Tailed Ground Squirrel under the Plan

Within the Conservation Areas under the worst case scenario, 2,491~~2,478~~ acres of Take of modeled Habitat (2%) could occur. There would be approximately 1,319 acres (6% of all Core Habitat) of Core Habitat and 1,172~~1,159~~ acres of Other Conserved Habitat (6% of all Other Conserved Habitat) subject to Take Authorization (See Table 9-30 and Table 4-119). Take of ground squirrel Habitat within the Conservation Areas must be consistent with the Conservation Objectives for this species to: 1) ensure Conservation of Core Habitat; 2) protect Essential Ecological Processes needed to maintain ground squirrel Habitat; and 3) maintain Biological Corridors and Linkages among conserved populations to provide for population fluctuation and enhance genetic diversity. So, although some Take could occur within the Conservation Areas, the Conservation Objectives required by the Plan will provide for protection of Habitat to ensure the long-term persistence of this species.

Outside of the Conservation Areas, there are 58,628~~58,765~~ acres of modeled Habitat authorized for Take. The Habitat outside the Conservation Areas is already highly fragmented, surrounded by existing Development, and has a compromised sand source/transport system. The potential for these to provide for the long-term persistence of ground squirrel populations is low. These areas are primarily in the remnants of the Big Dune south of Interstate 10, and in the area south of Desert Hot Springs and east of Highway 62. The Big Dune area no longer has a viable sand transport/wind corridor and is highly fragmented by major roads. These fragmented blocks are more susceptible to edge effects, including mortality on roads and predation by feral animals. Roads and low-density residential Development generally fragment the area near Desert Hot Springs. Modeled Habitat not included in the Conservation Areas in the area east of Highway 62 includes coarser soils and an apparently lower density of ground squirrels. Observations of Coachella Valley round-tailed ground squirrels in the area are limited to one observation (K. Barrows et al. 1997) of one individual south of Dillon Road, just west of Big Morongo Canyon wash and four individuals at the Mission Springs Water District water treatment facility.

The Conservation Areas benefit this species by securing the long-term sand transport-delivery systems for the Core Habitat and Other Conserved Habitat. At the present time, the sand transport corridors for the Snow Creek area, the Willow Hole area, and for the Thousand Palms Preserve are unprotected; the MSHCP Reserve System would protect these areas. Potential Linkage areas would be protected between Highway 111 and Interstate 10 near Snow Creek. From Willow Hole east, Habitat that typically supports this species along the south-facing slopes of Edom Hill would be protected, providing a Linkage with Habitat to the east on the Thousand Palms Preserve. Essential Ecological Processes, including wind corridors and sand sources for the Habitat named above, would be protected under the Plan. Habitat at Dos Palmas would be conserved in the proposed Plan. Those areas where Take could be permitted for this species are primarily in the remnants of the Big Dune south of Interstate 10, and in the area south of Desert Hot Springs and east of Highway 62. The Big Dune area no longer has a viable sand transport/wind corridor and is highly fragmented by major roads. These fragmented blocks are more susceptible to edge effects, including mortality on roads and predation by feral animals. Roads and low-density residential Development generally fragment the area near Desert Hot Springs.

Therefore, implementation of this Plan will maintain and enhance population viability of the Coachella Valley round-tailed ground squirrel, as significant Habitat that is now unprotected

will be conserved. The Plan will also secure the Essential Ecological Processes necessary to maintain this Habitat.

9.8.2.5 Species Account: Background

Distribution, Abundance, and Trends. The Coachella Valley round-tailed ground squirrel is typically associated with sand fields and dune formations (Bradley and Deacon 1971), although it does not require active blowsand areas. This small ground squirrel seems to prefer areas where hummocks of sand accumulate at the base of large shrubs that provide burrow sites and adequate cover (Grinnell and Dixon 1918, Cameron Barrows, pers. comm.). Various authors have referred to the use of mesquite Habitat by round-tailed ground squirrels (Allen and Price 1895, Elliot 1904, Grinnell and Dixon 1918, Vorhies 1945, Drabek 1973, Dunford 1975). Although numerical data were not presented, McDonald (1999) reported relatively high densities of Coachella Valley round-tailed ground squirrel in a mesquite hummocks and active sand field Habitat at the east end of the Indio Hills. In surveys for this Plan, Dodero (1995) reported observing this squirrel at Willow Hole in the central portion of the dune as well as at the southern periphery, at the edge of mesquite clumps. He also reported that these squirrels are most abundant at Willow Hole in the dune area where the transition from desert dune to Sonoran creosote scrub takes place. C. Barrows (pers. comm. 2001) suggests that they are most abundant in more mesic sand dune Habitats, often associated with mesquite hummocks. They may also be found in areas where sandy substrates occur in creosote bush scrub and desert saltbush scrub or in desert sink scrub that supports herbaceous growth. In addition to wind blown sand Habitats, they may occur in areas of more coarse sands, associated with washes. According to Mark Fisher of the UC Deep Canyon Desert Research Center (Mark Fisher, pers. comm.), the Coachella Valley round-tailed ground squirrel used to occur on this reserve in sandy patches associated with washes and was reported from 1979 to 1984. He indicated that this ground squirrel has not been observed in the Deep Canyon area since the 1980s when the population was extirpated by the effects of a severe drought. According to Ryan (1968), the highest concentrations of this species in the Deep Canyon area were not in aeolian dunes but in areas of somewhat coarser sand, slightly pebbly ground cover, or packed silt.

Very little quantitative data are available to describe the population density for this species throughout the Plan Area. Density estimates for round-tailed ground squirrels in Arizona range from 2.1 individuals per acre (5.3/ha) on a 63-hectare site in south-central Arizona (Drabek 1973) to 16/acre (40/ha) on a crowded site (Dunford 1977). It is likely that densities in the Coachella Valley would be less than in Arizona where average annual rainfall and vegetation density are relatively higher. The Coachella Valley round-tailed ground squirrel occurs in small colonies widely scattered in suitable sandy Habitats (Ryan 1968). According to Jaeger (1961), 10 to 15 animals per square mile (0.01 to 0.02/acre) is probably an average number. From trap data in the creosote-palo verde Habitat, Ryan (1968) estimated 1.1 individuals per acre during 30 April through 2 May, 2.3 individuals per acre during October, and 1.1 individuals per acre during January. Drabek (1973) found mean home range estimates of 0.74/acre for adults and 0.77/acre for juveniles.

Based on input from various observers, including members of the Planning Team, areas where the Coachella Valley round-tailed ground squirrel occurs in relatively high density have been identified. This squirrel occurs in good populations in the vicinity of Snow Creek, from Fingal's Finger to Windy Point; it has also been observed further west near Cabazon. It occurs

around the Whitewater River channel north and west of Palm Springs, including the Whitewater Floodplain Preserve. It has been observed along the Mission Creek wash and likely occurs in suitable Habitat in the southern parts of Desert Hot Springs. Habitat, including mesquite hummocks and sand dunes, at the Willow Hole-Edom Hill Preserve/ACEC has been described as high quality for this species (Dodero 1995), and many individuals were observed there during surveys for the Plan. Table 9-31 provides results of various surveys for Coachella Valley round-tailed ground squirrel. Data on the number of individuals of Coachella Valley round-tailed ground squirrel along a 1 km. transect at the Willow Hole-Edom Hill Preserve/ACEC have been collected during annual monitoring surveys for the fringe-toed lizard (CNLM 2000); the mean number of squirrels per survey per year ranges from two to seven squirrels from 1990 to 1994 and from four to 10 squirrels from 1998 to 2000.

Table 9-31: Results of Various Surveys for Coachella Valley Round-Tailed Ground Squirrel

LOCATION	Year of Observation	Number of *CVRTGS* Observed	Number of Transects
SNOW CREEK ROAD	1996 [5] 1997 [5]	±30 ±20	- 4
WINDY POINT	1995a[1]	Not observed	-
WHITEWATER FLOODPLAIN PRESERVE	1995b[2]	54 (13.5)	4
WEST OF PALM DRIVE	2001[4]	1	-
WILLOW HOLE PRESERVE	1995a[1] 1995b[2]	Many squirrels 92 (9.2)	- 10
EDOM HILL	1999[3]	Low	
THOUSAND PALMS PRESERVE	1995b[2]	466 (12.9)	36
EAST END INDIO HILLS (1999)	1995b[2] 1999[3]	107 (35.7) High	3
DEEP CANYON (within Santa Rosa & San Jacinto Mountains Conservation Area)	1964[3]	Density from 1.1 to 2.3/acre	-

[1] Records from 1995a are from a report on biological surveys completed for this Plan by M. Dodero (Dodero 1995).

[2] Records from 1995b are from a report on biological surveys completed for this Plan by Katie Barrows (1995); in this survey, squirrels were counted along 10-meter-wide transects of variable length. Number in parentheses is number of animals per transect.

[3] Observations for 1999 were reported by Matt McDonald, USFWS, Carlsbad Field Office, (McDonald 1999) from surveys conducted between 29 April and 11 August 1999; density is described on a qualitative basis, as no counts were made.

[4] Density estimates based on trapping results from an unreported number of quadrants by Ryan (1968) in Mammals of Deep Canyon.

[5] Observations are from an informal survey on the west side of Snow Creek Road (Katie Barrows et al. 1997). Observations in 1996 are by Katie Barrows on July 1, 1996 (K. Barrows, pers. comm.) from both sides of Snow Creek Road.

From the Willow Hole-Edom Hill ACEC, this ground squirrel can be found in sandy Habitats east toward the Thousand Palms Preserve. It occurs in good numbers on the dunes of the Thousand Palms Preserve. It is also common on the sand dunes at the east end of the Indio Hills. Habitat is still present for this ground squirrel on the so-called Big Dune south of Interstate 10, although surveys for this species have not been conducted in this area because it is on private land without access.

The burrows of the Coachella Valley round-tailed ground squirrel are typically located at the base of a large creosote bush or other shrub, often on a small mound or hummock. The entry is several inches across leading to tunnels that are not usually deep or over five or six feet in length (Jaeger 1961). Young are born in March or April in litters of four to 12. In winter, they remain in their underground burrows for much of the time. They feed on seeds and green leaves of desert plants, including the stems of Mormon tea (*Ephedra* sp.), leaves and beans of mesquite, cactus fruit, ocotillo blossoms (Hoffmeister 1986), and agricultural crops, but may occasionally take small lizards (including flat-tailed horned lizards) and insects; they have also been observed to feed on carrion.

Associated Covered Species. Within the Plan Area, other species of concern whose Habitat overlaps with that of the Coachella Valley round-tailed ground squirrel include flat-tailed horned lizard, Palm Springs pocket mouse, Coachella Valley fringe-toed lizard, Coachella Valley milkvetch, Coachella Valley giant sand-treader cricket, Coachella Valley Jerusalem cricket, and burrowing owl.

9.8.3 Palm Springs Pocket Mouse *Perognathus longimembris bangsi*

Status	**Federal:**	**No official status**
	State:	**Species of Special Concern**

9.8.3.1 Species Conservation Goals and Objectives

Conserve and manage populations within the MSHCP Reserve System according to the following criteria:

Goal 1: Protect Core Habitat areas that include occupied Habitat Conserve Habitat, and associated Essential Ecological Processes, allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused disturbance, and edge effects to Core Habitat by conserving contiguous Habitat patches and effective Linkages between patches of Core Habitat.

Objective 1. Ensure conservation of Core Habitat within the following Conservation Areas~~ and Special Provisions Area~~:

- Snow Creek/Windy Point Conservation Area
- Whitewater Floodplain Conservation Area
- Upper Mission Creek/Big Morongo Canyon Conservation Area
- ~~Morongo Wash Special Provisions Area~~

- Willow Hole Conservation Area
- Thousand Palms Conservation Area

Please refer to Section 4.3 and Table 9-32 for specific acreages to be protected by this Conservation Objective.

Goal 2: Protect Other Conserved Habitat, to provide sufficient area and variety of Habitat types to accommodate population fluctuations, allow for and genetic diversity, and to conserve the range of environmental conditions within which this pocket mouse is known to occur.

Objective 2. Conserve Other Conserved Habitat for this mouse through adherence to other Conservation Objectives (for another species, a natural community, Essential Ecological Process area, Biological Corridor, or Linkage area) in the following Conservation Areas:

- Cabazon Conservation Area
- Stubbe and Cottonwood Canyons Conservation Area
- Whitewater Canyon Conservation Area
- Highway 111/I-10 Conservation Area
- Upper Mission Creek/Big Morongo Canyon Conservation Area
- Mission Creek/Morongo Wash Conservation Area
- Edom Hill Conservation Area
- Indio Hills/Joshua Tree National Park Linkage Conservation Area
- Indio Hills Palms Conservation Area
- East Indio Hills Conservation Area
- Joshua Tree National Park Conservation Area
- Desert Tortoise and Linkage Conservation Area
- Mecca Hills/Orocopia Mountains Conservation Area
- Dos Palmas Conservation Area
- Coachella Valley Stormwater Channel and Delta Conservation Area
- Santa Rosa and San Jacinto Mountains Conservation Area
- ~~Morongo Wash Special Provisions Area~~

Please refer to Section 4.3 and Table 9-32 for specific acreages to be conserved by other Conservation Objectives.

Goal 3: Protect Essential Ecological Processes, including sand source/transport systems, necessary to maintain Core Habitat and Other Conserved Habitat for this species.

Objective 3. Ensure protection of Essential Ecological Process areas through Conservation Area Conservation Objectives for Essential Ecological Processes.

Goal 4: Maintain Biological Corridors and Linkages among all conserved populations.

Objective 4. Note: Specific additional details on these Biological Corridors and Linkages, and requirements for the installation of wildlife underpasses,

are found in the Conservation Area descriptions in Section 4.3. Key Habitat Linkages and Biological Corridors include the following:

- Fornat Wash Biological Corridor
- Stubbe Canyon Wash Biological Corridor
- Whitewater River Biological Corridor
- Mission Creek Biological Corridor
- Willow Wash Biological Corridor, which maintains potential Habitat connectivity for Palm Springs pocket mouse between the Willow Hole and Whitewater Floodplain Conservation Areas
- Highway 62 Biological Corridor
- Morongo Wash, including Palm Springs pocket mouse Habitat, to maintain potential Habitat connectivity between Core Habitat in the Upper Mission Creek/Big Morongo Canyon Conservation Area and the Willow Hole Conservation Area
- Interstate 10 Biological Corridors, which maintain potential Habitat connectivity for Palm Springs pocket mouse between the Joshua Tree National Park Conservation Area and the Mecca Hills/Orocopia Mountains Conservation Area
  a. Conserve Corridor 1, centered on Thermal Canyon
  b. Conserve Corridor 2 centered on the E. Cactus City Wash and Hazy Gulch culverts
  c. Conserve Corridor 3 centered on the Happy Gulch culvert
  d. Conserve Corridor 4 centered on the Desperation Arroyo culvert
  e. Conserve Corridor 5 centered on the Desperation Arroyo, West Buried Mountain Wash, Buried Mountain Wash, Resurrection Wash, West Saddle Gulch, Saddle Gulch, West Cotton Gulch, Cotton Gulch, East Cotton Gulch, and Paul Gulch culverts
- Possible future wildlife undercrossings at Indian Avenue and Gene Autry Trail in the Whitewater Floodplain Conservation Area
- Possible future widened culverts or undercrossings at Palm Drive
- Possible future widened culverts or undercrossings at Mountain View Road, and Varner Road in the Willow Hole Conservation Area
- Possible future wildlife undercrossings along Ramon Road, Washington Street, and Thousand Palms Canyon Road in the Thousand Palms Conservation Area

Goal 5: Ensure conservation of the Palm Springs pocket mouse by maintaining the long-term persistence of self-sustaining populations and conserving Habitat quality 275 through biological monitoring and Adaptive Management actions in the Plan Area.

Objective 5: Implement monitoring and Adaptive Management actions to ensure self-sustaining populations within each Core Habitat area.

Table 9-32: Summary of Habitat within Conservation Areas Palm Springs Pocket Mouse

Conservation Area	*Total Acres of Habitat in Conserv Area*	*Acres of Disturbance Authorized*	*Acres of Existing Conservation Lands*	*Remaining Acres to be Conserved*	*Total Acres to be Conserved in MSHCP Reserve System*	*Designation*
Cabazon	934	N/A	24	(910)[1, 3]	24	Other Cons. Habitat
Stubbe & Cottonwood Canyons	1,210	118	26	1,066	1,092	Other Cons. Habitat
Snow Creek/ Windy Point	2,744 / 53	241 / 5	334 / 0	2,169 / 48	2,503 / 48	Core / Other Cons. Habitat
Whitewater Canyon	166	14	30	122	152	Other Cons. Habitat
Hwy 111/I-10	389	39	0	350	350	Other Cons. Habitat
Whitewater Floodplain	6,981 / 19	407 / 2	2,914 / 0	3,660 / 17	6,574 / 17	Core / Other Cons. Habitat
Upper Mission Creek/Big Morongo Canyon	3,806 / 392 ~~3,685 / 353~~	339 / 30 ~~422[4] / 27~~	498 / 85	2,969 / 277 ~~2,765 / 241~~	3,467 / 362 ~~3,263 / 326~~	Core / Other Cons. Habitat
Willow Hole	4,610 / 217	405 / 20	564 / 13	3,641 / 184	4,205 / 197	Core / Other Cons. Habitat
Long Canyon	788	N/A	101	(687)[1, 3]	101	Other Cons. Habitat
Edom Hill	1,342	115	189	1,038	1,227	Other Cons. Habitat
Thousand Palms	11,707 / 425	518[2] / 15	7,601 / 269	3,588 / 141	11,189/ 410	Core/ Other Cons. Habitat
West Deception	2,818	N/A	10	1 (2,807)[1, 3]	11	Other Cons. Habitat
Indio Hills /Joshua Tree National Park Linkage	7,059	661	445	5,953	6,398	Other Cons. Habitat
Indio Hills Palms	458	19	264	175	439	Other Cons. Habitat
East Indio Hills	1,651	117	480	1,054	1,534	Other Cons. Habitat
Joshua Tree National Park	35	4	0	31	31	Other Cons. Habitat

Conservation Area	*Total Acres of Habitat in Conserv Area*	*Acres of Disturbance Authorized*	*Acres of Existing Conservation Lands*	*Remaining Acres to be Conserved*	*Total Acres to be Conserved in MSHCP Reserve System*	*Designation*
Desert Tortoise & Linkage	2,122	169	436	1,517	1,953	Other Cons. Habitat
Mecca Hills/Orocopia Mountains	1,946	148	462	1,336	1,798	Other Cons. Habitat
Dos Palmas	8,147	353	4,617	3,177	7,794	Other Cons. Habitat
Coachella Valley Stormwater Channel & Delta	172	15	20	137	157	Other Cons. Habitat
Santa Rosa & San Jacinto Mountains	5,565	502	1,869	3,194	5,063	Other Cons. Habitat
Total – All Habitat	*65,756* ~~*65,596*~~	*4,339* ~~*4,336*~~	*21,251*	*35,762 (4,404)*[1]	*57,013* ~~*56,856*~~	--
Total – Core Habitat	*29,848* ~~*29,727*~~	*1,993*	*11,911*	*15,944* ~~*15,823*~~	*27,734*	--
Total – Other Conserved Habitat	*35,908* ~~*35,869*~~	*2,346*~~*2,343*~~	*9,340*	*19,818* ~~*19,782*~~ *(4,404)*[1]	*29,279* ~~*29,122*~~	--

[1] Numbers within parentheses are acres of Habitat in fluvial sand transport areas. The only Conservation Objective in this Conservation Area is to maintain fluvial sand transport. Habitat conservation is not an objective. In these cases there are no "Acres Authorized for Take."

[2] Of this Authorized Take, 147 acres can only be used in Section 8, T4S, R6E of the Thousand Palms Conservation Area.

[3] A portion of this species Habitat model occurs within a fluvial sand transport area

[4] ~~Includes 293 acres in the Morongo Wash Special Provisions Area~~.

9.8.3.2 Threats, Limiting Factors, and Adaptive Management

Threats to this species and its Habitat within the Coachella Valley include agricultural Development, urban Development, construction of roads, railroads, airports and other structures, OHV use, illegal trash dumping, and domestic animal predators.

The following actions may be needed to ensure species persistence and long-term viability if biological monitoring results indicate that such actions are warranted. This list is not comprehensive but identifies some of the known or likely threats to pocket mice. More detailed information on the Management and Monitoring Programs can be found in Section 8.0. Actions may include:

1. Control and manage activities that degrade pocket mouse Habitat. In particular, control those activities that adversely affect this species, which may include OHV travel within Core Habitat (except on designated routes of travel, if any); vegetation manipulation or clearing; and other human disturbance. Fencing, patrol and enforcement may be necessary to accomplish this goal.
2. Identify actions to reduce impacts from, and control where feasible, invasive species if it is determined from monitoring results that there are impacts to pocket mouse Habitat or populations.
3. Restore and enhance degraded Habitat as necessary according to monitoring results.
4. Where necessary, develop fire management guidelines within conserved areas to protect populations from fires and disturbances associated with fire suppression. Fire management is primarily an issue in the western, more mesic, portion of the Plan Area where alien annual grasses may facilitate the spread of fire.
5. Complete studies to determine where Habitat interfaces occur between *P.l. bangsi* and other subspecies.

9.8.3.3 Species Conservation Analysis

Conservation Area Reserve Design. The Palm Springs pocket mouse occurs throughout the Plan Area, and at least some potential Habitat for this species occurs in all the Conservation Areas. The Planning Team selected Core Habitat from the Habitat model for this species using the following four criteria: (1) Core Habitat is sufficiently large that it can support a self-sustaining population independent of other Core Habitat areas; (2) Core Habitat is not fragmented by Development, including roads. Lightly traveled two-lane roads that have limited potential for expansion (e.g. Snow Creek Road) were not considered barriers to this species. Where roads have the potential to fragment Core Habitat, the Plan provides for wildlife underpasses to be constructed when road widening could cause potential fragmentation; (3) Core Habitat has intact Essential Ecological Processes, including sand source and sand delivery systems; while this species may not depend on active blowsand areas, long-term maintenance of the sand dunes and sand fields where it occurs was considered essential; and (4) Core Habitat area provides suitable areas to act as refugia in the event of large-scale flood events or other extreme conditions (climate change, extended drought). Natural features such as ridges and washes or features such as roads (as a buffer from Development) are used to minimize edge effects from Development. In addition to new Conservation Areas at Snow Creek and Mission Creek, existing Conservation Areas will be expanded to include adjacent Habitat areas, Essential Ecological Process areas, and Linkages. Linkages will also help maintain predator-prey relationships in the Conservation Areas by providing for movement of predators such as coyotes and foxes.

For each area, see Table 9-32 for a breakdown of Existing Conservation Lands and remaining lands to be conserved. The Planning Team identified and assessed the sufficiency of the following Conservation Areas as Core Habitats:

Core Habitat Areas:

1. ***Snow Creek/Windy Point.*** There are approximately 2,744 acres of pocket mouse Core Habitat within this Conservation Area, of which the Plan will conserve approximately

2,503 acres. Shana Dodd's density estimates for the Snow Creek area range from 43.9 to 73.1 individuals per hectare or 17.56 to 29.4 animals per acre (Dodd 1996, 1999). Using the lower density figure would result in an estimate of 47,061 pocket mice occurring in this area. The sand sources for this area include primarily the Whitewater and San Gorgonio Rivers, plus their tributaries, originating in the San Jacinto and San Bernardino Mountains. The two-lane Snow Creek Road was not considered a significant impediment to movement of pocket mice from one side to the other due to the relatively low traffic volume. Because much of the existing land on either side of Snow Creek Road is currently held by public and private conservation groups, the traffic levels are not expected to increase greatly. The Snow Creek area could provide a refugium for this species in the event of a major flood in the portions of the area that are above the 500-year floodplain (FEMA). The Planning Team considered this area as Core Habitat for this species.

2. ***Whitewater Floodplain.*** Nearly all of the land included in this Conservation Area is potential Habitat for the Palm Springs pocket mouse, according to the species distribution model. The Plan includes approximately 1,240 acres of modeled Habitat on the existing preserve, approximately 420 acres of Habitat adjacent to the southeastern corner of the preserve, and Habitat throughout the floodplain to comprise a total of approximately 6,981 acres, of which the Plan will conserve approximately 6,574 acres. Trap results from Shana Dodd (1996) were from two locations on the existing preserve. One individual was trapped on her transect at the eastern edge near Date Palm Drive, an area of relatively active blowsand. 10 individuals were trapped in the southwestern portion of the preserve, an area of low sand hummocks; *P.l. bangsi* is expected to occur throughout the preserve, except possibly in the very high wind-formed dunes where no vegetation occurs (Dodd 1996). A relatively small patch of Habitat, including 371 acres of potential pocket mouse Habitat, lies east of Gene Autry Trail and was historically connected with Habitat at the Whitewater Floodplain Preserve. Gene Autry Trail, a two-lane road, has heavy traffic and is already scheduled for widening. A wildlife undercrossing will be installed when the road is widened to six lanes. No known occurrences for Palm Springs pocket mouse have been recorded here; individuals of this species, however, have been trapped north of the railroad tracks, between the tracks and Interstate 10 (Chambers Group 2000). The Planning Team considered the modeled Habitat within this entire Conservation Area as Core Habitat for the Palm Springs pocket mouse.

3. ***Upper Mission Creek/Big Morongo Canyon.*** The Conservation Area includes approximately 3,806~~3,685~~ acres of modeled Core Habitat for Palm Springs pocket mouse, of which the Plan will conserve approximately 3,467~~3,263~~ acres. A density plot placed west of Highway 62 and south of the Mission Creek drainage (SE ¼ of Section 20, T. 2S, R. 4E) by Dodd (1996) resulted in a density of 14.54 individuals per acre. The trapping completed by Dodd (1999) on the east side of Highway 62 in the Mission Creek channel resulted in the capture of 30 individuals, the highest ratio of individuals captured per trap night. While Highway 62 is certainly a major impediment to movement for animal species, the presence of a significant under crossing at Mission Creek allows connectivity between the Habitat on both sides of the highway to be maintained. The Planning Team did consider this area as Core Habitat for the Palm Springs pocket mouse.

4. ***Thousand Palms.*** The Conservation Area includes approximately 11,707 acres of modeled Habitat for Palm Springs pocket mouse in this Conservation Area, of which the Plan will conserve approximately 11,189 acres. The Thousand Palms Preserve includes

Habitat for Palm Springs pocket mouse in the main dune system, in the area south of Ramon Road and west of Washington Avenue. Because Ramon Road and Washington Avenue receive moderate traffic volumes, the main dune system is somewhat isolated from the remaining Palm Springs pocket mouse Habitat on the preserve. The Palm Springs pocket mouse population is not well studied on the preserve and no known occurrences have been located in this portion of the Conservation Area. Because the Habitat is similar to that found in areas where Palm Springs pocket mouse is known to occur (the Whitewater Floodplain Preserve, dune areas of Snow Creek, and at the Willow Hole-Edom Hill Preserve/ACEC), the presence of Palm Springs pocket mouse is probable. One density plot sampled by Dodd in 1996, in the vicinity of Willis Palms north of Ramon Road, did not result in sufficient individuals trapped to estimate density. Dodd (1996, 1999) characterizes this preserve as having moderate density and estimates that a reasonable estimate of density could be made based on trap results on the density plot. She suggests that densities in the vicinity of this plot do not likely exceed 6.4 individuals per acre (16/ha). The Planning Team included this area as Core Habitat.

Most of the known occurrences for Palm Springs pocket mouse on the Thousand Palms Preserve are north of Ramon Road and west of Thousand Palms Canyon Road (Dodd 1996, 1999, USFWS 1997). The Habitat patch delineated in this area includes 4,272 acres of potential pocket mouse Habitat. On the east side of Thousand Palms Canyon Road, the model for this species predicts that there are 1,861 acres of potential Habitat. Because each of these areas could support a self-sustaining population of this species, the Planning Team designated them as Core Habitat.

5. ***Willow Hole.*** Data for the presence of Palm Springs pocket mouse in the Willow Hole vicinity comes from the trapping results of Dodd (1996). The number of individuals trapped on the one density plot sampled in 1996 was insufficient to estimate density. It should be noted that trapping was not completed west of Palm Drive or south of Varner Road. However, Dodd (1996) did report that the Habitat and soils are relatively similar throughout this site and Palm Springs pocket mouse would be expected to occur over most of the study area. West of Palm Drive, the Habitat occurs primarily south of the San Andreas Fault where sandy deposits from Mission Creek and Big Morongo Wash provide suitable Habitat for Palm Springs pocket mouse.

   There is some fragmentation in this area as a result of roads, including Palm Drive, Mountain View Drive, and Varner Road. These roads likely reduce the unimpeded movement of pocket mice from one Habitat patch to another; culverts under Palm Drive provide for connectivity between the Habitat east and west of Palm Drive. There are a total of 4,610 acres of Core Habitat and 217 acres of Other Conserved Habitat. The Plan will ensure conservation of at least 4,205 acres of Core Habitat and 197 acres of Other Conserved Habitat.

<u>Other Conserved Habitat Areas</u>:

1. ***Cabazon.*** There are approximately 934 acres of modeled Habitat for this pocket mouse in the Cabazon Conservation Area, of which the Plan will conserve approximately 24 acres. The area was not considered large enough to provide Core Habitat for the pocket mouse.

2. ***Stubbe and Cottonwood Canyons.*** This Conservation Area includes limited, scattered sandy substrate for a total of approximately 1,210 acres of modeled Habitat, of which the

Plan will conserve approximately 1,092 acres. The area has not been surveyed for this species and no known occurrences have been reported from this Conservation Area. The area was not considered large enough to provide Core Habitat for the Palm Springs pocket mouse.

3. ***Whitewater Canyon.*** This Conservation Area includes very limited, scattered sandy substrate for a total of approximately 166 acres of modeled Habitat, of which the Plan will conserve approximately 152 acres. The substrates in this Conservation Area are more gravelly, stony, or cobbly than at other locations and would not be expected to support more than low numbers of pocket mice.

4. ***Highway 111/I-10.*** This Conservation Area includes approximately 389 acres of Habitat for the pocket mouse, of which the Plan will conserve approximately 350 acres. This area was added to the MSHCP Reserve System primarily as Habitat for the Coachella Valley Jerusalem cricket. However, the area can also be considered as a Linkage for the Palm Springs pocket mouse. According to Shana Dodd (pers. comm. 2000) the area could have value as a Linkage to the Whitewater River and Snow Creek in that it provides adequate shrub cover for this species. The area has not been surveyed for Palm Springs pocket mouse; however, if the area supports pocket mice at a density comparable to the lowest density on the Snow Creek density plots then this area could be considered contiguous Core Habitat. In 1996, Shana Dodd trapped 18 individuals west of density plot with the highest sampled density, 29.24 animals/acre.

5. ***Long Canyon, West Deception Canyon.*** These Conservation Areas do not have specific Conservation Objectives for species Habitat. Each of the Conservation Areas includes 788 acres and 2,818 acres of modeled pocket mouse Habitat, respectively. These acres are within the Essential Ecological Process fluvial sand transport area, which is not covered by a specific Conservation Objective. Because of existing land use patterns and associated edge effects in these areas, they would be unsuitable for Habitat protection through acquisition.

6. ***Upper Mission Creek/Big Morongo Canyon.*** There are approximately 392~~353~~ acres of modeled Habitat for this pocket mouse within this Conservation Area, of which the Plan will conserve approximately 362~~326~~ acres.

7. ~~***Morongo Wash Special Provisions Area***. The Morongo Wash Special Provisions Area is within the Upper Mission Creek/Big Morongo Canyon Conservation Area. There are approximately 1,819 acres of modeled habitat for the pocket mouse within this Provision Area, of which the Plan will conserve all 1,527 acres.~~

8. ***Edom Hill.*** This Conservation Area includes scattered sandy substrate Habitat, which provides a Linkage between the Willow Hole and the Thousand Palms Conservation Areas in the Indio Hills. No records for the Palm Springs pocket mouse have been recorded from this Conservation Area. There are approximately 1,342 acres of Other Conserved Habitat, of which the Plan will conserve approximately 1,227 acres.

9. ***Indio Hills/Joshua Tree National Park Linkage.*** The Conservation Area includes approximately 7,059 acres of potential Habitat for the Palm Springs pocket mouse, of which the Plan will conserve approximately 6,398 acres. Shana Dodd (1996) reported that this species was detected in very low numbers, primarily at two transects immediately north of Dillon Road, south of Fan Hill. Bob James also trapped this species in Pushwalla Canyon north of Dillon Road (USFWS 1997). The soils in this area,

particularly north of Dillon Road, are more compacted, stony, and cobbly than at other locations where trapping was completed (Dodd 1996). Jim Cornett (pers. comm.) has also reported trapping this species in the vicinity of Dillon Road and Thousand Palms Canyon Road. He also cited the cobbly nature of the substrate here and the indication that Palm Springs pocket mouse would occur at lower densities. Still no data are available to estimate the density of individuals in this Conservation Area. Without adequate data to evaluate the extent of occupied Habitat, the Planning Team did not designate this area as Core Habitat for this species. Additional Habitat for this species is indicated in the West Deception Canyon Conservation Area, although no known occurrences of the species have been recorded there.

This area could provide a refugium in that the transects where the species was recorded (Dodd 1996) were at 1,000 and 1,120 feet, well above the 200 to 600 foot elevation at other known occurrences on the Thousand Palms Preserve. Some safe crossing by this species, particularly during the night hours when it is active, could occur across Dillon Road. Should traffic volumes increase significantly on Dillon Road, a culvert or other undercrossing could be necessary to maintain a connection with the Thousand Palms Canyon Conservation Area.

10. ***East Indio Hills.*** This Conservation Area includes approximately 1,651 acres of modeled Habitat for this pocket mouse, of which approximately 1,534 acres will be conserved by the Plan.

11. ***Desert Tortoise and Linkage.*** This Conservation Area includes approximately 2,122 acres of modeled Habitat for the Palm Springs pocket mouse, of which the Plan will conserve approximately 1,953 acres. Palm Springs pocket mouse was recorded in Thermal Canyon (USFWS 1997) and in Shavers Valley (Dodd 1999). The Shavers Valley area may approach the eastern limit of this subspecies; a 1976 University of California, Berkeley Museum of Vertebrate Zoology record for Palm Springs pocket mouse is southeast of Shavers Valley in the Salt Creek Wash area. Dodd described that, although the Habitat appears suitable, this species appears to be at very low densities in this area. The Habitat distribution map did not allow a complete prediction of potential Habitat because soils data, on which the model was based, is not available for this part of Riverside County. There is insufficient data to determine whether this area could serve as Core Habitat for the Palm Springs pocket mouse.

12. ***Mecca Hills/Orocopia Mountains.*** This Conservation Area includes approximately 1,946 acres of modeled Habitat for the Palm Springs pocket mouse, of which the Plan will conserve approximately 1,798 acres. Dodd (1999) described that although the Habitat appears suitable, this species appears to be at very low densities in this area. The Habitat distribution map did not allow a complete prediction of potential Habitat because soils data, on which the model was based, is not available for this part of Riverside County.

13. ***Dos Palmas.*** The Dos Palmas area includes Habitat that appears to be of high quality for this species (Dodd 1999). However, only two individuals were captured here on two different trap lines. Shana Dodd indicates that she would expect the species to occur in low numbers throughout the region, especially in fine sandy areas. She suggests that the low densities for this species may relate to decreased precipitation and higher temperatures in the east end of the Coachella Valley; drier conditions would likely result in reduced availability of annual plants as a food source for the pocket mouse, compared

to the west end of the valley. The Dos Palmas area includes approximately 8,147 acres of modeled Habitat for this species, of which the Plan will conserve 7,794 acres.

14. ***Coachella Valley Stormwater Channel and Delta.*** There are approximately 172 acres of modeled Habitat for this species within this Conservation Area, of which the Plan will conserve approximately 157 acres. The Habitat in this Conservation area has a high edge to area ratio. More information is needed on the occurrence and distribution of the Palms Springs pocket mouse here.

15. ***Santa Rosa and San Jacinto Mountains.*** There are approximately 5,565 acres of modeled Habitat for this species within this Conservation Area, of which the Plan will conserve approximately 5,063 acres. Most of the modeled Habitat for this pocket mouse is located adjacent to the Snow Creek/Windy Point Conservation Area where bighorn sheep Habitat overlaps the sand dune areas.

16. ***Other Conservation Areas.*** There are two Conservation Areas with very limited Palm Springs pocket mouse Habitat, Indio Hills Palms with 458 acres and Joshua Tree National Park with 35 acres.

9.8.3.4 Take Analysis

Significance of the Plan Area to Palm Springs Pocket Mouse

The Plan Area contains the major portion of the range of the Palm Springs pocket mouse, including the western, northern, and eastern limits of the species' range. The southern boundary of the range extends out of the Plan Area into Imperial and San Diego Counties. This subspecies occurs in the lower Sonoran life zone from the San Gorgonio Pass area east to the Little San Bernardino Mountains and south along the eastern edge of the Peninsular Range to Borrego Valley and the east side of San Felipe Narrows (Hall 1981). The Palm Springs pocket mouse has no federal status and is considered a species of special concern by the State of California.

Within the Plan Area, the east to west range of the Palm Springs pocket mouse does not appear to differ from what has been described in the past (Dodd 1996). This pocket mouse can be found in the Cabazon area as the western limits of the Plan Area in suitable Habitat and has also been recorded in the Shaver's Valley area near the eastern limits of the Plan Area. In the Coachella Valley, much of the Habitat for this species south of the I-10 freeway has been impacted by Development and fragmentation. Relatively undisturbed Habitat for the Palm Springs pocket mouse can still be found in the northern parts of the Plan Area. Within its historic range Habitat for this pocket mouse has been greatly reduced by urbanization and agriculture in the Coachella Valley.

The Plan Area still presents opportunities for Conservation of a large portion of this species total range. Although comprehensive surveys for this species have not been done, core populations have been identified. These populations occur in the Snow Creek/Windy Point Conservation Area, the area with the highest known population density for the species (Dodd, 1996), the Whitewater Floodplain Conservation Area, Upper Mission Creek/Big Morongo Canyon Conservation Area, and the Thousand Palms Conservation Area.

Effects of Take on the Palm Springs Pocket Mouse

The primary importance of the proposed MSHCP to Palm Springs pocket mouse is that it provides Conservation (including Habitat protection, management and monitoring) of the species across nearly all of its entire range. The Plan ensures the long-term conservation of Core Habitat, the associated Essential Ecological Processes, and connectivity between these Habitat areas. In addition, the Conservation Areas provide protection of lands with an array of Habitat variables, including moisture, soil character, elevation, and vegetation, from the northern, eastern, and western limits for this subspecies.

There are 142,539 acres of modeled Habitat for this species within the Plan Area of which approximately 29,848~~29,727~~ acres are identified as Core Habitat. The Plan would ensure Conservation of 27,734 acres (93%) of the Core Habitat and 29,279~~29,122~~ acres (81%) of the Other Conserved Habitat for Palm Springs pocket mouse. The five conserved Core Habitat areas range in size from 2,503 acres to over 11,000 acres. Approximately 21,251 acres (15%) of the modeled Habitat are within Existing Conservation Lands and would be managed as part of the Reserve System. The Plan would conserve an additional 35,762~~35,605~~ acres (25%) of the modeled Habitat for Palm Springs pocket mouse.

Within the Conservation Areas under the worst case scenario, 4,339~~4,336~~ acres of Take of modeled Habitat (3%) could occur. There would be approximately 1,993 acres of Core Habitat (7% of all Core Habitat) and 2,346~~2,343~~ acres of Other Conserved Habitat (7% of all Other Conserved Habitat) subject to Take Authorization (See Table 9-32 and Table 4-114). Take of pocket mouse Habitat within the Conservation Areas must be consistent with the Conservation Objectives for this species to: 1) ensure Conservation of Core Habitat; 2) protect Essential Ecological Processes needed to maintain pocket mouse Habitat; and 3) maintain Biological Corridors and Linkages among conserved populations to provide for population fluctuation and enhance genetic diversity. So, although some Take could occur within the Conservation Areas, the Conservation Objectives required by the Plan will provide for protection of Habitat to ensure the long-term persistence of the Palm Springs pocket mouse.

Outside of the Conservation Areas, there are 70,808~~70,968~~ acres (50%) of modeled Habitat authorized for Take. These areas are primarily in the remnants of the Big Dune south of Interstate 10, in the area south of Desert Hot Springs, west and east of Highway 62, along Dillon Road north of the Indio Hills and east of Pushawalla Canyon, and south of the Mecca Hills and the Coachella Canal. The potential for pocket mouse populations to persist long-term in these areas is low. The Big Dune area no longer has a viable sand transport/wind corridor, is surrounded by existing Development, and is highly fragmented by major roads. These fragmented blocks are more susceptible to edge effects, including mortality on roads and predation by feral animals. Roads and low-density residential Development generally fragment the area near Desert Hot Springs. Modeled Habitat not included in the Conservation Areas in the area east of Highway 62 includes coarser soils although the density of Palm Springs pocket mouse in this area is not known. Other areas outside the Conservation Areas have an unknown density of Palm Springs pocket mouse and were not considered Core Habitat.

The percentage of Palm Springs pocket mouse modeled Habitat that could be subject to Take appears to be substantial, although evaluation of the impacts of Take requires an assessment of the quality of this Habitat. The establishment of Conservation Areas where this

species is protected is a significant improvement over the current situation where only 15% of the Palm Springs pocket mouse modeled Habitat is conserved. The actual reduction in Habitat value is expected to be considerably less than indicated by the raw acreage numbers because:

1. Conserved Habitat areas are large enough to contain self-sustaining populations of pocket mice and incorporate key Habitat elements, including sandy substrates and annual vegetation as forage.
2. Take within the Conservation Areas would not eliminate or substantially impact any core populations. Conservation Objectives require any approved Development within Conservation Areas to ensure protection of Core Habitat.
3. Implementation of the Conservation Objectives to protect Habitat for this species will provide connectivity; the Plan has been carefully crafted to ensure connectivity for the Palm Springs pocket mouse. Habitat areas are adequately connected to each other to allow genetic exchange. Biological Corridors and Linkages would be conserved to provide Habitat connectivity from Cabazon and Snow Creek to the east end of the Indio Hills and Dos Palmas.
4. Potential Development would not adversely impact the Essential Ecological Processes needed to maintain currently viable Habitat. Conservation Areas were carefully designed to incorporate the sand source and sand transport systems.
5. Lands in the MSHCP Reserve System would be managed and monitored to address significant edge effect problems, potential loss of Habitat from introduction of exotic species, and other stressors to this species,

The issuance of Take Permits, therefore, will not likely jeopardize the continued existence of Palm Springs pocket mouse and the implementation of the MSHCP will provide for the Conservation of the species.

Measures to Avoid, Minimize, and Mitigate Take of Palm Springs Pocket Mouse

To mitigate the Take of this pocket mouse, the Permittees will protect and manage, in perpetuity, 35,762~~35,605~~ acres of the modeled Habitat for this species. The 21,251 acres of modeled Habitat within Existing Conservation Lands will be monitored and managed to ensure that Conservation Objectives are met. The Plan will thus ensure Conservation, through protection and management, of 57,013~~56,856~~ acres of Additional Conservation Lands for this species.

The proposed Conservation Areas in the Plan would protect the Core Habitat areas for this pocket mouse from Cabazon to Thousand Palms. This includes 77% of the known occurrences for the Palm Springs pocket mouse. The Plan includes all five of the Core Habitat areas identified by the Planning Team, including the area with the highest known population density for the species, which occurs in the Snow Creek/Windy Point Conservation Area (Dodd, 1996). Other Core Habitat areas to be conserved include the Whitewater Floodplain Conservation Area, Upper Mission Creek/Big Morongo Canyon Conservation Area, and the Thousand Palms Conservation Area. In addition, Other Conserved Habitat from a range of environmental conditions within which this pocket mouse is known to occur will be protected in the following Conservation Areas: Cabazon, Stubbe and Cottonwood Canyons, Whitewater Canyon, Highway 111/I-10, Mission Creek/Morongo Wash, Willow Hole, Edom Hill, Indio

Hills/Joshua Tree National Park Linkage, Indio Hills Palms, East Indio Hills, Joshua Tree National Park, Desert Tortoise and Linkage, Mecca Hills/Orocopia Mountains, Dos Palmas, Coachella Valley Stormwater Channel and Delta, and the Santa Rosa and San Jacinto Mountains. Reserve Design criteria used to establish the Conservation Areas require Conservation of Essential Ecological Processes.

The Conservation Areas benefit this species by securing the long-term sand transport-delivery systems for the Core Habitat and Other Conserved Habitat. At the present time, the sand transport corridors for the Snow Creek area, the Willow Hole area, and for the Thousand Palms Preserve are unprotected. The Conservation Areas will incorporate and protect additional sand source/sand transport areas for Snow Creek/Windy Point, the Whitewater Floodplain Conservation Area, Willow Hole and Flat Top Mountain, and the Thousand Palms Preserve. Potential Linkage areas would be protected between Highway 111 and Interstate 10 near Snow Creek. From Willow Hole east, Habitat that could support this species along the south-facing slopes of Edom Hill would be protected, providing a Linkage with Habitat to the east on the Thousand Palms Preserve. Essential Ecological Processes, including wind corridors and sand sources for the Habitat named above, would be protected under the Plan. Habitat at Dos Palmas would be conserved in the proposed Plan.

Additionally, the Plan calls for Management and Monitoring Programs to ensure the Conservation of this species, including control of activities that degrade pocket mouse Habitat such as OHV trespass, control of invasive species where necessary, development of fire management guidelines where appropriate, and restoration and enhancement of degraded Habitat as necessary according to monitoring results. The Plan also calls for data gathering on the distribution, Habitat parameters, and ecology of the Palm Springs pocket mouse as part of the Monitoring Program.

Overall Impacts to Palm Springs Pocket Mouse under the Plan

Implementation of the Plan will maintain and enhance population viability of the Palm Springs pocket mouse, which currently receives no protection outside of the existing CVFTL Preserve system. Management and monitoring prescriptions will further enhance long-term Conservation of this species.

The Palm Springs pocket mouse will benefit from the establishment of the MSHCP Reserve System which will include Core Habitat in the Snow Creek/Windy Point Conservation Area, Whitewater Floodplain Conservation Area, Upper Mission Creek/Big Morongo Canyon Conservation Area, Willow Hole Conservation Area, and the Thousand Palms Conservation Area. The proposed Conservation Areas in the Plan would protect 93% of the Core Habitat areas for this pocket mouse from Cabazon to Thousand Palms. This includes 77% of the known occurrences for the Palm Springs pocket mouse. Implementation of the Plan is expected to provide for persistence of the Palm Springs pocket mouse within the Plan Area, as currently unprotected portions of its Habitat and potential Habitat areas will be conserved. The combination of the overall Conservation measures; species-specific Conservation Objectives and measures such as management to minimize OHV impacts in pocket mouse Habitat, monitoring to better understand the distribution and ecology of this species, and long-term protection, management, and enhancement of Palm Springs pocket mouse Habitat is expected to effectively compensate for potential adverse effects to this species.

9.8.3.5 Species Account: Background

Distribution, Abundance, and Trends. The Palm Springs pocket mouse is one of seven subspecies of *Perognathus longimembris*, the "little pocket mouse" that occurs 2 in Southern California. The species is the smallest of the Heteromyidae family that also includes kangaroo rats, kangaroo mice, and spiny pocket mice. The Palm Springs pocket mouse was originally described by Mearns (1898) with the type locality in Palm Springs. This subspecies occurs in the lower Sonoran life zone from the San Gorgonio Pass area east to the Little San Bernardino Mountains and south along the eastern edge of the Peninsular Range to Borrego Valley and the east side of San Felipe Narrows (Hall 1981). There is no evidence that this subspecies' range is different than what has been described in the past (Dodd 1996), although its Habitat has been greatly reduced by urbanization and agriculture in the Coachella Valley.

The Palm Springs pocket mouse is known to hybridize with the Los Angeles pocket mouse (*P.l. brevinasus*) along its western boundary. Although the extent is not known, hybridization also occurs with other subspecies, including the Jacumba pocket mouse (*P. l. internationalis*) to the south and the little pocket mouse (*P. l. longimembris*) to the north.

Generally, their Habitat is described as having level to gently sloping topography, sparse to moderate vegetative cover, and loosely packed or sandy soils. The species was found broadly distributed in the Plan Area on slopes ranging from 0% to approximately 15% (Dodd 1996). The Plan Area contains the major portion of the range of this species, including the western, northern, and eastern limits of the species' range. The southern boundary of the range extends out of the Plan Area into Imperial and San Diego Counties. The species occurs on three existing preserves: the Thousand Palms Preserve, the Whitewater Floodplain Preserve, and the Willow Hole-Edom Hill Preserve/ACEC. It occurs at the highest reported densities for the Plan Area in the Snow Creek area. Three individuals were captured in a small mammal-trapping grid (LaPre 1999) in the blowsand Habitat adjoining the San Gorgonio River wash just north of One Horse Spring; this location is approximately 3 miles west of Snow Creek Road. Surveys completed for this Plan (Dodd 1999) confirmed that the species also occurs at Dos Palmas Preserve/ACEC and in the Cottonwood Canyon area of Joshua Tree National Park. Tests to determine that the subspecies captured in these areas is *P. bangsi* and not *P. longimembris* have not been finalized.

Our understanding of the ecology of the Palm Springs pocket mouse arises largely from the observations of mammalogists studying other species. Pocket mice of the *P. longimembris* group are nocturnal, solitary, and generally exhibit strong intraspecific aggression (Dodd 1996). They spend the day in burrows they construct, which are comprised of a system of tunnels and a plugged entrance. This species generally breeds from January to August, with a peak of activity from March to May (Dodd 1996). Several studies suggest that reproduction in heteromyids may be dependent on availability of annual vegetation. Studies of other subspecies of the little pocket mouse indicate that they hibernate in winter and are active above ground in spring, summer, and fall (Bartholomew and Cade 1957).

Table 9-33: Results of Live Trapping for Palm Springs Pocket Mouse [1]

LOCATION	Number of Transects/ Trap Nights	Number of *P.l. bangsi* Trapped	Number of Individuals/ Trap Night	Density Estimate [2]
SNOW CREEK/WINDY POINT (1995) SNOW CREEK/WINDY POINT (1999)	7/775 ----- 2/592	75 ----- 40/33	0.10 ----- 0.10/0.17	29.24/acre, 17.56/acre [2] ----- 32.64/acre, 25.3/acre[3]
WHITEWATER FLOODPLAIN PRESERVE (1995)	2/275	11	0.04	NA
W. OF HIGHWAY 62 (1995)	6/1548	8	0.005	14.56/acre
MISSION CREEK (1999)	4/180	30	0.17	NA
WILLOW HOLE – EDOM HILL (1995)	6/1440	18	0.01	(5)
INDIO HILLS TO JOSHUA TREE NATIONAL PARK CORRIDOR (1995)	10/2000	5	0.003	(5)
THOUSAND PALMS PRESERVE (1995)	5/1150	10	0.009	(8) [6.4/acre]
THOUSAND PALMS – TTP SAND SOURCE AREA (1999)	3/180	4	0.02	NA
EAST END INDIO HILLS (1999)	5/435	4	0.009	NA
MARTINEZ CANYON – EAST END OF SANTA ROSA MOUNTAINS (1999)	9/890	0	-	NA
SHAVERS VALLEY – S. OF JOSHUA TREE NATIONAL PARK	6/875	4	0.005	NA
DOS PALMAS	2/1070	2	0.002	NA

[1] Results are from Dodd (1996 and 1999) based on live trapping surveys from March to July 1995 and between 8 April and 28 May 1999.

[2] In 1995, Dodd sampled density plots; *P.l bangsi* numbers were sufficient to calculate density on three of the six density plots (two plots at Snow Creek and one plot W. of Highway 62). Numbers given are shown in number of individuals per acre, converted from number of individuals per hectare reported by Dodd. Numbers in parentheses under Density Estimate are the number of *P.l bangsi captured* where accurate density estimates could not be calculated.

[3] Density estimates (Spencer et al. 2000) are for two trap grids located west of Snow Creek Road and north of Snow Creek Village. The two grids were trapped for eight consecutive nights from 27 July to 3 August 1999 and for two nights on 1 and 2 September 1999. Numbers given are shown in number of individuals per acre, converted from number of individuals per hectare reported by Spencer.

Estimates of home range size are not available for the Palm Springs pocket mouse. In Joshua Tree National Park, home ranges of *P. longimembris* ranged from 38.7 to 84.4 meters (Chew and Butterworth 1964) and densities ranged from 0.85 to 1.74 individuals/ha. In Nevada, home ranges of males ranged from 12.4 to 31.6 meters and home ranges of females from 13.7 to 40.5 meters (Maza et al. 1973). O'Farrell (1978) determined that home range for both sexes varied from 0.28 ha in early spring to 0.80 ha in late fall. According to the survey results of Shana Dodd in 1995 and 1999 (Dodd 1996, 1999), the highest densities of this pocket mouse occur at the western end of the Plan Area, with lower densities occurring farther east. Her live trapping data, which are summarized in Table 9-33 below, indicate that this species is most

abundant throughout the Snow Creek to Windy Point area. She describes the Palm Springs pocket mouse as moderately abundant in the Highway 62/Mission Creek area, where the species is not currently protected. Considerable unprotected Habitat also occurs adjacent to the Willow Hole-Edom Hill Preserve/ACEC. Dodd (1996) described the density of this species at Willow Hole as moderate. Additional density estimates were made for the Palm Springs pocket mouse, based on live trapping on two 0.5 ha (1.2 acre) grids located west of Snow Creek Road, approximately ½-mile north of Snow Creek Village in the Snow Creek area (Spencer et al. 2000). The minimum density was 32.6 individuals per acre (81.6 individuals/ha) and 25.3 individuals per acre (63.3 individuals/ha), on two adjacent grids.

Associated Covered Species. This species is generally associated with sandy soils. The Palm Springs pocket mouse is a near-endemic to the Plan Area; the type locality for the species is from Palm Springs (Mearns 1898). It does, however, occur in the vicinity of Borrego Springs and on the east side of the San Felipe Narrows (Hall 1981), which are not within the Plan Area. Other target species whose Habitat overlaps with that of the Palm Springs pocket mouse include the flat-tailed horned lizard, Coachella Valley round-tailed ground squirrel, Coachella Valley giant sand-treader cricket, Coachella Valley milkvetch, Coachella Valley Jerusalem cricket, Coachella Valley fringe-toed lizard, and the burrowing owl.

9.8.4 Peninsular Bighorn Sheep *Ovis canadensis nelsoni*

Status	**Federal:**	**Endangered**
	State:	**Threatened**

9.8.4.1 Species Conservation Goals and Objectives

Conserve and manage populations within the MSHCP Reserve System according to the following criteria:

Goal 1: Ensure species persistence in the Plan area by securing Essential Habitat, and associated Essential Ecological Processes, allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused disturbance, and edge effects to Core Habitat by conserving contiguous Habitat patches and effective Linkages between patches of Core Habitat.

Objective 1a. Ensure conservation of Essential Habitat, from a range of environmental conditions within which this bighorn sheep is known to occur, to provide for population fluctuation and genetic diversity, within the following Conservation Areas:

- Cabazon Conservation Area
- Snow Creek/Windy Point Conservation Area
- Santa Rosa and San Jacinto Mountains Conservation Area

Please refer to Section 4.3 and Table 9-34 for specific acreages to be protected by this Conservation Objective.

Objective 1b. Ensure implementation of avoidance, minimization, and mitigation measures as described in Section 4.4, and Land Use Adjacency Guidelines as described in Section 4.5.

Objective 1c. Ensure that implementation of the MSHCP is consistent with the recovery strategy delineated in the Recovery Plan for Bighorn Sheep in the Peninsular Ranges, California (USFWS 2000).

Objective 1d. Ensure that any Development allowed does not fragment Essential Habitat, and that edge effects from such Development are minimized.

Goal 2: Maintain connectivity by preventing Habitat fragmentation within and between the four recovery regions within Essential Habitat areas to allow dispersal and movement of bighorn sheep.

Objective 2. Include Habitat Linkages and Biological Corridors within Essential Habitat areas to allow dispersal and movement of bighorn sheep.

Goal 3: Ensure conservation of the Peninsular bighorn sheep by maintaining the long-term persistence of self-sustaining populations and conserving Habitat quality through biological monitoring and Adaptive Management actions in the Plan Area.

Objective 3: Implement monitoring and Adaptive Management actions to ensure self-sustaining populations within each Core Habitat area

Table 9-34: Summary of Habitat within Conservation Areas Peninsular Bighorn Sheep

Conservation Area	*Total Acres of Habitat in Conserv. Area*	*Acres of Disturbance Authorized*	*Acres of Existing Conservation Lands*	*Remaining Acres to be Conserved*	*Total Acres to be Conserved in MSHCP Reserve System*	*Designation*
Cabazon	264	(181)[1]	0	83	83	Essential Habitat
Snow Creek/Windy Point	705	65	53	587	640	Essential Habitat
Santa Rosa & San Jacinto Mtns. - All Recovery Zones	168,935	3,802	135,577	29,556	165,133	Essential Habitat
Total	*169,904*	*3,867 (181)*	*135,630*	*30,226*	*165,856*	Essential Habitat

[1] There are 181 acres in the fluvial sand transport Essential Ecological Process area, where the only Conservation Objective is to maintain fluvial sand transport.

9.8.4.2 Threats, Limiting Factors, and Adaptive Management

The Peninsular bighorn sheep is endangered because of the loss and fragmentation of Habitat, disease, and predation. A limiting factor is that the sheep live in a narrow band of Habitat in which they must find the resources needed to survive in a harsh desert environment. This band of Habitat is at the lower elevations of the Peninsular Ranges and includes canyon bottoms, alluvial fans, and mountain slopes. Within the narrow band of Habitat, bighorn sheep need to be able to move daily, seasonally, and annually to make use of the sparse and sometimes sporadically available resources found within their home ranges. Habitat loss is considered to be one of the greatest threats to this bighorn sheep's continued existence. As humans encroach into the Habitat, the resources, and the survival potential of a particular ewe group that depends on them, may be eliminated. Habitat loss can impact the sheep's ability to forage, reproduce, find water, avoid predators, and move among important resource areas and between ewe groups. Habitat fragmentation is recognized as a major threat to Peninsular bighorn sheep because of the dual effect of restricting animals to a smaller area and severing connections between ewe groups, thus creating genetic isolation. Roads and human use of an area can create Habitat fragmentation. Habitat modification in bighorn Habitat, such as constructing golf courses and residences that attract sheep, creates threats that place sheep at risk of collisions with vehicles, poisoning by toxic landscape plants, entanglement in wire fences, harassment by dogs, and exposure to pathogens and chemicals such as herbicides and insecticides. Disease and predation, particularly by mountain lions, are also significant threats. The most impacted portions of Peninsular bighorn sheep Habitat have been alluvial fans and canyon mouths. Protection of remaining alluvial fans and canyon mouths in the species' Habitat is, therefore, of the highest importance. Many actions

needed for the recovery of the species are beyond the scope of this Plan; however, the Plan needs to be consistent with the recovery plan where elements overlap.

A public use and trails plan is needed to provide for trail use in bighorn sheep Habitat that is compatible with bighorn sheep Conservation Goals and that affords a reasonable level of use to the public. Allowable trail uses are described in Section 7.3.3.2 and the full Trails Plan is found in Section 2 of the EIR/EIS.

The following actions may be needed to ensure species persistence and long-term viability if biological monitoring indicates that such actions are warranted. This list is not comprehensive but identifies some of the known or likely threats to bighorn sheep. More detailed and specific information on the biological monitoring and management actions described here and proposed for this species can be found in Section 8.0, MSHCP Reserve System Management and Monitoring Program. Some of these actions may include:

1. Protect Essential Habitat for the Peninsular bighorn sheep as delineated in the final *Recovery Plan for Bighorn Sheep in the Peninsular Ranges, California* (USFWS 2000).
2. Control and manage activities that degrade Peninsular bighorn sheep Essential Habitat within the Conservation area. This could include human disturbance, Habitat fragmentation, and edge effects.
3. Identify actions to reduce impacts from, and control where feasible, invasive species if it is determined from monitoring results that there are impacts to the bighorn sheep or to its Habitat. Tamarisk is an identified threat to this species' Habitat and a control program is underway.
4. Limit human access to lambing areas from January 15 to June 30 and from water source areas from July 1 to September 30.
5. Restore and enhance degraded Habitat as necessary according to monitoring results.
6. Where necessary, develop fire management guidelines within conserved areas to protect populations from fires and disturbances associated with fire suppression. Fire management is primarily an issue in the western, more mesic, portion of the Plan area where alien annual grasses may facilitate the spread of fire.

9.8.4.3 Species Conservation Analysis

Conservation Area Reserve Design. The Habitat of the Peninsular bighorn sheep occurs in a continuous band at the lower elevations of the San Jacinto and Santa Rosa Mountains in the Plan area. In order to meet the Conservation Objectives for Peninsular bighorn sheep in the MSHCP Reserve System, special measures are required to ensure protection of Essential Habitat. These measures are described in detail in Section 4.3.21 on the Santa Rosa and San Jacinto Mountains Conservation Area and are summarized below in Section 9.8.4.4.

The species distribution map shows the final Peninsular bighorn sheep Essential Habitat boundary as presented in the *Recovery Plan for Bighorn Sheep in the Peninsular Ranges, California* (USFWS 2000). This final Essential Habitat boundary was made available to the GIS team in November 2000. The boundary for the Santa Rosa and San Jacinto Mountains Conservation Area is concurrent with the Essential Habitat line, with a few exceptions. See

Section 4.3.21 for details about Conservation and Take areas (in the form of Habitat loss) in the Santa Rosa and San Jacinto Mountains Conservation Area, which contains the vast majority of Peninsular bighorn sheep Habitat.

Table 9-34 identifies the amount of Essential bighorn sheep Habitat that will be conserved in the Cabazon, Snow Creek/Windy Point, and Santa Rosa and San Jacinto Mountains Conservation Areas.

9.8.4.4 Analysis: Impacts of Disturbance

Significance of the Plan Area to Peninsular Bighorn Sheep

The Peninsular bighorn sheep is restricted to the lower, east-facing desert slopes of the Peninsular Ranges in southern California and Mexico. The Peninsular Ranges extend from the San Jacinto Mountains south to the Jacumba Mountains near the California border, and south into Mexico, forming the backbone of Baja California. Bighorn sheep inhabit the eastern slopes of the Peninsular Ranges in Habitat characterized by steep slopes and cliffs, rugged canyons, washes, and alluvial fans. Current taxonomy places the Peninsular bighorn sheep in the Nelson subspecies (*Ovis canadensis nelsoni).* The bighorn sheep occupying the Peninsular Ranges of southern California are listed as a distinct vertebrate population segment.

The Plan Area includes four of the eight subpopulations, or ewe groups, of the Peninsular bighorn sheep metapopulation. The ewe groups are designated by the area in which they occur. The four ewe groups in the Plan Area are the San Jacinto Mountains group, the northern Santa Rosa Mountains (northwest of Highway 74) group, the Deep Canyon group (southeast of Highway 74 through Martinez Canyon), and the southern Santa Rosa Mountains group (south of Martinez Canyon). The territories of these ewe groups are the basis for the four recovery regions delineated in the Recovery Plan and illustrated in Figure 4-26e.

Essential Habitat for Peninsular bighorn sheep is present in three of the Conservation Areas within the Plan Area. These Conservation Areas are Cabazon, Snow Creek/Windy Point and Santa Rosa and San Jacinto Mountains.

Effects of Disturbance on the Peninsular Bighorn Sheep

The primary importance of the proposed MSHCP Reserve System to Peninsular bighorn sheep is that it provides Conservation (including Habitat protection, management and monitoring) of the species across a substantial portion of its range. The Plan ensures the long-term conservation of Essential Habitat and connectivity between these Habitat areas. In addition, the Conservation Areas provide protection of lands with an array of Habitat variables, including lamb rearing Habitat, escape terrain, access to water, and foraging areas for Peninsular bighorn sheep.

There are 172,811 acres of modeled Essential Habitat for this species within the Plan Area as described in the *Recovery Plan for Bighorn Sheep in the Peninsular Ranges, California* (USFWS 2000). Core Habitat was not designated for this species. The Plan would ensure Conservation of 165,856 (97%) of the Essential Habitat for Peninsular bighorn sheep. Approximately 135,630 acres (78%) of the Essential Habitat are within Existing Conservation

Lands and would be managed as part of the Reserve System. The Plan would conserve an additional 30,226 acres (19%) of the Essential Habitat for Peninsular bighorn sheep.

Within the Conservation Areas under the worst case scenario, 3,867 acres of disturbance of Essential Habitat (1%) could occur (See Table 9-34 and Table 4-114). Disturbance of bighorn sheep Essential Habitat within the Conservation Areas must be consistent with the Conservation Objectives for this species to: 1) ensure Conservation of Essential Habitat; 2) ensure connectivity by preventing fragmentation and maintaining Biological Corridors and Linkages within Essential Habitat to allow dispersal, provide for population fluctuation, and enhance genetic diversity; and 3) ensure Conservation of Habitat quality through biological monitoring and Adaptive Management. So, although some disturbance could occur within the Conservation Areas, the Conservation Objectives required by the Plan will provide for protection of Habitat to ensure the long-term persistence of the Peninsular bighorn sheep.

Outside of the Conservation Areas, there are 2,666 acres (1%) of Essential Habitat authorized for disturbance. This Habitat occurs on lands previously approved for Development through specific plans that are still in effect. The Development potential for private lands in the mountainous Habitat is limited by terrain, availability of utilities, road access and environmental considerations, including impacts to bighorn sheep.

The establishment of Conservation Areas where Peninsular bighorn sheep is protected is a significant improvement over the current situation as coordinated protection, a Management Program, and a Monitoring Program will be implemented for bighorn sheep Essential Habitat. The actual impacts of disturbance to this species are expected to be low because:

1. Conserved Essential Habitat areas are large enough to contain self-sustaining subpopulations of a larger metapopulation of bighorn sheep and incorporate key Habitat elements, including lamb rearing Habitat, access to water, escape terrain, and foraging areas.
2. Implementation of the MSHCP is consistent with the recovery strategy delineated in the *Recovery Plan for Bighorn Sheep in the Peninsular Ranges, California* (USFWS 2000).
3. Implementation of the Conservation Objectives to protect Habitat for this species will provide connectivity; the Plan has been carefully crafted to ensure connectivity for the Peninsular bighorn sheep. Habitat areas are adequately connected to each other to allow genetic exchange. Biological Corridors and Linkages would be conserved to provide Habitat connectivity from Cabazon and Snow Creek throughout the San Jacinto and Santa Rosa Mountains and south to the remainder of the Peninsular Ranges outside the Plan Area.
4. Lands in the MSHCP Reserve System would be managed and monitored to address significant edge effect problems, human disturbance, fragmentation, potential impacts to Habitat from introduction of exotic species, and other stressors to bighorn sheep.

The issuance of Permits, therefore, will not likely jeopardize the continued existence of Peninsular bighorn sheep and the implementation of the MSHCP will provide for the Conservation of the species.

Measures to Avoid, Minimize, and Mitigate Disturbance of Peninsular Bighorn Sheep

To mitigate the Disturbance to Peninsular bighorn sheep, the Permittees will protect and manage, in perpetuity, 30,226 acres of Essential Habitat for this species. The 134,819 acres of Essential Habitat within Existing Conservation Lands will be monitored and managed to ensure that Conservation Objectives are met. The Plan will thus ensure Conservation, through protection and management, of 165,856 acres of Essential bighorn sheep Habitat.

The proposed Conservation Areas in the Plan would protect the Core Habitat areas for bighorn sheep from Cabazon to Snow Creek and throughout the San Jacinto and Santa Rosa Mountains. This includes 97% of the Essential Habitat for Peninsular bighorn sheep.

To minimize the impacts to bighorn sheep Essential Habitat, Required Measures and special provisions apply, within a zone generally defined as within 0.5 mile of the urban interface, the lower boundary of the Santa Rosa and San Jacinto Mountains Conservation Area. The exclusions from this zone are areas where lambing or water sources intersect that area (see Figures 4.27e(1) through 4.27e(4)). Within this half-mile zone, each of four recovery regions are delineated for each of the four ewe groups as identified in the *Recovery Plan for Bighorn Sheep of the Peninsular Ranges, California* (USFWS 2000). Within these recovery regions, conservation measures apply in five types of areas, described in detail in Section 4.3.21. Special provisions apply to some areas within the Santa Rosa and San Jacinto Mountains Conservation Area, including west of Chino Canyon, in Palm Hills, along Highway 74, and near the mouth of Martinez Canyon. Some areas would require a Minor Amendment and specific criteria to be met. Other areas would require the use of the HANS process or a Major Amendment to be processed before Development could occur (see Section 6.5.2). For additional discussion of the Required Measures with regard to special provisions, HANS, and Minor/Major Amendments see Section 4.3.21.

Avoidance, minimization, and mitigation measures (See Section 4.4) would be required for any approved disturbance within Essential bighorn sheep Habitat in the Conservation Areas. Construction of Covered Activities in Peninsular bighorn sheep Habitat in the Cabazon, Snow Creek/Windy Point, and Santa Rosa and San Jacinto Mountains Conservation Areas would be conducted outside of the January 1 to June 30 lambing season unless otherwise authorized through a Minor Amendment to the Plan with concurrence from the Wildlife Agencies. Operation and maintenance of Covered Activities, including but not limited to refinishing the inside of water storage tanks, may occur during the January 1 to June 30 period if necessary. These measures also address the threat of toxic or invasive plant species in or adjacent to bighorn sheep Habitat. For new projects in the above-listed Conservation Areas, no toxic or invasive plant species may be used for landscaping. For existing public infrastructure facilities, the Permittees will develop and implement a plan to remove or prevent access to toxic plants by Peninsular bighorn sheep.

To minimize the potential for disturbance to bighorn sheep as a result of trail use, a Santa Rosa and San Jacinto Mountains Trails Plan (Trails Plan) was developed as a Compatible Activity within the Santa Rosa and San Jacinto Mountains Conservation Area. Implementation of this Trails Plan (see Section 7.3.3.2 of the Plan and Sections 2.0 and 5.0 of the EIR/EIS) would minimize the risk of potential adverse impacts to bighorn sheep from recreational activities, consistent with the Conservation Objectives.

Additionally, the Plan calls for Management and Monitoring Programs to ensure the Conservation of this species, including control of activities that degrade Peninsular bighorn sheep Essential Habitat. This will include control of invasive species where necessary (tamarisk is already being removed from Essential Habitat areas), development of fire management guidelines where appropriate, and restoration and enhancement of degraded Habitat as necessary according to monitoring results.

Bighorn sheep are a California Fully Protected Species. All Covered Activities of the Plan must avoid actions that would result in violation of Section 4700 of the Fish and Game Code that addresses Fully Protected Species. In Essential bighorn sheep Habitat, the Habitat must be avoided or measures approved by the Wildlife Agencies taken to ensure that no take of an individual occurs, other than projects where Fish and Game Code Section 2081.7 is applicable.

Overall Impacts to Peninsular Bighorn Sheep under the Plan

Implementation of the Plan will maintain and enhance population viability of the Peninsular bighorn sheep by acquiring Essential Habitat and helping to implement the Recovery Plan. The Plan is neither the same as nor a substitute for the Recovery Plan for the Peninsular bighorn sheep. The goals of the Plan for the Peninsular bighorn sheep are consistent with the Recovery Plan.

The Peninsular bighorn sheep will benefit from the establishment of the MSHCP Reserve System which will include Essential Habitat in the Cabazon Conservation Area, Snow Creek/Windy Point Conservation Area, and Santa Rosa and San Jacinto Mountains Conservation Area. The proposed Conservation Areas in the Plan would protect 97% of the Essential Habitat for Peninsular bighorn sheep within the Plan Area. Implementation of the Plan is expected to provide for long-term Conservation of the Peninsular bighorn sheep within the Plan Area, as currently unprotected portions of its Habitat and potential Habitat areas will be conserved. The combination of the overall Conservation measures; species-specific Conservation Objectives and measures such as management to minimize disturbance in bighorn sheep Habitat, monitoring to better understand the distribution and ecology of this species, and long-term protection, management, and enhancement of Peninsular bighorn sheep Habitat is expected to effectively compensate for potential adverse effects to this species.

9.8.4.5 Species Account: Background

Distribution, Abundance, and Trends. The Peninsular bighorn sheep is restricted to the east-facing, lower elevation slopes (below 1,400 meters) of the Peninsular Ranges in the Sonoran desert life zone. Range-wide estimates of abundance for the U.S. population, from the San Jacinto Mountains to the Mexican border, began in the 1970s. The highest population estimate was 1,171 in 1974 (Weaver 1975). Surveys in the 1970s, 1980s, and 1990s indicate that significant declines have occurred in multiple ewe groups. The synergistic effects from Habitat loss, disease, human disturbance, and predation are believed to have caused the decline. The 1998 range-wide population was estimated to be 334 animals (excluding lambs). Approximately half of these were in the Plan area in four subpopulations, or ewe groups. The San Jacinto (Recovery Region 1) and Northern Santa Rosa (Recovery Region 2) ewe groups have the

smallest populations, excluding lambs. These two groups are especially vulnerable. Table 9-35 provides adult population estimates for bighorn sheep in the four recovery regions within the Plan Area, from 1996 to 2004; data for the 2005 year were not yet available.

Table 9-35: Adult Population Estimates for Peninsular Bighorn Sheep Ewe Groups and Subgroups in the Santa Rosa and San Jacinto Mountains Conservation Area

Year	*Recovery Region 1 – San Jacinto Mountains*	*Recovery Region 2a – Bradley/ Magnesia/ Cathedral Canyons*	*Recovery Region 2b – Carrizo/ Dead Indian Canyons*	*Recovery Region 3 – La Quinta Area*	*Recovery Region 4 – Martinez Canyon*
2006	26*	53	5	163	n/a
2004	32*	57	4	234**	234**
2003	25	44*	3	87	100
2002	24*	35	3	115	84
2001	31	41	4	57	96
2000	26	27	3	53	51
1999	21	26	3	87	36
1998	23	17	3	55	24
1997	22	21	n/a	36	38
1996	19	18	n/a	35	17

* An asterisk denotes the population was augmented with captive-reared bighorn sheep from Bighorn Institute.

** In 2004, separate population estimates for Recovery Regions 3 and 4 were not available and the estimate is for both regions combined.

The breeding behavior of bighorn sheep is described as polygynous, in that males mate with more than one female. Females typically produce one offspring per year after they reach sexual maturity at approximately two years of age. Males typically live 10 to 12 years and females live 12 to 14 years (Ostermann 2001).

Bighorn sheep in the Peninsular Ranges range from the lower elevations of desert mountain slopes and canyons from the valley floor up to approximately 4,500 feet (Jorgensen and Turner 1975, USFWS 2000). In contrast to most mountain sheep, Peninsular Ranges bighorn sheep tend to favor the lower elevation habitat which makes them particularly vulnerable to habitat loss and human disturbance (Ostermann 2001).

The Essential Habitat for bighorn sheep in the northern portion of the Peninsular Ranges which is within the Plan Area borders the rapidly urbanizing Coachella Valley area. Urban encroachment into alluvial fans, bajadas, and canyons within Peninsular bighorn sheep habitat in the San Jacinto and northern Santa Rosa Mountains began in the 1950s and continues today (Ostermann 2001). DeForge and Scott (1982) described the situation of bighorn sheep using urban areas during the hot summer months in the mid-1950s. Urbanization was considered the leading cause of mortality for Peninsular bighorn sheep from 1991 to 1996 (Bighorn Institute

1999). Until very recently, disease has not been considered a limiting factor for bighorn sheep in the Peninsular Ranges outside the Northern Santa Rosa Mountains ewe group (USFWS 2000). In other portions of the Santa Rosa Mountains recruitment has been relatively high (Rubin et al. 2000).

Bighorn sheep in the Peninsular Ranges were listed as threatened by the State of California in 1971 and endangered by the U.S. Fish and Wildlife Service in 1998 (USFWS 1998).Among the reasons hypothesized as contributing to the decline in PBS populations since the 1970s are habitat loss and fragmentation, disease, drought, population declines potentially resulting from low recruitment, and high predation rates (Wehausen et al. 1987, USFWS 2000, Ostermann 2001). Urban development and low adult survivorship are considered among the greatest threats to the metapopulation (USFWS 1999).

More recently, the number of adult bighorn sheep in the four recovery regions within the Plan Area has shown a stable or positive trend, as shown in Table 9-35. Recovery Regions 3 and 4 in particular show a more positive trend in population numbers since 1996. The San Jacinto population in Recovery Region 1 increased slightly and appears to be stable during this period. Ongoing monitoring of bighorn sheep populations will continue to monitor the status of these ewe groups.

Associated Covered Species. Other species of concern which occur in the same general area as bighorn sheep include gray vireo, desert tortoise, and the riparian bird species.

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10.0 Natural Community Accounts and Conservation Measures

10.1 General Conservation Approach for Natural Communities

This section outlines the overall Conservation approach for all natural communities proposed for inclusion in the Plan. The implementation of this Conservation approach is described in Section 4.0 for protection-related activities, including acquisition, and in Section 8.0 for management-related activities. Section 4.3 subsections on each Conservation Area contain specific Conservation Objectives for natural communities. Additional information and the complete Conservation strategy for each natural community are found here.

These natural communities provide the Habitats for the species to be covered under the Plan. Conservation of these natural communities also includes Conservation of the rich biological diversity of the Plan Area on an ecosystem-wide basis, consistent with the NCCP goals provided by CDFG.

10.1.1 Conservation: Acquisition and Related Protection Actions

The following Conservation approaches involve acquisition and other protection actions that will be applied to achieve Conservation of all natural communities.

1. Conserve, restore, and manage representative stands of each natural community in one or more Conservation Areas. The maximum number of available natural community stands is delineated for Conservation wherever feasible. Table 10-1 shows the Conservation Areas where each natural community is conserved and identifies the number of acres conserved.
2. Conserve natural community occurrences representative of the range of environmental conditions within which the community is known to occur. Incorporate a range of environmental gradients (e.g. slope, elevation, aspect) and high Habitat diversity.
3. Protect Essential Ecological Processes that sustain natural communities. Essential Ecological Processes, including the sand source areas and sand transport systems, hydrological systems, including watershed features and flooding regimes, and fire regimes will be conserved.

10.1.2 Conservation: Adaptive Management Actions

1. Implement Management and Monitoring Programs to contribute to maintenance of natural communities within Conservation Areas. Additional research on natural community composition, ecology, and dynamics may be included in these actions.
2. Restore and enhance degraded natural communities, using native species only, as necessary according to monitoring results.
3. Identify activities, and any restrictions on those activities, allowed within Conservation Areas that are compatible with the Conservation of species, Habitats, and natural communities, and their associated ecological functions.
4. Control threats, which may include Habitat fragmentation, invasive plant and animal species, alteration of ecological processes, including hydrological regimes and sand transport, OHV use, and edge effects.

10.1.3 Summary of Natural Communities Conserved in Conservation Areas

The following Table 10-1 provides a summary of the occurrence of each natural community within each Conservation Area. The number of acres of each natural community to be conserved according to the Conservation Objectives is also shown. This table is intended to provide an overview of the natural communities to be conserved within each Conservation Area.

10.2 Natural Community Conservation Strategies: Sand Dunes and Sand Fields

This section contains a natural community Conservation strategy and a natural community account, including characteristics, typical species, and significant threats, for each of the seven sand-affiliated natural communities proposed for coverage in the Plan. General Conservation measures, which are common to all these sand dune and sand field types, are listed below.

1. Conserve the sand source/transport systems to ensure sustainability of the sand dunes and sand fields. Maintain and enhance aeolian (wind-blown) and fluvial (water-borne) sand transport systems and existing hydrological regimes.
2. Control disturbance and compaction of sand dunes and sand fields.
3. Avoid stabilization of sand dunes due to spread of non-native plant species and effects from adjacent Development.

Table 10-1a: Natural Communities to Be Conserved in Conservation Areas

Natural Community	*Cabazon*	*Stubbe and Cottonwood Canyons*	*Snow Creek/ Windy Point*	*Whitewater Canyon*	*Hwy 111/ I-10*	*Whitewater Floodplain*	*Upper Mission Creek/ Big Morongo Canyon*	*Willow Hole*	*Long Canyon*	*Edom Hill*
	Acres to be conserved within each Conservation Area based on Conservation Objectives									
Active desert dunes	◇	◇	62	◇	◇	◇	◇	◇	◇	◇
Stabilized and partially stabilized desert dunes	◇	◇	◇	◇	◇	◇	◇	348	◇	◇
Active desert sand fields	◇	◇	◇	◇	◇	436	◇	33	◇	69
Ephemeral desert sand fields	◇	◇	1,035	◇	◇	2,821	◇	1,032	◇	◇
Stabilized and partially stabilized desert sand fields	◇	◇	147	◇	◇	537	◇	181	◇	28
Stabilized shielded desert sand fields	◇	◇	◇	◇	◇	◆	◇	◇	◇	◇
Mesquite hummocks	12	◇	◇	◇	◇	◇	◇	114	◇	◇
Sonoran creosote bush scrub	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Sonoran mixed woody and succulent scrub	◇	◆	◇	◆	◇	◆	◆	◆	◆	◆
Mojave mixed woody scrub	◇	◇	◇	◇	◇	◇	◆	◇	◇	◇
Desert saltbush scrub	◇	◇	◇	◇	◇	◇	◇	152	◇	◇
Desert sink scrub	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇
Chamise chaparral	◆	◆	◇	◆	◇	◇	◇	◇	◇	◇
Redshank chaparral	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇

Table 10-1a (cont.)

Natural Community	*Cabazon*	*Stubbe and Cottonwood Canyons*	*Snow Creek/ Windy Point*	*Whitewater Canyon*	*Hwy 111/ I-10*	*Whitewater Floodplain*	*Upper Mission Creek/ Big Morongo Canyon*	*Willow Hole*	*Long Canyon*	*Edom Hill*
	Acres to be conserved within each Conservation Area based on Conservation Objectives									
Semi-desert chaparral	◆	◆	◆	◆	◇	◇	◇	◇	◇	◇
Interior live oak Chaparral	◆	◆	◇	◆	◇	◇	◇	◇	◇	◇
Cismontane alkali marsh	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇
Coastal and valley Freshwater marsh	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇
Southern arroyo willow riparian forest	◆	◇	◇	◇	◇	◇	◇	◇	◇	◇
Sonoran cottonwood-willow riparian forest	◇	267	◇	166	◇	◇	100	◇	◇	◇
Mesquite bosque	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇
Desert dry wash Woodland	◇	263	◇	◇	◇	◇	263~~245~~	◇	◇	◇
Desert fan palm oasis woodland	◇	◇	◇	1	◇	◇	◇	1	◇	◇
Southern sycamore-alder riparian woodland	◆	◇	◇	◇	◇	◇	104	◇	◇	◇
Arrowweed Scrub	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇
Mojavean pinyon-juniper woodland	◇	◇	◇	◇	◇	◇	◆	◇	◇	◇
Peninsular juniper woodland and scrub	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇

Table 10-1b: Natural Communities Protected in Conservation Areas

Natural Community	*Thousand Palms*	*West Deception Canyon*	*Indio Hills/ Joshua Tree National Park Linkage*	*Indio Hills Palms*	*East Indio Hills*	*Joshua Tree Nat'l Park*	*Desert Tortoise Linkage*	*Mecca Hills/ Orocopia Mountains*	*Dos Palmas*	*Coachella Valley Stormwater Channel and Delta*	*Santa Rosa and San Jacinto Mountains*
	Acres to be conserved within each Conservation Area based on Conservation Objectives										
Active desert dunes	419	◇	◇	◇	4	◇	◇	◇	◇	◇	◆
Stabilized and partially stabilized desert dunes	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇
Active desert sand fields	3,452	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇
Ephemeral desert sand fields	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◆
Stabilized and partially stabilized desert sand fields	◇	◇	◇	◇	298	◇	◇	◇	◇	◇	◆
Stabilized shielded desert sand fields	◇	◇	◇	◇	476	◇	◇	◇	◇	◇	◆
Mesquite hummocks	58	◇	◇	2	39	◇	◇	◇	52	67	◆
Sonoran creosote bush scrub	◆	◆	◆	◆	◆	◆	◆	◆	◆	◇	◆
Sonoran mixed woody and succulent scrub	◆	◇	◇	◆	◆	◇	◆	◇	◇	◇	◆
Mojave mixed woody scrub	◇	◆	◆	◇	◇	56,299	◆	◇	◇	◇	◇
Desert saltbush scrub	◇	◇	◇	◇	7	◇	◇	◇	◇	642	◇
Desert sink scrub	◇	◇	◇	◇	◇	◇	◇	◇	6,708	1,106	◇

Table 10-1b (cont.)

Natural Community	*Thousand Palms*	*West Deception Canyon*	*Indio Hills/ Joshua Tree Nat'l Park Linkage*	*Indio Hills Palms*	*East Indio Hills*	*Joshua Tree Nat'l Park*	*Desert Tortoise Linkage*	*Mecca Hills/ Orocopia Mountains*	*Dos Palmas*	*Coachella Valley Stormwater Channel and Delta*	*Santa Rosa and San Jacinto Mountains*
	Acres to be conserved within each Conservation Area based on Conservation Objectives										
Chamise chaparral	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇
Redshank chaparral	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	12,261
Semi-desert chaparral	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	17,318
Interior live oak Chaparral	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◆
Cismontane alkali marsh	◇	◇	◇	◇	◇	◇	◇	◇	321	◇	◇
Coastal and valley freshwater marsh	◇	◇	◇	◇	◇	◇	◇	◇	◇	55	◇
Southern arroyo willow riparian forest	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	32
Sonoran cottonwood-willow riparian forest	4	◇	◇	◇	◇	◇	◇	◇	◇	◆	58
Mesquite bosque	◇	◇	◇	◇	◇	◇	◇	◇	446	◇	◇
Desert dry wash Woodland	744	◇	◇	75	◇	2,182	12,800	8,999	1,773	◇	3,635

Table 10-1b (cont.)

Natural Community	*Thousand Palms*	*West Deception Canyon*	*Indio Hills/ Joshua Tree Nat'l Park Linkage*	*Indio Hills Palms*	*East Indio Hills*	*Joshua Tree Nat'l Park*	*Desert Tortoise Linkage*	*Mecca Hills/ Orocopia Mountains*	*Dos Palmas*	*Coachella Valley Stormwater Channel and Delta*	*Santa Rosa and San Jacinto Mountains*
	Acres to be conserved within each Conservation Area based on Conservation Objectives										
Desert fan palm oasis woodland	137	◇	◇	88	◇	5	◇	1	119	◇	880
Southern sycamore-alder riparian woodland	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	548
Arrowweed scrub	◇	◇	◇	◇	◇	◇	◇	◇	277	◇	◇
Mojavean pinyon-juniper woodland	◇	◇	◇	◇	◇	30,519	◇	◇	◇	◇	◇
Peninsular juniper woodland and scrub	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	36,458

◆ = Natural community present in this Conservation Area but with no specific Conservation Objective; natural community conserved by virtue of Conservation Objectives for ecological process areas, Biological Corridors, or Core Habitat for Covered Species

◇ = Natural community not present in this Conservation Area.

10.2.1 Active Desert Dunes

10.2.1.1 Natural Community Conservation Goals and Objectives

Conserve and manage occurrences of this natural community within the MSHCP Reserve System according to the following criteria:

Goal 1: Conserve natural community occurrences representative of the range of environmental conditions within which the community is known to occur. Incorporate a range of environmental gradients (e.g. slope, elevation, aspect) and high Habitat diversity.

Objective 1. Ensure Conservation of this natural community within the following Conservation Areas:

- Snow Creek/Windy Point Conservation Area
- Thousand Palms Conservation Area
- East Indio Hills Conservation Area

Please refer to Section 4.3 and Table 10-2 for specific acreages to be protected by this Conservation Objective.

Table 10-2: Summary of Natural Community within Conservation Areas: Active Desert Dunes

CONSERVATION AREA	*Land within the Conservation Areas*				
	Total Acres of Natural Community in Conservation Area	*Total Acres Subject to Impacts*	*Acres within Existing Conservation Lands*	*Remaining Acres to be Conserved*	*Total Acres to be Conserved in MSHCP Reserve System*
SNOW CREEK/ WINDY POINT	69	7	0	62	62
THOUSAND PALMS	421	2	405	14	419
EAST INDIO HILLS	5	1	0	4	4
SANTA ROSA & SAN JACINTO MTNS	57	6	0	51	51
TOTAL	**552**	**16**	**405**	**131**	**536**

Goal 2: Protect Essential Ecological Processes, including sand source/transport systems, necessary to maintain this natural community.

Objective 2. Ensure protection of Essential Ecological Process areas through Conservation Area Conservation Objectives for Essential Ecological Processes.

Goal 3: Ensure Conservation of Habitat quality through protection, monitoring and Adaptive Management, and restoration where necessary, to contribute to maintenance of this community within Conservation Areas.

Objective 3. Implement Monitoring Program and Adaptive Management actions to ensure Conservation of this natural community.

10.2.1.2 Threats, Limiting Factors, and Adaptive Management

Threats to this natural community include interruption of Essential Ecological Processes, notably the sand source and sand transport system by barriers, including roads, buildings, and vegetation. Fragmentation of active desert dunes by roads results in alteration to these ecological processes and may increase the likelihood of invasive plant species becoming established. Active desert dunes may also be threatened by invasive non-native plants that can stabilize sand. Other stressors to this natural community may come as a result of natural phenomena. Periods of above average rainfall promote the growth of plants that ultimately stabilize the dunes. At the opposite end of the spectrum, a prolonged drought period without large storm events results in a decline in the delivery of sand to the active dune areas. The effects of these natural stressors will ultimately be reversed as periods of below average rainfall or large storm events occur. Nevertheless, these natural stressors will impact the species that inhabit active desert dunes.

The following actions may be needed to ensure persistence of active desert dunes if biological monitoring indicates that such actions are warranted. This list is not comprehensive but identifies some of the known or likely threats to this natural community. In addition to conserving the active desert dunes natural community, the Plan will integrate monitoring and Adaptive Management actions into the Management and Monitoring Programs for this natural community. Monitoring Programs will be designed to provide feedback so that management activities can be adjusted to maximize natural community Conservation. More detailed and specific information on the biological monitoring and management actions described here and proposed for this natural community can be found in Section 8.0, MSHCP Reserve Management and Monitoring Program. Actions may include:

1. Control and manage activities that degrade active desert dunes. In particular, control and manage the primary threats to the sand community, including OHVs and factors (including invasive plants) that contribute to the loss or stabilization of active dunes.
2. Identify actions to reduce impacts from, and control where feasible, invasive species if it is determined from monitoring results that there are impacts to the active desert dune community.
3. Implement monitoring to track, and ultimately distinguish between, changes due to human or natural causes. Significant variables may include sand compaction, native ant numbers, live perennial shrub abundance, and invasive exotic plant abundance.
4. Restore and enhance degraded active desert dunes as necessary according to results from biological monitoring.

10.2.1.3 Natural Community Conservation Analysis

Conservation Area Configuration Issues. The Conservation Areas in the MSHCP Reserve System include occurrences of active desert dunes judged by the Planning Team to be likely to persist long-term. This determination was based on the presence of a relatively intact natural community, the absence of fragmentation impacts, and the presence of intact Essential Ecological Processes necessary to maintain this community. To the extent they occur, contiguous stands of this natural community were selected when available. Also, to the extent possible, the Planning Team attempted to include a range of environmental gradients (e.g. slope, elevation, aspect) within which this natural community occurs. Natural disturbance from aeolian and fluvial processes (wind and flooding) are essential to the long-term maintenance of this natural community. The Conservation Areas accomplish this goal by securing the long-term sand transport-delivery systems that are Essential Ecological Processes for active desert dunes.

The occurrence of active desert dunes is limited within the Plan Area to three Conservation Areas, Snow Creek/Windy Point, Thousand Palms, and East Indio Hills. At the present time, the sand transport corridors for the Snow Creek area and for the Thousand Palms Preserve are unprotected; the MSHCP Reserve System would protect these areas. The presence of active desert dunes within each of the Conservation Areas is shown in Table 10-2. The Planning Team identified and assessed the sufficiency for this natural community in the following Conservation Areas:

1. ***Snow Creek/Windy Point.*** There are approximately 69 acres of active desert dunes mapped in this Conservation Area, of which the Plan will ensure conservation of approximately 62 acres. The active desert dunes at Snow Creek are maintained via a sand transport system from the San Gorgonio River. The MSHCP Reserve System will conserve this sand transport-delivery system. OHV activity in this dune area is very high and will need to be controlled.

2. ***Thousand Palms.*** There are approximately 421 acres of active desert dunes mapped in this Conservation Area, of which the Plan will ensure that approximately 419 acres are conserved. The Plan will also ensure Conservation of the sand source areas that provide sand to the active desert dunes on the Thousand Palms Preserve. The Management and Monitoring Program will assess the extent to which the active desert dunes within the Thousand Palms Conservation Area may be more susceptible to stabilizing factors than similar dune areas to the west. In the central and eastern areas of the Coachella Valley, sand delivery systems, including large-scale storm events, are more compromised by roads and barriers to wind.

3. ***East Indio Hills.*** There are approximately 5 acres of active desert dunes mapped in this Conservation Area. The Plan will ensure that at least 4 of these acres are conserved. The active desert dunes in the East Indio Hills Conservation Area are limited to a small area on the northern slope of the Indio Hills. At the present time, OHV activity is severe and has degraded much of this natural community. The sand sources for this area are at least partly compromised. Like the Thousand Palms Conservation Area, the active desert dunes here may be more susceptible to stabilizing factors than similar dune areas to the west.

Conservation and Disturbance Levels. The MSHCP Reserve System would provide protection of active desert dunes in three Conservation Areas identified by the Planning Team: Snow Creek/Windy Point, Thousand Palms, and East Indio Hills Conservation Areas. In addition to conserving currently unprotected Habitat, the Plan benefits this natural community by securing the long-term sand transport-delivery systems necessary to maintain active desert dunes. The important Essential Ecological Processes, including wind corridors and sand sources, will be protected under the Plan. Conservation of at least 536 acres, or 96%, of active desert dunes will ensure that this natural community is sustained within the Plan Area.

10.2.1.4 Natural Community Account: Background

Description. These dunes are essentially barren expanses of actively moving sand; their size and shape are determined by abiotic site factors rather than by stabilizing vegetation. The dunes may intergrade with stabilized and partially stabilized desert dunes. This community occurs within a creosote bush scrub matrix. However, the dunes are the defining feature for this natural community. Perennial shrub species are sparse but may include creosote bush (*Larrea tridentata*), four-wing saltbush (*Atriplex canescens*), California croton (*Croton californicus*), sandpaper plant (*Petalonyx thurberi*), and indigo bush (*Psorothamnus arborescens*). These perennial shrubs are not common on these active dunes in part because their slow-growing stems do not keep pace with the rate of burial by loose sand (Barbour et al. 1993). In high rainfall years, annual wildflowers, including desert sand verbena (*Abronia villosa*) and dune evening primrose (*Oenothera deltoides*), may carpet the dunes. In the Plan Area, the active desert dunes are remnants of a once extensive dune system. Approximately 561 acres still exist in the Plan Area, primarily under protected status within the CVFTL Preserve. The remainder occurs near Windy Point and in a small patch of active dunes at the east end of the Indio Hills, west of Dillon

Road and north of Interstate 10. For the remaining dune areas, protecting the sand sources and sand transport-delivery system that sustains the dunes is essential.

Distribution within the Coachella Valley. Within the MSHCP Reserve System, active desert dunes occur in three of the Conservation Areas:

1. Snow Creek/Windy Point Conservation Area
2. Thousand Palms Conservation Area
3. East Indio Hills Conservation Area

Comparison with *Manual of California Vegetation*. Ultimately, the Plan will use the vegetation classification system in the *Manual of California Vegetation* (MCV) (Sawyer and Keeler-Wolf 1995). The natural community described by the Holland system as active desert dunes would be a part of the following MCV series:

1. Desert sand - verbena series

Associated Covered Species. Covered Species associated with active desert dunes are the flat-tailed horned lizard, Coachella Valley fringe-toed lizard, Coachella Valley giant sand-treader cricket, Coachella Valley Jerusalem cricket, Coachella Valley round-tailed ground squirrel, Palm Springs pocket mouse, and Coachella Valley milkvetch. Le Conte's thrasher may also be associated with this natural community.

Essential Ecological Processes. The Essential Ecological Processes that are significant to the maintenance of active desert dunes include sand source and sand transport systems. The hydrological regimes are an important part of the sand transport systems that move sand via fluvial processes to the dune areas. For active desert dunes, it is also essential that the wind corridor is unobstructed to allow aeolian processes to continue.

10.2.2 Stabilized and Partially Stabilized Desert Dunes

10.2.2.1 Natural Community Conservation Goals and Objectives

Conserve and manage occurrences of this natural community within the MSHCP Reserve System according to the following criteria:

Goal 1: Conserve natural community occurrences representative of the range of environmental conditions within which the community is known to occur. Incorporate a range of environmental gradients (e.g. slope, elevation, aspect) and high Habitat diversity.

Objective 1. Ensure Conservation of this natural community within the following Conservation Area:

- Willow Hole Conservation Area

Please refer to Section 4.3 and Table 10-3 for specific acreages to be protected by this Conservation Objective.

Table 10-3: Summary of Natural Community Within Conservation Areas: Stabilized and Partially Stabilized Desert Dunes

CONSERVATION AREA	Land within the Conservation Areas				
	Total Acres of Natural Community in Conservation Area	Total Acres Subject to Impacts	Acres within Existing Conservation Lands	Remaining Acres to be Conserved	Total Acres to be Conserved in MSHCP Reserve System
WILLOW HOLE	383	35	29	319	348
TOTAL	383	35	29	319	348

Goal 2: Protect Essential Ecological Processes, including sand source/transport systems, necessary to maintain this natural community.

Objective 2. Ensure protection of Essential Ecological Process areas through Conservation Area Conservation Objectives for Essential Ecological Processes.

Goal 3: Ensure Conservation of Habitat quality through protection, monitoring and Adaptive Management, and restoration where necessary, to contribute to maintenance of stabilized and partially stabilized desert dunes within Conservation Areas.

Objective 3. Implement biological monitoring and Adaptive Management actions to ensure Conservation of this natural community.

10.2.2.2 Threats, Limiting Factors, and Adaptive Management

Like active desert dunes, stabilized and partially stabilized desert dunes are threatened by interruption of the Essential Ecological Processes, including the sand source and sand transport system, and by barriers such as roads, buildings, and vegetation. This community may also be threatened by invasive, non-native plants that increase the rate and degree of sand stabilization. Natural fluctuations in annual rainfall, and periods of above average rainfall may increase stabilization and temporarily alter the Habitat availability for Covered Species. The extent to which this stabilization is a threat is not well understood.

The following actions may be needed to ensure persistence of this natural community if biological monitoring indicates that such actions are warranted. This list is not comprehensive but identifies some of the known or likely threats to stabilized and partially stabilized desert dunes. In addition to conserving the stabilized and partially stabilized desert dunes natural community, the Plan will integrate biological monitoring and management actions into the Management and Monitoring Programs for this natural community. The Monitoring Program will be designed to provide feedback so that management activities can be adjusted to maximize natural community Conservation. More detailed and specific information on the biological monitoring and management actions described here and proposed for this natural community can be found in Section 8.0, MSHCP Reserve Management and Monitoring Program. Actions may include:

1. Control and manage activities that degrade stabilized and partially stabilized desert dunes. In particular, control and manage the primary threats to the sand community, including OHVs and invasive plants that contribute to the loss or further stabilization of this natural community.
2. Identify actions to reduce impacts from, and control where feasible, invasive species if it is determined from monitoring results that there are impacts to the stabilized and partially stabilized desert dune community.
3. Implement monitoring to track, and ultimately distinguish between, changes due to human or natural causes. Significant variables may include sand compaction, native ant numbers, live perennial shrub abundance, and invasive exotic plant abundance.
4. Restore and enhance degraded stabilized and partially stabilized desert dunes as necessary according to results from biological monitoring.

10.2.2.3 Natural Community Conservation Analysis

Conservation Area Reserve Design. The Conservation Areas in the MSHCP Reserve System include occurrences of stabilized and partially stabilized desert dunes judged by the Planning Team to be likely to persist long-term. This determination was based on the presence of a relatively intact natural community, the absence of fragmentation impacts, and the presence of intact Essential Ecological Processes necessary to maintain this community. To the extent they occur, contiguous stands of this natural community were selected when available. Also, to the extent possible, the Planning Team attempted to include a range of environmental gradients (e.g. slope, elevation, aspect) within which this natural community occurs. Natural disturbance from aeolian and fluvial processes (wind and flooding) are essential to the long-term maintenance of this natural community. The Conservation Areas accomplish this goal by securing the long-term sand transport-delivery systems that are Essential Ecological Processes for stabilized and partially stabilized desert dunes.

1. ***Willow Hole.*** There are approximately 383 acres of stabilized and partially stabilized desert dunes mapped in this Conservation Area, of which approximately 348 acres will be conserved as a result of the Plan. The stabilized and partially stabilized desert dunes within the Willow Hole Conservation Area are maintained via a sand transport system from Mission Creek and Big Morongo Wash. The MSHCP Reserve System will conserve this sand transport and delivery system. The Willow Hole Conservation Area includes 77% of the total acres of this natural community within the Plan Area.

Conservation Levels. The MSHCP Reserve System would provide protection of stabilized and partially stabilized desert dunes in one Conservation Area, the Willow Hole Conservation Area. In addition to conserving currently unprotected Habitat, the Plan benefits this natural community by securing the long-term sand transport-delivery systems necessary to maintain stabilized and partially stabilized desert dunes. The important Essential Ecological Processes, including wind corridors and sand sources, would be protected under the Plan.

Conservation of at least 348 acres, or 77%, of stabilized and partially stabilized desert dunes will ensure that this natural community is sustained within the Plan Area.

10.2.2.4 Natural Community Account: Background

Description. These are sand dune accumulations that are stabilized or partially stabilized by evergreen and/or deciduous shrubs, scattered low annuals, and perennial grasses. Stabilized and partially stabilized desert dunes are characterized by prominent dune features, with consistent cover of vegetation. This community may intergrade with active desert dunes in windier sites, and with stabilized and partially stabilized desert sand fields, or sandier phases of creosote bush scrub. This community includes perennial plant species typical of a creosote bush scrub matrix, with perennial shrub species including creosote bush, four-wing saltbush, California croton, and indigo bush. However, the dune characteristics are the defining feature. The total cover of vegetation increases as the dunes are progressively stabilized. Stabilization varies based on input of sand, rainfall, which influences vegetative cover, and other factors. There are approximately 418 acres in the Plan Area, mostly in the vicinity of Willow Hole.

Distribution within the Coachella Valley. Within the MSHCP Reserve System, stabilized and partially stabilized desert dunes occur in one of the Conservation Areas:

1. Willow Hole Conservation Area

Comparison with *Manual of California Vegetation*. Ultimately, the Plan will use the vegetation classification system in the MCV (Sawyer and Keeler-Wolf 1995). The natural community described by the Holland system as stabilized and partially stabilized desert dunes would be a part of the following MCV series:

1. Desert sand - verbena series

Associated Covered Species. Covered Species associated with stabilized and partially stabilized desert dunes are the flat-tailed horned lizard, Coachella Valley fringe-toed lizard, Coachella Valley giant sand-treader cricket, Coachella Valley Jerusalem cricket, Coachella Valley round-tailed ground squirrel, Palm Springs pocket mouse, and Coachella Valley milkvetch. Le Conte's thrasher may also be associated with this natural community.

Essential Ecological Processes. The Essential Ecological Processes that are significant to the maintenance of stabilized and partially stabilized desert dunes include sand source and sand transport systems. The hydrological regimes are an important part of the sand transport systems that move sand via fluvial processes to the dune areas. Annual rainfall provides the water necessary for vegetation to develop and stabilize these dunes. Fluctuations in rainfall contribute to varying degrees of stabilization.

10.2.3 Active Desert Sand Fields

10.2.3.1 Natural Community Conservation Goals and Objectives

Conserve and manage occurrences of this natural community within the MSHCP Reserve System according to the following criteria:

Goal 1: Conserve natural community occurrences representative of the range of environmental conditions within which the community is known to occur. Incorporate a range of environmental gradients (e.g. slope, elevation, aspect) and high Habitat diversity.

Objective 1. Ensure Conservation of this natural community within the following Conservation Areas:

- Whitewater Floodplain Conservation Area
- Willow Hole Conservation Area
- Edom Hill Conservation Area
- Thousand Palms Conservation Area

Please refer to Section 4.3 and Table 10-4 for specific acreages to be protected by this Conservation Objective.

Goal 2: Protect Essential Ecological Processes, including sand source/transport systems, necessary to maintain this natural community.

Objective 2. Ensure protection of Essential Ecological Process areas through Conservation Area Conservation Objectives for Essential Ecological Processes.

Table 10-4: Summary of Natural Community within Conservation Areas: Active Desert Sand Fields

CONSERVATION AREA	***Land within the Conservation Areas***				
	Total Acres of Natural Community in Conservation Area	*Total Acres Subject to Impacts*	*Acres within Existing Conservation Lands*	*Remaining Acres to be Conserved*	*Total Acres to be Conserved in MSHCP Reserve System*
WHITEWATER FLOODPLAIN	485	49	1	435	436
WILLOW HOLE	37	4	0	33	33
EDOM HILL	73	4	32	37	69
THOUSAND PALMS	3,543	91	2,632	820	3,452
TOTAL	**4,138**	**148**	**2,665**	**1,325**	**3,990**

Goal 3: Ensure Conservation of Habitat quality through protection, monitoring and Adaptive Management, and restoration where necessary, to contribute to maintenance of this community within Conservation Areas.

Objective 3. Implement biological monitoring and Adaptive Management actions to ensure Conservation of this natural community.

10.2.3.2 Threats, Limiting Factors, and Adaptive Management

Threats to this natural community include interruption of Essential Ecological Processes, notably the sand source and sand transport system by barriers such as roads, buildings, and vegetation. Fragmentation of active desert sand fields by roads results in alteration of Essential Ecological Processes and may increase the likelihood of invasive plant species becoming established. Active desert sand fields may also be threatened by invasive, non-native plants that can stabilize sand. Active desert sand fields are similar to active desert dunes in that natural fluctuations that result in variable input of sand and vegetation stabilization are part of this dynamic system. Periods of above average rainfall promote the growth of plants that ultimately stabilize the active desert sand fields. At the opposite end of the spectrum, a prolonged drought period without large storm events results in a decline in the delivery of sand to the active sand field areas. The effects of these natural stressors will ultimately be reversed as periods of below average rainfall or large storm events occur. Nevertheless, these natural stressors will impact the species that inhabit active desert sand fields.

The following actions may be needed to ensure this natural community is sustained if biological monitoring indicates that such actions are warranted. This list is not comprehensive but identifies some of the known or likely threats to active desert sand fields. In addition to conserving active desert sand fields, the Plan will integrate biological monitoring and management actions into a Management and Monitoring Program for this natural community. The Monitoring Program will be designed to provide feedback so that management activities can be adjusted to maximize natural community Conservation. More detailed and specific information on the biological monitoring and management actions described here and proposed for this natural community can be found in Section 8.0, MSHCP Reserve Management and Monitoring Program. Actions may include:

1. Control and manage activities that degrade active desert sand fields. In particular, control and manage the primary threats to the sand community, including OHVs and factors that contribute to the loss or stabilization of active fields.
2. Identify actions to reduce impacts from, and control where feasible, invasive species if it is determined from monitoring results that there are impacts to the active desert sand field community.
3. Implement monitoring to track, and ultimately distinguish between, changes due to human or natural causes. Significant variables may include sand compaction, native ant numbers, live perennial shrub abundance, and invasive exotic plant abundance.
4. Restore and enhance degraded active desert sand fields as necessary according to results from biological monitoring.

10.2.3.3 Natural Community Conservation Analysis

Conservation Area Reserve Design. The proposed Conservation Areas in the MSHCP Reserve System include stands of this natural community judged by the Planning Team to be likely to be sustained long-term. This determination was based on the presence of a relatively intact natural community, the absence of fragmentation impacts, and the presence of intact Essential Ecological Processes necessary to maintain this community. To the extent they occur, contiguous stands of this natural community were selected when available. Also, to the extent possible, the Planning Team attempted to include a range of environmental gradients (e.g. slope, elevation, aspect) within which this natural community occurs. Natural disturbance from aeolian and fluvial processes (wind and flooding) are essential to the long-term maintenance of this natural community.

The Conservation Areas accomplish this goal by securing the long-term sand transport-delivery systems that are Essential Ecological Processes for active desert sand fields.

Active desert sand fields occur within the Plan Area in four Conservation Areas, Whitewater Floodplain, Willow Hole, Edom Hill, and Thousand Palms. At the present time, the

sand transport corridors for these Conservation Areas are unprotected; the MSHCP Reserve System would protect these areas. The presence of active desert sand fields within each of the Conservation Areas evaluated is shown in Table 10-4. The Planning Team identified and assessed Conservation for this natural community in the following Conservation Areas:

1. ***Whitewater Floodplain.*** There are approximately 485 acres of active desert sand fields mapped in this Conservation Area. Approximately 436 acres of this natural community will be conserved in this Conservation Area. The active desert sand fields within the Whitewater Floodplain Conservation Area are maintained via a sand transport system from the San Gorgonio and Whitewater Rivers. The MSHCP Reserve System will conserve these sand transport and delivery systems.
2. ***Willow Hole.*** Active desert sand fields occur on approximately 37 acres within the Willow Hole Conservation Area. The Plan will ensure that at least 33 of these acres will be conserved. This natural community includes the Stebbins Dune area along the northern slope of Flat Top Mountain. The Essential Ecological Processes, notably the sand transport system, that maintain this aeolian system will also be conserved in the Mission Creek and Big Morongo Wash drainages. OHV activity in this dune area is high and will need to be controlled.
3. ***Edom Hill.*** There are approximately 73 acres of active desert sand fields mapped in this Conservation Area. The Plan will ensure that approximately 69 of these acres in this Conservation Area are conserved. The active desert sand fields here primarily occur as isolated patches of active sand Habitat scattered in the Indio Hills.
4. ***Thousand Palms.*** There are approximately 3,543 acres of active desert sand fields mapped in this Conservation Area. The Plan will ensure that approximately 3,452 of these acres are conserved. Most of the extensive sandy areas on the Thousand Palms Preserve are classified as active desert sand fields. The Plan will also ensure Conservation of the sand source areas to the west and north that provide sand to the active desert sand fields on the Thousand Palms Preserve. The Management and Monitoring Programs will assess the extent to which the active desert sand fields within the Thousand Palms Conservation Area may be more susceptible to stabilizing factors than similar dune areas to the west. In the central and eastern areas of the Coachella Valley, sand delivery systems, including large-scale storm events, are more compromised by roads and barriers to wind.

Conservation and Disturbance Levels. The MSHCP Reserve System would provide protection of active desert sand fields in four Conservation Areas identified by the SAC and the Planning Team: Whitewater Floodplain, Willow Hole, Edom Hill, and Thousand Palms Conservation Areas. In addition to conserving currently unprotected Habitat, the Plan benefits this natural community by securing the long-term sand transport-delivery systems necessary to maintain active desert sand fields. The important Essential Ecological Processes, including wind

corridors and sand sources, would be protected under the Plan. The only area not proposed for protection that is mapped as active desert sand fields is located east of Date Palm Drive and south of Varner Road near Edom Hill. Much of the land within this area is owned by the Agua Caliente Band of Cahuilla Indians and is not a part of this Plan.

Conservation of 3,990 acres, or 72%, of active desert sand fields will ensure that this natural community is sustained within the Plan Area.

10.2.3.4 Natural Community Account: Background

Description. These sand fields are areas of active sand movement, with little or no vegetation, where accumulated sand is not of sufficient depth to form classic formations that characterize dune systems. The distinction between this community and active desert sand dunes is the absence in sand fields of prominent dune landforms. Sand fields may intergrade with active dunes, and stabilized and partially stabilized dunes and sand fields. They may be characterized by hummocks of sand forming behind individual shrubs or clumps of vegetation. Vegetation varies from scant cover of widely scattered shrubs and annual wildflowers to denser shrub cover. This community occurs within a creosote bush scrub matrix. Typical species include four wing saltbush, creosote bush, and indigo bush. Approximately 5,484 acres occur in the Plan Area. Many of these sand fields were probably once dune formations prior to fragmentation and interruption of wind corridors.

Distribution within the Coachella Valley. Within the MSHCP Reserve System, active desert sand fields occur in four of the Conservation Areas:

1. Whitewater Floodplain Conservation Area
2. Willow Hole Conservation Area
3. Edom Hill Conservation Area
4. Thousand Palms Conservation Area

Comparison with *Manual of California Vegetation*. Ultimately, the Plan will use the vegetation classification system in the MCV (Sawyer and Keeler-Wolf 1995). The natural community described by the Holland system as active desert sand fields would be a part of the following MCV series:

1. Desert sand - verbena series

Associated Covered Species. Covered Species associated with active desert sand fields are the flat-tailed horned lizard, Coachella Valley fringe-toed lizard, Coachella Valley giant sand-treader cricket, Coachella Valley Jerusalem cricket, Coachella Valley round-tailed ground squirrel, Palm Springs pocket mouse, and Coachella Valley milkvetch. Le Conte's thrasher may also be associated with this natural community.

Essential Ecological Processes. The Essential Ecological Processes that are significant to the maintenance of active desert sand fields include sand source and sand transport systems. The hydrological regimes are an important part of the sand transport systems that move sand via fluvial processes to the sand field areas. Wind corridors must also be maintained to allow aeolian processes to continue.

10.2.4 Ephemeral Desert Sand Fields

10.2.4.1 Natural Community Conservation Goals and Objectives

Conserve and manage occurrences of this natural community within the MSHCP Reserve System according to the following criteria:

Goal 1: Conserve natural community occurrences representative of the range of environmental conditions within which the community is known to occur. Incorporate a range of environmental gradients (e.g. slope, elevation, aspect) and high Habitat diversity.

Objective 1. Ensure Conservation of this natural community within the following Conservation Areas:

- Snow Creek/Windy Point Conservation Area
- Whitewater Floodplain Conservation Area
- Willow Hole Conservation Area
- Santa Rosa and San Jacinto Mountains Conservation Area
  (*note: the SRSJM Conservation Area does not include a specific acre Conservation Objective for ephemeral desert sand fields but these acres will be conserved by other Conservation Objectives)*

Please refer to Section 4.3 and Table 10-5 for specific acreages to be protected by this Conservation Objective.

Goal 2: Protect Essential Ecological Processes, including sand source/transport systems, necessary to maintain ephemeral desert sand fields.

Objective 2. Ensure protection of Essential Ecological Process areas through Conservation Area Conservation Objectives for Essential Ecological Processes.

Goal 3: Ensure Conservation of Habitat quality through protection, monitoring and Adaptive Management, and restoration where necessary, to contribute to maintenance of this community within Conservation Areas.

Objective 3: Implement biological monitoring and Adaptive Management actions to ensure Conservation of this natural community.

Table 10-5: Summary of Natural Community within Conservation Areas: Ephemeral Desert Sand Fields

	Land within the Conservation Areas				
CONSERVATION AREA	***Total Acres of Natural Community in Conservation Area***	***Total Acres Subject to Impacts***	***Acres within Existing Conservation Lands***	***Remaining Acres to be Conserved***	***Total Acres to be Conserved in MSHCP Reserve System***
SNOW CREEK/ WINDY POINT	1,148	113	16	1,019	1,035
WHITEWATER FLOODPLAIN	2,959	138	1,584	1,237	2,821
WILLOW HOLE	1,133	101	126	906	1,032
SANTA ROSA & SAN JACINTO MOUNTAINS	38	2	22	14	36
TOTAL	**5,278**	**354**	**1,748**	**3,176**	**4,924**

10.2.4.2 Threats, Limiting Factors, and Adaptive Management

The input of new sand to the system is a critical feature for this natural community in that high wind velocities in the areas where this natural community occurs can deplete ephemeral sand field areas. One of the key stressors for ephemeral desert sand fields is at least in part a result of natural phenomena. Periods of prolonged drought without large storm events result in a decline in the delivery of sand to these sand field areas. The ephemeral desert sand fields will develop again as large storm events occur. These natural stressors will nevertheless have impacts on the species that inhabit ephemeral desert sand fields. Fragmentation by roads results in alteration to the Essential Ecological Processes that maintain these sand fields and may increase the likelihood of invasive plant species becoming established. Likewise, barriers such as roads, buildings, and planted vegetation (e.g. tree rows) interrupt the sand source and sand transport systems. The extent to which ephemeral desert sand fields may also be threatened by invasive, non-native plants that can stabilize sand is not fully understood and should be evaluated.

The following actions may be needed to ensure this natural community is sustained if biological monitoring indicates that such actions are warranted. This list is not comprehensive but identifies some of the known or likely threats to ephemeral desert sand fields. In addition to conserving ephemeral desert sand fields, the Plan will integrate biological monitoring and management actions into the Management and Monitoring Programs for this natural community. The Monitoring Program will be designed to provide feedback so that management activities can be adjusted to maximize natural community Conservation. More detailed and specific information on the biological monitoring and management actions described here and proposed for this natural community can be found in Section 8.0, MSHCP Reserve Management and Monitoring Program. Actions may include:

1. Control and manage activities that degrade ephemeral desert sand fields. In particular, control and manage the primary threats to the sand community, including loss of sand deposition in upwind areas and other factors that contribute to the loss or stabilization of these sand fields.
2. Identify actions to reduce impacts from, and control where feasible, invasive species if it is determined from monitoring results that there are impacts to the ephemeral desert sand field community.
3. Implement monitoring to track, and ultimately distinguish between, changes due to human or natural causes. Significant variables may include sand compaction, native ant numbers, live perennial shrub abundance, and invasive exotic plant abundance.
4. Restore and enhance degraded ephemeral desert sand fields as necessary according to results from biological monitoring.

10.2.4.3 Natural Community Conservation Analysis

Conservation Area Reserve Design. The Conservation Areas in the MSHCP Reserve System include occurrences of this natural community judged by the Planning Team to be likely to be sustained long-term. This determination was based on the presence of a relatively intact natural community, the absence of fragmentation impacts, and the presence of intact Essential Ecological Processes necessary to maintain this community. To the extent they occur, contiguous stands of this natural community were selected when available. Also, to the extent possible, the Planning Team attempted to include a range of environmental gradients (e.g. slope, elevation, aspect) within which this natural community occurs. Natural disturbance from aeolian and fluvial processes (wind and flooding) are essential to the long-term maintenance of ephemeral desert sand fields. The Conservation Areas accomplish this goal by securing the long-term sand transport-delivery systems that are Essential Ecological Processes for ephemeral desert sand fields.

The occurrence of ephemeral desert sand fields is limited to the western end of the Plan Area where high wind velocities result in loss of sand from the system. Ephemeral desert sand

fields occur in four Conservation Areas: Snow Creek/Windy Point, Whitewater Floodplain, Willow Hole, and Santa Rosa and San Jacinto Mountains Conservation Areas. At the present time, the sand transport corridors for the Snow Creek area, the Whitewater Floodplain, and the Willow Hole area are unprotected; the MSHCP Reserve System would protect these areas. The presence of ephemeral desert sand fields within each of the Conservation Areas is shown in Table 10-5. The Planning Team identified and assessed Conservation for this natural community in the following Conservation Areas:

1. ***Snow Creek/Windy Point***. There are approximately 1,148 acres of ephemeral desert sand fields mapped in this Conservation Area. The Plan will ensure Conservation of approximately 1,035 of these acres. The ephemeral desert sand fields at Snow Creek receive sand deposited from the San Gorgonio River. The MSHCP Reserve System will conserve this sand transport and delivery system. OHV activity in this dune area is very high and will need to be controlled.

2. ***Whitewater Floodplain.*** There are approximately 2,959 acres of ephemeral desert sand fields mapped in this Conservation Area. Approximately 2,821 acres will be conserved in this Conservation Area as a result of the Plan. Much of the sand Habitat in the Whitewater Floodplain Conservation Area is classified as ephemeral desert sand fields. These sand fields are maintained via a sand transport system from the San Gorgonio and Whitewater Rivers. The MSHCP Reserve System will conserve these sand transport and delivery systems.

3. ***Willow Hole***. Ephemeral desert sand fields occur on approximately 1,133 acres within the Willow Hole Conservation Area. Approximately 1,032 of these acres will be conserved under the Plan. This natural community occurs primarily west of Palm Drive in the vicinity of the San Andreas Fault dunes. The Essential Ecological Processes, notably the sand transport system, that maintain this aeolian system will also be conserved in the Mission Creek and Big Morongo Wash drainages.

4. ***Santa Rosa and San Jacinto Mountains.*** A portion of the ephemeral desert sand fields in the Snow Creek area fall within the Santa Rosa and San Jacinto Mountains Conservation Area. This Conservation Area boundary is based on the Essential Habitat line for Peninsular bighorn sheep, which includes some of the sand fields. The total acreage of ephemeral desert sand fields within this Conservation Area is approximately 38 acres. There is no specific Conservation Objective for this natural community. However, at least 36 of the acres are conserved as the result of a Conservation Objective for Palm Springs pocket mouse.

Conservation and Disturbance Levels. The MSHCP Reserve System would provide protection of ephemeral desert sand fields in four Conservation Areas identified by the SAC and the Planning Team: Snow Creek/Windy Point, Whitewater Floodplain, Willow Hole, and Santa Rosa and San Jacinto Mountains Conservation Areas. In addition to conserving currently unprotected Habitat, the Plan benefits this natural community by securing the long-term sand

transport-delivery systems necessary to maintain ephemeral desert sand fields. The important Essential Ecological Processes, including wind corridors and sand sources, would be protected under the Plan.

Conservation of 4,924 acres, or 86%, of stabilized ephemeral desert sand fields will ensure that this natural community is sustained within the Plan Area.

10.2.4.4 Natural Community Account: Background

Description. These are desert sand accumulations lacking dune formations and characterized by irregular deposition of sand materials such that sand accumulations are regularly blown off the Habitat area. This sand may not be replaced until additional sand is deposited by a major flood event or other movement process. This community occurs primarily at the western end of the Plan Area where wind speeds are consistently at or above 15 mph and sands are routinely blown away. This community occurs in areas where exposure to consistent winds tends to reduce vegetation cover. This community occurs within a Sonoran creosote bush scrub matrix. Perennial shrubs are generally widely scattered and include creosote bush, indigo bush, desert willow (*Chilopsis linearis*), and California croton. There are approximately 5,745 acres of this community in the Plan Area, primarily at the west end of the valley from the Snow Creek area to the Whitewater Floodplain Preserve where the constant high winds remove sand accumulations.

Distribution within the Coachella Valley. Within the MSHCP Reserve System, ephemeral desert sand fields occur in four of the Conservation Areas:

1. Snow Creek/Windy Point Conservation Area
2. Whitewater Floodplain Conservation Area
3. Willow Hole Conservation Area
4. Santa Rosa and San Jacinto Mountains Conservation Area

Comparison with *Manual of California Vegetation*. Ultimately, the Plan will use the vegetation classification system in the MCV (Sawyer and Keeler-Wolf 1995). The ephemeral desert sand fields natural community was developed by the Planning Team using the Holland (1986) numbering system. Ephemeral desert dunes would be a part of the following MCV series:

1. Desert sand - verbena series

Associated Covered Species. Covered Species associated with ephemeral desert sand fields are the flat-tailed horned lizard, Coachella Valley fringe-toed lizard, Coachella Valley giant sand-treader cricket, Coachella Valley Jerusalem cricket, Coachella Valley round-tailed ground squirrel, Palm Springs pocket mouse, and Coachella Valley milkvetch. Le Conte's thrasher may also be associated with this natural community.

Essential Ecological Processes. The Essential Ecological Processes that are significant to the maintenance of ephemeral desert sand fields include sand source and sand transport systems. The hydrological regimes are an important part of the sand transport systems that move sand via fluvial processes to the dune areas. Large-scale storm events are a key factor in the maintenance of these sand fields.

10.2.5 Stabilized and Partially Stabilized Desert Sand Fields

10.2.5.1 Natural Community Conservation Goals and Objectives

Conserve and manage occurrences of this natural community within the MSHCP Reserve System according to the following criteria:

Goal 1: Conserve natural community occurrences representative of the range of environmental conditions within which the community is known to occur. Incorporate a range of environmental gradients (e.g. slope, elevation, aspect) and high Habitat diversity.

Objective 1. Ensure Conservation of this natural community within the following Conservation Areas:

- Snow Creek/Windy Point Conservation Area
- Whitewater Floodplain Conservation Area
- Willow Hole Conservation Area
- Edom Hill Conservation Area
- East Indio Hills Conservation Area
- Santa Rosa and San Jacinto Mountains Conservation Area

Please refer to Section 4.3 and Table 10-6 for specific acreages to be protected by this Conservation Objective.

Goal 2: Protect Essential Ecological Processes, including sand source/transport systems, necessary to maintain this natural community.

Objective 2. Ensure protection of Essential Ecological Process areas through Conservation Area Conservation Objectives for Essential Ecological Processes.

Goal 3: Ensure Conservation of Habitat quality through protection, monitoring and Adaptive Management, and restoration where necessary, to contribute to maintenance of this community within Conservation Areas.

Objective 3. Implement biological monitoring and Adaptive Management actions to ensure Conservation of this natural community.

Table 10-6: Summary of Natural Community within Conservation Areas: Stabilized and Partially Stabilized Desert Sand Fields

CONSERVATION AREA	*Land within the Conservation Areas*				
	Total Acres of Natural Community in Conservation Area	*Total Acres Subject to Impacts*	*Acres within Existing Conservation Lands*	*Remaining Acres to be Conserved*	*Total Acres to be Conserved in MSHCP Reserve System*
SNOW CREEK/ WINDY POINT	157	10	54	93	147
WHITEWATER FLOODPLAIN	582	45	139	398	537
WILLOW HOLE	201	20	2	179	181
EDOM HILL	47	2	25	20	45
EAST INDIO HILLS	331	33	3	295	298
SANTA ROSA AND SAN JACINTO MOUNTAINS	20	2	0	18	18
TOTAL	**1,338**	**112**	**223**	**1,003**	**1,226**

10.2.5.2 Threats, Limiting Factors, and Adaptive Management

Threats to this natural community include interruption of Essential Ecological Processes, notably the sand source and sand transport system by barriers such as roads, buildings, and vegetation. Fragmentation of stabilized and partially stabilized desert sand fields by roads results in alteration to these ecological processes and may increase the likelihood of invasive plant species becoming established. Stabilized and partially stabilized desert sand fields may be particularly susceptible to invasive, non-native plants that might further stabilize sand.

The following actions may be needed to ensure this natural community is sustained if biological monitoring indicates that such actions are warranted. This list is not comprehensive but identifies some of the known or likely threats to stabilized and partially stabilized desert sand fields. In addition to conserving the stabilized and partially stabilized desert sand fields natural community, the Plan will integrate biological monitoring and management actions into a

Management and Monitoring Program for this natural community. The Monitoring Program will be designed to provide feedback so that management activities can be adjusted to maximize natural community Conservation. More detailed and specific information on the biological monitoring and management actions described here and proposed for this natural community can be found in Section 8.0, MSHCP Reserve Management and Monitoring Program. Actions may include:

1. Control and manage activities that degrade stabilized and partially stabilized desert sand fields.
2. Identify actions to reduce impacts from, and control where feasible, invasive species if it is determined from monitoring results that there are impacts to the stabilized and partially stabilized desert sand field natural community.
3. Implement monitoring to track, and ultimately distinguish between, changes due to human or natural causes. Significant variables may include sand compaction, native ant numbers, live perennial shrub abundance, and invasive exotic plant abundance.
4. Restore and enhance degraded stabilized and partially stabilized desert sand fields as necessary according to results from biological monitoring.

10.2.5.3 Natural Community Conservation Analysis

Conservation Area Reserve Design. The proposed Conservation Areas in the MSHCP Reserve System include stands of this natural community judged by the Planning Team to be likely to be sustained long-term. This determination was based on the presence of a relatively intact natural community, the absence of fragmentation impacts, and the presence of intact Essential Ecological Processes necessary to maintain this community. To the extent they occur, contiguous stands of this natural community were selected when available. Also, to the extent possible, the Planning Team attempted to include a range of environmental gradients (e.g. slope, elevation, aspect) within which this natural community occurs. Natural disturbance from aeolian and fluvial processes (wind and flooding) are essential to the long-term maintenance of this natural community. The Conservation Areas accomplish this goal by securing the long-term sand transport-delivery systems that are Essential Ecological Processes for stabilized and partially stabilized desert sand fields.

Stabilized and partially stabilized desert sand fields occur within the Plan Area in six Conservation Areas: Snow Creek/Windy Point, Whitewater Floodplain, Willow Hole, Edom Hill, East Indio Hills, and Santa Rosa and San Jacinto Mountains Conservation Areas. At the present time, the sand transport corridors for the Snow Creek area, Whitewater Floodplain, Willow Hole area, and Edom Hill areas are unprotected; the MSHCP Reserve System would protect these areas. The presence of stabilized and partially stabilized desert sand fields within each of the Conservation Areas is shown in Table 10-6. The Planning Team identified and assessed Conservation for this natural community in the following Conservation Areas:

1. ***Snow Creek/Windy Point.*** There are approximately 157 acres of stabilized and partially stabilized desert sand fields mapped in this Conservation Area. For this natural community, the Plan will ensure Conservation of approximately 147 acres in this Conservation Area. The stabilized and partially stabilized desert sand fields at Snow Creek occur west of Fingal's Finger and is maintained via a sand transport system from the San Gorgonio River. The MSHCP Reserve System will conserve this sand transport and delivery system. OHV activity in this dune area is moderate and will need to be controlled.

2. ***Whitewater Floodplain.*** There are approximately 582 acres of stabilized and partially stabilized desert sand fields mapped in this Conservation Area. Approximately 537 acres of this natural community will be protected under the Plan. Stabilized and partially stabilized desert sand fields within the Whitewater Floodplain Conservation Area occur along the southern boundary, south of the recharge ponds. These sand fields are maintained via a sand transport system from the San Gorgonio and Whitewater Rivers. The MSHCP Reserve System will conserve these sand transport and delivery systems.

3. ***Willow Hole.*** Stabilized and partially stabilized desert sand fields occur on approximately 201 acres within the Willow Hole Conservation Area, of which approximately 181 acres will be conserved. The Essential Ecological Processes, notably the sand transport system, that maintain this aeolian system will also be conserved in the Mission Creek and Big Morongo Wash drainages.

4. ***Edom Hill.*** Scattered patches of stabilized and partially stabilized desert sand fields occur on the southern slopes of Edom Hill for a total of 47 acres within this Conservation Area. The Plan ensures that approximately 45 acres of stabilized and partially stabilized desert sand fields will be protected.

5. ***East Indio Hills.*** There are approximately 331 acres of stabilized and partially stabilized desert sand fields mapped in this Conservation Area. Approximately 298 acres of this natural community will be protected under the Plan. Protection of the Essential Ecological Processes, including the sand source and sand transport system, is not certain within this Conservation Area. OHV activity in this dune area is very high and will need to be controlled. Areas adjacent to the mapped occurrence of these stabilized and partially stabilized desert sand fields at the east end of the Indio Hills are currently undergoing Development.

6. ***Santa Rosa and San Jacinto Mountains.*** A very small portion, only approximately 20 acres, of the stabilized and partially stabilized desert sand fields in the Snow Creek area fall within the Santa Rosa and San Jacinto Mountains Conservation Area. The Plan will ensure Conservation of at least 18 of these acres as a result of a Conservation Objective for Palm Springs pocket mouse. This Conservation Area boundary is based on the Essential Habitat line for Peninsular bighorn sheep.

Conservation and Disturbance Levels. The MSHCP Reserve System would provide protection of stabilized and partially stabilized desert sand fields in six Conservation Areas identified by the SAC and the Planning Team: Snow Creek/Windy Point, Whitewater Floodplain, Willow Hole, Edom Hill, East Indio Hills, and Santa Rosa and San Jacinto Mountains Conservation Areas. In addition to conserving currently unprotected Habitat, the Plan benefits this natural community by securing the long-term sand transport-delivery systems necessary to maintain these sand fields. The important Essential Ecological Processes, including wind corridors and sand sources, would be protected under the Plan. A very limited amount of this natural community could be subject to impacts in the areas adjacent to the East Indio Hills Conservation Area.

Conservation of 1,226 acres or 82% of stabilized and partially stabilized desert sand fields will ensure that this natural community is sustained and restored within the Plan Area.

10.2.5.4 Natural Community Account: Background

Description. This community consists of desert sand accumulations lacking dune formations that are stabilized by vegetation. A small patch occurs west of Fingal's Finger. The most extensive occurrence is north of Highway 111 from Windy Point to approximately Indian Avenue. Scattered patches occur in the Willow Hole and in the Edom Hill area. This is also the primary sand community at the east end of the Indio Hills. This community occurs within a creosote bush scrub matrix. Perennial plants occurring on these sand fields are the same as those listed for stabilized and partially stabilized desert dunes. Of the roughly 1,549 acres in the Plan Area, approximately 15% of this community currently occurs on public or private Existing Conservation Land.

Distribution within the Coachella Valley. Within the MSHCP Reserve System, stabilized and partially stabilized desert sand fields occur in six of the Conservation Areas:

1. Snow Creek/Windy Point Conservation Area
2. Whitewater Floodplain Conservation Area
3. Willow Hole Conservation Area
4. Edom Hill Conservation Area
5. East Indio Hills Conservation Area
6. Santa Rosa and San Jacinto Mountains Conservation Area

Comparison with *Manual of California Vegetation*. Ultimately, the Plan will use the vegetation classification system in the MCV (Sawyer and Keeler-Wolf 1995). The natural community described by the Holland system as stabilized and partially stabilized desert sand fields would be a part of the following MCV series:

1. Desert sand - verbena series

Associated Covered Species. Covered Species associated with stabilized and partially stabilized desert sand fields are the flat-tailed horned lizard, Coachella Valley fringe-toed lizard, Coachella Valley giant sand-treader cricket, Coachella Valley Jerusalem cricket, Coachella Valley round-tailed ground squirrel, Palm Springs pocket mouse, and Coachella Valley milkvetch. Le Conte's thrasher and burrowing owl may also be associated with this natural community.

Essential Ecological Processes. The Essential Ecological Processes that are significant to the maintenance of stabilized and partially stabilized desert sand fields include sand source and sand transport systems. The hydrological regimes are an important part of the sand transport systems that move sand via fluvial processes to the dune areas.

10.2.6 Stabilized Shielded Desert Sand Fields

10.2.6.1 Natural Community Conservation Goals and Objectives

Conserve and manage occurrences of this natural community within the MSHCP Reserve System according to the following criteria:

Goal 1: Conserve natural community occurrences representative of the range of environmental conditions within which the community is known to occur. Incorporate a range of environmental gradients (e.g. slope, elevation, aspect) and high Habitat diversity.

Objective 1. Ensure Conservation of this natural community within the following Conservation Areas:

- Whitewater Floodplain Conservation Area
- East Indio Hills Conservation Area
- Santa Rosa and San Jacinto Mountains Conservation Area

Please refer to Section 4.3 and Table 10-7 for specific acreages to be protected by this Conservation Objective.

Goal 2: Protect Essential Ecological Processes, including sand source/transport systems, necessary to maintain this natural community.

Objective 2. Ensure protection of Essential Ecological Process areas through Conservation Area Conservation Objectives for Essential Ecological Processes.

Please refer to Section 4.3 and Table 10-7 for specific acreages to be protected by this Conservation Objective.

Table 10-7: Summary of Natural Community within Conservation Areas: Stabilized Shielded Desert Sand Fields

CONSERVATION AREA	*Land within the Conservation Areas*				
	Total Acres of Natural Community in Conservation Area	*Total Acres Subject to Impacts*	*Acres within Existing Conservation Lands*	*Remaining Acres to be Conserved*	*Total Acres to be Conserved in MSHCP Reserve System*
WHITEWATER FLOODPLAIN	1,591	79	806	707	1,513
EAST INDIO HILLS	515	39	120	356	476
SANTA ROSA AND SAN JACINTO MOUNTAINS	7	1	0	6	6
TOTAL	**2,113**	**119**	**926**	**1,069**	**1,995**

Goal 3: Ensure Conservation of Habitat quality through protection, monitoring and Adaptive Management, and restoration where necessary, to contribute to maintenance of this community within Conservation Areas.

Objective 3. Implement biological monitoring and Adaptive Management actions to ensure Conservation of this natural community.

10.2.6.2 Threats, Limiting Factors, and Adaptive Management

Stabilized shielded desert sand fields are already compromised by blockage or shielding of the sand source and sand transport systems by barriers such as roads, buildings, and vegetation. Fragmentation of these sand fields by roads results in further shielding and alteration of the sand transport system and may increase the likelihood of invasive plant species becoming

established. The stabilized shielded desert sand fields may also be threatened by invasive, non-native plants that may further stabilize sand.

The following actions may be needed to ensure this natural community is sustained if biological monitoring indicates that such actions are warranted. This list is not comprehensive but identifies some of the known or likely threats to stabilized shielded desert sand fields. In addition to conserving the stabilized shielded desert sand fields natural community, the Plan will integrate monitoring and management actions into a Management and Monitoring Program for this natural community. Monitoring Programs will be designed to provide feedback so that management activities can be adjusted to maximize natural community Conservation. More detailed and specific information on the biological monitoring and management actions described here and proposed for this natural community can be found in Section 8.0, MSHCP Reserve Management and Monitoring Program. Actions may include:

1. Control and manage activities that degrade stabilized shielded desert sand
2. Ensure that CVWD will deposit sand removed from the groundwater recharge basins during maintenance operations so as to optimize sand transport and flow within the MSHCP Reserve System as determined by adaptive management and in consultation with the RMOC.
3. Identify actions to reduce impacts from, and control where feasible, invasive species if it is determined from monitoring results that there are impacts to the stabilized shielded desert sand fields.
4. Implement monitoring to track, and ultimately distinguish between, changes due to human or natural causes. Significant variables may include sand compaction, native ant numbers, live perennial shrub abundance, and invasive exotic plant abundance.
5. Restore and enhance degraded stabilized shielded desert sand fields as necessary according to results from biological monitoring.

10.2.6.3 Natural Community Conservation Analysis

Conservation Area Reserve Design. The proposed Conservation Areas in the MSHCP Reserve System include stands of this natural community judged by the Planning Team to be likely to persist long-term. This determination was based on the presence of a relatively intact natural community, the absence of fragmentation impacts, and the presence of intact Essential Ecological Processes necessary to maintain this community. To the extent they occur, contiguous stands of this natural community were selected when available. Also, to the extent possible, the Planning Team attempted to include a range of environmental gradients (e.g. slope, elevation, aspect) within which this natural community occurs. The long-term sand transport-delivery systems for stabilized shielded desert sand fields have been at least partially compromised in the Whitewater Floodplain Conservation Area and below the southern slopes of the Indio Hills.

The occurrence of stabilized shielded desert sand fields is limited within the Plan Area to three Conservation Areas: Whitewater Floodplain, East Indio Hills, and the Santa Rosa and San Jacinto Mountains Conservation Areas. The presence of stabilized shielded desert sand fields within each of the Conservation Areas is shown in Table 10-7. The Planning Team identified and assessed Conservation for this natural community in the following Conservation Areas:

1. ***Whitewater Floodplain.*** There are approximately 1,591 acres of stabilized shielded desert sand fields mapped in this Conservation Area. Approximately 1,513 acres of this natural community will be protected by meeting the Conservation Objectives for sand transport. The stabilized shielded desert sand fields within the Whitewater Floodplain Conservation Area occur downwind of the CVWD groundwater recharge ponds west of Indian Avenue which are in the path of the fluvial flows of the Whitewater River, and their presence has restricted flows to a narrower deposition area, which has affected the extent of suitable Habitat. The recharge ponds trap an unknown amount of sediment when water from the Colorado River Aqueduct, released into the Whitewater River approximately one mile north of I-10, flows down the river channel to the recharge ponds. As part of the Plan, CVWD will remove sands deposited within the recharge ponds and apply in the deposition area downwind of the recharge ponds.
2. ***East Indio Hills.*** Stabilized shielded desert sand fields occur on approximately 515 acres within the East Indio Hills Conservation Area. This natural community occurs primarily south of the Indio Hills in areas where the sand transport processes are shielded by Development or by the canal. The Plan will ensure the protection of approximately 476 acres of stabilized shielded desert sand fields in this Conservation Area. The Essential Ecological Processes, notably the sand transport system, may be permanently compromised.
3. ***Santa Rosa and San Jacinto Mountains.*** A small portion of the stabilized shielded desert sand fields, approximately 7 acres in total, fall within the Santa Rosa and San Jacinto Mountains Conservation Area. The Plan will ensure Conservation of at least 6 of these acres. This Conservation Area boundary is based on the Essential Habitat line for Peninsular bighorn sheep.

Conservation Levels. The MSHCP Reserve System would provide protection of stabilized shielded desert sand fields in three Conservation Areas: Whitewater Floodplain, East Indio Hills, Santa Rosa and San Jacinto Mountains Conservation Areas. The important Essential Ecological Processes, including wind corridors and sand sources, would be protected under the Plan. The Plan may also result in actions to enhance sand deposition in areas where aeolian and fluvial sand transport has been shielded. Conservation of 1,995 acres, or 15%, of stabilized shielded desert sand fields will occur within the Plan Area. Areas of this natural community where impacts to natural communities could occur are primarily in the Big Dune south of Interstate 10 where sand transport systems are entirely compromised and shielded and desert sand fields are highly fragmented.

10.2.6.4 Natural Community Account: Background

Description. This community is essentially similar to Stabilized and Partially Stabilized Desert Sand Fields except that sand source and sand transport systems, which would supply sand to the sand fields, have been interrupted or shielded. This natural community occurs west of the existing Whitewater Floodplain Preserve, adjacent to the recharge ponds, which shield this dune area. It also includes most of the remaining sand fields that make up the Big Dune south of Interstate 10, and portions of the sand fields south of the Indio Hills and east of the Thousand Palms Preserve. The long-term persistence of stabilized shielded desert sand fields is compromised by the interruption of the sand source and sand transport system. There are approximately 13,218 acres of this community in the Plan Area, of which only 7% is currently on public or private Existing Conservation Land.

Distribution within the Coachella Valley. Within the MSHCP Reserve System, stabilized shielded desert sand fields occur in three of the Conservation Areas:

1. Whitewater Floodplain Conservation Area
2. East Indio Hills Conservation Area
3. Santa Rosa and San Jacinto Mountains Conservation Area

Comparison with *Manual of California Vegetation*. Ultimately, the Plan will use the vegetation classification system in the MCV (Sawyer and Keeler-Wolf 1995). The stabilized shielded desert sand fields natural community was developed by the Planning Team using the Holland (1986) numbering system. Stabilized shielded desert sand fields would be a part of the following MCV series:

1. Desert sand - verbena series

Associated Covered Species. Covered Species associated with stabilized shielded desert sand fields are the flat-tailed horned lizard, Coachella Valley fringe-toed lizard, Coachella Valley giant sand-treader cricket, Coachella Valley Jerusalem cricket, Coachella Valley round-tailed ground squirrel, Palm Springs pocket mouse, and Coachella Valley milkvetch. Le Conte's thrasher may also be associated with this natural community.

10.2.7 Mesquite Hummocks

10.2.7.1 Natural Community Conservation Goals and Objectives

Conserve and manage occurrences of this natural community within the MSHCP Reserve System according to the following criteria:

Goal 1: Conserve natural community occurrences representative of the range of environmental conditions within which the community is known to occur. Incorporate

a range of environmental gradients (e.g. slope, elevation, aspect) and high Habitat diversity.

Objective 1a. Ensure Conservation of this natural community within the following Conservation Areas:

- Cabazon Conservation Area
- Willow Hole Conservation Area
- Thousand Palms Conservation Area
- Indio Hills Palms Conservation Area
- East Indio Hills Conservation Area
- Dos Palmas Conservation Area
- Coachella Valley Stormwater Channel and Delta Conservation Area
- Santa Rosa and San Jacinto Mountains Conservation Area

Objective 1b. Conserve the watershed for mesquite hummocks within the East Indio Hills Conservation Area.

Please refer to Section 4.3 and Table 10-8 for specific acreages to be protected by this Conservation Objective.

Table 10-8: Summary of Natural Community within Conservation Areas: Mesquite Hummocks

CONSERVATION AREA	*Land within the Conservation Areas*				
	Total Acres of Natural Community in Conservation Area	*Total Acres Subject to Impacts*[1]	*Acres within Existing Conservation Lands*	*Remaining Acres to be Conserved*	*Total Acres to be Conserved in MSHCP Reserve System*
CABAZON	13	1[2]	0	12[3]	12
WILLOW HOLE	125	11	16	98	114
THOUSAND PALMS	58	0	58	0	58
INDIO HILLS PALMS	3	1	1	1	2
EAST INDIO HILLS	43	4	0	39	39
DOS PALMAS	55	3	29	23	52
CV STORMWATER CHANNEL AND DELTA	74	7	0	67	67
SANTA ROSA AND SAN JACINTO	5	1	0	4	4

CONSERVATION AREA	Land within the Conservation Areas				
	Total Acres of Natural Community in Conservation Area	Total Acres Subject to Impacts[1]	Acres within Existing Conservation Lands	Remaining Acres to be Conserved	Total Acres to be Conserved in MSHCP Reserve System
MOUNTAINS					
TOTAL	**376**	**28**	**104**	**244**	**348**

[1] Pursuant to the avoidance, minimization and mitigation measures in Section 4.4, mesquite hummocks will be avoided to the maximum extent feasible.
[2] Disturbance of no more than one acre may occur, but it would be replaced to ensure that no net loss occurs and the Conservation Objective is achieved.
[3] This mesquite hummock area is surrounded by a fluvial sand transport area. The specific Conservation Objective for mesquite hummocks will ensure Conservation.

Goal 2: Protect Essential Ecological Processes, including hydrological regimes, necessary to maintain this natural community.

Objective 2. Ensure protection of Essential Ecological Process areas through Conservation Area Conservation Objectives for Essential Ecological Processes.

Goal 3: Ensure Conservation of Habitat quality through protection, monitoring and Adaptive Management, and restoration where necessary, to contribute to maintenance of this community within Conservation Areas.

Objective 3a. Implement biological monitoring and Adaptive Management actions to ensure Conservation of this natural community.

A mesquite hummock area in the East Indio Hills Conservation Area has a specific Conservation Objective (See Section 4.3.15). The Conservation Objective requires that, consistent with the research program described in Section 8.4.1.2, 80 acres of mesquite hummocks will be restored if 80% of the mesquite hummocks natural community in the south half of Section 17, T5S, R8E, is not conserved under the Plan. If the 80% is conserved, the Conservation Objective shall be to restore 40 acres of mesquite hummocks.

10.2.7.2 Threats, Limiting Factors, and Adaptive Management

Threats to this natural community include depletion of the groundwater and fragmentation. Depletion of ground water reduces water available to individual mesquite plants, even with their long tap roots. Lack of available water is evident in various mesquite hummock areas in the Coachella Valley by decadent and declining mesquite. Fragmentation of mesquite

hummocks has already occurred as a result of roads, residential Development, and agriculture. Because these mesquite hummocks occur in small patches naturally, they are more susceptible to fragmentation and associated edge effects. For example, in some areas mesquite hummocks persist completely surrounded by residential and/or agricultural Development. These mesquite hummock areas are impacted by disturbance, increased predation of resident species by domestic animals, and other edge effects.

The following actions may be needed to ensure that mesquite hummocks are sustained if biological monitoring indicates that such actions are warranted. This list is not comprehensive but identifies some of the known or likely threats to mesquite hummocks. In addition to conserving the mesquite hummocks natural community, the Plan will integrate a Monitoring and Management Program for this natural community. Monitoring Programs will be designed to provide feedback so that management activities can be adjusted to maximize natural community Conservation. More detailed and specific information on the biological monitoring and management actions described here and proposed for this natural community can be found in Section 8.0, MSHCP Reserve Management and Monitoring Program. Actions may include:

1. Monitor the hydrological regimes that support mesquite hummocks. Monitor groundwater level relative to maintenance of mesquite hummocks as part of the Management and Monitoring Program. This effort could involve determination of the level of existing groundwater monitoring by water districts and other entities. See Section 6.8.3.4 on Changed Circumstances for additional information.
2. Identify actions to reduce impacts from, and control where feasible, invasive species if it is determined from monitoring results that there are impacts to the mesquite hummocks.
3. Implement monitoring to track, and ultimately distinguish between, changes due to human or natural causes. Significant variables may include groundwater levels, live perennial shrub abundance, and invasive weed abundance.
4. As part of the Management and Monitoring Program, establish a research element that evaluates the potential for a mesquite hummocks restoration strategy. This may include restoration of mesquite hummocks if research and monitoring results indicate restoration is warranted. A preliminary discussion of a mesquite hummocks restoration strategy, including draft criteria, is included in the MSHCP Reserve System Management and Monitoring Program in Section 8.0.
5. Implement monitoring to track the recruitment of young mesquite plants into the mesquite hummock natural community in the Conservation Areas identified in Goal 1 (Section 10.2.7.1) and where recruitment is not occurring at a level needed to meet the Conservation Area's acreage goal, implement Adaptive Management measures to achieve a recruitment level needed to sustain the mesquite natural community.

10.2.7.3 Natural Community Conservation Analysis

Conservation Area Configuration Issues. The Planning Team selected those stands of mesquite hummocks judged to be likely to be sustained long-term. The determination of potential long-term persistence was based on the presence of a relatively intact natural community, the relative absence of fragmentation, and the presence of intact Essential Ecological Processes necessary to maintain this community. To the extent they occur, contiguous stands of this natural community were selected when available. Also, to the extent possible, the Planning Team attempted to include a range of environmental gradients (e.g. slope, elevation, aspect) within which this natural community occurs. Mesquite hummocks are widely scattered in the Plan Area, often in isolated patches associated with higher groundwater levels. The determination by the Planning Team of where to include mesquite hummocks in proposed Conservation Areas was made more difficult by the highly fragmented distribution of the remnants of this natural community. Those mesquite hummock areas included in the MSHCP Reserve System are those that are relatively unfragmented and free of disturbance. Available groundwater is essential to the long-term maintenance of this natural community; however, evaluating impacts to persistence of mesquite hummocks from groundwater depletion is difficult. The Conservation Areas will secure the hydrological regimes and intact watersheds that are Essential Ecological Processes for mesquite hummocks.

In the Coachella Valley, mesquite hummocks occupied about 8,300 acres in 1939 but were reduced to less than 1,000 acres by 1998 (Coachella Valley Mountains Conservancy, 2003). Most of the mesquite hummocks were present along the Banning and San Andreas Faults where ground-water levels historically have been within about 50 feet of land surface.

The occurrence of mesquite hummocks is limited within the Plan Area to locations with high groundwater in eight of the Conservation Areas: Cabazon, Willow Hole, Thousand Palms, Indio Hills Palms, East Indio Hills, Dos Palmas, Coachella Valley Stormwater Channel and Delta, and Santa Rosa and San Jacinto Mountains. The presence of mesquite hummocks within each of the Conservation Areas is shown in Table 10-8. The Planning Team identified and assessed the Conservation for this natural community in the following Conservation Areas:

1. ***Cabazon.*** This Conservation Area includes approximately 13 acres of mesquite hummocks. Conservation of 12 of the 13 acres of the mesquite hummocks natural community is ensured by the Plan. Mesquite hummocks occur south of Cabazon near the base of the San Jacinto Mountains. The primary means for achieving Conservation of the surrounding fluvial sand transport areas in this Conservation Area is through compliance with Riverside County General Plan and Area Plan policies.
2. ***Willow Hole.*** There are approximately 125 acres of mesquite hummocks mapped in this Conservation Area. The Plan will ensure that approximately 114 acres in this

Conservation Area are conserved. The Monitoring and Management Program will assess the hydrological regimes that are essential to maintenance of mesquite hummocks.

3. ***Thousand Palms.*** There are approximately 58 acres of mesquite hummocks mapped in this Conservation Area, all of which will be conserved under the Plan. The Monitoring and Management Program will assess the hydrological regimes that are essential to maintenance of mesquite hummocks.

4. ***Indio Hills Palms.*** This Conservation Area includes approximately 3 acres of mesquite hummocks. At least 2 of these acres are protected under the Plan. The mesquite hummocks occur in small patches along the base of the Indio Hills.

5. ***East Indio Hills.*** There are approximately 43 acres of mesquite hummocks mapped in this Conservation Area. The Plan will ensure that approximately 39 of these acres are conserved. The mesquite hummocks are primarily south and east of the Indio Hills. At the present time, OHV activity is severe and has degraded much of this natural community.

6. ***Dos Palmas.*** This Conservation Area includes approximately 55 acres of mesquite hummocks. Of this total acreage, the Plan will ensure that approximately 52 acres are protected. Mesquite hummocks in this area are affected by leakage from the Coachella Canal. As mitigation for the lining of the canal, the Metropolitan Water District will plant and maintain 352 acres of mesquite.

7. ***Coachella Valley Stormwater Channel and Delta.*** There are approximately 74 acres of mesquite hummocks mapped in this Conservation Area. The Plan will ensure that approximately 67 of these acres are conserved. The mesquite hummocks within this Conservation Area are scattered around the north end of the Salton Sea. The intent in this Conservation Area was to include the largest and most contiguous stands of mesquite hummocks within this area.

8. ***Santa Rosa and San Jacinto Mountains.*** The total acreage of mesquite hummocks within this Conservation Area is 5 acres. The Plan will ensure Conservation of at least 4 of these acres as a result of a Conservation Objective for Palm Springs pocket mouse.

Conservation and Disturbance Levels. The MSHCP Reserve System would provide protection of mesquite hummocks in eight Conservation Areas identified by the SAC and the Planning Team: Cabazon, Willow Hole, Thousand Palms, Indio Hills Palms, East Indio Hills, Dos Palmas, Coachella Valley Stormwater Channel and Delta, and Santa Rosa and San Jacinto Mountains Conservation Areas. In addition to conserving currently unprotected mesquite hummocks, the Plan will benefit this natural community by evaluating and maintaining groundwater levels that support this community. The important Essential Ecological Processes, including hydrological regimes, would be protected under the Plan.

Conservation of 348 acres, or 41%, of mesquite hummocks is focused on Conservation of those mesquite hummock areas that are still intact and not highly fragmented. The remaining mesquite hummock areas not included in the Conservation Areas are generally small, highly fragmented, and often isolated.

10.2.7.4 Natural Community Account: Background

Description. This community is composed of large clumps of low growing honey mesquite (*Prosopis glandulosa*) shrubs. The mesquite shrubs may form hummocks over sand dunes, such as at Willow Hole and the Thousand Palms Preserve. The hummocks also occur on level terrain, at the margins of palm oases or in the area south and east of Indio to the north end of the Salton Sea. These mesquite hummocks are typically associated with high soil moisture, often associated with fault areas or springs. This community occurs in the Plan Area at one location south of Cabazon, in the vicinity of Willow Hole, on the Thousand Palms Preserve, and along the southern base of the Indio Hills, associated with the San Andreas Fault. Mesquite hummocks also occur around the northern end of the Salton Sea and at Dos Palmas. Mesquite hummocks were formerly widespread from the dune areas of Indian Wells, La Quinta, and Indio south to the Salton Sea but are now restricted in this area to undeveloped lots amid urban or agricultural lands. Changes in soil moisture and water table declines may have reduced the occurrence of these hummocks. Unfortunately, remaining mesquite hummocks are highly fragmented and often senescent, perhaps due to lack of groundwater. Of the 945 acres in the Plan Area, only about 11% currently occur on public or private Existing Conservation Land.

Distribution within the Coachella Valley. Within the MSHCP Reserve System, mesquite hummocks occur in eight of the Conservation Areas:

1. Cabazon Conservation Area
2. Willow Hole Conservation Area
3. Thousands Palms Conservation Area
4. Indio Hills Palms Conservation Area
5. East Indio Hills Conservation Area
6. Dos Palmas Conservation Area
7. Coachella Valley Stormwater Channel and Delta Conservation Area
8. Santa Rosa and San Jacinto Mountains Conservation Area

Comparison with *Manual of California Vegetation*. Ultimately, the Plan will use the vegetation classification system in the MCV (Sawyer and Keeler-Wolf 1995). The mesquite hummocks natural community was developed by the Planning Team using the Holland (1986) numbering system. Mesquite hummocks would be a part of the following MCV series:

1. Mesquite series

Associated Covered Species. The Covered Species associated with this community are Coachella Valley round-tailed ground squirrel, Palm Springs pocket mouse, Le Conte's thrasher, and crissal thrasher. These hummocks may also be used during migration by riparian birds.

Essential Ecological Processes. The Essential Ecological Processes that are significant to the maintenance of mesquite hummocks include the hydrological regimes that relate to availability of groundwater. Protection of watersheds that contribute to this groundwater availability should also be considered.

Additional Background Information on Mesquite Hummocks. Information assembled for the EIR/EIS for this Plan (Terra Nova 2004) provides additional insight for this natural community. Mesquite hummocks are plant communities proposed for protection under the MSHCP. Mesquite hummocks have historically been found throughout the Coachella Valley. Mesquite communities have been impacted in the past several decades by the lowering of groundwater levels from pumpage associated with agriculture and urban development.

The most viable surviving mesquite hummock are currently found along the geological faulting associated with the San Andreas Fault Zone along the eastern portions of the Plan Area. Fault movement deposits clays that create barriers to the movement of groundwater. Up-gradient water pressure causes pooled groundwater to rise vertically along the fault. Mesquite is also well equipped to tap groundwater with taproots that can exceed 140 feet. The mesquite communities proposed for long-term protection under the Plan and the groundwater regimes that sustain them are briefly discussed below.

Extensive areas of mesquite communities throughout the southwestern U.S. have been eliminated by lowering the water tables (Phillips and Comus 1999). Mesquite are tolerant of adverse conditions (Bainbridge and Virginia 2002) yet relatively moderate groundwater decreases will substantially stress or kill adult mesquite individuals (Stromberg et al. 1992). The greatest influence of severe water conditions in individual plants in the short-term (such as during a natural drought) is reduced photosynthesis and reduced or precluded carbohydrate translocation (Sosebee and Wan 1989). Most large floodplain mesquites die if the water table drops below 43 feet of the ground surface (Phillips and Comus 1999). Stromberg et al. (1993) indicated that when the water table occurred below 20 feet, continual and quantifiable reduction in mesquite stature resulted. No evidence could be found indicating an effective ability of mesquite individuals to adapt to groundwater artificially lowered to more than 49 feet of the ground surface (Stromberg et al. 1992, Phillips and Comus 1999, Nabhan and Holdsworth 1998, Judd et al. 1971, Stromberg 1993, Laity 2003, Sharifi et al. 1982, Bainbridge and Virginia 2002, Sosebee and Wan 1989).

Exceptional mesquite individuals are notable for extremely deep roots of up to 160 feet (Phillips 1963, Phillips and Comus 1999). Despite the often theoretically supposed adaptability to lower groundwater of existing adult mesquite plants based on extended deep roots, no empirical data actually exist to support this theory. Sosebee and Wan (1989) indicate that the deep taproot of honey mesquite plays as significant role in water uptake only during extended droughts, not for normal transpiration functioning of the plant. The mesquite communities proposed for long term protection under the Plan and the groundwater regimes that sustain them are briefly discussed below.

Mission Creek Subbasin & Associated Mesquite Communities: The Plan proposes to protect the mesquite hummocks located within and west of Willow Hole. This largely continuous community extends well west of Palm Drive and lies along the Banning Branch of the San Andreas Fault Zone in the western part of the valley south of Desert Hot Springs. The Mission Creek Subbasin is a well-defined water-bearing aquifer bounded on the south by the Banning Fault, on the north by the Mission Creek Fault, on the north by non-water bearing rock of the San Bernardino Mountains, and on the east by the Indio Hills. The Coachella Valley Water District (CVWD), the Mission Springs Water District (MSWD) and a few independent well owners ("Minimal Pumpers") extract water from the subbasin. Estimates of subbasin capacity, water in storage and annual water balance (recharge v. withdrawals) vary widely.

The subbasin is naturally recharged by surface and subsurface discharge, most of which is from Mission Creek, and Little and Big Morongo Creeks. Water depths below the ground surface, as determined by the U.S. Geological Survey in 1971, range from a maximum of 425 feet in the northwesterly portion, to flowing wells (water at ground surface) at a minimum in a narrow strip along the Banning Fault.[1] A steady water level decline of approximately 0.5 to 1.5 feet per year has been observed since 1952.[2]

According to data collected at CVWD's Well No. 3407, located at Dillon Road and Little Morongo Drive, the subbasin water level has dropped from 760 feet above sea level in 1955 to 715 feet in 1998.[3] Alternatively, a private well located east of Mountain View Road and on the upgrade margin of Willow Hole had a water level at 5.7 feet below the surface in 2002; over the past decade the water level in this well has dropped from less than two feet below the surface, indicating that groundwater has remained at or near the surface in the eastern end of Willow Hole during a period of extended drought.[4]

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1 "Engineer's Report on Water Supply and Replenishment Assessment," Coachella Valley Water District, April 2000.

2 Ibid.

3 "Water Master Plan for Mission Springs Water District," ASL Consulting Engineers, August 2000.

4 Personal communication, Alan Harrell, Engineering Technician, Coachella Valley Water District. November 5, 2003.

Mission Creek Basin Water in Storage: Based upon several studies of the Mission Creek Subbasin[5], it is estimated that the total water in storage in 1955 was approximately 2,015,733 acre feet (AF) (in storage in first 1,000 feet below surface). By 1970, total water in storage in the subbasin was estimated to have declined to 1,967,733 AF, to 1,920,800 AF by 1978, and to 1,778,400 AF by 1997. Based upon pumpage in the subbasin between 1998 and 2002, the total water in storage in the subbasin in 2002 was estimated at 1,717,979 AF. The best available pumpage data is from 1978 to the present and estimates indicate water in storage in 1978 at 1,920,800 AF. Based upon this approach, total water in storage in the subbasin in 2002 was about 1,778,400 AF.

Mission Creek Recharge: The annual rate of recharge will vary but is estimated by the USGS to be about 5,000 AF. The overall gradient of subsurface flows is from northwest to southeast, with the low point of the basin being located along the Banning Fault and at Willow Hole, where groundwater is currently at or near the surface in specific locations. It is estimated that 2,000 to 5,360 AF per year flow across the Banning Fault and into the adjoining Garnet Hill Subbasin. In calculating annual recharge and outflow it is conservatively assumed that natural recharge roughly equals natural subbasin outflows.

The Mission Creek Subbasin lies within an area covered by a Water Management Agreement between the Desert Water Agency (DWA) and CVWD. Both agencies have been aware of the overdraft situation in the subbasin and have taken steps to increase groundwater recharge using Colorado River water being delivered via a turnout on the Metropolitan Water District Colorado River Aqueduct. Recently completed Mission Creek recharge ponds constructed in the northwest portion of the subbasin benefit all areas where extraction occurs and will occur in the future. In 2002, 4,733 AF of Colorado River water were delivered and recharged into the aquifer reducing the net overdraft for that year to about 4,346 AF.

The Mission Creek recharge facility is designed to recharge up to 25,000 AF of Colorado River water in any one year. Based upon current production, the Mission Creek Recharge Project would use about 6% of the available State Water (SWP) project exchange water or up to 3,700 AF per year of the current SWP entitlement.[6] It is anticipated that between 5,000 and 10,000 AF per year could be delivered to the spreading facility in non-drought years, and in wetter years, up to 15,000 AF may be spread.[7]

Current pumpage from the Mission Creek Subbasin is approximately 14,700 AF per year (MSWD 2004). The MSWD, which extracts approximately 58% of the water pumped from the subbasin, is expected to accelerate its pumping by approximately 7% per year between 1998 and 2005, and 2% per year between 2005 and 2010 (MSWD 2000). Similar increases in pumping are

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5 "Basin Water Supply and Initial Groundwater Replenishment and Assessment for the Mission Creek Subbasin," Prepared by Krieger & Stewart, Inc. April 2003. Prepared for the Coachella Valley Water District.

6 "Water Master Plan for Mission Springs Water District," ASL Consulting Engineers, August 2000.

7 Ibid.

likely from CVWD, which currently extracts 31% of the water from the subbasin. If natural recharge to the subbasin is estimated to be 5000 AF per year, more than 9000 AF of water would need to be imported and recharged per year to offset current pumping (to retain status quo groundwater levels), and these imports would need to increase by 2.7 percent per year to keep track with the accelerating pumping in the subbasin. As of 2002, the estimated gross overdraft in the subbasin has been 127,000 AF since 1978 (CVWD 2003a).

DWA is assessing Mission Springs Water District a replenishment fee to help recover the costs of the groundwater recharge program.[8] Artificial recharge water being percolated into the subbasin will not reach the CVWD well field in the southeastern portion of the subbasin for several years but will in time increase water in storage in this area of the subbasin.

Mission Creek Subbasin Pumpage Trends: Both Mission Springs Water District (MSWD) and CVWD draw water from the Mission Creek Subbasin. MSWD is the larger of the two purveyors mining this aquifer, with pumpage having increased steadily since 1978, rising from 1,516 AF in that year to 7,055 AF in 1998[9]. While the District's boundaries lie north of the Banning Fault, a review of MSWD production records illustrates the trend in groundwater production.

The CVWD owns and operates production wells closest to the Banning Fault and the associated mesquite. CVWD Wells No. 3406 and 3518 are located west of Palm Drive and north of 18th Avenue and are representative of the effects of production pumpage on groundwater levels. These and other production wells are located west and north of the aforementioned area of the subbasin where water quality has been impacted by high levels of fluoride and total dissolved solids from spillage of non-potable water from the Desert Hot Springs Subbasin.

CVWD pumpage data show a steady increase in groundwater extraction for CVWD users in the Sky Valley area, which is underlain by the non-potable Desert Hot Springs Subbasin. CVWD pumpage in 1978 was 854 AF, rising to 2,302 AF by 1988, 2,757 AF in 1998, and jumping to 4,371 AF in 2002. During the period from 1974 to 2002, groundwater levels in the production wells decreased from 139.4 feet below ground surface to 178.6 feet by 2002, a 74 foot lowering of the water table. Other CVWD wells in the area show a 51.8 foot drop in water table levels between 1973 and 2002. It should be noted that groundwater levels are identified as those in the well, pumping from which creates a "cone of depression" in the water table. With distance from the well, depending on location and soils transmissivity, groundwater levels will be progressively less affected (higher).

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8 Woody Adams, Senior Service Planner, Desert Water Agency, letter to City of Desert Hot Springs, July 24, 2000.

9 MSWD Water Master Plan, prepared by ASL Consulting Engineers, May 2000

Constraints to Pumpage in the Mission Creek Subbasin: In the vicinity of the Mission Creek Fault and in most of the southeastern portion of the subbasin there is an intrusion or spillage of groundwater from the Desert Hot Springs Subbasin into the Mission Creek Subbasin. This spillage is caused by an overflow across the Mission Creek Fault north of Willow Hole and has resulted in a plume of groundwater with high dissolved solids, including high levels of sulfate and fluoride, which has been determined to be non-potable. This intrusion extends from Willow Hole northwest to Palm Drive following the alignment of the Banning Fault. This intrusion of non-potable water has forced CVWD to develop its well field west of Palm Drive in Section 12, northwest of the high TDS plume.

Long-Term Impacts to Mesquite Along the Banning Fault. The mesquite hummocks located in the southeastern portion of the Mission Creek Subbasin are at the lower end of a large and unconfined aquifer. Historically and to a lesser spatial extent currently, groundwater in the southeastern portion of the subbasin flow to or near the surface, spills over the Banning Fault and leaks into the Garnet Hill Subbasin, indicating the continuing migration of up-gradient groundwater to this area. Considering the semi-flat gradient of groundwater in Mission Creek Subbasin (DWR 1964, DWR 2003), groundwater in the 1950s was likely at or near the surface along several linear feet of the Banning Fault. For example, from west of Palm Drive to several thousand feed to the east, groundwater was likely historically at or near the surface. Within this same area, groundwater likely currently continues at or near the surface for less than a thousand linear feet, in the low elevation area of the fault to the east of Palm Drive (MSWD 2004). Groundwater at or near the surface is likely similarly reduced in linear extent around Willow Hole.

Recharge of the subbasin to partially offset overdraft began in 2002 and in future years may be as much as 15,000 AF per year in extremely high rainfall years. The mesquite hummocks associated with the Banning Fault are also influenced and supported by reliable continued leakage of the non-potable Desert Hot Springs Subbasin into Willow Hole and lands lying along the Banning Fault as far west as Palm Drive. Conditions, which support the mesquite hummocks community in this area, are expected to remain in place for the indefinite future.

The mesquite hummocks associated with the Banning Fault are senescent and degraded along its western extent (between Mission Creek and Morongo Wash), likely due to artificially lowered groundwater levels in the subbasin. The mesquite hummocks farther to the east, (near Palm Drive) are currently less degraded and show substantially greater density of leafed out mesquite plants; these hummocks were historically and are currently closer to groundwater. Further reductions in groundwater in the subbasin would likely increase the extent of degradation that has already occurred in Willow Hole Conservation Area.

Desert Hot Springs Subbasin and Associated Mesquite Communities[10]**.** The Desert Hot Springs Subbasin is bounded by the Little San Bernardino Mountains on the northeast, the Indio Hills and Mission Creek fault on the southwest, and the Mecca Hills on the southeast. It is further divided into three subareas as follows: Miracle Hill Subarea, Sky Valley Subarea and the Fargo Canyon Subarea. It is estimated that between the high ground water elevations that occurred during the 1935-1936 season and a depth of 1,000 feet below the ground surface, the Desert Hot Springs Subbasin has a capacity for storing (and had in storage) about 4,100,000 AF of groundwater.

Although the subbasin is quite extensive in size, approximately 104 square miles, the land that overlies it is only sparsely developed. The coalescing alluvial fan deposits underlying the Dillon Road Piedmont Slope are the water-bearing materials of the Desert Hot Springs Subbasin. Water-bearing materials in the subbasin primarily consist of coarse-grained, poorly sorted alluvial fan deposits, which are principally of Ocotillo conglomerate estimated to be more than 700 feet thick. Recent fanglomerates cover most of the land surface, and recent alluvium in the subbasin ranges in thickness from a thin edge to more than 100 feet.

Groundwater in this subbasin is characterized by high concentrations of fluoride, total dissolved solids, sodium sulfates and other undesirable minerals, which have limited its use for agricultural and domestic water purposes.[11] The presence of high mineral concentrations is largely due to faulting along the margins of the subbasin. Faulting is associated with geothermal activity, which warms the earth's crust. As subsurface temperatures rise, minerals contained within the subbasin's sediments are more easily dissolved and mixed with groundwater, increasing the overall dissolved mineral content of the water. Groundwater pumped from the Miracle Hill subarea can reach up to 200°F and is the primary source of mineral spa waters in the City of Desert Hot Springs.

CVWD does not extract groundwater from the Desert Hot Springs Subbasin, given its high concentration of undesirable minerals. Instead, domestic water for the Sky Valley and Indio Hills communities is extracted by CVWD from the Mission Creek Subbasin to the west[12], as discussed above. The poor quality of groundwater in the Desert Hot Springs Subbasin is expected to assure natural rates of recharge exceeding current and future pumpage. Available information and data on each of the three subareas comprising the Desert Hot Springs Subbasin is summarized below. ~~The following table shows the total storage capacity and presumed 1936 storage in the individual subareas located within the Desert Hot Springs Subbasin.~~

Miracle Hill Subarea: The portion of the Desert Hot Springs subbasin along the Mission

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10 "Engineer's Report on Water Supply and Replenishment Assessment," Coachella Valley Water District, April 2000.

11 Steve Bigley, Coachella Valley Water District, personal communication, March 13, 2001.

12 Ibid.

Creek fault in which there is extensive development of hot-water wells is called the Miracle Hill subarea. It covers approximately 12 square miles and includes the northeastern portion of the community of Desert Hot Springs. A principal use of ground water in this area is to provide the hot mineral water available at several spas. The boundary separating the subarea from the Sky Valley subarea is a surface drainage divide. Ground water levels indicate that underflow across this boundary moves from Miracle Hill subarea southeastward into the Sky Valley subarea.

More than 130 water wells have been drilled in the Miracle Hill subarea. Approximately half of these are active and pump water for domestic use or for commercial spas. Depth to water ranges from 12 feet below ground surface near the Mission Creek fault to over 300 feet in the southeast portion of the subarea. Water level data in the Miracle Hill subarea suggest several barriers to ground water movement. The barriers appear to trend parallel to the Mission Creek Fault with which they are probably associated. Structural conditions within the subarea are complex and the barrier effects are not well understood. Movement of groundwater in the subarea is generally southeastward except within the narrow strip between the main Mission Creek Fault and the secondary parallel fault that follows the northeast flank of Miracle Hill.

The water temperatures in 34 wells of the Miracle Hill subarea were measured in the spring of 1961, and the values range from 82°F to 200°F. The average value was 118°F. Water temperatures measured in 16 wells along the southwest side of the Mission Creek fault in the Mission Creek subbasin range in value from 74°F to 86°F. This difference is probably a reflection of the barrier effect of the fault and suggests that ground water is heated on the northeast side of the fault with very little movement across the fault.

Sky Valley Subarea: The central portion of the Desert Hot Springs subbasin, in which ground water movement is toward Thousand Palms Canyon, is the Sky Valley subarea. The subarea extends 11 miles from the Miracle Hill subarea southeasterly to the trace of the Indio Hills fault and covers approximately 35 square miles. The trace of the Indio Hills fault is the boundary of the Sky Valley and Fargo Canyon subareas. The fault coincides with a ground water divide and is probably an effective barrier to ground water movement.

Groundwater and other hydrologic data in the Sky Valley subarea are sparse. Only 15 water wells were located during the course of the investigation and of these, 8 were active, pumping only small quantities of groundwater for domestic use. Movement of water within the subarea is southeasterly from the Miracle Hill subarea and southwesterly from the vicinity of Fan Canyon, converging on the Thousand Palms Canyon, where rising water along the fault is present throughout the year. The gradient of the water table is moderate. Groundwater is probably unconfined in the greater part of the subarea.

Fargo Canyon Subarea: The portion of the Desert Hot Springs subbasin south and east of the Indio Hills fault is called the Fargo Canyon subarea. It covers approximately 57 square miles and extends 17 miles from the Sky Valley subarea to the southeast limit of the subbasin.

The northwest half of the area is underlain by coarse alluvial fan deposits of "Recent" age. To the southeast, "Recent" deposits are confined to stream channels cut into the Ocotillo conglomerate.

Data on the occurrence of groundwater within the Fargo Canyon subarea is even less than that available for the Sky Valley subarea. Nine wells drilled in the Fargo Canyon subarea were located during the investigation, all in the vicinity of Dillon Road. Two of these wells were active, pumping water for domestic use and for irrigation of approximately 200 acres of young citrus trees.

Water levels measured in these wells during the spring of 1961 range from 717 feet to 17 feet. Although the data are not sufficient to determine the configuration of the water table, the measured levels along Dillon Road suggest that ground water movement in the northwest portion of the subarea moves southeasterly, and the groundwater is probably unconfined.

Impacts to Mesquite Communities: In the Plan Area, CVWD, Desert Water Agency (DWA), Mission Springs Water District, City of Indio, City of Coachella, and the Myoma Dunes Water District provide domestic water service. Each of these agencies owns and operates infrastructure improvements, such as wells and water storage reservoirs.

The routine maintenance and occasional repair of existing improvements, and the initial construction of new facilities, can result in low-impact site disturbances, such as periodic inspections and data collection efforts. More intense land disturbances, such as restoration of eroded earthen levees, road and other grading, fence installation, compaction of access roads, sand-blasting and painting, and restoration of failed structures and/or electrical components are also anticipated maintenance activities. Such efforts may require the use of heavy equipment and machinery, such as dump trucks, sand blasters, conveyor belts, skip loaders, and concrete trucks, which can disturb ground surfaces and generate intrusive vibrations and noise levels on surrounding lands.

The frequency and duration of such projects influences the level of impact on the surrounding environment. Other maintenance operations may include the removal of exotic plants, grasses, and other vegetation or debris that has collected or grown within stormwater channels and atop channel banks, and the protection of infrastructure from potentially damaging wildlife activity, such as rodents burrowing into channel banks. The construction and maintenance of such facilities will also contribute to a limited degree to some Habitat loss and/or fragmentation.

10.3 Natural Community Conservation Strategies: Desert Scrub Communities

This section contains a summary description, including natural community characteristics, typical species, and significant threats, for the three desert scrub communities proposed for coverage in the Plan. General Conservation measures, which are common to all these desert scrub types, are listed below.

1. This natural community may be subject to increased fire frequency as a result of invasive annual grasses and other non-native plant species. As part of the Management and Monitoring Program, establish a research element that addresses the impact of non-native species.

2. This natural community is adaptively managed, according to an approved Management and Monitoring Program, which would include management to prevent damage from OHV activity and other threats.

10.3.1 Sonoran Creosote Bush Scrub

10.3.1.1 Natural Community Conservation Goals and Objectives

Conserve and manage occurrences of this natural community within the MSHCP Reserve System according to the following criteria:

Goal 1: Conserve natural community occurrences representative of the range of environmental conditions within which the community is known to occur. Incorporate a range of environmental gradients (e.g. slope, elevation, aspect) and high Habitat diversity.

Objective 1. Through adherence to other Conservation Objectives (for another species, a natural community, Essential Ecological Process area, Biological Corridor, or Linkage area), conserve occurrences of this natural community within the following Conservation Areas:

- Cabazon Conservation Area
- Stubbe and Cottonwood Canyons Conservation Area
- Snow Creek/Windy Point Conservation Area
- Whitewater Canyon Conservation Area
- Highway 111/I-10 Conservation Area
- Whitewater Floodplain Conservation Area
- Upper Mission Creek/Big Morongo Canyon Conservation Area
- Willow Hole Conservation Area
- Edom Hill Conservation Area
- Thousand Palms Conservation Area
- Indio Hills/Joshua Tree National Park Linkage Conservation Area
- Indio Hills Palms Conservation Area

- East Indio Hills Conservation Area
- Joshua Tree National Park Conservation Area
- Desert Tortoise and Linkage Conservation Area
- Mecca Hills/Orocopia Mountains Conservation Area
- Dos Palmas Conservation Area
- Santa Rosa and San Jacinto Mountains Conservation Area

Goal 2: Protect Essential Ecological Processes necessary to maintain this natural community.

Objective 2. Ensure protection of Essential Ecological Process areas through Conservation Area Conservation Objectives for Essential Ecological Processes.

Goal 3: Ensure Conservation of Habitat quality through protection, monitoring and Adaptive Management, and restoration where necessary, to contribute to maintenance of this community within Conservation Areas.

Objective 3. Implement biological monitoring and Adaptive Management actions to ensure Conservation of this natural community.

10.3.1.2 Threats, Limiting Factors, and Adaptive Management

Threats include invasive species, nitrogen deposition, OHVs, and edge effects. One of these threats with known impacts is the invasion of non-native plant species, including Saharan grass (*Schismus barbatus*) and Saharan mustard (*Brassica tournefortii*). The presence of these exotic annuals increases the fuel load and the continuity of fuels, which make this community much more susceptible to wildfires than was historically the case. Deposition of nitrogen from smog fallout can result in higher soil nitrogen levels that give exotic weeds a competitive advantage (Dr. Edith Allen, pers. comm.). Creosote scrub areas are not heavily used by OHV enthusiasts, but some areas have experienced a proliferation of OHV trails; this OHV activity can reduce native plant cover.

The following actions may be needed to ensure that this natural community is sustained if biological monitoring indicates that such actions are warranted. This list is not comprehensive but identifies some of the known or likely threats to Sonoran creosote bush scrub. In addition to conserving the Sonoran creosote bush scrub natural community, the Plan will integrate biological monitoring and management actions into the Management and Monitoring Programs for this natural community. The Monitoring Program will be designed to provide feedback so that management activities can be adjusted to maximize natural community Conservation. More detailed and specific information on the biological monitoring and management actions described here and proposed for this natural community can be found in Section 8.0, MSHCP Reserve Management and Monitoring Program. Actions may include:

1. Control and manage activities that degrade Sonoran creosote bush scrub. In particular, control and manage the primary threats to this scrub community, including invasive plants that may increase fire frequency and edge effects.
2. Identify actions to reduce impacts from, and control where feasible, invasive species if it is determined from monitoring results that there are impacts to the creosote scrub community.
3. Implement monitoring to track changes due to human or natural causes. Significant variables may include live perennial shrub abundance and invasive weed abundance.

10.3.1.3 Natural Community Conservation Analysis

Conservation Area Reserve Design. Sonoran creosote bush scrub is the most widespread natural community in the Plan Area and can be found in nearly all the Conservation Areas. The proposed Conservation Areas in the MSHCP Reserve System include, to the extent possible, a relatively intact natural community, without significant fragmentation impacts, and the presence of intact Essential Ecological Processes necessary to maintain this community. To the extent they occur, contiguous stands of this natural community were selected when available. Also, to the extent possible, the Planning Team attempted to include a range of environmental gradients (e.g. slope, elevation, aspect) within which this natural community occurs. This natural community is conserved within the Plan Area by Conservation Objectives for Covered Species, other natural communities, Essential Ecological Processes, or Biological Corridors.

Sonoran creosote bush scrub occurs within the Plan Area in 20 Conservation Areas: Cabazon, Stubbe and Cottonwood Canyons, Snow Creek/Windy Point, Whitewater Canyon, Highway 111/I-10, Whitewater Floodplain, Upper Mission Creek/Big Morongo Canyon, Willow Hole, Long Canyon, Edom Hill, Thousand Palms, West Deception Canyon, Indio Hills/Joshua Tree National Park Linkage, Indio Hills Palms, East Indio Hills, Joshua Tree National Park, Desert Tortoise and Linkage, Mecca Hills/Orocopia Mountains, Dos Palmas, and Santa Rosa and San Jacinto Mountains. The presence of Sonoran creosote bush scrub within each of the Conservation Areas is shown in Table 10-9. The Planning Team identified and assessed the sufficiency for this natural community in the following Conservation Areas:

Table 10-9: Summary of Natural Community within Conservation Areas: Sonoran Creosote Bush Scrub

	Land within the Conservation Areas

CONSERVATION AREA	***Total Acres of Natural Community in Conservation Area***	***Total Acres Subject to Impacts[2]***	***Acres within Existing Conservation Lands***	***Remaining Acres to be Conserved***	***Total Acres to be Conserved in MSHCP Reserve System***
CABAZON	3,027	35	42	312 (2,638)[1]	354
STUBBE & COTTONWOOD CYN	1,562	129	273	1,160	1,433
SNOW CREEK/WINDY POINT	1,351	126	88	1,137	1,225
WHITEWATER CANYON	2,748	32	2,431	285	2,716
HIGHWAY 111/I-10	389	39	0	350	350
WHITEWATER FLOODPLAIN	1,556	126	299	1,131	1,430
UPPER MISSION CREEK/ BIG MORONGO CYN	5,369~~5,296~~	100~~93~~	4,370	899~~833~~	5,269~~5,203~~
WILLOW HOLE	24	2	0	22	22
LONG CANYON	99	N/A	90	(9)[1]	90
EDOM HILL	1,379	96	421	862	1,283
THOUSAND PALMS	14,754	396	10,791	3,567	14,358
WEST DECEPTION CANYON	1,467	3	0	23 (1,441)[1]	23
INDIO HILLS / JOSHUA TREE NP LINKAGE	8,374	788	499	7,087	7,586
INDIO HILLS PALMS	5,718	247	3,246	2,225	5,471
EAST INDIO HILLS	2,882	201	874	1,807	2,681
JOSHUA TREE NATIONAL PARK	70,498	761	62,891	6,846	69,737
DESERT TORTOISE AND LINKAGE	58,229	3,233	25,895	29,101	54,996
MECCA HILLS/ OROCOPIA MOUNTAINS	103,456	2,323	80,230	20,903	101,133
DOS PALMAS	12,177	624	5,939	5,614	11,553
SANTA ROSA & SAN JACINTO MOUNTAINS	44,230	2,372	23,243	18,615	41,858
TOTAL	**339,289~~339,216~~**	**11,633 ~~11,626~~**	**221,622**	**101,946 ~~101881~~ (4,088)**	**323,568~~323,503~~**

[1] Numbers within parentheses are acres of Habitat in fluvial sand transport areas. The only Conservation Objective in this Conservation Area is to maintain fluvial sand transport. Habitat Conservation is not an objective.

1. ***Cabazon.*** There are approximately 3,027 acres of Sonoran creosote bush scrub mapped in this Conservation Area, of which the Plan will conserve approximately 354 acres. In this Conservation Area, 2,638 acres of Sonoran creosote bush scrub on mostly private land are not covered by a Conservation Objective, as they occur in the fluvial sand transport area; the only Conservation Objective here is for fluvial sand transport to be maintained.

2. ***Stubbe and Cottonwood Canyons.*** Sonoran creosote bush scrub occurs on approximately 1,562 acres within the Stubbe and Cottonwood Canyons Conservation Area. Approximately 1,433 of these acres will be conserved as a result of a specific Conservation Objective for one of the Covered Species.

3. ***Snow Creek/Windy Point.*** There are approximately 1,351 acres of Sonoran creosote bush scrub mapped in this Conservation Area. As a result of a specific Conservation Objective for one of the Covered Species approximately 1,225 acres of this natural community are conserved.

4. ***Whitewater Canyon.*** Sonoran creosote bush scrub occurs on approximately 2,748 acres within the Whitewater Canyon Conservation Area. At least 2,716 of these acres will be conserved as a result of a specific Conservation Objective for one of the Covered Species.

5. ***Highway 111/I-10.*** There are approximately 389 acres of Sonoran creosote bush scrub in this Conservation Area, of which the Plan will conserve approximately 350 acres.

6. ***Whitewater Floodplain***. There are approximately 1,556 acres of Sonoran creosote bush scrub mapped in this Conservation Area, of which the Plan will conserve approximately 1,430 acres. In addition, the entire Conservation Area is covered by a Conservation Objective to protect either the sand source or sand transport areas. The MSHCP Reserve System will conserve these sand transport and delivery systems.

7. ***Upper Mission Creek/Big Morongo Canyon.*** Sonoran creosote bush scrub occurs on approximately 5,369~~5,296~~ acres within the Upper Mission Creek/Big Morongo Canyon Conservation Area. Approximately 5,269~~5,203~~ of these acres will be conserved as a result of a specific Conservation Objective for one of the Covered Species.

8. ***Willow Hole.*** Sonoran creosote bush scrub occurs on approximately 24 acres within the Willow Hole Conservation Area. Approximately 22 of these acres will be conserved according to a specific Conservation Objective for one of the Covered Species.

9. ***Long Canyon.*** This Conservation Area does not have a specific Conservation Objective for natural communities. There are approximately 99 acres of Sonoran creosote bush scrub in this Conservation Area; 90 of these acres are within Existing Conservation Lands. The remaining 9 acres are within the fluvial sand transport area which does not have a specific Conservation Objective for Habitat or natural community Conservation. Because of existing land use patterns and associated edge effects in these areas, they would be unsuitable for Habitat protection through acquisition.

10. ***Edom Hill.*** There are approximately 1,379 acres of Sonoran creosote bush scrub mapped in this Conservation Area. A Conservation Objective for one of the Covered Species would conserve 1,283 acres of Sonoran creosote bush scrub in this Conservation Area.

11. ***Thousand Palms.*** Sonoran creosote bush scrub occurs on approximately 14,754 acres within the Thousand Palms Conservation Area. Approximately 14,358 of these acres will be conserved as a result of a specific Conservation Objective for one of the Covered Species.

12. ***West Deception Canyon.*** There are approximately 1,467 acres of Sonoran creosote bush scrub in this Conservation Area. All but 23 acres, approximately 1,441 acres, are in the fluvial sand transport area, which does not have a specific Conservation Objective for natural community Conservation. Because of existing land use patterns and associated edge effects in these areas, they would be unsuitable for Habitat protection through acquisition.

13. ***Indio Hills/Joshua Tree National Park Linkage.*** There are approximately 8,374 acres of Sonoran creosote bush scrub mapped in this Conservation Area. A Conservation Objective for one of the Covered Species would conserve approximately 7,586 acres of creosote bush scrub in this Conservation Area.

14. ***Indio Hills Palms.*** Sonoran creosote bush scrub occurs on approximately 5,718 acres within the Indio Hills Palms Conservation Area, of which the Plan will conserve approximately 5,471 acres. All but 30 of these acres will be conserved as a result of a specific Conservation Objective for one of the Covered Species; of these 30 acres, 13 acres are private and 17 acres are BLM Conservation Level 3.

15. ***East Indio Hills.*** There are approximately 2,882 acres of Sonoran creosote bush scrub mapped in this Conservation Area, of which the Plan will conserve approximately 2,681 acres. All but 33 of these acres will be conserved as a result of a specific Conservation Objective for one of the Covered Species; of these 33 acres, 32 acres are private and 1 acre is BLM Conservation Level 3.

16. ***Joshua Tree National Park.*** Sonoran creosote bush scrub occurs on approximately 70,498 acres within the Joshua Tree National Park Conservation Area, of which the Plan will conserve approximately 69,737 acres. All but 92 of these acres will be conserved as a result of a specific Conservation Objective for one of the Covered Species. However, all of these 92 acres are either Conservation Level 1 (67 acres) or Level 2 (25 acres) and owned by the National Park Service.

17. ***Desert Tortoise and Linkage.*** Sonoran creosote bush scrub occurs on approximately 58,229 acres within the Desert Tortoise and Linkage Conservation Area. At least 54,996 of these acres will be conserved as a result of a specific Conservation Objective for one of the Covered Species.

18. ***Mecca Hills/Orocopia Mountains.*** There are approximately 103,456 acres of Sonoran creosote bush scrub mapped in this Conservation Area, of which the Plan will conserve

approximately 101,133 acres. All but approximately 234 of these acres will be conserved as a result of a specific Conservation Objective for one of the Covered Species. Of these approximately 234 acres, 92 acres are private, and the rest are BLM, either Conservation Level 1 (104 acres) or Level 3 (38 acres).

19. ***Dos Palmas.*** Sonoran creosote bush scrub occurs on approximately 12,177 acres within the Dos Palmas Conservation Area. Approximately 11,553 of these acres will be conserved as a result of a specific Conservation Objective for one of the Covered Species. The remaining approximately 9,824 acres are not covered by a Conservation Objective; of these 9,824 acres, 4,478 acres are private, 2,521 acres are BLM Conservation Level 2, 1,631 acres are BLM Conservation Level 3, 233 acres are CNLM Conservation Level 2, and 623 acres are owned by the Bureau of Reclamation.

20. ***Santa Rosa and San Jacinto Mountains.*** There are approximately 44,230 acres of Sonoran creosote bush scrub mapped in this Conservation Area. All but approximately 4,359 of these acres will be conserved as a result of a specific Conservation Objective for one of the Covered Species; of these 4,359 acres, 2,076 acres are private, 93 acres are BLM Conservation Level 2, 590 acres are BLM Conservation Level 3, 107 acres are CDFG/WCB Conservation Level 1, and 1,491 acres are CDFG/WCB Conservation Level 2.

Conservation Levels. The MSHCP Reserve System would provide protection of Sonoran creosote bush scrub in 20 Conservation Areas: Cabazon, Stubbe and Cottonwood Canyons, Snow Creek/Windy Point, Whitewater Canyon, Highway 111/I-10, Whitewater Floodplain, Upper Mission Creek/Big Morongo Canyon, Willow Hole, Edom Hill, Thousand Palms, Indio Hills/Joshua Tree National Park Linkage, Indio Hills Palms, East Indio Hills, Joshua Tree National Park, Desert Tortoise and Linkage, Mecca Hills/Orocopia Mountains, Dos Palmas, and Santa Rosa and San Jacinto Mountains Conservation Areas. In addition to conserving currently unprotected Habitat, the Plan benefits this natural community by addressing threats to this community, including invasive plants.

Conservation of 323,568~~323,503~~ acres, or 80%, of Sonoran creosote bush scrub will ensure that this natural community is sustained within the Plan Area.

10.3.1.4 Natural Community Account: Background

Description. Sonoran creosote bush scrub is the most widespread vegetation type in the Colorado Desert. It is dominated by creosote bush (*Larrea tridentata*). It characterizes the vast intermountain bajadas, reaching greatest development on coarse, well-drained soil with a total salinity of less than 0.02%. Sonoran Creosote bush scrub occupies areas surrounding the Salton basin between the higher rocky hillsides and the desert saltbush community. The transition to desert saltbush occurs as the soil becomes heavier and the salt content increases to approximately 0.2%. The physiognomy of the Sonoran creosote bush scrub community is simple because of low

species diversity and the broad spacing of the shrubs, 0.5 - 3 meters tall, usually with bare ground between. The codominant species in the community is burrobush (*Ambrosia dumosa)*, a much shorter shrub varying from 20-60 cm. Many species of ephemeral herbs may flower in late winter/early spring if winter rains are sufficient. This is by far the dominant community in the Plan Area, and the most susceptible to impacts from Development. It is widespread on the valley floor and in the northeastern portion of the Plan Area. Of the 404,644 acres of Sonoran creosote bush scrub in the Plan Area, 55% of the community currently occurs on public or private Existing Conservation Land, much of this in the northeastern portion of the Plan Area.

Distribution within the Coachella Valley. Within the MSHCP Reserve System, Sonoran creosote bush scrub occurs in 20 of the Conservation Areas:

1. Cabazon Conservation Area
2. Stubbe and Cottonwood Canyons Conservation Area
3. Snow Creek/Windy Point Conservation Area
4. Whitewater Canyon Conservation Area
5. Highway 111/I-10 Conservation Area
6. Whitewater Floodplain Conservation Area
7. Upper Mission Creek/Big Morongo Canyon Conservation Area
8. Willow Hole Conservation Area
9. Long Canyon Conservation Area
10. Edom Hill Conservation Area
11. Thousand Palms Conservation Area
12. West Deception Canyon Conservation Area
13. Indio Hills/Joshua Tree National Park Linkage Conservation Area
14. Indio Hills Palms Conservation Area
15. East Indio Hills Conservation Area
16. Joshua Tree National Park Conservation Area
17. Desert Tortoise and Linkage Conservation Area
18. Mecca Hills/Orocopia Mountains Conservation Area
19. Dos Palmas Conservation Area
20. Santa Rosa and San Jacinto Mountains Conservation Area

Comparison with *Manual of California Vegetation*. Ultimately, the Plan will use the vegetation classification system in the MCV (Sawyer and Keeler-Wolf 1995). The natural community described by the Holland system as Sonoran creosote bush scrub would be represented by one or more of the following MCV series:

1. Big galleta series
2. Brittlebush series
3. Creosote bush series
4. Creosote bush - white bursage series
5. Teddy-bear cholla series
6. White bursage series

Associated Covered Species. Covered Species that are associated with portions of this community are: Peninsular bighorn sheep, Coachella Valley round-tailed ground squirrel, Palm Springs pocket mouse, desert tortoise, burrowing owl, Le Conte's thrasher, Coachella Valley giant sand-treader cricket, Coachella Valley milkvetch, triple-ribbed milkvetch, Mecca aster, and Orocopia sage.

Essential Ecological Processes. The processes that may be significant to the maintenance of this creosote scrub community are not well known. Large-scale ecological processes that affect Sonoran creosote bush scrub are those processes that threaten the integrity of this natural community, including invasion of exotic plants and nitrogen deposition from smog fallout. These processes that manifest as threats to the community are discussed in more detail in Section 8.0.

10.3.2 Sonoran Mixed Woody and Succulent Scrub

10.3.2.1 Natural Community Conservation Goals and Objectives

Conserve and manage occurrences of this natural community within the MSHCP Reserve System according to the following criteria:

Goal 1: Conserve natural community occurrences representative of the range of environmental conditions within which the community is known to occur. Incorporate a range of environmental gradients (e.g. slope, elevation, aspect) and high Habitat diversity.

Objective 1. Through adherence to other Conservation Objectives (for another species, a natural community, Essential Ecological Process area, Biological Corridor, or Linkage area), conserve occurrences of this natural community within the following Conservation Areas:

- Stubbe and Cottonwood Canyons Conservation Area
- Whitewater Canyon Conservation Area
- Whitewater Floodplain Conservation Area
- Upper Mission Creek/Big Morongo Canyon Conservation Area

- Mission Creek/Morongo Wash Conservation Area
- Willow Hole Conservation Area
- Edom Hill Conservation Area
- Thousand Palms Conservation Area
- Indio Hills/Joshua Tree National Park Linkage Conservation Area
- Joshua Tree National Park Conservation Area
- Desert Tortoise and Linkage Conservation Area
- Santa Rosa and San Jacinto Mountains Conservation Area

Goal 2: Protect Essential Ecological Processes necessary to maintain this natural community.

Objective 2. Ensure protection of Essential Ecological Process areas through Conservation Area Conservation Objectives for Essential Ecological Processes.

Goal 3: Ensure Conservation of Habitat quality through protection, monitoring and Adaptive Management, and restoration where necessary, to contribute to maintenance of this community within Conservation Areas.

Objective 3. Implement biological monitoring and Adaptive Management actions to ensure Conservation of this natural community.

10.3.2.2 Threats, Limiting Factors, and Adaptive Management

Threats to this natural community are much the same as those described for Sonoran creosote bush scrub. These threats include invasive species, nitrogen deposition, OHVs, and edge effects. One of these threats with known impacts is the invasion of non-native plant species, including Saharan grass (*Schismus barbatus*) and Saharan mustard (*Brassica tournefortii*). The presence of these exotic annuals increases the fuel load and the continuity of fuels, which make this community much more susceptible to wildfires than was historically the case. Deposition of nitrogen from smog fallout can result in higher soil nitrogen levels that give exotic plants a competitive advantage (Dr. Edith Allen, pers. comm.). These Sonoran mixed woody and succulent scrub areas are not heavily used by OHV enthusiasts, but some areas have experienced a proliferation of OHV trails; this OHV activity can reduce native plant cover and collapse burrows of Covered Species. Edge effects can include increased levels of predation by native species and domestic pets, and road mortality.

The following actions may be needed to ensure persistence of this natural community if biological monitoring indicates that such actions are warranted. This list is not comprehensive but identifies some of the known or likely threats to Sonoran mixed woody and succulent scrub. In addition to conserving the Sonoran mixed woody and succulent scrub natural community, the Plan will integrate biological monitoring and management actions into a Management and

Monitoring Program for this natural community. The Monitoring Program will be designed to provide feedback so that management activities can be adjusted to maximize natural community Conservation. More detailed and specific information on the biological monitoring and management actions described here and proposed for this natural community can be found in Section 8.0, MSHCP Reserve Management and Monitoring Program. Actions may include:

1. Control and manage activities that degrade Sonoran mixed woody and succulent scrub. In particular, control and manage the primary threats to this scrub community, including invasive plants that may increase fire frequency and edge effects.
2. Identify actions to reduce impacts from, and control where feasible, invasive species if it is determined from monitoring results that there are impacts to this scrub community.
3. Develop appropriate management prescriptions to be incorporated into the MSHCP Reserve System management plan.
4. Implement monitoring to track, and ultimately distinguish between, changes due to human or natural causes. Significant variables may include live perennial shrub abundance and invasive exotic plant abundance.

10.3.2.3 Natural Community Conservation Analysis

Conservation Area Reserve Design. To conserve Sonoran mixed woody and succulent scrub within the Plan Area, the MSHCP Reserve System includes, to the extent possible, intact stands of this natural community, without significant fragmentation impacts, and the presence of intact Essential Ecological Processes necessary to maintain this community. To the extent they occur, contiguous stands of this natural community were selected when available. Also, to the extent possible, the Planning Team attempted to include a range of environmental gradients (e.g. slope, elevation, aspect) within which this natural community occurs. This natural community is conserved within the Plan Area by Conservation Objectives for Covered Species, other natural communities, Essential Ecological Processes, or Biological Corridors.

Sonoran mixed woody and succulent scrub occurs within the Plan Area in 13 Conservation Areas: Stubbe and Cottonwood Canyons, Whitewater Canyon, Whitewater Floodplain, Upper Mission Creek/Big Morongo Canyon, Mission Creek/Morongo Wash, Willow Hole, Long Canyon, Edom Hill, Thousand Palms, Indio Hills Palms, East Indio Hills, Desert Tortoise and Linkage, and Santa Rosa and San Jacinto Mountains. The presence of Sonoran mixed woody and succulent scrub within each of the Conservation Areas is shown in Table 10-10. The Planning Team identified and assessed the sufficiency for this natural community in the following Conservation Areas:

Table 10-10: Summary of Natural Community within Conservation Areas: Sonoran Mixed Woody and Succulent Scrub

CONSERVATION AREA	Land within the Conservation Areas				
	Total Acres of Natural Community in Conservation Area	Total Acres Subject to Impacts[2]	Acres within Existing Conservation Lands	Remaining Acres to be Conserved	Total Acres to be Conserved in MSHCP Reserve System
STUBBE & COTTONWOOD CYN	1,703	67	1,037	599	1,636
WHITEWATER CYN	955	63	327	565	892
WHITEWATER FLOODPLAIN	93	7	21	65	86
UPPER MISSION CREEK/BIG MORONGO CYN	7,527~~6,912~~	522~~461~~	2,306	4,699~~4,145~~	7,005~~6,451~~
WILLOW HOLE	3,327	275	575	2,477	3,052
LONG CANYON	689	N/A	11	(678)[1]	11
EDOM HILL	2,034	182	219	1,634	1,853
THOUSAND PALMS	5,515	354	1,973	3,188	5,161
INDIO HILLS PALMS	216	1	210	5	215
EAST INDIO HILLS	63	6	0	57	57
DESERT TORTOISE AND LINKAGE	129	13	0	116	116
SANTA ROSA/ SAN JACINTO MOUNTAINS	89,999	2,764	65,893	21,342	87,235
TOTAL	**112,250~~111,635~~**	**4,254~~4,192~~**	**72,572**	**34,746~~34193~~ (678)[1]**	**107,318~~106,765~~**

[1] Numbers within parentheses are acres of Habitat in fluvial sand transport areas. The Conservation Objective for these acres is to maintain fluvial sand transport. Habitat Conservation is not an objective.

1. ***Stubbe and Cottonwood Canyons.*** Sonoran mixed woody and succulent scrub occurs on approximately 1,703 acres within the Stubbe and Cottonwood Canyons Conservation Area. Approximately 1,636 of these acres will be conserved as a result of a specific Conservation Objective for one of the Covered Species.

2. ***Whitewater Canyon.*** Sonoran mixed woody and succulent scrub occurs on approximately 955 acres within the Whitewater Canyon Conservation Area. Approximately 892 of these acres will be conserved as a result of a specific Conservation Objective for one of the Covered Species.

3. ***Whitewater Floodplain.*** There are approximately 93 acres of Sonoran mixed woody and succulent scrub mapped in this Conservation Area. Approximately 86 acres of this natural community would be conserved through implementation of a Conservation Objective for one of the Covered Species. In addition, the entire Conservation Area is covered by a Conservation Objective to protect either the sand source or sand transport areas. The MSHCP Reserve System will conserve these sand transport and delivery systems.

4. ***Upper Mission Creek/Big Morongo Canyon.*** Sonoran mixed woody and succulent scrub occurs on approximately 7,527~~6,912~~ acres within the Upper Mission Creek/Big Morongo Canyon Conservation Area. Approximately 7,005~~6,451~~ of these acres will be conserved as a result of a specific Conservation Objective for one of the Covered Species.

5. ***Willow Hole.*** Sonoran mixed woody and succulent scrub occurs on approximately 3,327 acres within the Willow Hole Conservation Area. Approximately 3,052 of these acres will be conserved as a result of a specific Conservation Objective for one of the Covered Species.

6. ***Long Canyon.*** This Conservation Area does not have specific Conservation Objectives for natural communities. This Conservation Area includes approximately 689 acres of mapped Sonoran mixed woody and succulent scrub; 11 acres are within Existing Conservation Lands. The remaining 678 acres are within the fluvial sand transport area. Because of existing land use patterns and associated edge effects in this area it would be unsuitable for Habitat protection through acquisition.

7. ***Edom Hill.*** There are approximately 2,034 acres of Sonoran mixed woody and succulent scrub mapped in this Conservation Area. A Conservation Objective for one of the Covered Species would conserve approximately 1,853 acres of mixed woody and succulent scrub in this Conservation Area.

8. ***Thousand Palms.*** Sonoran mixed woody and succulent scrub occurs on approximately 5,515 acres within the Thousand Palms Conservation Area. Approximately 5,161 of these acres will be conserved as a result of a specific Conservation Objective for one of the Covered Species.

9. ***Indio Hills Palms.*** Sonoran mixed woody and succulent scrub occurs on approximately 216 acres within the Indio Hills Palms Conservation Area. At least 215 of these acres will be conserved as a result of a specific Conservation Objective for one of the Covered Species.

10. ***East Indio Hills.*** There are approximately 63 acres of Sonoran mixed woody and succulent scrub mapped in this Conservation Area. At least 57 of these acres will be conserved as a result of a specific Conservation Objective for one of the Covered Species.

11. ***Desert Tortoise and Linkage.*** Sonoran mixed woody and succulent scrub occurs on approximately 129 acres within the Desert Tortoise and Linkage Conservation Area. At

least 116 of these acres will be conserved as a result of a specific Conservation Objective for one of the Covered Species.

12. ***Santa Rosa and San Jacinto Mountains.*** There are approximately 89,999 acres of Sonoran mixed woody and succulent scrub mapped in this Conservation Area. All but approximately 403 of these acres will be conserved as a result of a specific Conservation Objective for one of the Covered Species; of the 403 acres, 4 acres are private, 2 acres are BLM Conservation Level 1, 195 acres are BLM Conservation Level 2, 27 acres are BLM Conservation Level 3, 107 acres are CDFG/WCB Conservation Level 1, 12 acres are USFS Conservation Level 1, and 12 acres are USFS Conservation Level 2. Therefore, most of these acres are already in protected status.

Conservation Levels. The MSHCP Reserve System would provide protection of Sonoran mixed woody and succulent scrub in 12 of the 13 Conservation Areas: Stubbe and Cottonwood Canyons, Whitewater Canyon, Whitewater Floodplain, Upper Mission Creek/Big Morongo Canyon, Mission Creek/Morongo Wash, Willow Hole, Edom Hill, Thousand Palms, Indio Hills Palms, East Indio Hills, Desert Tortoise and Linkage, and Santa Rosa and San Jacinto Mountains Conservation Areas. In addition to conserving currently unprotected Habitat, the Plan benefits this natural community by addressing threats to this community, including invasive plants.

Conservation of 107,318~~106,765~~ acres, or 80%, of Sonoran mixed woody and succulent scrub will ensure that this natural community is sustained and restored within the Plan Area.

10.3.2.4 Natural Community Account: Background

Description. This is the only Sonoran desert community in the Plan Area with substantial dominance of cacti and other stem succulents. It is similar to creosote bush scrub but more varied and usually with a higher plant density. In addition to creosote bush and other associated perennial shrubs, typical species include silver cholla (*Opuntia echinocarpa*), buckhorn cholla (*Opuntia acanthocarpa)*, pencil cholla (*Opuntia ramosissima*), prickly pear (*Opuntia engelmannii*), beavertail cactus (*Opuntia basilaris*), barrel cactus (*Ferocactus acanthodes*), and ocotillo (*Fouquieria splendens*). This community occurs on alluvial fans and slopes of the Santa Rosa Mountains, in the Little San Bernardino Mountains, on the valley floor north of Interstate 10 to just east of the Thousand Palms Preserve. Covering 133,682 acres, it is the second most abundant community in the Plan Area. Currently, 54% of this community occurs on public or private Existing Conservation Land.

Distribution within the Coachella Valley. Within the MSHCP Reserve System, Sonoran mixed woody and succulent scrub occurs in 13 of the Conservation Areas:

1. Stubbe and Cottonwood Canyons Conservation Area

2. Whitewater Canyon Conservation Area
3. Whitewater Floodplain Conservation Area
4. Upper Mission Creek/Big Morongo Canyon Conservation Area
5. Mission Creek/Morongo Wash Conservation Area
6. Willow Hole Conservation Area
7. Long Canyon Conservation Area
8. Edom Hill Conservation Area
9. Thousand Palms Conservation Area
10. Indio Hills Palms Conservation Area
11. East Indio Hills Conservation Area
12. Desert Tortoise and Linkage Conservation Area
13. Santa Rosa and San Jacinto Mountains Conservation Area

Comparison with *Manual of California Vegetation*. Ultimately, the Plan will use the vegetation classification system in the MCV (Sawyer and Keeler-Wolf 1995). The natural community described by the Holland system as Sonoran mixed woody and succulent scrub would be represented by one or more of the following MCV series:

1. Creosote bush - white bursage series
2. Ocotillo series

Associated Covered Species. Covered Species that are associated with portions of this community are: Peninsular bighorn sheep, Coachella Valley round-tailed ground squirrel, Palm Springs pocket mouse, desert tortoise, burrowing owl, Le Conte's thrasher, Coachella Valley giant sand-treader cricket, Coachella Valley milkvetch, triple-ribbed milkvetch, Mecca aster, and Orocopia sage.

Essential Ecological Processes. The processes that may be significant to the maintenance of this scrub community are not well known. Large-scale ecological processes that affect both Sonoran creosote bush scrub and Sonoran mixed woody and succulent scrub are those processes that threaten the integrity of this natural community, including invasion of exotic plants and nitrogen deposition from smog fallout. These processes that manifest as threats to the community are discussed in more detail in Section 8.0.

10.3.3 Mojave Mixed Woody Scrub

10.3.3.1 Natural Community Conservation Goals and Objectives

Conserve and manage occurrences of this natural community within the MSHCP Reserve System according to the following criteria:

Goal 1: Conserve natural community occurrences representative of the range of environmental conditions within which the community is known to occur. Incorporate a range of environmental gradients (e.g. slope, elevation, aspect) and high Habitat diversity.

Objective 1. Through adherence to other Conservation Objectives (for another species, a natural community, Essential Ecological Process area, Biological Corridor, or Linkage area), conserve occurrences of this natural community within the following Conservation Areas:

- Upper Mission Creek/Big Morongo Canyon Conservation Area
- Indio Hills/Joshua Tree National Park Linkage Conservation Area
- Joshua Tree National Park Conservation Area
- Desert Tortoise and Linkage Conservation Area

Goal 2: Protect Essential Ecological Processes necessary to maintain this natural community.

Objective 2. Ensure protection of Essential Ecological Process areas through Conservation Area Conservation Objectives for Essential Ecological Processes.

Goal 3: Ensure Conservation of Habitat quality through protection, monitoring and Adaptive Management, and restoration where necessary, to contribute to maintenance of this community within Conservation Areas.

Objective 3. Implement biological monitoring and Adaptive Management actions to ensure Conservation of this natural community.

10.3.3.2 Threats, Limiting Factors, and Adaptive Management

Threats to this natural community are much the same as those described for Sonoran creosote bush scrub. These threats include invasive species, nitrogen deposition, OHVs, and edge effects. One of these threats with known impacts is the invasion of non-native plant species, including Saharan grass (*Schismus barbatus*) and Saharan mustard (*Brassica tournefortii*). The presence of these exotic annuals increases the fuel load and the continuity of fuels, which make

this community much more susceptible to wildfires than was historically the case. Deposition of nitrogen from smog fallout can result in higher soil nitrogen levels that give exotic plants a competitive advantage (Dr. Edith Allen, pers. comm.). These Mojave mixed woody scrub areas are not heavily used by OHV enthusiasts but some areas have experienced a proliferation of OHV trails; this OHV activity can reduce native plant cover and collapse burrows of Covered Species. Edge effects can include increased levels of predation by native species and domestic pets, and road mortality.

The following actions may be needed to ensure persistence of this natural community if biological monitoring indicates that such actions are warranted. This list is not comprehensive but identifies some of the known or likely threats to Mojave mixed woody scrub. In addition to conserving the Mojave mixed woody scrub natural community, the Plan will integrate biological monitoring and management actions into the Management and Monitoring Programs for this natural community. The Monitoring Program will be designed to provide feedback so that management activities can be adjusted to maximize natural community Conservation. More detailed and specific information on the biological monitoring and management actions described here and proposed for this natural community can be found in Section 8.0, MSHCP Reserve Management and Monitoring Program. Actions may include:

1. Control and manage activities that degrade Mojave mixed woody scrub. In particular, control and manage the primary threats to this scrub community, including invasive plants that may increase fire frequency and edge effects.
2. Identify actions to reduce impacts from, and control where feasible, invasive species if it is determined from monitoring results that there are impacts to this scrub community.
3. Develop appropriate management prescriptions to be incorporated into the MSHCP Reserve System management plan.
4. Implement monitoring to track, and ultimately distinguish between, changes due to human or natural causes. Significant variables may include live perennial shrub abundance and invasive exotic plant abundance.

These measures are described in more detail in the Monitoring and Management Program in Section 8.0.

10.3.3.3 Natural Community Conservation Analysis

Conservation Area Reserve Design. To conserve Mojave mixed woody scrub within the Plan Area, the MSHCP Reserve System includes, to the extent possible, intact stands of this natural community, without significant fragmentation impacts, and the presence of intact Essential Ecological Processes necessary to maintain this community. To the extent they occur, contiguous stands of this natural community were selected when available. Also, to the extent

possible, the Planning Team attempted to include a range of environmental gradients (e.g. slope, elevation, aspect) within which this natural community occurs. This natural community is conserved within the Plan Area by Conservation Objectives for Covered Species, other natural communities, Essential Ecological Processes, or Biological Corridors.

Mojave mixed woody scrub occurs within the Plan Area in five Conservation Areas: Upper Mission Creek/Big Morongo Canyon, West Deception Canyon, Indio Hills/Joshua Tree National Park Linkage, Joshua Tree National Park, and Desert Tortoise and Linkage. The presence of Mojave mixed woody scrub within each of the Conservation Areas is shown in Table 10-11. The Planning Team identified and assessed the sufficiency for this natural community in the following Conservation Areas:

1. ***Upper Mission Creek/Big Morongo Canyon.*** Mojave mixed woody scrub occurs on approximately 15,771 acres within the Upper Mission Creek/Big Morongo Canyon Conservation Area. Approximately 15,265 of these acres will be conserved as a result of a specific Conservation Objective for one of the Covered Species.

2. ***West Deception Canyon.*** This Conservation Area does not have specific Conservation Objectives for natural communities. This Conservation Area includes approximately 1,397 acres of mapped Mojave mixed woody scrub. A Conservation Objective for the sand source area would conserve approximately 1,160 acres of Mojave mixed woody scrub in this Conservation Area. The remaining approximately 110 acres are only covered by a Conservation Objective to maintain fluvial sand transport. Because of existing land use patterns and associated edge effects in this area it would be unsuitable for Habitat protection through acquisition.

3. ***Indio Hills/Joshua Tree National Park Linkage.*** There are approximately 4,380 acres of Mojave mixed woody scrub mapped in this Conservation Area. A Conservation Objective for one of the Covered Species would conserve approximately 4,064 acres of Mojave mixed woody scrub in this Conservation Area.

4. ***Joshua Tree National Park.*** Mojave mixed woody scrub occurs on approximately 57,099 acres within the Joshua Tree National Park Conservation Area. Approximately 56,299 of these acres will be conserved as a result of a specific Conservation Objective for this natural community.
5. ***Desert Tortoise and Linkage.*** There are approximately 17,264 acres of Mojave mixed woody scrub within the Desert Tortoise and Linkage Conservation Area. At least 16,247 of these acres will be conserved as a result of a Conservation Objective for one of the Covered Species.

Conservation Levels. The MSHCP Reserve System would provide at least some protection of Mojave mixed woody scrub in five Conservation Areas: Upper Mission Creek/Big

Morongo Canyon, West Deception Canyon, Indio Hills/Joshua Tree National Park Linkage, Joshua Tree National Park, and Desert Tortoise and Linkage Conservation Areas. In addition to conserving currently unprotected Habitat, the Plan benefits this natural community by addressing threats to this community, including invasive plants.

Conservation of 93,035 acres, or 89%, of Mojave mixed woody scrub will ensure that this natural community is sustained and restored within the Plan Area.

Table 10-11: Summary of Natural Community within Conservation Areas: Mojave Mixed Woody Scrub

	Land within the Conservation Areas				
CONSERVATION AREA	***Total Acres of Natural Community in Conservation Area***	***Total Acres Subject to Impacts[2]***	***Acres within Existing Conservation Lands***	***Remaining Acres to be Conserved***	***Total Acres to be Conserved in MSHCP Reserve System***
UPPER MISSION CREEK/ BIG MORONGO CYN	15,771	506	10,711	4,554	15,265
WEST DECEPTION CANYON	1,397	127	132	1,028 (110) [1]	1,160
INDIO HILLS/ JOSHUA TREE NP	4,380	316	1,219	2,845	4,064
JOSHUA TREE NATIONAL PARK	57,099	800	49,104	7,195	56,299
DESERT TORTOISE AND LINKAGE	17,264	1,017	7,090	9,157	16,247
TOTAL	95,911	2,766	68,256	24,779 (110) [1]	93,035

[1] Numbers within parentheses are acres of Habitat in fluvial sand transport areas. The Conservation Objective for these acres is to maintain fluvial sand transport. Habitat Conservation is not an objective.

10.3.3.4 Natural Community Account: Background

Description. Mojave mixed woody scrub is a complex scrub community, open enough to be passable, and usually characterized by Joshua Tree (*Yucca brevifolia herbertii)*, California buckwheat (*Eriogonum fasciculatum polifolium)*, and bladderpod (*Isomeris arborea)*. Most of the constituent species also occur in other nearby communities. The sites where this community occurs typically have very shallow, overly drained, often rolling to steep soils, usually derived from granitic parent materials. These sites have extremely low water holding capacity, mild alkalinity, and are not very saline. The typical elevation range is 2,000-5,000 feet. In the Plan Area, approximately 104,212 acres of this community occurs along the southern slopes of the

Little San Bernardino Mountains, where approximately 65% is protected within Joshua Tree National Park, Big Morongo ACEC, and the San Gorgonio Wilderness immediately west of Highway 62.

Distribution within the Coachella Valley. Within the MSHCP Reserve System, Mojave mixed woody scrub occurs in five of the Conservation Areas:

1. Upper Mission Creek/Big Morongo Canyon Conservation Area
2. West Deception Canyon Conservation Area
3. Indio Hills/Joshua Tree National Park Linkage Conservation Area
4. Joshua Tree National Park Conservation Area
5. Desert Tortoise and Linkage Conservation Area

Comparison with *Manual of California Vegetation*. Ultimately, the Plan will use the vegetation classification system in the MCV (Sawyer and Keeler-Wolf 1995). The natural community described by the Holland system as Mojave mixed woody scrub would be represented by the following MCV series:

1. Joshua tree series

Associated Covered Species. One Covered Species is associated with this natural community, the desert tortoise.

Essential Ecological Processes. The processes that may be significant to the maintenance of this scrub community are not well known. Large-scale ecological processes that affect Mojave mixed woody scrub are those processes that threaten the integrity of this natural community, including invasion of exotic weeds and nitrogen deposition from smog fallout. These processes that manifest as threats to the community are discussed in more detail in Section 8.0.

10.4 Alkali Scrub Communities

This section contains a summary description, including natural community characteristics, typical species, and significant threats, for the two alkali scrub communities proposed for coverage in the Plan. General Conservation measures, which are common to both of these communities, are listed below.

1. Protect unfragmented blocks of these natural communities to the Maximum Extent Feasible.

2. Reduce and control non-native plant species, in particular tamarisk, which is highly invasive in these communities and can replace desert saltbush scrub or desert sink scrub in suitable Habitat.

3. Portions of these natural communities west of the Salton Sea are on the Torres Martinez Indian Reservation and are not in the Plan Area. Coordination and cooperation with the Torrez Martinez will be pursued.

10.4.1 Desert Saltbush Scrub

10.4.1.1 Natural Community Conservation Goals and Objectives

Conserve and manage occurrences of this natural community within the MSHCP Reserve System according to the following criteria:

Goal 1: Conserve natural community occurrences representative of the range of environmental conditions within which the community is known to occur. Incorporate a range of environmental gradients (e.g. slope, elevation, aspect) and high Habitat diversity.

Objective 1. Through adherence to other Conservation Objectives (for another species, a natural community, Essential Ecological Process area, Biological Corridor, or Linkage area), conserve occurrences of this natural community within the following Conservation Areas

- East Indio Hills Conservation Area
- Dos Palmas Conservation Area
- Coachella Valley Stormwater Channel and Delta Conservation Area

Goal 2: Protect Essential Ecological Processes necessary to maintain this natural community.

Objective 2. Ensure protection of Essential Ecological Process areas through Conservation Area Conservation Objectives for Essential Ecological Processes.

Goal 3: Ensure Conservation of Habitat quality through protection, monitoring and Adaptive Management, and restoration where necessary, to contribute to maintenance of this community within Conservation Areas.

Objective 3. Implement biological monitoring and Adaptive Management actions to ensure Conservation of this natural community.

10.4.1.2 Threats, Limiting Factors, and Adaptive Management

Threats to this community include fragmentation; many of the intact occurrences occur in small patches surrounded by agriculture. Another threat is invasive plant species, particularly tamarisk, which often displaces desert saltbush scrub in the moist soils around the Salton Sea. Because tamarisk tolerates the alkaline soils to which the species in this natural community are adapted, it can and does become a dominant member of this community.

The following actions may be needed to ensure persistence of this natural community if biological monitoring indicates that such actions are warranted. This list is not comprehensive but identifies some of the known or likely threats to desert saltbush scrub. In addition to conserving the desert saltbush scrub natural community, the Plan will integrate biological monitoring and management actions into a Management and Monitoring Program for this natural community. The Monitoring Program will be designed to provide feedback so that management activities can be adjusted to maximize natural community Conservation. More detailed and specific information on the biological monitoring and management actions described here and proposed for this natural community can be found in Section 8.0, MSHCP Reserve Management and Monitoring Program. Actions may include:

1. Control and manage activities that degrade desert saltbush scrub. In particular, control and manage the primary threats to this scrub community, including invasive plants that can dominate this community, and fragmentation.
2. Identify actions to reduce impacts from, and control where feasible, invasive species if it is determined from monitoring results that there are impacts to desert saltbush scrub community. Tamarisk is a known invasive species that may dominate this community.
3. Implement monitoring to track, and ultimately distinguish between, changes due to human or natural causes. Significant variables may include live perennial shrub abundance and invasive exotic plant abundance.

10.4.1.3 Natural Community Conservation Analysis

Conservation Area Reserve Design. To conserve desert saltbush scrub within the Plan Area, the MSHCP Reserve System includes, to the extent possible, intact stands of this natural community, without significant fragmentation impacts, and the presence of intact Essential Ecological Processes necessary to maintain this community. To the extent they occur, contiguous stands of this natural community were selected when available. Also, to the extent possible, the Planning Team attempted to include a range of environmental gradients (e.g. slope, elevation, aspect) within which this natural community occurs. The extant occurrences of desert saltbush scrub within the Plan Area are primarily in the Coachella Valley Stormwater Channel and Delta Conservation Area. Stands of this natural community occur mostly in fragmented patches surrounded by agriculture. To the extent possible, the MSHCP Reserve System includes the

largest, contiguous stands of desert saltbush scrub still extant in this area. This natural community is conserved within the Plan Area by specific Conservation Objectives in all three Conservation Areas where it occurs.

Desert saltbush scrub occurs within the Plan Area in three Conservation Areas: Willow Hole, East Indio Hills, and Coachella Valley Stormwater Channel and Delta. The presence of desert saltbush scrub within each of the Conservation Areas is shown in Table 10-12. The Planning Team identified and assessed Conservation for this natural community in the following Conservation Areas:

1. ***Willow Hole.*** Desert saltbush scrub occurs on approximately 169 acres within the Willow Hole Conservation Area, of which the Plan will conserve approximately 152 acres. The desert saltbush scrub occurs primarily along the margins of the mesquite hummock areas in nearly pure stands of several saltbush species.

2. ***East Indio Hills.*** There are approximately 8 acres of desert saltbush scrub mapped in this Conservation Area. Approximately 7 of these acres will be conserved under the Plan.

3. ***Coachella Valley Stormwater Channel & Delta.*** There are 713 acres of desert saltbush scrub within this Conservation Area; approximately 642 of these acres will be conserved under the Plan.

Table 10-12: Summary of Natural Community within Conservation Areas: Desert Saltbush Scrub

	Land within the Conservation Areas				
CONSERVATION AREA	***Total Acres of Natural Community in Conservation Area***	***Total Acres Subject to Impacts[2]***	***Acres within Existing Conservation Lands***	***Remaining Acres to be Conserved***	***Total Acres to be Conserved in MSHCP Reserve System***
WILLOW HOLE	169	17	0	152	152
EAST INDIO HILLS	8	1	0	7	7
CV STORMWATER CHANNEL & DELTA	713	71	0	642	642
TOTAL	**890**	**89**	**0**	**801**	**801**

Conservation Levels. The MSHCP Reserve System would provide protection of desert saltbush scrub in three Conservation Areas: Willow Hole, East Indio Hills, and Coachella Valley

Stormwater Channel and Delta Conservation Areas. It should be noted that several species of saltbush occur in smaller stands as a subset of Sonoran creosote bush scrub in other Conservation Areas, including Thousand Palms and Dos Palmas. These smaller stands will also be protected as a result of the Plan. In addition to conserving currently unprotected Habitat, the Plan benefits this natural community by addressing threats, including invasive plants such as tamarisk.

Conservation of 801 acres, or 15%, of desert saltbush scrub will occur within the Plan Area. The occurrences of this natural community outside the Conservation Areas are generally highly fragmented.

10.4.1.4 Natural Community Account: Background

Description. The desert saltbush scrub community can include various species of saltbush in a nearly uniform stand of shrubs, forming a more complete cover than in creosote bush scrub. This community occupies areas where fine-textured, poorly drained soils with high salinity and/or alkalinity occur, Habitats that are generally moist, with a sandy loam soil, and a total salinity in the range of 0.2 - 0.7%. Physiognomically, the community is often composed of a nearly uniform stand of shrubs about 1 meter tall forming a more complete cover than in creosote bush scrub. One or more species of *Atriplex* are dominant in this community, including allscale (*Atriplex polycarpa)* and four-winged saltbush (*Atriplex canescens* var. *linearis*). Screwbean mesquite (*Prosopis glandulosa* var. *torreyana*) is a common associate. Four-wing saltbush shows greater dominance in dryer, coarser soils and occurs throughout the desert saltbush scrub community. Screwbean mesquite reaches greater development in lower-elevation areas with a shallow water table or capillary fringe. Alkali goldenbush (*Isocoma acradenia)* is common in areas where *P. glandulosa* is dominant. Once common in the Plan Area, this community now occurs only in small patches in the Willow Hole area, the Thousand Palms Preserve, and in the higher salinity soils in the area around the northern portion of the Salton Sea. The total acreage in the Plan Area is 5,325, none of which currently occurs on public or private Existing Conservation Land.

Distribution within the Coachella Valley. Within the MSHCP Reserve System, desert saltbush scrub is mapped in three of the Conservation Areas:

1. Willow Hole Conservation Area
2. East Indio Hills Conservation Area
3. Coachella Valley Stormwater Channel and Delta Conservation Area

Comparison with *Manual of California Vegetation*. Ultimately, the Plan will use the vegetation classification system in the MCV (Sawyer and Keeler-Wolf 1995). The natural community described by the Holland system as desert saltbush scrub would compare with one or more of the following MCV series:

1. Allscale series
2. Desert holly series
3. Fourwing saltbush series
4. Mixed saltbush series

5. Spinescale series

Associated Covered Species. Covered Species that are associated with this community are: flat-tailed horned lizard, Le Conte's thrasher, and crissal thrasher. This community may be used during migration by riparian birds.

Essential Ecological Processes. The Essential Ecological Processes that are significant to the maintenance of desert saltbush scrub are not well known. Maintenance of the existing hydrological regimes is probably significant to this natural community as an important element of soil alkalinity or salinity. Some ecological processes that affect desert saltbush scrub are those processes that threaten the integrity of this natural community, including invasion of exotic plants, particularly tamarisk.

10.4.2 Desert Sink Scrub

10.4.2.1 Natural Community Conservation Goals and Objectives

Conserve and manage occurrences of this natural community within the MSHCP Reserve System according to the following criteria:

Goal 1: Conserve natural community occurrences representative of the range of environmental conditions within which the community is known to occur. Incorporate a range of environmental gradients (e.g. slope, elevation, aspect) and high Habitat diversity.

Objective 1. Ensure Conservation of this natural community within the following Conservation Areas:

- Dos Palmas Conservation Area
- Coachella Valley Stormwater Channel and Delta Conservation Area

Goal 2: Protect Essential Ecological Processes necessary to maintain this natural community.

Objective 2. Ensure protection of Essential Ecological Process areas through Conservation Area Conservation Objectives for Essential Ecological Processes.

Goal 3: Ensure Conservation of Habitat quality through protection, monitoring and Adaptive Management, and restoration where necessary, to contribute to maintenance of this community within Conservation Areas.

Objective 3. Implement biological monitoring and Adaptive Management actions to ensure Conservation of this natural community.

10.4.2.2 Threats, Limiting Factors, and Adaptive Management

Threats to this community include fragmentation and invasive plant species, particularly tamarisk. Most of the occurrences of desert sink scrub in the vicinity of the Whitewater River delta and the Salton Sea are fragmented. In this area, desert sink scrub occurs as scattered patches amidst agricultural Development. This fragmentation results in high edge effects. Another threat to this natural community is the invasive, non-native tamarisk or salt cedar. Because tamarisk tolerates the high soil salinity areas where desert sink scrub species occur, it invades this natural community if adequate soil moisture is available.

The following actions may be needed to ensure persistence of this natural community if biological monitoring indicates that such actions are warranted. This list is not comprehensive but identifies some of the known or likely threats to desert sink scrub. In addition to conserving the desert sink scrub natural community, the Plan will integrate biological monitoring and management actions into a Management and Monitoring Program for this natural community. The Monitoring Program will be designed to provide feedback so that management activities can be adjusted to maximize natural community Conservation. More detailed and specific information on the biological monitoring and management actions described here and proposed for this natural community can be found in Section 8.0, MSHCP Reserve Management and Monitoring Program. Actions may include:

1. Control and manage activities that degrade desert sink scrub. In particular, control and manage the primary threats to this scrub community, including invasive plants that dominate this community, and fragmentation.
2. Identify actions to reduce impacts from, and control where feasible, invasive species if it is determined from monitoring results that there are impacts to desert sink scrub community. Tamarisk is a known invasive species that may dominate this community.
3. Implement monitoring to track, and ultimately distinguish between, changes due to human or natural causes. Significant variables may include live perennial shrub abundance and invasive exotic plant abundance.

10.4.2.3 Natural Community Conservation Analysis

Conservation Area Reserve Design. To conserve desert sink scrub within the Plan Area, the MSHCP Reserve System includes, to the extent possible, intact stands of this natural community, without significant fragmentation impacts, and the presence of intact Essential Ecological Processes necessary to maintain this community. To the extent they occur, contiguous stands of this natural community were selected when available. Also, to the extent possible, the Planning Team attempted to include a range of environmental gradients (e.g. slope, elevation, aspect) within which this natural community occurs. The extant occurrences of desert sink scrub within the Plan Area are in the Dos Palmas and Coachella Valley Stormwater Channel and Delta

Conservation Areas. Stands of this natural community occur mostly in fragmented patches surrounded by agriculture. To the extent possible, the MSHCP Reserve System includes the largest, contiguous stands of desert sink scrub still extant in this area. This natural community is conserved within the Plan Area by specific Conservation Objectives in each of the Conservation Areas where it occurs.

Desert sink scrub occurs within the Plan Area in two Conservation Areas: Dos Palmas and Coachella Valley Stormwater Channel and Delta. The presence of desert sink scrub within each of the Conservation Areas is shown in Table 10-13. The Planning Team identified and assessed Conservation for this natural community in the following Conservation Areas:

1. ***Dos Palmas.*** Desert sink scrub occurs on approximately 7,195 acres within the Dos Palmas Conservation Area, of which the Plan will conserve approximately 6,708 acres. Within the Dos Palmas Conservation Area this natural community occurs in areas where soil alkalinity is high and plants are widely spaced with large expanses of bare ground.

2. ***Coachella Valley Stormwater Channel & Delta.*** Desert sink scrub occurs on approximately 1,206 acres within the Coachella Valley Stormwater Channel & Delta Conservation Area, of which the Plan will conserve approximately 1,106 acres. Within the Coachella Valley Stormwater Channel & Delta Conservation Area this natural community occurs in areas where soil alkalinity is high, usually close to the Salton Sea.

Conservation Levels. The MSHCP Reserve System would provide protection of desert sink scrub in two Conservation Areas: Dos Palmas and Coachella Valley Stormwater Channel and Delta Conservation Areas. In addition to conserving currently unprotected Habitat, the Plan benefits this natural community by addressing threats to this community, including invasive plants such as tamarisk.

Conservation of 7,814 acres, or 82%, of desert sink scrub will ensure that this natural community is sustained within the Plan Area.

Table 10-13: Summary of Natural Community within Conservation Areas: Desert Sink Scrub

CONSERVATION AREA	*Land within the Conservation Areas*				
	Total Acres of Natural Community in Conservation Area	*Total Acres Subject to Impacts*[2]	*Acres within Existing Conservation Lands*	*Remaining Acres to be Conserved*	*Total Acres to be Conserved in MSHCP Reserve System*
DOS PALMAS	7,195	487	2,327	4,381	6,708
CV STORMWATER CHANNEL & DELTA	1,206	100	209	897	1,106
TOTAL	**8,401**	**587**	**2,536**	**5,278**	**7,814**

10.4.2.4 Natural Community Account: Background

Description. This community is similar to desert saltbush scrub, but plants are often more widely spaced and most species are succulent chenopods. Saltbush (*Atriplex* spp.) is a minor component. Pickleweed (*Salicornia virginica*), iodine bush (*Allenrolfea occidentalis*), and bush seepweed (*Suaeda moquinii)* are characteristic of this community. It occurs at lower elevations on poorly drained moist to wet soils with high alkalinity and/or salinity. Desert sink scrub appears to displace desert saltbush scrub in areas of a high water table and a salt crust at the surface. Some of the species, in particular iodine bush, can endure more alkaline or salty soils than most other desert plants (Jaeger 1969). In some areas, such as at Dos Palmas, the plant cover is extremely low and this natural community grades into alkaline flats devoid of vegetation. It is found in the vicinity of the Salton Sea, partially on Torres Martinez Reservation land and partially on private land, and in the Dos Palmas/Salt Creek area east of the Salton Sea. Of the 9,535 acres in the Plan Area, 27% currently occurs on public or private Existing Conservation Land.

Distribution within the Coachella Valley. Within the MSHCP Reserve System, desert sink scrub is mapped in three of the Conservation Areas:

1. Dos Palmas Conservation Area
2. Coachella Valley Stormwater Channel and Delta Conservation Area

Vegetation Characterization. Ultimately, the Plan will use the vegetation classification system in the MCV (Sawyer and Keeler-Wolf 1995). The natural community described by the

Holland system as desert sink scrub would compare with one or more of the following MCV series:

1. Bush seepweed series
2. Fourwing saltbush series
3. Greasebush series
4. Iodine bush series
5. Mixed saltbush series

Associated Covered Species. The Covered Species associated with this community is the flat-tailed horned lizard in the Salt Creek area of the Dos Palmas Conservation Area. This community may be used during migration by riparian birds.

Essential Ecological Processes. The Essential Ecological Processes that are significant to the maintenance of desert sink scrub have not been described. Maintenance of the existing hydrological regimes is probably significant to this natural community as an important element of soil alkalinity or salinity. Some ecological processes that affect desert sink scrub are those processes that threaten the integrity of this natural community, including invasion of exotic plants, particularly tamarisk.

10.5 Chaparral Communities

This section contains a summary description, including natural community characteristics, typical species, and significant threats, for each of the four chaparral communities proposed for coverage in the Plan. General Conservation measures, which are common to all these chaparral types, are listed below.

1. As part of the Management and Monitoring Program, evaluate the need to manage fire to avoid senescence of vegetation due to fire suppression. Develop appropriate fire management prescriptions for chaparral natural communities. This may include the use of prescribed fire and/or standards for controlling wildfires to maintain or restore these communities.

2. Essential Ecological Processes, including fire regimes, are protected to ensure sustainability of the community. Please refer to the Section 4.3 subsections for specific goals for ecosystem processes.

10.5.1 Chamise Chaparral

10.5.1.1 Natural Community Conservation Goals and Objectives

Conserve and manage occurrences of chamise chaparral within the MSHCP Reserve System according to the following criteria:

Goal 1: Conserve natural community occurrences representative of the range of environmental conditions within which the community is known to occur. Incorporate a range of environmental gradients (e.g. slope, elevation, aspect) and high Habitat diversity.

Objective 1. Ensure Conservation of this natural community within the following Conservation Areas:

- Cabazon Conservation Area
- Stubbe and Cottonwood Canyons Conservation Area
- Whitewater Canyon Conservation Area

Goal 2: Protect Essential Ecological Processes necessary to maintain this natural community.

Objective 2. Ensure protection of Essential Ecological Process areas through Conservation Area Conservation Objectives for Essential Ecological Processes.

Goal 3: Ensure Conservation of Habitat quality through protection, monitoring and Adaptive Management, and restoration where necessary, to contribute to maintenance of this community within Conservation Areas.

Objective 3. Implement biological monitoring and Adaptive Management actions to ensure Conservation of this natural community.

10.5.1.2 Threats, Limiting Factors, and Adaptive Management

Threats to the chamise chaparral natural community are relatively few in that the occurrences of chamise chaparral are on the slopes of the San Bernardino Mountains in areas of no Development potential, including portions of the San Gorgonio Wilderness Area. However, increased fire frequency due to the spread of non-native plant species may affect this chaparral in the future.

The following actions may be needed to ensure persistence of this natural community if biological monitoring indicates that such actions are warranted. This list is not comprehensive but identifies some of the known or likely threats to chamise chaparral. In addition to conserving

the chamise chaparral natural community, the Plan will integrate monitoring and management actions into a Management and Monitoring Program for this natural community. The Monitoring Program will be designed to provide feedback so that management activities can be adjusted to maximize natural community Conservation. More detailed and specific information on the biological monitoring and management actions described here and proposed for this natural community can be found in Section 8.0, MSHCP Reserve Management and Monitoring Program. Actions may include:

1. Control and manage activities that degrade chamise chaparral.

2. Identify actions to reduce impacts from, and control where feasible, invasive species if it is determined from monitoring results that there are impacts to the chamise chaparral natural community.

10.5.1.3 Natural Community Conservation Analysis

Conservation Area Configuration Issues. The areas of chamise chaparral within the Plan Area are in scattered patches on the slopes of the San Bernardino Mountains, in the vicinity of Millard, Stubbe and Cottonwood Canyons. Chamise chaparral occurs in intact stands in an area where there has been little or no disturbance. It occurs in a matrix with other chaparral types, including semi-desert chaparral and interior live oak chaparral.

The occurrence of chamise chaparral is limited within the Plan Area to three Conservation Areas, Cabazon, Stubbe and Cottonwood Canyons, and Whitewater Canyon. The presence of chamise chaparral within each of the Conservation Areas is shown in Table 10-14. The Planning Team identified and assessed Conservation for this natural community in the following Conservation Areas:

1. ***Cabazon.*** There are approximately 188 acres of chamise chaparral in this Conservation Area of which the Plan conserves approximately 163 acres.

2. ***Stubbe and Cottonwood Canyons.*** There are approximately 1,983 acres of chamise chaparral in this Conservation Area. The Plan will ensure Conservation of approximately 1,966 of these acres.

3. ***Whitewater Canyon.*** There are approximately 569 acres of chamise chaparral within this Conservation Area, of which approximately 553 acres will be conserved under the Plan.

Conservation Levels. The MSHCP Reserve System would provide protection of chamise chaparral in three Conservation Areas: Cabazon, Stubbe and Cottonwood Canyons, and Whitewater Canyon Conservation Areas. In addition to conserving currently unprotected Habitat,

the Plan benefits this natural community by addressing threats to this community as they are identified through Adaptive Management.

Conservation of 2,688 acres, or 98%, of chamise chaparral will ensure that this natural community is sustained within the Plan Area.

Table 10-14: Summary of Natural Community within Conservation Areas: Chamise Chaparral

CONSERVATION AREA	*Land within the Conservation Areas*				
	Total Acres of Natural Community in Conservation Area	*Total Acres Subject to Impacts*[2]	*Acres within Existing Conservation Lands*	*Remaining Acres to be Conserved*	*Total Acres to be Conserved in MSHCP Reserve System*
CABAZON	188	19	0	163 (6)[1]	163
STUBBE & COTTONWOOD CYN	1,983	17	1,813	153	1,966
WHITEWATER CANYON	569	16	407	146	553
TOTAL	**2,740**	**52**	**2,220**	**462 (6)[1]**	**2,688**

[1] Numbers within parentheses are acres of Habitat in fluvial sand transport areas. The Conservation Objective for these acres is to maintain fluvial sand transport. Habitat Conservation is not an objective.

10.5.1.4 Natural Community Account: Background

Description. Chamise chaparral is one of nine chaparral types in California. Chamise chaparral is a 1-to-3-meter-tall chaparral overwhelmingly dominated by chamise (*Adenostoma fasciculatum*). It is adapted to repeated fires by stump sprouting. Mature stands are densely interwoven with very little herbaceous understory or litter and a nearly continuous canopy. This is a common community on the western slopes of the San Jacinto and Santa Rosa Mountains, but is not prevalent in the Plan Area. Approximately 2,741 acres occurs in two areas, on the lower slopes of the San Bernardino Mountains west of Whitewater Canyon, and near the western edge of the Plan Area. The other occurrence stretches in a band from the Whitewater River to Stubbe Creek. The majority of this occurrence is on BLM land. Approximately 81% of the chamise chaparral occurs on public land. This natural community also occurs on the Morongo Indian Reservation, which is not part of the Plan Area.

Distribution within the Coachella Valley. Within the MSHCP Reserve System, chamise chaparral is mapped in three of the Conservation Areas:

1. Cabazon Conservation Area
2. Stubbe and Cottonwood Canyons Conservation Area
3. Whitewater Canyon Conservation Area

Comparison with *Manual of California Vegetation*. Ultimately, the Plan will use the vegetation classification system in the MCV (Sawyer and Keeler-Wolf 1995). The natural community described by the Holland system as chamise chaparral would compare with one or more of the following MCV series:

1. Chamise series
2. Chamise - bigberry manzanita series
3. Chamise - black sage series
4. Chamise - cupleaf ceanothus series
5. Chamise - Eastwood manzanita series
6. Chamise - hoaryleaf ceanothus series
7. Chamise - mission-manzanita - woollyleaf ceanothus series
8. Chamise - wedgeleaf ceanothus series and Chamise - white sage series

Associated Covered Species. The Covered Species associated with this community is the desert tortoise in the area west of Whitewater Canyon. It is possible that gray vireo could be associated with this natural community.

Essential Ecological Processes. Maintenance of fire regimes is a relevant ecological process to ensure that this natural community is sustained.

10.5.2 Redshank Chaparral

10.5.2.1 Natural Community Conservation Goals and Objectives

Conserve and manage occurrences of this natural community within the MSHCP Reserve System according to the following criteria:

Goal 1: Conserve natural community occurrences representative of the range of environmental conditions within which the community is known to occur. Incorporate a range of environmental gradients (e.g. slope, elevation, aspect) and high Habitat diversity.

Objective 1. Ensure Conservation of this natural community within the following Conservation Area:

- Santa Rosa and San Jacinto Mountains Conservation Area

Goal 2: Protect Essential Ecological Processes necessary to maintain this natural community.

Objective 2. Ensure protection of Essential Ecological Process areas through Conservation Area Conservation Objectives for Essential Ecological Processes.

Goal 3: Ensure Conservation of Habitat quality through protection, monitoring and Adaptive Management, and restoration where necessary, to contribute to maintenance of this community within Conservation Areas.

Objective 3. Implement biological monitoring and Adaptive Management actions to ensure Conservation of this natural community.

10.5.2.2 Threats, Limiting Factors, and Adaptive Management

The redshank chaparral stands within the Santa Rosa and San Jacinto Mountains Conservation Area are relatively free of threats. There is some fragmentation from sparse, low-density residential Development in the vicinity of Pinyon Flat. This Development creates a potential for larger and more frequent wildfires resulting from human activities. Altered fire frequency and magnitude are stressors to this natural community.

The following actions may be needed to ensure persistence of this natural community if biological monitoring indicates that such actions are warranted. This list is not comprehensive but identifies some of the known or likely threats to redshank chaparral. In addition to conserving the redshank chaparral natural community, the Plan will integrate biological monitoring and management actions into a Management and Monitoring Program for this natural community. The Monitoring Program will be designed to provide feedback so that management activities can be adjusted to maximize natural community Conservation. More detailed and specific information on the biological monitoring and management actions described here and proposed for this natural community can be found in Section 8.0, MSHCP Reserve Management and Monitoring Program. Actions may include:

1. Control and manage activities that degrade redshank chaparral.
2. Identify actions to reduce impacts from, and control where feasible, invasive species if it is determined from monitoring results that there are impacts to redshank chaparral community.
3. Coordinate with state and federal agencies on fire management efforts affecting this natural community.

10.5.2.3 Natural Community Conservation Analysis

Conservation Area Reserve Design. Redshank chaparral occurs in relatively contiguous stands along Highway 74 in the vicinity of Pinyon Flat and along an elevational gradient along the south-facing slopes of the Santa Rosa and San Jacinto Mountains. This natural community occurs in relatively intact stands, with very little fragmentation. All of the areas where this natural community occurs are included within the Santa Rosa and San Jacinto Mountains Conservation Area. The presence of redshank chaparral within this Conservation Areas is shown in Table 10-15. The Planning Team identified and assessed Conservation for this natural community in the following Conservation Area:

1. ***Santa Rosa and San Jacinto Mountains.*** There are approximately 12,514 acres of redshank chaparral mapped in this Conservation Area. The Plan will ensure Conservation of approximately 12,261 of these acres. Very limited low-density residential Development occurs within the stands of redshank chaparral along Highway 74. Highway 74 and the Santa Rosa peak road bisect a portion of the redshank chaparral. Most of the stands of redshank chaparral are intact and undisturbed.

Conservation and Disturbance Levels. The MSHCP Reserve System would provide protection of redshank chaparral in the only Conservation Area where it occurs, the Santa Rosa and San Jacinto Mountains Conservation Area. In addition to conserving currently unprotected Habitat, the Plan benefits this natural community by addressing threats to this community as they are identified through Adaptive Management.

Conservation of 12,261 acres, or 92%, of redshank chaparral will ensure that this natural community is sustained and restored within the Plan Area.

Table 10-15: Summary of Natural Community within Conservation Areas: Redshank Chaparral

	Land within the Conservation Areas				
CONSERVATION AREA	***Total Acres of Natural Community in Conservation Area***	***Total Acres Subject to Impacts[2]***	***Acres within Existing Conservation Lands***	***Remaining Acres to be Conserved***	***Total Acres to be Conserved in MSHCP Reserve System***
SANTA ROSA & SAN JACINTO MOUNTAINS	12,514	253	9,987	2,274	12,261
TOTAL	**12,514**	**253**	**9,987**	**2,274**	**12,261**

10.5.2.4 Natural Community Account: Background

Description. Redshank chaparral is similar to chamise chaparral, but it is typically taller, 2 to 4 meters, and somewhat more open, often forming nearly pure stands of redshank (*Adenostoma sparsifolium*). Redshank itself is an open shrub or small tree with multiple branches from the base covered with rust-red, shaggy bark. Redshank chaparral is often adjacent to and may intergrade with chamise chaparral. Redshank chaparral is found in only four locations in Southern California and Baja California. Its center of distribution is in the San Jacinto and Santa Rosa Mountains and the interior valleys of Riverside and San Diego Counties. Major stands occur in the south Laguna Mountains of San Diego County, the mountain plateaus of northern Baja California, the western Santa Monica Mountains in Los Angeles County, and the western Cuyama Valley of Santa Barbara and San Luis Obispo Counties. It ranges in elevation from 600 to 1,800 meters, with both coastal and desert exposures on granitic soils. Davis et al. (1995) listed redshank chaparral as a natural community considered to be at risk; this ranking is perhaps because this natural community is not widely distributed in California and occurs in areas of increasing pressure from urbanization. In the Plan Area, about 13,282 acres of redshank chaparral occur just above chamise chaparral in the Santa Rosa Mountains. Approximately 75% of it currently occurs on public land or Private Conservation Land. Occurrences in the Santa Rosa and San Jacinto Mountains Conservation Area are protected with the designation of the Santa Rosa and San Jacinto Mountains National Monument.

Distribution within the Coachella Valley. Within the MSHCP Reserve System, redshank chaparral is mapped in one of the Conservation Areas:

1. Santa Rosa and San Jacinto Mountains Conservation Area

Comparison with *Manual of California Vegetation*. Ultimately, the Plan will use the vegetation classification system in the MCV (Sawyer and Keeler-Wolf 1995). The natural community described by the Holland system as redshank chaparral would compare with one or more of the following MCV series:

1. Red shank series
2. Red shank birchleaf and red shank - chamise series

Associated Covered Species. The Covered Species associated with this community is the gray vireo.

Essential Ecological Processes. Fire regimes are an important ecological process for this community.

10.5.3 Interior Live Oak Chaparral

10.5.3.1 Natural Community Conservation Goals and Objectives

Conserve and manage occurrences of this natural community within the MSHCP Reserve System according to the following criteria:

Goal 1: Conserve natural community occurrences representative of the range of environmental conditions within which the community is known to occur. Incorporate a range of environmental gradients (e.g. slope, elevation, aspect) and high Habitat diversity.

Objective 1. Ensure Conservation of this natural community within the following Conservation Areas:

- Cabazon Conservation Area
- Stubbe and Cottonwood Canyons Conservation Area
- Whitewater Canyon Conservation Area
- Santa Rosa and San Jacinto Mountains Conservation Area

Goal 2: Protect Essential Ecological Processes necessary to maintain this natural community.

Objective 2. Ensure protection of Essential Ecological Process areas through Conservation Area Conservation Objectives for Essential Ecological Processes.

Goal 3: Ensure Conservation of Habitat quality through protection, monitoring and Adaptive Management, and restoration where necessary, to contribute to maintenance of this community within Conservation Areas.

Objective 3. Implement biological monitoring and Adaptive Management actions to ensure long-term persistence of this natural community.

10.5.3.2 Threats, Limiting Factors, and Adaptive Management

Immediate threats to this natural community are not apparent. The stands of interior live oak chaparral occur in remote areas where disturbance is minimal, including USFS and BLM lands that are protected within the Santa Rosa and San Jacinto Mountains National Monument. An understanding of the natural fire regime and the need for fire management would be beneficial.

The following actions may be needed to ensure that this natural community is sustained if biological monitoring indicates that such actions are warranted. This list is not comprehensive

but identifies some of the known or likely threats to interior live oak chaparral. In addition to conserving the interior live oak chaparral natural community, the Plan will integrate biological monitoring and management actions into a Management and Monitoring Program for this natural community. The Monitoring Program will be designed to provide feedback so that management activities can be adjusted to maximize natural community Conservation. More detailed and specific information on the biological monitoring and management actions described here and proposed for this natural community can be found in Section 8.0, MSHCP Reserve Management and Monitoring Program. Actions may include:

1. Control and manage activities that degrade interior live oak chaparral.
2. Identify actions to reduce impacts from, and control where feasible, invasive species if it is determined from monitoring results that there are impacts to the interior live oak chaparral natural community.

10.5.3.3 Natural Community Conservation Analysis

Conservation Area Reserve Design. The interior live oak chaparral natural community occurs in relatively intact stands, with virtually no fragmentation, and with natural processes intact.

The occurrence of interior live oak chaparral is limited within the Plan Area to three Conservation Areas, Cabazon, Whitewater Canyon, and Santa Rosa and San Jacinto Mountains. The presence of this natural community within each of the Conservation Areas is shown in Table 10-16. The Planning Team identified and assessed the Conservation for this natural community in the following Conservation Areas:

1. ***Cabazon.*** There are approximately 4,691 acres of interior live oak chaparral in this Conservation Area of which the Plan conserves approximately 4,678 acres.

2. ***Stubbe & Cottonwood Canyons.*** There are approximately 1,220 acres of interior live oak chaparral within this Conservation Area; all 1,220 acres are within Existing Conservation Lands and will be conserved under the Plan.

3. ***Whitewater Canyon.*** There are approximately 24 acres of interior live oak chaparral within this Conservation Area; all 24 acres are within Existing Conservation Lands and will be conserved under the Plan.

4. ***Santa Rosa and San Jacinto Mountains.*** There are approximately 2,738 acres of interior live oak chaparral mapped in this Conservation Area. The Plan will ensure Conservation of approximately 2,660 of these acres. These stands are essentially intact and undisturbed.

Conservation and Disturbance Levels. The MSHCP Reserve System would provide protection of interior live oak chaparral in four Conservation Areas identified by the SAC and the Planning Team: Cabazon, Stubbe and Cottonwood Canyons, Whitewater Canyon, and Santa Rosa and San Jacinto Mountains Conservation Areas. In addition to conserving currently unprotected Habitat, the Plan benefits this natural community by addressing threats to this community as they are identified through Adaptive Management.

Conservation of 8,582 acres of interior live oak chaparral will ensure that this natural community is sustained within the Plan Area.

Table 10-16: Summary of Natural Community within Conservation Areas: Interior Live Oak Chaparral

	Land within the Conservation Areas				
CONSERVATION AREA	***Total Acres of Natural Community in Conservation Area***	***Total Acres Subject to Impacts[2]***	***Acres within Existing Conservation Lands***	***Remaining Acres to be Conserved***	***Total Acres to be Conserved in MSHCP Reserve System***
CABAZON	4,691	13	4,562	116	4,678
STUBBE & COTTONWOOD CANYONS	1,220	0	1,220	0	1,220
WHITEWATER CANYON	24	0	24	0	24
SANTA ROSA & SAN JACINTO MOUNTAINS	2,738	78	1,954	706	2,660
TOTAL	**8,673**	**91**	**7,760**	**822**	**8,582**

10.5.3.4 Natural Community Account: Background

Description. The interior live oak chaparral community occurs as a dense, tall (to seven meters (20 feet)) chaparral dominated by interior live oak (*Quercus wislizenii*) and scrub oak (*Quercus berberidifolia*) with several other sclerophylls also in the canopy. Other associated species include chaparral whitethorn (*Ceanothus leucodermis*), birchleaf mountain mahogany (*Cercocarpus betuloides*), coffeeberry (*Rhamnus californica*), and hollyleaf redberry (*Rhamnus ilicifolia*). This chaparral is fairly mesic and occurs in valley and foothills. In Southern California, stands are believed to be the result of frequent sprouting after fire (White and Sawyer 1995). This community recovers rapidly after fire (Holland 1986). There is typically very little

understory due to the persistent leaf litter and dense canopy of these stands. Approximately 38% of the approximately 20,574 acres in the Plan Area is protected on Existing Conservation Lands.

Distribution within the Coachella Valley. Within the MSHCP Reserve System, interior live oak chaparral is mapped in four of the Conservation Areas:

1. Cabazon Conservation Area
2. Stubbe and Cottonwood Canyons Conservation Area
3. Whitewater Canyon Conservation Area
4. Santa Rosa and San Jacinto Mountains Conservation Area

Comparison with *Manual of California Vegetation*. Ultimately, the Plan will use the vegetation classification system in the MCV (Sawyer and Keeler-Wolf 1995). The natural community described by the Holland system as interior live oak chaparral would compare with one or more of the following MCV series:

1. Canyon live oak scrub series
2. Interior live oak scrub series
3. Interior live oak - canyon live oak shrub series
4. Interior live oak - chaparral whitethorn shrub series and interior live oak - scrub oak shrub series

Associated Covered Species. The Covered Species associated with this community is the gray vireo.

Essential Ecological Processes. Fire regimes are an important ecological process for this community.

10.5.4 Semi-Desert Chaparral

10.5.4.1 Natural Community Conservation Goals and Objectives

Conserve and manage occurrences of this natural community within the MSHCP Reserve System according to the following criteria:

Goal 1: Conserve natural community occurrences representative of the range of environmental conditions within which the community is known to occur. Incorporate a range of environmental gradients (e.g. slope, elevation, aspect) and high Habitat diversity.

Objective 1. Ensure Conservation of this natural community within the following Conservation Areas:

- Cabazon
- Stubbe and Cottonwood Canyons
- Snow Creek/Windy Point
- Whitewater Canyon
- Santa Rosa and San Jacinto Mountains Conservation Area

Goal 2: Protect Essential Ecological Processes, which may include hydrological regimes, necessary to maintain this natural community.

Objective 2. Ensure protection of Essential Ecological Process areas through Conservation Area Conservation Objectives for Essential Ecological Processes.

Goal 3: Ensure Conservation of Habitat quality through protection, monitoring and Adaptive Management, and restoration where necessary, to contribute to maintenance of this community within Conservation Areas.

Objective 3. Implement biological monitoring and Adaptive Management actions to ensure Conservation of this natural community.

10.5.4.2 Threats, Limiting Factors, and Adaptive Management

Threats to this community are few; however, increased fire frequency due to the spread of non-native plant species may affect this chaparral community.

The following actions may be needed to ensure that this natural community is sustained if biological monitoring indicates that such actions are warranted. This list is not comprehensive but identifies some of the known or likely threats to semi-desert chaparral. In addition to conserving the semi-desert chaparral natural community, the Plan will integrate biological monitoring and management actions into a Management and Monitoring Program for this natural community. Monitoring Programs will be designed to provide feedback so that management activities can be adjusted to maximize natural community Conservation. More detailed and specific information on the biological monitoring and management actions described here and proposed for this natural community can be found in Section 8.0, MSHCP Reserve Management and Monitoring Program. Actions may include:

1. Control and manage activities that degrade semi-desert chaparral.
2. Identify actions to reduce impacts from, and control where feasible, invasive species if it is determined from monitoring results that there are impacts to semi-desert chaparral community.

10.5.4.3 Natural Community Conservation Analysis

Conservation Area Configuration Issues. Semi-desert chaparral occurs in relatively intact stands, with very little fragmentation. Semi-desert chaparral occurs within the Plan Area in five Conservation Areas, Cabazon, Stubbe and Cottonwood Canyons, Snow Creek/Windy Point, Whitewater Canyon, and the Santa Rosa and San Jacinto Mountains. The presence of this natural community within each of the Conservation Areas is shown in Table 10-17. The Planning Team identified and assessed the Conservation for this natural community in the following Conservation Areas:

1. ***Cabazon.*** There are approximately 26 acres of semi-desert chaparral in this Conservation Area. All of these acres are within the fluvial sand transport area where the only Conservation Objective is to maintain fluvial sand transport.

2. ***Stubbe and Cottonwood Canyon***. There are approximately 9 acres of this natural community within this Conservation Area. The Plan will ensure Conservation of all 9 of these acres which are already within Existing Conservation Lands.

3. ***Snow Creek/Windy Point.*** There are approximately 6 acres of this natural community within this Conservation Area. The Plan will ensure Conservation of at least 5 of these acres.

4. ***Whitewater Canyon.*** There are approximately 4,927 acres of semi-desert chaparral mapped in this Conservation Area. The Plan will ensure Conservation of approximately 4,908 of these acres.

5. ***Santa Rosa and San Jacinto Mountains.*** There are approximately 17,602 acres of semi-desert chaparral mapped in this Conservation Area. The Plan will ensure Conservation of approximately 17,318 of these acres.

Conservation and Disturbance Levels. The MSHCP Reserve System would provide protection of semi-desert chaparral in five Conservation Areas: Cabazon, Stubbe and Cottonwood Canyons, Snow Creek/Windy Point, Whitewater Canyon, and Santa Rosa and San Jacinto Mountains Conservation Areas. In addition to conserving currently unprotected Habitat, the Plan benefits this natural community by addressing threats to this community as they are identified through Adaptive Management.

Conservation of 22,229 acres, or 98%, of semi-desert chaparral will ensure that this natural community is sustained and restored within the Plan Area

Table 10-17: Summary of Natural Community within Conservation Areas: Semi-Desert Chaparral

CONSERVATION AREA	*Land within the Conservation Areas*				
	Total Acres of Natural Community in Conservation Area	*Total Acres Subject to Impacts*[2]	*Acres within Existing Conservation Lands*	*Remaining Acres to be Conserved*	*Total Acres to be Conserved in MSHCP Reserve System*
CABAZON	26	N/A	0	(26)[1]	0
STUBBE & COTTONWOOD CANYONS	9	0	9	0	9
SNOW CREEK/ WINDY POINT	6	1	1	4	5
WHITEWATER CANYON	4,927	19	4,739	169	4,908
SANTA ROSA & SAN JACINTO MTNS.	17,602	284	14,654	2,664	17,318
TOTAL	**22,570**	**304**	**19,403**	**2,837 (26)**[1]	**22,240**

[1] Numbers within parentheses are acres of Habitat in fluvial sand transport areas. The Conservation Objective for these acres is to maintain fluvial sand transport. Habitat Conservation is not an objective.

10.5.4.4 Natural Community Account: Background

Description., The semi-desert Chaparral community consists mainly of woody evergreen shrubs between 1.5 and 3 meters (approximately 4.5 and 9 feet) in height, and is somewhat more open than most chaparrals. Some of the dominant plant species include California juniper (*Juniperus californica*), California buckwheat, and O*puntia* cactus species. Other associated species include manzanita (*Arctostaphylos* spp.), *Ceanothus* species, sugar bush (*Rhus ovata*), and scrub oak. This community tends to occur on rockier soils or recently burned sites. Semi-desert chaparral is less fire-prone than other chaparrals because of the lower fuel loads. This community is distributed from the inner Coast Ranges from San Benito County to Kern County, extending into northern Ventura and Santa Barbara counties, and on the interior slopes of the Transverse and Peninsular Ranges. It is most common between 2,000-5,000 feet elevation. Approximately 22,572 acres of this community occur in the Plan Area, in the San Jacinto, Santa Rosa and Little San Bernardino Mountains. Approximately 86% of it currently occurs on public or private Existing Conservation Land.

Distribution within the Coachella Valley. Within the MSHCP Reserve System, semi-desert chaparral is mapped in five of the Conservation Areas:

1. Cabazon Conservation Area.
2. Stubbe and Cottonwood Canyons Conservation Area
3. Snow Creek/Windy Point Conservation Area
4. Whitewater Canyon Conservation Area
5. Santa Rosa and San Jacinto Mountains Conservation Area

Comparison with *Manual of California Vegetation*. Ultimately, the Plan will use the vegetation classification system in the MCV (Sawyer and Keeler-Wolf 1995). The natural community described by the Holland system as semi-desert chaparral would compare with one or more of the following MCV series:

1. Birchleaf mountain-mahogany - California buckwheat series
2. Cupleaf ceanothus - fremontia - oak series

Associated Covered Species. The Covered Species associated with this community are Peninsular bighorn sheep, gray vireo, and, possibly, triple-ribbed milkvetch.

10.6 Marsh Communities

This section contains a summary description, including natural community characteristics, typical species, and significant threats, for the two marsh communities proposed for coverage in the Plan. General Conservation measures, which are common to these marsh types, are listed below.

1. Ecological processes, including water availability, are protected to ensure sustainability of the community. Please refer to the Section 4.3 subsections for specific goals for ecosystem processes.
2. To the extent activities are under Plan authority, maintain water levels, water quality and proper functioning condition of ponds, springs, and other wetlands.
3. Control of non-native plants, particularly tamarisk, is implemented.
4. As part of the Management and Monitoring Program, complete hydrologic studies for the Salt Creek area and Whitewater Delta to determine if the water sources for marsh areas are adequately protected or if additional water sources may be needed.
5. This natural community is adaptively managed, according to an approved Management and Monitoring Program.
6. Marsh communities shall be subject to a no net loss objective such that Disturbance of a given number of acres may occur, but an equal number of acres would be replaced to ensure that no net loss of that marsh community occurs.

10.6.1 Cismontane Alkali Marsh

10.6.1.1 Natural Community Conservation Goals and Objectives

Conserve and manage occurrences of this natural community within the MSHCP Reserve System according to the following criteria:

Goal 1: Conserve natural community occurrences representative of the range of environmental conditions within which the community is known to occur. Incorporate a range of environmental gradients (e.g. slope, elevation, aspect) and high Habitat diversity.

Objective 1. Ensure Conservation of this natural community within the following Conservation Area:

- Dos Palmas Conservation Area

Goal 2: Protect Essential Ecological Processes, which may include hydrological regimes, necessary to maintain this natural community.

Objective 2. Ensure protection of Essential Ecological Process areas through Conservation Area Conservation Objectives for Essential Ecological Processes.

Goal 3: Ensure Conservation of Habitat quality through protection, monitoring and Adaptive Management, and restoration where necessary, to contribute to maintenance of this community within Conservation Areas.

Objective 3. Implement biological monitoring and Adaptive Management actions to ensure Conservation of this natural community.

10.6.1.2 Threats, Limiting Factors, and Adaptive Management

Threats to this community include changes in the availability of water and competition from invasive plants, particularly tamarisk. The wetlands at Dos Palmas are partially enhanced by leakage along sections of the Coachella Canal. Soon, to provide additional water to the Los Angeles region, the canal will be lined, and the majority of this leakage will be stopped. The impacts to the wetlands from lining the canal are difficult to predict, but most likely will result in reduced wetland Habitat. Mitigation measures associated with the canal lining will be directed at ameliorating the impacts.

The following actions may be needed to ensure the persistence of this natural community if biological monitoring indicates that such actions are warranted. This list is not comprehensive but identifies some of the known or likely threats to cismontane alkali marsh. In addition to conserving the cismontane alkali marsh natural community, the Plan will integrate biological

monitoring and management actions into a Management and Monitoring Program for this natural community. The Monitoring Program will be designed to provide feedback so that management activities can be adjusted to maximize natural community Conservation. More detailed and specific information on the biological monitoring and management actions described here and proposed for this natural community can be found in Section 8.0, MSHCP Reserve Management and Monitoring Program. Actions may include:

1. Control and manage activities that degrade cismontane alkali marsh.
2. Identify actions to reduce impacts from, and control where feasible, invasive species if it is determined from monitoring results that there are impacts to cismontane alkali marsh community.

10.6.1.3 Natural Community Conservation Analysis

Conservation Area Configuration Issues. The cismontane alkali marsh natural community is very limited in occurrence within the Plan Area. It occurs in one contiguous stand in the Dos Palmas Conservation Area, within the Dos Palmas Preserve/ACEC. The entire stand of this natural community is included within the Conservation Area. It is a relatively intact stand with no fragmentation.

The occurrence of cismontane alkali marsh is limited within the Plan Area to one Conservation Area, Dos Palmas. The presence of cismontane alkali marsh within this Conservation Areas is shown in Table 10-18. The Planning Team identified and assessed Conservation for this natural community in the following Conservation Areas:

1. ***Dos Palmas.*** There are approximately 321 acres of cismontane alkali marsh mapped in this Conservation Area. The Plan will ensure Conservation of approximately 321 of these acres. The Plan will also ensure Conservation of the watershed for Salt Creek, where this marsh community occurs.

Conservation and Disturbance Levels. The MSHCP Reserve System would provide protection of cismontane alkali marsh in one Conservation Area: Dos Palmas Conservation Area. In addition to conserving currently unprotected Habitat, the Plan benefits this natural community by securing the hydrological regimes that maintain this marsh and by addressing threats to this community as they are identified through Adaptive Management.

Conservation of at least 321 acres, or 93%, of cismontane alkali marsh will ensure that this natural community is sustained and restored within the Plan Area.

Table 10-18: Summary of Natural Community within Conservation Areas: Cismontane Alkali Marsh

CONSERVATION AREA	*Land within the Conservation Areas*				
	Total Acres of Natural Community in Conservation Area	*Total Acres Subject to Impacts*[2]	*Acres within Existing Conservation Lands*	*Remaining Acres to be Conserved*	*Total Acres to be Conserved in MSHCP Reserve System*
DOS PALMAS	321	(23)[1]	93	228	321
TOTAL	**321**	**(23)[1]**	**93**	**228**	**321**

[1] Disturbance of no more than twenty-three acres may occur, but it would be replaced to ensure that the no net loss occurs and the Conservation Objective is achieved

10.6.1.4 Natural Community Account: Background

Description. This community is dominated by perennial, emergent, herbaceous monocots to 2 meters (approximately 6 feet) tall; cover is often complete and dense. Dominant species include cattail (*Typha latifolia, T. domingensis*), alkali bulrush (*Scirpus americanus*), and saw-grass (*Cladium californicum*); iodine bush (*Allenrolfea occidentalis*) is also associated with these marshes (BLM 1996). This marsh Habitat occurs where standing water or saturated soil is present throughout most or all of the year. High evaporation and low input of freshwater render the marsh alkaline. This natural community occurs in the Dos Palmas area, where about 29% of it is within public or private Existing Conservation Land. It is important Habitat for the Yuma clapper rail and the California black rail.

Distribution within the Coachella Valley. Within the MSHCP Reserve System, cismontane alkali marsh is mapped in one of the Conservation Areas:

1. Dos Palmas Conservation Area

Comparison with *Manual of California Vegetation*. Ultimately, the Plan will use the vegetation classification system in the MCV (Sawyer and Keeler-Wolf 1995). The natural community described by the Holland system as cismontane alkali marsh would compare with one or more of the following MCV series:

1. Bulrush series
2. Bulrush - cattail series
3. Cattail series and Ditch-grass series

Associated Covered Species. The Covered Species associated with this community are the Yuma clapper rail and the California black rail.

Essential Ecological Processes. Maintenance of the watershed and existing hydrological regimes are important to the long-term persistence of cismontane alkali marshes.

10.6.2 Coastal and Valley Freshwater Marsh

10.6.2.1 Natural Community Conservation Goals and Objectives

Conserve and manage occurrences of this natural community within the MSHCP Reserve System according to the following criteria:

Goal 1: Conserve natural community occurrences representative of the range of environmental conditions within which the community is known to occur. Incorporate a range of environmental gradients (e.g. slope, elevation, aspect) and high Habitat diversity.

Objective 1a. Ensure Conservation of this natural community within the following Conservation Area:

- Coachella Valley Stormwater Channel and Delta Conservation Area

Objective 1b. Ensure that CVWD establishes 66 acres of permanent Habitat for California black rail and Yuma clapper rail in this area to replace the Habitat that is periodically altered by flood control and drain maintenance activities. See Section 4.3.21.

Goal 2: Protect Essential Ecological Processes, which may include hydrological regimes, necessary to maintain this natural community.

Objective 2. Ensure protection of Essential Ecological Process areas through Conservation Area Conservation Objectives for Essential Ecological Processes.

Goal 3: Ensure Conservation of Habitat quality through protection, monitoring and Adaptive Management, and restoration where necessary, to contribute to maintenance of this community within Conservation Areas.

Objective 3. Implement biological monitoring and Adaptive Management actions to ensure Conservation of this natural community.

10.6.2.2 Threats, Limiting Factors, and Adaptive Management

The primary threats to this community include changes in water availability, water quality, and the infestation of exotic species of plants and fish. The level of the Salton Sea is maintained by agricultural runoff, and by the highly polluted New and Alamo Rivers. The most immediate issue with the Salton Sea is the increasing salinity. Current efforts to stabilize and/or reduce salinity will have unknown effects on water levels, and the results on the marsh Habitat are far from assured. This natural community is also threatened by disturbance from periodic drain and flood control channel maintenance activities. Mitigation measures to address this threat are provided for by the Plan.

The following actions may be needed to ensure persistence of this natural community if biological monitoring indicates that such actions are warranted. This list is not comprehensive but identifies some of the known or likely threats to coastal and valley freshwater marsh. In addition to conserving the coastal and valley freshwater marsh natural community, the Plan will integrate biological monitoring and management actions into the Management and Monitoring Programs for this natural community. The Monitoring Program will be designed to provide feedback so that management activities can be adjusted to maximize natural community Conservation. More detailed and specific information on the biological monitoring and management actions described here and proposed for this natural community can be found in Section 8.0, MSHCP Reserve Management and Monitoring Program. Actions may include:

1. Control and manage activities that degrade coastal and valley freshwater marsh. In particular, control and manage the primary threats to this marsh community, including fragmentation and changes in water availability.
2. Identify actions to reduce impacts from, and control where feasible, invasive species if it is determined from monitoring results that there are impacts to coastal and valley freshwater marsh community.

10.6.2.3 Natural Community Conservation Analysis

Conservation Area Reserve Design. The coastal and valley freshwater marsh natural community is very limited in occurrence within the Plan Area. It occurs in one contiguous stand in the Coachella Valley Stormwater Channel and Delta Conservation Area, at the mouth of the Whitewater River where it enters the Salton Sea. The entire stand of this natural community is included within the Conservation Area. It is a relatively intact stand with no fragmentation.

The occurrence of coastal and valley freshwater marsh is limited within the Plan Area to one Conservation Area, the Coachella Valley Stormwater and Delta Conservation Area. The presence of this natural community within this Conservation Areas is shown in Table 10-19.

The Planning Team identified and assessed Conservation for this natural community in the following Conservation Areas:

1. ***Coachella Valley Stormwater Channel and Delta.*** There are approximately 61 acres of coastal and valley freshwater marsh mapped in this Conservation Area. The Plan will ensure Conservation of approximately 55 of these acres.

Conservation and Disturbance Levels. The MSHCP Reserve System would provide protection of coastal and valley freshwater marsh in one Conservation Area: Coachella Valley Stormwater Channel and Delta Conservation Area. In addition to conserving currently unprotected Habitat, the Plan benefits this natural community by securing the hydrological regimes that maintain this marsh and by addressing threats to this community as they are identified through Adaptive Management.

Conservation of at least 55 acres, or 71%, of coastal and valley freshwater marsh will ensure that this natural community is sustained and restored within the Plan Area.

Table 10-19: Summary of Natural Community within Conservation Areas: Coastal and Valley Freshwater Marsh

	Land within the Conservation Areas				
CONSERVATION AREA	***Total Acres of Natural Community in Conservation Area***	***Total Acres Subject to Impacts[2]***	***Acres within Existing Conservation Lands***	***Remaining Acres to be Conserved***	***Total Acres to be Conserved in MSHCP Reserve System***
CV STORMWATER CHANNEL & DELTA	61	(6)[1]	4	51	55
TOTAL	**61**	**(6)-[1]**	**4**	**51**	**55**

[1] Disturbance of no more than six acres may occur, but it would be replaced to ensure that no net loss occurs and the Conservation Objective is achieved.

10.6.2.4 Natural Community Account: Background

Description. This community is dominated by perennial, emergent monocots, including cattail, bulrush, tules (*Scirpus* spp.), and rushes (*Juncus* spp.), often forming completely closed canopies. Sites lack significant currents and are permanently flooded with fresh water rather than brackish water. About 61 acres occurs in one location at the mouth of the Coachella Valley Stormwater Channel at the Salton Sea, where only 4% of it is currently protected. Small stands of freshwater marsh also occur at Dos Palmas, on the edge of some of the palm oases (e.g.

Andreas Oasis) and along the margins of the recently restored man-made ponds (BLM 1996); these stands are small and are not mapped on the Natural Communities Map. Threats to this community include reduction in the availability of fresh water resulting from diversions along the Coachella Valley Stormwater channel at the mouth of the Salton Sea. This community is also subject to invasion from tamarisk. There is some uncertainty as to the long-term status of the current occurrence of this community. The Salton Sea restoration project may result in the lowering of the sea's level, which could impact the current wetlands. CVWD will create new marsh Habitat to compensate for impacts to marsh Habitat from maintenance activities in the irrigation drains and in the Coachella Valley Stormwater channel.

Distribution within the Coachella Valley. Within the MSHCP Reserve System, coastal and valley freshwater marsh is mapped in one of the Conservation Areas:

1. Coachella Valley Stormwater Channel and Delta

Comparison with *Manual of California Vegetation*. Ultimately, the Plan will use the vegetation classification system in the MCV (Sawyer and Keeler-Wolf 1995). The natural community described by the Holland system as coastal and valley freshwater marsh would compare with one or more of the following MCV series:

1. Bulrush
2. Bulrush - cattail series
3. Cattail series
4. Duckweed series
5. Mosquito fern series
6. Pondweeds with floating leaves series
7. Pondweeds with submerged leaves series
8. Quillwort series

Associated Covered Species. The Covered Species associated with this community are the Yuma clapper rail and the California black rail.

Essential Ecological Processes. Availability of perennial fresh water and hydrological regimes must be maintained to ensure that this natural community is sustained.

10.7 Riparian and Desert Fan Palm Communities

This section contains a summary description, including natural community characteristics, typical species, and significant threats, for each of the four riparian communities

and the desert fan palm oasis community proposed for coverage in the Plan. Riparian communities are considered to be at great risk throughout Southern California (Bowler 1990, Davis et al. 1996). General Conservation measures, which are common to all these riparian types, are listed below.

1. Ecological processes, including flooding regimes and water table continuity, are protected to ensure sustainability of the community. Please refer to the Section 4.3 subsections for specific goals for ecosystem processes.
2. To the extent activities are under Plan authority, maintain water levels, water quality and proper functioning condition of springs, streams, and other natural water sources that support these natural communities.
3. Riparian Habitat along the Whitewater River channel from Indio south that is currently subject to periodic removal during maintenance of the Channel to maintain flood capacity will be replaced by the establishment of permanent riparian Habitat as a result of an agreement, and/or Plan participation, with the CVWD.
4. Remove and control invasive non-native plants, including tamarisk and arundo (very limited in occurrence).As part of the Management and Monitoring Program, complete hydrologic studies for the Salt Creek area and Whitewater Delta to determine if the water sources for marsh areas are adequately protected or if additional water sources may be needed.
5. This natural community is adaptively managed, according to an approved Management and Monitoring Program.
6. Riparian communities shall be subject to a no net loss objective such that Disturbance of a given number of acres may occur, but an equal number of acres would be replaced to ensure that no net loss of that riparian community occurs.

10.7.1 Southern Arroyo Willow Riparian Forest

10.7.1.1 Natural Community Conservation Goals and Objectives

Conserve and manage occurrences of this natural community within the MSHCP Reserve System according to the following criteria:

Goal 1: Conserve natural community occurrences representative of the range of environmental conditions within which the community is known to occur. Incorporate a range of environmental gradients (e.g. slope, elevation, aspect) and high Habitat diversity.

Objective 1. Ensure Conservation of this natural community within the following Conservation Areas:

- Cabazon Conservation Area
- Santa Rosa and San Jacinto Mountains Conservation Area

Goal 2: Protect Essential Ecological Processes, which may include hydrological regimes, necessary to maintain this natural community.

Objective 2. Ensure protection of Essential Ecological Process areas through Conservation Area Conservation Objectives for Essential Ecological Processes.

Goal 3: Ensure Conservation of Habitat quality through protection, monitoring and Adaptive Management, and restoration where necessary, to contribute to maintenance of this community within Conservation Areas.

Objective 3a. Implement biological monitoring and Adaptive Management actions to ensure Conservation of this natural community.

10.7.1.2 Threats, Limiting Factors, and Adaptive Management

Threats to the southern arroyo willow riparian forest include invasive plants such as tamarisk and arundo, degradation of water quality (e.g. infusion of nitrates, nitrites), and alteration of hydrological regimes.

The following actions may be needed to ensure persistence of this natural community if biological monitoring indicates that such actions are warranted. This list is not comprehensive but identifies some of the known or likely threats to southern arroyo willow riparian forest. In addition to conserving the southern arroyo willow riparian forest natural community, the Plan will integrate a Monitoring and Management Program for this natural community. Monitoring Programs will be designed to provide feedback so that management activities can be adjusted to maximize natural community Conservation. More detailed and specific information on the biological monitoring and management actions described here and proposed for this natural community can be found in Section 8.0, MSHCP Reserve Management and Monitoring Program. Actions may include:

1. Control and manage activities that degrade southern arroyo willow riparian forest. In particular, control and manage the primary threats to this scrub community, including invasive plants that dominate this community, and fragmentation.
2. Identify actions to reduce impacts from, and control where feasible, invasive species if it is determined from monitoring results that there are impacts to southern arroyo willow riparian forest community.

3. Implement monitoring to track, and ultimately distinguish between, changes due to human or natural causes. Significant variables may include live perennial shrub abundance and invasive exotic plant abundance.

10.7.1.3 Natural Community Conservation Analysis

Conservation Area Reserve Design. The southern arroyo willow riparian forest natural community occurs in two Conservation Areas, Cabazon Conservation Area and Santa Rosa and San Jacinto Mountains Conservation Area. Where it occurs, southern arroyo willow riparian forest occurs in essentially linear stands along the streams in Snow and Wood Canyons. The nature of its distribution tends to create the potential for high edge effects due to the linear Habitat. However, in the locations where it occurs, this natural community is surrounded by other protected Habitats, which reduce the potential for edge effects.

The occurrence of southern arroyo willow riparian forest is limited within the Plan Area to two Conservation Areas, Cabazon and Santa Rosa and San Jacinto Mountains. The presence of this natural community within the Conservation Areas is shown in Table 10-20. The Planning Team identified and assessed Conservation for this natural community in the following Conservation Areas:

1. ***Cabazon.*** There are approximately 78 acres of southern arroyo willow riparian forest mapped in this Conservation Area. The Plan will ensure Conservation of all 78 of these acres. The Plan will also ensure Conservation of the watershed for Wood Canyon, where this riparian forest community occurs.

2. ***Santa Rosa and San Jacinto Mountains.*** There are approximately 32 acres of southern arroyo willow riparian forest mapped in this Conservation Area. The Plan will ensure Conservation and no net loss of this natural community. The Plan will also ensure Conservation of the watershed for Snow Creek, where this riparian forest community occurs.

Conservation and Disturbance Levels. The MSHCP Reserve System would provide protection of southern arroyo willow riparian forest in two Conservation Areas: Cabazon and Santa Rosa and San Jacinto Mountains Conservation Areas. In addition to conserving currently unprotected Habitat, the Plan benefits this natural community by securing the hydrological regimes that maintain this riparian Habitat and by addressing threats to this community as they are identified through Adaptive Management.

Conservation of at least 110 acres, or 94%, of southern arroyo willow riparian forest will ensure that this natural community is sustained and restored within the Plan Area. The Plan will ensure no net loss such that any disturbance that may occur would require the Habitat to be replaced.

Table 10-20: Summary of Natural Community within Conservation Areas: Southern Arroyo Willow Riparian Forest

CONSERVATION AREA	*Land within the Conservation Areas*				
	Total Acres of Natural Community in Conservation Area	*Total Acres Subject to Impacts*[2]	*Acres within Existing Conservation Lands*	*Remaining Acres to be Conserved*	*Total Acres to be Conserved in MSHCP Reserve System*
CABAZON	78	0	78	0	78
SANTA ROSA & SAN JACINTO MTNS.	32	(2)[1]	17	15	32
TOTAL	**110**	**(2)**[1]	**95**	**15**	**110**

[1] Disturbance of no more than two acres may occur, but it would be replaced to ensure that the no net loss occurs and the Conservation Objective is achieved.

10.7.1.4 Natural Community Account: Background

Description. This community consists of streamside vegetation dominated by arroyo willow (*Salix lasiolepis*), often forming dense thickets. This community is characterized by a continuous canopy up to 10 meters (34 feet), with typically sparse to non-existent shrub and herb layer (Sawyer and Keeler-Wolf 1995). These riparian forests are seasonally flooded, but water is present year-round. In the Plan Area, this community occurs in the northwest portion of the Plan Area, south of Fingal, near Snow Canyon, southeast of Snow Canyon, and in Wood Canyon. The total acreage of this community in the Plan Area is 117 acres, of which about 81% currently occurs on public or private Existing Conservation Land.

Distribution within the Coachella Valley. Within the MSHCP Reserve System, southern arroyo willow riparian forest is mapped in two of the Conservation Areas:

1. Cabazon Conservation Area
2. Santa Rosa and San Jacinto Mountains Conservation Area

Comparison with *Manual of California Vegetation*. Ultimately, the Plan will use the vegetation classification system in the MCV (Sawyer and Keeler-Wolf 1995). The natural community described by the Holland system as southern arroyo willow riparian forest would compare with one or more of the following MCV series:

1. Arroyo willow series
2. Mixed willow series

Associated Covered Species. The Covered Species associated with this community are least Bell's vireo, Peninsular bighorn sheep, yellow warbler, yellow-breasted chat, southwestern willow flycatcher, and summer tanager.

Essential Ecological Processes. This natural community is dependent on the existing hydrological regime, which allows water to be present to maintain the riparian vegetation. Conservation of the watershed for the areas where southern arroyo willow riparian forest is present is essential in order for this natural community to be sustained.

10.7.2 Sonoran Cottonwood-Willow Riparian Forest

10.7.2.1 Natural Community Conservation Goals and Objectives

Conserve and manage occurrences of this natural community within the MSHCP Reserve System according to the following criteria:

Goal 1: Conserve natural community occurrences representative of the range of environmental conditions within which the community is known to occur. Incorporate a range of environmental gradients (e.g. slope, elevation, aspect) and high Habitat diversity.

Objective 1. Ensure Conservation of this natural community within the following Conservation Areas:

- Stubbe and Cottonwood Canyons Conservation Area
- Whitewater Canyon Conservation Area
- Upper Mission Creek/Big Morongo Canyon Conservation Area
- Thousand Palms Conservation Area
- Coachella Valley Stormwater Channel and Delta Conservation Area
- Santa Rosa and San Jacinto Mountains Conservation Area

Goal 2: Protect Essential Ecological Processes, which may include hydrological regimes, necessary to maintain this natural community.

Objective 2. Ensure protection of Essential Ecological Process areas through Conservation Area Conservation Objectives for Essential Ecological Processes.

Goal 3: Ensure Conservation of Habitat quality through protection, monitoring and Adaptive Management, and restoration where necessary, to contribute to maintenance of this community within Conservation Areas.

Objective 3a. Implement biological monitoring and Adaptive Management actions to ensure Conservation of this natural community.

Objective 3b. CVWD will establish permanent riparian Habitat including at least 44 acres of Sonoran cottonwood-willow riparian forest in these Conservation Areas to replace the Habitat that is periodically altered by flood control maintenance activities. This Habitat will provide for the Conservation of this natural community and the riparian birds covered by the Plan. Before the Habitat is established, a plan detailing the location, water supply, and monitoring and management responsibilities, including funding, shall be reviewed and approved by CDFG and USFWS.

10.7.2.2 Threats, Limiting Factors, and Adaptive Management

Like other riparian forest and woodlands, threats to Sonoran cottonwood-willow riparian forest include invasive plants such as tamarisk and arundo, degradation of water quality (e.g. infusion of nitrates, nitrites), and alteration of hydrological regimes.

The following actions may be needed to ensure persistence of this natural community if biological monitoring indicates that such actions are warranted. This list is not comprehensive but identifies some of the known or likely threats to Sonoran cottonwood-willow riparian forest. In addition to conserving the Sonoran cottonwood-willow riparian forest natural community, the Plan will integrate biological monitoring and management actions into a Management and Monitoring Program for this natural community. The Monitoring Program will be designed to provide feedback so that management activities can be adjusted to maximize natural community Conservation. More detailed and specific information on the biological monitoring and management actions described here and proposed for this natural community can be found in Section 8.0, MSHCP Reserve Management and Monitoring Program. Actions may include:

1. Control and manage activities that degrade Sonoran cottonwood-willow riparian forest. In particular, control and manage the primary threats to this forest community, including invasive plants that dominate this community, and fragmentation.
2. Identify actions to reduce impacts from, and control where feasible, invasive species if it is determined from monitoring results that there are impacts to Sonoran cottonwood-willow riparian forest community.
3. Implement monitoring to track, and ultimately distinguish between, changes due to human or natural causes. Significant variables may include live perennial shrub abundance and invasive exotic plant abundance.
4. Monitor groundwater level relative to maintenance of the Sonoran cottonwood-willow riparian forest natural community in the Thousand Palms Conservation Area as part of

the Management and Monitoring Program. See Section 6.7.3 on Changed Circumstances for additional information.

10.7.2.3 Natural Community Conservation Analysis

Conservation Area Reserve Design. Where it occurs, Sonoran cottonwood-willow riparian forest occurs in essentially linear stands along streams. This nature of its distribution tends to create the potential for high edge effects due to the linear Habitat. However, in the locations where it occurs, this natural community is surrounded by other protected Habitats, which reduce the potential for edge effects.

The Sonoran cottonwood-willow riparian forest occurs within the Plan Area in six Conservation Areas, Stubbe and Cottonwood Canyons, Whitewater Canyon, Upper Mission Creek/Big Morongo Canyon, Thousand Palms, Coachella Valley Stormwater Channel and Delta, and the Santa Rosa and San Jacinto Mountains Conservation Areas. The presence of this natural community within these Conservation Areas is shown in Table 10-21. The Planning Team identified and assessed Conservation for this natural community in the following Conservation Areas:

1. ***Stubbe and Cottonwood Canyons.*** There are approximately 267 acres of Sonoran cottonwood-willow riparian forest mapped in this Conservation Area. The Plan will ensure Conservation of approximately 267 of these acres, through Habitat Conservation or replacement. The Plan will also ensure Conservation of the watershed for Stubbe and Cottonwood Canyons, where this riparian forest community occurs.

2. ***Whitewater Canyon.*** There are approximately 166 acres of Sonoran cottonwood-willow riparian forest mapped in this Conservation Area. The Plan will ensure Conservation of approximately 166 of these acres, through Habitat Conservation or replacement. The Plan will also ensure Conservation of the watershed for Whitewater Canyon.

Table 10-21: Summary of Natural Community within Conservation Areas: Sonoran Cottonwood-Willow Riparian Forest

	Land within the Conservation Areas				
CONSERVATION AREA	***Total Acres of Natural Community in Conservation Area***	***Total Acres Subject to Impacts[2]***	***Acres within Existing Conservation Lands***	***Remaining Acres to be Conserved***	***Total Acres to be Conserved in MSHCP Reserve System***
STUBBE & COTTONWOOD CANYONS	267	(3)[1]	242	25	267
WHITEWATER CANYON	166	(11)[1]	59	107	166
UPPER MISSION CREEK/ BIG MORONGO CANYON	100	(8)[1]	16	84	100
THOUSAND PALMS	4	0[1]	4	0	4
CV STORMWATER CHANNEL & DELTA	8	0[1]	0	8	8
SANTA ROSA & SAN JACINTO MTNS.	58	0[1]	0	58	58
TOTAL	**603**	**(22)-[1]**	**321**	**282**	**603**

[1] Disturbance of no more than twenty two acres may occur, but it would be replaced to ensure that no net loss occurs and the Conservation Objective is achieved

3. ***Upper Mission Creek/Big Morongo Canyon.*** There are approximately 100 acres of Sonoran cottonwood-willow riparian forest mapped in this Conservation Area. The Plan will ensure Conservation of approximately 100 of these acres, through Habitat Conservation or replacement. The Plan will also ensure Conservation of the watershed for Mission Creek where this riparian Habitat occurs.

4. ***Thousand Palms.*** There are approximately 4 acres of Sonoran cottonwood-willow riparian forest mapped in this Conservation Area. The Plan will ensure Conservation of all 4 of these acres which are within Existing Conservation Lands. The Plan will also ensure Conservation of the hydrological regimes in Thousand Palms Canyon.

5. ***Coachella Valley Stormwater Channel and Delta.*** There are approximately 8 acres of Sonoran cottonwood-willow riparian forest mapped in this Conservation Area. The Plan will ensure Conservation of approximately 8 of these acres, through Habitat Conservation or replacement. The Plan will also require that CVWD establish permanent riparian

Habitat in this area to replace the Habitat that is periodically altered by flood control maintenance activities.

6. ***Santa Rosa and San Jacinto Mountains.*** There are approximately 58 acres of Sonoran cottonwood-willow riparian forest mapped. The Plan will ensure Conservation of approximately 58 of these acres in this Conservation Area, through Habitat Conservation or replacement. The Plan will also ensure Conservation of the hydrological regimes that maintain this riparian forest.

Conservation and Disturbance Levels. The MSHCP Reserve System would provide protection of Sonoran cottonwood-willow riparian forest in six Conservation Areas: Stubbe and Cottonwood Canyons Conservation Area, Whitewater Canyon Conservation Area, Upper Mission Creek/Big Morongo Canyon Conservation Area, Thousand Palms Conservation Area, Coachella Valley Stormwater Channel and Delta Conservation Area, and Santa Rosa and San Jacinto Mountains Conservation Area. In addition to conserving currently unprotected Habitat, the Plan benefits this natural community by securing the hydrological regimes that maintain this riparian Habitat and by addressing threats to this community as they are identified through Adaptive Management.

Conservation of at least 603 acres, or 95%, of Sonoran cottonwood-willow riparian forest will ensure that this natural community is sustained and restored within the Plan Area. The Plan will ensure no net loss such that any disturbance that may occur would require the Habitat to be replaced.

10.7.2.4 Natural Community Account: Background

Description. This community consists of a winter-deciduous, broad-leaved streamside forest to about 60 feet tall, dominated by Fremont cottonwood (*Populus fremontii*) with dense understories of willow (*Salix*) species. The site characteristics include deep, well-watered, loamy alluvial soils along the near-channel floodplains of perennial desert rivers. In the Plan Area, it occurs in Stubbe, Cottonwood, Whitewater, Mission, Big Morongo, and Chino Canyons, in Dry Morongo Creek, in scattered locations in the Whitewater River channel east of Monroe Avenue, and on the Thousand Palms Preserve. The total acreage of this community in the Plan Area is 636 acres, of which about 50% currently occurs on public land or Private Conservation Land.

Distribution within the Coachella Valley. Within the MSHCP Reserve System, Sonoran cottonwood-willow riparian forest is mapped in six of the Conservation Areas:

1. Stubbe and Cottonwood Canyons Conservation Area
2. Whitewater Canyon Conservation Area
3. Upper Mission Creek/Big Morongo Canyon Conservation Area
4. Thousand Palms Conservation Area

5. Coachella Valley Stormwater Channel and Delta Conservation Area
6. Santa Rosa and San Jacinto Mountains Conservation Area

Comparison with *Manual of California Vegetation*. Ultimately, the Plan will use the vegetation classification system in the MCV (Sawyer and Keeler-Wolf 1995). The natural community described by the Holland system as Sonoran cottonwood-willow riparian forest would compare with one or more of the following MCV series:

1. Narrow leaf willow series
2. Arroyo willow series
3. Fremont cottonwood series
4. Mixed willow series

Associated Covered Species. The Covered Species associated with this community are least Bell's vireo, Peninsular bighorn sheep, yellow warbler, yellow-breasted chat, southwestern willow flycatcher, and summer tanager.

Essential Ecological Processes. This natural community is dependent on hydrological regimes to ensure that riparian vegetation continues to receive the water it requires. In locations where this riparian forest occurs in canyons, surrounding watersheds should be conserved. In the Coachella Valley Stormwater Channel, water from agricultural runoff, flooding from rainfall, and other sources supports this vegetation.

10.7.3 Southern Sycamore-Alder Riparian Forest

10.7.3.1 Natural Community Conservation Goals and Objectives

Conserve and manage occurrences of this natural community within the MSHCP Reserve System according to the following criteria:

Goal 1: Conserve natural community occurrences representative of the range of environmental conditions within which the community is known to occur. Incorporate a range of environmental gradients (e.g. slope, elevation, aspect) and high Habitat diversity.

Objective 1. Ensure Conservation of this natural community within the following Conservation Areas:

- Cabazon Conservation Area
- Upper Mission Creek/Big Morongo Canyon Conservation Area

- Santa Rosa and San Jacinto Mountains Conservation Area

Goal 2: Protect Essential Ecological Processes, which may include hydrological regimes, necessary to maintain this natural community.

Objective 2. Ensure protection of Essential Ecological Process areas through Conservation Area Conservation Objectives for Essential Ecological Processes.

Goal 3: Ensure Conservation of Habitat quality through protection, monitoring and Adaptive Management, and restoration where necessary, to contribute to maintenance of this community within Conservation Areas.

Objective 3. Implement biological monitoring and Adaptive Management actions to ensure Conservation of this natural community.

10.7.3.2 Threats, Limiting Factors, and Adaptive Management

Threats to this community include invasive plants such as tamarisk and arundo, degradation of water quality (e.g. infusion of nitrates, nitrites), and alteration of hydrological regimes.

The following actions may be needed to ensure persistence of this natural community if biological monitoring indicates that such actions are warranted. This list is not comprehensive but identifies some of the known or likely threats to southern sycamore-alder riparian woodland. In addition to conserving the southern sycamore-alder riparian woodland natural community, the Plan will integrate biological monitoring and management actions into a Management and Monitoring Program for this natural community. The Monitoring Program will be designed to provide feedback so that management activities can be adjusted to maximize natural community Conservation. More detailed and specific information on the biological monitoring and management actions described here and proposed for this natural community can be found in Section 8.0, MSHCP Reserve Management and Monitoring Program. Actions may include:

1. Control and manage activities that degrade southern sycamore-alder riparian woodland. In particular, control and manage the primary threats to this riparian community, including invasive plants such as tamarisk that may dominate this community, and fragmentation.
2. Identify actions to reduce impacts from invasive species if it is determined from monitoring results that there are impacts to the southern sycamore-alder riparian woodland community.

3. Implement monitoring to track, and ultimately distinguish between, changes due to human or natural causes. Significant variables may include live perennial shrub abundance and invasive exotic plant abundance.
4. Monitor groundwater level relative to maintenance of the southern sycamore-alder riparian woodland natural communities as part of the Management and Monitoring Program. See Section 6.7.3 on Changed Circumstances for additional information.

10.7.3.3 Natural Community Conservation Analysis

Conservation Area Reserve Design. Where it occurs, southern sycamore- alder riparian forest occurs in essentially linear stands along streams. Compared to the other riparian vegetation types, it tends to occur at higher elevations in more mountainous areas. The locations where it occurs in this natural community are surrounded by other protected Habitats, which reduce the potential for edge effects.

The southern sycamore-alder riparian forest occurs within the Plan Area in three Conservation Areas, Cabazon Conservation Area, Upper Mission Creek/Big Morongo Canyon Conservation Area, and Santa Rosa and San Jacinto Mountains Conservation Area. The presence of this natural community within these Conservation Areas is shown in Table 10-22. The Planning Team identified and assessed Conservation for this natural community in the following Conservation Areas:

1. ***Cabazon.*** There are approximately 9 acres of southern sycamore-alder riparian forest mapped in this Conservation Area. The Plan will ensure Conservation of approximately 9 of these acres, through Habitat Conservation or replacement. The Plan will also ensure Conservation of the watershed where this riparian forest community occurs.

2. ***Upper Mission Creek/Big Morongo Canyon.*** There are approximately 104 acres of southern sycamore-alder riparian forest mapped in this Conservation Area. The Plan will ensure Conservation of approximately 104 of these acres, through Habitat Conservation or replacement. The Plan will also ensure Conservation of the watershed for Mission Creek where this riparian Habitat occurs.

3. ***Santa Rosa and San Jacinto Mountains.*** Southern sycamore-alder riparian forest occurs on approximately 548 acres in this Conservation Area. The Plan will ensure Conservation of approximately 548 of these acres, through Habitat Conservation or replacement. The Plan will also ensure Conservation of the hydrological regimes that maintain this riparian forest.

Conservation and Disturbance Levels. The MSHCP Reserve System would provide protection of Southern sycamore-alder riparian woodland in three Conservation Areas: Cabazon, Upper Mission Creek/Big Morongo Canyon, and the Santa Rosa and San Jacinto Mountains

Conservation Areas. In addition to conserving currently unprotected Habitat, the Plan benefits this natural community by securing the hydrological regimes that maintain this riparian Habitat and by addressing threats to this community as they are identified through Adaptive Management.

Conservation of at least 661 acres, or 99%, of southern sycamore-alder riparian forest will ensure that this natural community is sustained and restored within the Plan Area. The Plan will ensure no net loss such that any disturbance that may occur would require the Habitat to be replaced.

Table 10-22: Summary of Natural Community within Conservation Areas: Southern Sycamore-Alder Riparian Woodland

	Land within the Conservation Areas				
CONSERVATION AREA	***Total Acres of Natural Community in Conservation Area***	***Total Acres Subject to Impacts[2]***	***Acres within Existing Conservation Lands***	***Remaining Acres to be Conserved***	***Total Acres to be Conserved in MSHCP Reserve System***
CABAZON	9	(1)[1]	0	9	9
UPPER MISSION CREEK/ BIG MORONGO CANYON	104	0[1]	91	13	104
SANTA ROSA & SAN JACINTO MTNS.	548	(14)[1]	407	141	548
TOTAL	**661**	**(15)[1]**	**498**	**163**	**661**

[1] Disturbance of no more than fifteen acres may occur, but it would be replaced to ensure that no net loss occurs and the Conservation Objective is achieved

10.7.3.4 Natural Community Account: Background

Description. This community consists of a tall, open, broad-leaved, winter-deciduous streamside woodland dominated by sycamore (*Platanus racemosa*), and, often, white alder (*Alnus rhombifolia*). Stands seldom form closed canopy forests. In the Plan Area there are 669 acres of this community, located in various canyons in the San Jacinto and San Bernardino Mountains: Snow Creek, Millard Canyon, Lion Canyon, Mission Creek, and near Blaisdell Canyon. This community occurs along rocky streambeds subject to occasional high intensity flooding. *Alnus* increases in abundance on more perennial streams, while *Platanus* appears to tolerate more intermittent streams. In the Plan Area, approximately 74% currently occurs on Existing public or private Conservation Land. Occurrences in Tahquitz, Andreas, Murray, and Tachevah Canyons, and on the west fork of Palm Canyon are part of the Agua Caliente Indian

Reservation and are not subject to this Plan. The Agua Caliente are preparing a separate MSHCP.

Distribution within the Coachella Valley. Within the MSHCP Reserve System, southern sycamore-alder riparian woodland is mapped in three of the Conservation Areas:

1. Cabazon Conservation Area
2. Upper Mission Creek/Big Morongo Canyon
3. Santa Rosa and San Jacinto Mountains Conservation Area

Comparison with *Manual of California Vegetation*. Ultimately, the Plan will use the vegetation classification system in the MCV (Sawyer and Keeler-Wolf 1995). The natural community described by the Holland system as southern sycamore-alder riparian woodland would compare with one or more of the following MCV series:

1. California sycamore series
2. White alder series

Associated Covered Species. The Covered Species associated with this community are least Bell's vireo, Peninsular bighorn sheep, yellow warbler, yellow-breasted chat, southwestern willow flycatcher, summer tanager, and triple-ribbed milkvetch (in the Mission Creek area).

Essential Ecological Processes. Hydrological regimes and the continued availability of perennial water are essential for southern sycamore-alder riparian forest to be maintained.

10.7.4 Arrowweed Scrub

10.7.4.1 Natural Community Conservation Goals and Objectives

Conserve and manage occurrences of this natural community within the MSHCP Reserve System according to the following criteria:

Goal 1: Conserve natural community occurrences representative of the range of environmental conditions within which the community is known to occur. Incorporate a range of environmental gradients (e.g. slope, elevation, aspect) and high Habitat diversity.

Objective 1. Ensure Conservation of this natural community within the following Conservation Area:

- Dos Palmas Conservation Area

Goal 2: Protect Essential Ecological Processes, which may include hydrological regimes, necessary to maintain this natural community.

Objective 2. Ensure protection of Essential Ecological Process areas through Conservation Area Conservation Objectives for Essential Ecological Processes.

Goal 3: Ensure Conservation of Habitat quality through protection, monitoring and Adaptive Management, and restoration where necessary, to contribute to maintenance of this community within Conservation Areas.

Objective 3. Implement biological monitoring and Adaptive Management actions to ensure Conservation of this natural community.

10.7.4.2 Threats, Limiting Factors, and Adaptive Management

Threats to arrowweed scrub include competition with invasive tamarisk; in areas around the Salton Sea, tamarisk has replaced arrowweed in suitable Habitat. Other threats include changes in the hydrological regime that could alter the availability of water in the soil.

The following actions may be needed to ensure persistence of this natural community if biological monitoring indicates that such actions are warranted. This list is not comprehensive but identifies some of the known or likely threats to arrowweed scrub. In addition to conserving the arrowweed scrub natural community, the Plan will integrate biological monitoring and management actions into a Management and Monitoring Program for this natural community. The Monitoring Program will be designed to provide feedback so that management activities can be adjusted to maximize natural community Conservation. More detailed and specific information on the biological monitoring and management actions described here and proposed for this natural community can be found in Section 8.0, MSHCP Reserve Management and Monitoring Program. Actions may include:

1. Control and manage activities that degrade arrowweed scrub.
2. Identify actions to reduce impacts from invasive species if it is determined from monitoring results that there are impacts to the arrowweed scrub natural community.
3. Implement monitoring to track, and ultimately distinguish between, changes due to human or natural causes.
4. Restore and enhance degraded arrowweed scrub as necessary according to results from biological monitoring.

10.7.4.3 Natural Community Conservation Analysis

Conservation Area Configuration Issues. Arrowweed scrub occurs in a patchwork of vegetation types in the Dos Palmas Preserve/ACEC, often associated with desert fan palm oasis woodland. All of the mapped areas of arrowweed scrub were included within this Conservation Area by the Planning Team. In the locations where it occurs, this natural community is surrounded by other protected Habitats, which reduce the potential for edge effects.

Arrowweed scrub occurs within the Plan Area in one Conservation Area, Dos Palmas Conservation Area. The presence of this natural community within this Conservation Area is shown in Table 10-23. The Planning Team identified and assessed Conservation for this natural community in the following Conservation Area:

1. ***Dos Palmas.*** There are approximately 277 acres of arrowweed scrub mapped in this Conservation Area. The Plan will ensure Conservation of approximately 277, including 13 acres subject to impacts under a no net loss conservation objective; this objective provides that "Disturbance of no more than 13 acres may occur, but it would be replaced to ensure that no net loss occurs." The Plan will also ensure Conservation of the hydrological regimes that support this natural community.

Conservation and Disturbance Levels. The MSHCP Reserve System would provide protection of arrowweed scrub in one Conservation Area: Dos Palmas Conservation Area. In addition to conserving currently unprotected Habitat, the Plan benefits this natural community, which occurs in high soil moisture areas, by securing the hydrological regimes that maintain this community. The Plan will also address threats to this community as they are identified through Adaptive Management.

Conservation of at least 277 acres, or 100%, of arrowweed scrub will ensure that this natural community is sustained and restored within the Plan Area.

Table 10-23: Summary of Natural Community within Conservation Areas: Arrowweed Scrub

CONSERVATION AREA	*Land within the Conservation Areas*				
	Total Acres of Natural Community in Conservation Area	*Total Acres Subject to Impacts*[2]	*Acres within Existing Conservation Lands*	*Remaining Acres to be Conserved*	*Total Acres to be Conserved in MSHCP Reserve System*
DOS PALMAS	277	(13)[1]	143	134	277
TOTAL	**277**	**(13)[1]**	**143**	**134**	**277**

[1] Disturbance of no more than thirteen acres may occur, but it would be replaced to ensure that no net loss occurs and the Conservation Objective is achieved

10.7.4.4 Natural Community Account: Background

Description. This community is composed of moderate to dense streamside thickets dominated by arrowweed (*Pluchea sericea*). Cattail (*Typha* spp.), tule (*Scirpus* spp.), rushes (*Juncus* spp.), and saltgrass (*Distichlis spicata*) may occur as scattered individuals, especially around the margins. Saltgrass is a common ground cover. Arrowweed scrub replaces willow and cottonwood riparian forests in areas where soils are more saline or alkaline. This natural community occurs from the Santa Inez River in Santa Barbara County east to the Amargosa River in Death Valley, in the Antelope Valley, the Mojave River, around the Salton Sea, and along the lower Colorado River (Holland 1986). Approximately 277 acres of this community occur in the Plan Area, predominantly at the Dos Palmas Preserve/ACEC; 52% currently occurs on Existing public or private Conservation Land.

Distribution within the Coachella Valley. Within the MSHCP Reserve System, arrowweed scrub is mapped in one of the Conservation Areas:

1. Dos Palmas Conservation Area

Comparison with *Manual of California Vegetation*. Ultimately, the Plan will use the vegetation classification system in the MCV (Sawyer and Keeler-Wolf 1995). The natural community described by the Holland system as arrowweed scrub would compare with one or more of the following MCV series:

1. Arrow weed series

Associated Covered Species. The Covered Species associated with this community are the yellow-breasted chat and crissal thrasher. This community may be used during migration by riparian birds.

Ecological Processes. The arrowweed scrub natural community is dependent on high available soil moisture. It does not appear to require standing water but occurs on the margins of wetland areas. The hydrological regimes that support the growth of arrowweed are essential for this natural community to be sustained. Invasive exotic species, in particular tamarisk, have altered the natural composition of arrowweed scrub in some areas.

10.7.5 Desert Fan Palm Oasis Woodland

10.7.5.1 Natural Community Conservation Goals and Objectives

Conserve and manage occurrences of this natural community within the MSHCP Reserve System according to the following criteria:

Goal 1: Conserve natural community occurrences representative of the range of environmental conditions within which the community is known to occur. Incorporate a range of environmental gradients (e.g. slope, elevation, aspect) and high Habitat diversity.

Objective 1. Ensure Conservation of this natural community within the following Conservation Areas:

- Whitewater Canyon Conservation Area
- Willow Hole Conservation Area
- Thousand Palms Conservation Area
- Indio Hills Palms Conservation Area
- Joshua Tree National Park Conservation Area
- Mecca Hills/Orocopia Mountains Conservation Area
- Dos Palmas Conservation Area
- Santa Rosa and San Jacinto Mountains Conservation Area

Goal 2: Protect Essential Ecological Processes, which may include hydrological regimes, necessary to maintain this natural community.

Objective 2. Ensure protection of Essential Ecological Process areas through Conservation Area Conservation Objectives for Essential Ecological Processes.

Goal 3: Ensure Conservation of Habitat quality through protection, monitoring and Adaptive Management, and restoration where necessary, to contribute to maintenance of this community within Conservation Areas.

Objective 3. Implement biological monitoring and Adaptive Management actions to ensure Conservation of this natural community.

10.7.5.2 Threats, Limiting Factors, and Adaptive Management

A provision in the Plan provides for monitoring groundwater levels relative to maintenance of the desert fan palm oasis woodland natural community in the Thousand Palms Conservation Area as part of the Monitoring and Management Program. See Section 6.7.3 on Changed Circumstances for additional information.

The following actions may be needed to ensure persistence of this natural community if biological monitoring indicates that such actions are warranted. This list is not comprehensive but identifies some of the known or likely threats to desert fan palm oasis woodland. In addition to conserving the desert fan palm oasis woodland natural community, the Plan will integrate biological monitoring and management actions into a Management and Monitoring Program for this natural community. The Monitoring Program will be designed to provide feedback so that management activities can be adjusted to maximize natural community Conservation. More detailed and specific information on the biological monitoring and management actions described here and proposed for this natural community can be found in Section 8.0, MSHCP Reserve Management and Monitoring Program. Actions may include:

1. Control and manage activities that degrade desert fan palm oasis woodland. In particular, control and manage the primary threats to this community, including invasive plants such as tamarisk that may dominate this community, and edge effects.
2. Identify actions to reduce impacts from invasive species if it is determined from monitoring results that there are impacts to desert fan palm oasis woodland community.
3. Implement monitoring to track, and ultimately distinguish between, changes due to human or natural causes. Significant variables may include live perennial shrub/tree abundance and invasive exotic plant abundance.
4. Monitor groundwater level relative to maintenance of the desert fan palm oasis woodland natural communities as part of the Monitoring and Management Program. See Section 6.7.3 on Changed Circumstances for additional information.

10.7.5.3 Natural Community Conservation Analysis

Conservation Area Configuration Issues. Desert fan palm oasis woodlands occur in discrete patches associated with springs or water sources that are perennial. The woodlands occur on valley floor locations associated with the San Andreas Fault or other fault activity, and in canyons of the San Jacinto, Santa Rosa and Little San Bernardino Mountains. Most of the palm oases are located in areas where Development impacts are reduced, either because the oases occur in isolated canyons or are surrounded by protected land.

The desert fan palm oasis woodland occurs within the Plan Area in eight Conservation Areas, Whitewater Canyon Conservation Area, Willow Hole Conservation Area, Thousand Palms Conservation Area, Indio Hills Palms Conservation Area, Joshua Tree National Park Conservation Area, Mecca Hills/Orocopia Mountains Conservation Area, Dos Palmas Conservation Area, and Santa Rosa and San Jacinto Mountains Conservation Area. The presence of this natural community within these Conservation Areas is shown in Table 10-24. The Planning Team identified and assessed Conservation for this natural community in the following Conservation Areas:

1. ***Whitewater Canyon.*** There is approximately 1 acre of desert fan palm oasis woodland, which is already conserved within Existing Conservation Lands. The palm oasis in Whitewater Canyon is located on the east slope of the canyon. The Plan will also ensure Conservation of the watershed for Whitewater Canyon.

2. ***Willow Hole.*** There is approximately 1 acre of desert fan palm oasis woodland mapped in this Conservation Area. This palm oasis is already conserved within Existing Conservation Lands. The oasis at Willow Hole is dependent on ground water associated with the San Andreas Fault.

3. ***Thousand Palms.*** There are approximately 137 acres of desert fan palm oasis woodland, including some of the largest stands in the Plan Area. The Plan will ensure Conservation of all 137 of these acres which occur within the Thousand Palms Preserve. The Plan will also ensure Conservation of the hydrological regimes in Thousand Palms Canyon.
4. ***Indio Hills Palms.*** There are approximately 93 acres of desert fan palm oasis woodland mapped in this Conservation Area, in scattered oases at the base of the Indio Hills. The Plan will ensure Conservation of at least 88 of these acres. The Plan will also secure the watershed for these palm oases by conserving the surrounding land in the Indio Hills.

5. ***Joshua Tree National Park.*** There are approximately 5 acres of desert fan palm oasis woodland mapped in this Conservation Area, in an oasis in Cottonwood Canyon. The Plan will ensure Conservation of all 5 of these acres which are within Joshua Tree National Park. The Plan will also ensure Conservation of the watershed, which is already protected in Joshua Tree National Park.

6. ***Mecca Hills/Orocopia Mountains.*** There is approximately 1 acre of desert fan palm oasis woodland mapped in this Conservation Area, in several remote canyons, including Hidden Palms Oasis. The palm oases within this Conservation Area are already conserved within the Mecca Hills Wilderness Area.

7. ***Dos Palmas.*** There are approximately 125 acres of desert fan palm oasis woodland mapped in this Conservation Area; several large palm oases are associated with springs resulting from fault activity in this area. The Plan will ensure Conservation of approximately 119 of these acres. The Plan will also ensure Conservation of the hydrological regime, including the springs that support these oases.

8. ***Santa Rosa and San Jacinto Mountains.*** There are approximately 956 acres of desert fan palm oasis woodland mapped in this Conservation Area, in scattered canyons throughout these mountains. The Plan will ensure Conservation of approximately 880 of these acres. The Plan will also ensure Conservation of the hydrological regimes that maintain these palm oases.

Conservation and Disturbance Levels. The MSHCP Reserve System would provide protection of desert fan palm oasis woodland in eight Conservation Areas: Whitewater Canyon Conservation Area, Willow Hole Conservation Area, Thousand Palms Conservation Area, Indio Hills Palms Conservation Area, Joshua Tree National Park Conservation Area, Mecca Hills/Orocopia Mountains Conservation Area, Dos Palmas Conservation Area, Santa Rosa and San Jacinto Mountains Conservation Area. In addition to conserving currently unprotected Habitat, the Plan benefits this natural community by securing the hydrological regimes that maintain this riparian Habitat and by addressing threats to this community as they are identified through Adaptive Management.

Conservation of 1,232 acres, or 94%, of desert fan palm oasis woodland will ensure that this natural community is sustained and restored within the Plan Area.

Table 10-24: Summary of Natural Community within Conservation Areas: Desert Fan Palm Oasis Woodland

	Land within the Conservation Areas				
CONSERVATION AREA	***Total Acres of Natural Community in Conservation Area***	***Total Acres Subject to Impacts[2]***	***Acres within Existing Conservation Lands***	***Remaining Acres to be Conserved***	***Total Acres to be Conserved in MSHCP Reserve System***
WHITEWATER CANYON	1	0	1	0	1
WILLOW HOLE	1	0	1	0	1
THOUSAND PALMS	137	0	137	0	137
INDIO HILLS PALMS	93	5	46	42	88
JOSHUA TREE NATIONAL PARK	5	0	5	0	5
MECCA HILLS/ OROCOPIA MTNS.	1	0	1	0	1
DOS PALMAS	125	6	69	50	119
SANTA ROSA & SAN JACINTO MTNS.	934	54	400	480	880
TOTAL	**1,297**	**65**	**660**	**572**	**1,232**

10.7.5.4 Natural Community Account: Background

Description. This community is composed of open to dense groves dominated by fan palm (*Washingtonia filifera*) to 75 - 100 feet tall. The understory is sparse, especially in alkaline areas or in dense groves, where the ground is mulched by fallen fronds. *Washingtonia* is a relict species, and this community is restricted to areas with available water in and around the Salton Basin and south into Baja California. Washes along the San Andreas Fault are the site of emergence of underground water and, therefore, the location of many oases. Other oases are present in washes and on hillsides, where exposed strata or other geological structures produce permanent water. Of the 1,309 acres of this community in the Plan Area, 50% currently occurs on Existing public or private Conservation Land.

Distribution within the Coachella Valley. Within the MSHCP Reserve System, desert fan palm oasis woodland is mapped in eight of the Conservation Areas:

1. Whitewater Canyon Conservation Area
2. Willow Hole Conservation Area

3. Thousand Palms Conservation Area
4. Indio Hills Palms Conservation Area
5. Joshua Tree National Park Conservation Area
6. Mecca Hills/Orocopia Mountains Conservation Area
7. Dos Palmas Conservation Area
8. Santa Rosa and San Jacinto Mountains Conservation Area

Comparison with *Manual of California Vegetation*. Ultimately, the Plan will use the vegetation classification system in the MCV (Sawyer and Keeler-Wolf 1995). The natural community described by the Holland system as desert fan palm oasis woodland would compare with one or more of the following MCV series:

1. Fan palm series

Associated Covered Species. The Covered Species associated with this community are southern yellow bat and riparian bird species, which use the community in migration: least Bell's vireo, yellow warbler, yellow-breasted chat, southwestern willow flycatcher, and summer tanager. Peninsular bighorn sheep may also visit these oases where they occur within the Santa Rosa and San Jacinto Mountains.

Essential Ecological Processes. Hydrological regimes that maintain these oases are essential for this natural community. The oases occur where springs or streams provide perennial water. Most of the springs are associated with earthquake faults in the canyons of the Indio Hills and in the Santa Rosa and San Jacinto Mountains.

10.8 Mesquite Bosque and Desert Dry Wash Woodland Communities

This section contains a summary description, including natural community characteristics, typical species, and significant threats, for desert dry wash woodland and mesquite bosque. General Conservation measures, which are common to these dry wash community types, are listed below.

1. Ecological processes, including flooding regimes, are protected to ensure sustainability of the community. Please refer to the Section 4.3 subsections for specific goals for ecosystem processes.
2. Potential changes, including proposed Development, are evaluated based on the impacts to the watershed, or drainage basin, for dry wash communities.
3. Reduce and control the spread of non-native tamarisk and other invasive species.

10.8.1 Mesquite Bosque

10.8.1.1 Natural Community Conservation Goals and Objectives

Conserve and manage occurrences of this natural community within the MSHCP Reserve System according to the following criteria:

Goal 1: Conserve natural community occurrences representative of the range of environmental conditions within which the community is known to occur. Incorporate a range of environmental gradients (e.g. slope, elevation, aspect) and high Habitat diversity.

Objective 1. Ensure Conservation of this natural community within the following Conservation Areas:

- Dos Palmas Conservation Area

Goal 2: Protect Essential Ecological Processes, which may include hydrological regimes, necessary to maintain this natural community.

Objective 2. Ensure protection of Essential Ecological Process areas through Conservation Area Conservation Objectives for Essential Ecological Processes.

Goal 3: Ensure Conservation of Habitat quality through protection, monitoring and Adaptive Management, and restoration where necessary, to contribute to maintenance of this community within Conservation Areas.

Objective 3. Implement biological monitoring and Adaptive Management actions to ensure Conservation of this natural community.

10.8.1.2 Threats, Limiting Factors, and Adaptive Management

This community is threatened by the invasion of exotic tamarisk, which competes for water and dominates the open "woodland" character of the mesquite bosque. This community is probably dependent on a relatively high water table. Loss of the natural water within the Dos Palmas basin through groundwater pumping and/or stream diversions is a likely threat to the mesquite bosque.

The following actions may be needed to ensure that this natural community is sustained if biological monitoring indicates that such actions are warranted. This list is not comprehensive but identifies some of the known or likely threats to mesquite bosque. In addition to conserving

the mesquite bosque natural community, the Plan will integrate biological monitoring and management actions into a Management and Monitoring Program for this natural community. The Monitoring Program will be designed to provide feedback so that management activities can be adjusted to maximize natural community Conservation. More detailed and specific information on the biological monitoring and management actions described here and proposed for this natural community can be found in Section 8.0, MSHCP Reserve Management and Monitoring Program. Actions may include:

1. Control and manage activities that degrade mesquite bosque. In particular, control and manage the primary threats to this community, including invasive plants such as tamarisk that may dominate this community, and edge effects.
2. Identify actions to reduce impacts from invasive species other than tamarisk if it is determined from monitoring results that there are impacts to mesquite bosque community.
3. Implement monitoring to track, and ultimately distinguish between, changes due to human or natural causes. Significant variables may include live perennial shrub/tree abundance and invasive exotic plant abundance.
4. Monitor groundwater level relative to maintenance of the mesquite bosque natural communities as part of the Management and Monitoring Program. See Section 6.7.3 on Changed Circumstances for additional information.
5. Implement monitoring to track the recruitment of young mesquite bosque plants into the mesquite bosque natural community in the Conservation Areas identified in Goal 1 (Section 10.2.7.1) and where recruitment is not occurring at a level needed to meet the Conservation Area's acreage goal, implement adaptive management measures to achieve a recruitment level needed to sustain the mesquite bosque natural community.

10.8.1.3 Natural Community Conservation Analysis

Conservation Area Reserve Design. Mesquite bosque occurs only in the Dos Palmas Preserve/ACEC. This occurrence of mesquite bosque includes open, park-like stands of screwbean mesquite. Tamarisk is a serious invasive plant in this community. All of the available area where this natural community occurs was included in this Conservation Area. Although impacted by tamarisk, the mesquite bosque areas consist of intact stands with only minor disturbance from power line roads and railroad tracks.

The mesquite bosque occurs within the Plan Area in one Conservation Area, Dos Palmas Conservation Area. The presence of this natural community within this Conservation Areas is shown in Table 10-25. The Planning Team identified and assessed Conservation for this natural community in the following Conservation Area:

1. ***Dos Palmas.*** There are approximately 482 acres of mesquite bosque mapped in this Conservation Area. The Plan will ensure Conservation of approximately 446 of these acres. The Plan will also ensure Conservation of the hydrological regimes that support this natural community. The mesquite bosque is associated with the Salt Creek wash area and appears to depend on relatively high soil moisture.

Conservation and Disturbance Levels. The MSHCP Reserve System would provide protection of mesquite bosque in one Conservation Area: Dos Palmas Conservation Area. In addition to conserving currently unprotected Habitat, the Plan benefits this natural community by securing the hydrological regimes that maintain this riparian Habitat and by addressing threats to this community as they are identified through Adaptive Management.

Conservation of 446 acres, or 93%, of mesquite bosque will ensure that this natural community is sustained and restored within the Plan Area.

Table 10-25: Summary of Natural Community within Conservation Mesquite Bosque

	Land within the Conservation Areas				
CONSERVATION AREA	***Total Acres of Natural Community in Conservation Area***	***Total Acres Subject to Impacts[2]***	***Acres within Existing Conservation Lands***	***Remaining Acres to be Conserved***	***Total Acres to be Conserved in MSHCP Reserve System***
DOS PALMAS	482	36	127	319	446
TOTAL	**482**	**36**	**127**	**319**	**446**

[1] Pursuant to the avoidance, minimization and mitigation measures in Section 4.4, mesquite bosque will be avoided to the maximum extent feasible.

10.8.1.4 Natural Community Account: Background

Description. This community is an open to fairly dense, drought-deciduous streamside thorn forest dominated by screwbean mesquite (*Prosopis pubescens*) with open, park-like interiors maintained by frequent flooding or fire. It occurs in dry washes. The understory is sparse but may include various species of saltbush (*Atriplex* spp.), iodine bush, and saltgrass (BLM 1996). This community is found only in the Dos Palmas area. Of the 482 acres there, about 26% are within Existing public or private Conservation Land.

Distribution within the Coachella Valley. Within the MSHCP Reserve System, mesquite bosque is mapped in one of the Conservation Areas:

1. Dos Palmas Conservation Area

Comparison with *Manual of California Vegetation*. Ultimately, the Plan will use the vegetation classification system in the MCV (Sawyer and Keeler-Wolf 1995). The natural community described by the Holland system as mesquite bosque would compare with one or more of the following MCV series:

1. Mesquite series

Associated Covered Species. The Covered Species associated with this community is the crissal thrasher. This community may be used by riparian bird species during migration.

10.8.2 Desert Dry Wash Woodland

10.8.2.1 Natural Community Conservation Goals and Objectives

Conserve and manage occurrences of this natural community within the MSHCP Reserve System according to the following criteria:

Goal 1: Conserve natural community occurrences representative of the range of environmental conditions within which the community is known to occur. Incorporate a range of environmental gradients (e.g. slope, elevation, aspect) and high Habitat diversity.

Objective 1. Ensure Conservation of this natural community within the following Conservation Areas:

- Stubbe and Cottonwood Canyons Conservation Area
- Upper Mission Creek/Big Morongo Canyon Conservation
- Area
- Thousand Palms Conservation Area
- Indio Hills Palms Conservation Area
- Joshua Tree National Park Conservation Area
- Desert Tortoise and Linkage Conservation Area
- Mecca Hills/Orocopia Mountains Conservation Area
- Dos Palmas Conservation Area
- Santa Rosa and San Jacinto Mountains Conservation Area

Goal 2: Protect Essential Ecological Processes, which may include hydrological regimes, necessary to maintain this natural community.

Objective 2. Ensure protection of Essential Ecological Process areas through Conservation Area Conservation Objectives for Essential Ecological Processes.

Goal 3: Ensure Conservation of Habitat quality through protection, monitoring and Adaptive Management, and restoration where necessary, to contribute to maintenance of this community within Conservation Areas.

Objective 3. Implement biological monitoring and Adaptive Management actions to ensure Conservation of this natural community.

10.8.2.2 Threats, Limiting Factors, and Adaptive Management

Threats to desert dry wash woodland include fragmentation, changes to the hydrological regime, particularly in terms of flooding patterns, and disturbance from excessive vehicle traffic. Washes are popular routes for OHV travel and this natural community can be impacted where heavy use of this kind occurs. Roads without adequate culverts or drainage ways can result in interruption of flooding regimes that are important to maintenance of desert dry wash woodlands.

The Plan includes a provision to monitor groundwater level relative to maintenance of the desert dry wash woodland community in the Thousand Palms Conservation Area as part of the Monitoring and Management Program. See Section 6.7.3 on Changed Circumstances for additional information.

The following actions may be needed to ensure that desert dry wash woodlands are sustained if biological monitoring indicates that such actions are warranted. This list is not comprehensive but identifies some of the known or likely threats to desert dry wash woodland. In addition to conserving the desert dry wash woodland natural community, the Plan will integrate biological monitoring and Adaptive Management actions into a Management and Monitoring Program for this natural community. Monitoring Programs will be designed to provide feedback so that management activities can be adjusted to maximize natural community Conservation. More detailed and specific information on the biological monitoring and management actions described here and proposed for this natural community can be found in Section 8.0, MSHCP Reserve Management and Monitoring Program. Actions may include:

1. Control and manage activities that degrade desert dry wash woodland. In particular, control and manage the primary threats to this community, including OHV use and alteration of hydrological regimes.
2. Identify actions to reduce impacts from, and control where feasible, invasive species if it is determined from monitoring results that there are impacts to the desert dry wash woodland natural community.
3. Implement monitoring to track, and ultimately distinguish between, changes due to human or natural causes. Significant variables may include live perennial shrub/tree abundance and invasive exotic plants abundance.

10.8.2.3 Natural Community Conservation Analysis

Conservation Area Reserve Design. Desert dry wash woodlands were once widespread on alluvial fans emanating from the Santa Rosa and San Jacinto Mountains where the communities of the Coachella Valley occur today. Extant stands of relatively undisturbed woodlands can still be found in the relatively undisturbed wash areas of the San Bernardino Mountains (Stubbe Canyon and Mission Creek), in the vicinity of the Thousand Palms Preserve and on alluvial fans emanating from the Indio Hills, in the eastern portion of the Plan Area, and along alluvial fans at the east end of the Santa Rosa Mountains. The Planning Team attempted to include all large contiguous stands of desert dry wash woodland that remain in the Plan Area. Because of their somewhat liner distribution, along washes, this natural community can be subject to edge effects.

The desert dry wash woodland natural community occurs within the Plan Area in nine Conservation Areas: Stubbe and Cottonwood Canyons Conservation Area, Upper Mission Creek/Big Morongo Canyon Conservation Area, Thousand Palms Conservation Area, Indio Hills Palms Conservation Area, Joshua Tree National Park Conservation Area, Desert Tortoise and Linkage Conservation Area, Mecca Hills/Orocopia Mountains Conservation Area, Dos Palmas Conservation Area, and Santa Rosa and San Jacinto Mountains Conservation Area. The presence of this natural community within these Conservation Areas is shown in Table 10-26. The Planning Team identified and assessed Conservation for this natural community in the following Conservation Areas:

1. ***Stubbe and Cottonwood Canyons.*** There are approximately 289 acres of desert dry wash woodland in this Conservation Area, of which the Plan will ensure Conservation of approximately 263 of these acres. Sparse desert dry wash woodland occurs in Stubbe Canyon from the canyon mouth to near the Interstate 10 freeway. In Cottonwood Canyon it occurs only along a portion from the mouth of Cottonwood Canyon to the channelized portion of this wash. The Plan will also ensure Conservation of the watershed for both of these canyons.

2. ***Upper Mission Creek/Big Morongo Canyon.*** There are approximately 280~~260~~ acres of desert dry wash woodland mapped in this Conservation Area. The Plan will ensure Conservation of approximately 263~~245~~ of these acres. The desert dry wash woodland occurs along Mission Creek on both sides of Highway 62 and along Big Morongo Canyon, mostly south of Indian Avenue. The watershed for these drainages will also be conserved as part of the Plan.

3. ***Thousand Palms.*** There are approximately 748 acres of desert dry wash woodland within the Thousand Palms Conservation Area. The Plan will ensure Conservation of approximately 744 of these acres. The Plan will also ensure Conservation of the hydrological regimes in Thousand Palms Canyon.

4. ***Indio Hills Palms.*** There are approximately 79 acres of desert dry wash woodland mapped in this Conservation Area in limited areas along the alluvial fans south of the Indio Hills. The Plan will ensure Conservation of approximately 75 of these acres. The Plan will also secure the watershed for these washes by conserving the surrounding land in the Indio Hills.

5. ***Joshua Tree National Park.*** There are approximately 2,195 acres of desert dry wash woodland mapped in this Conservation Area. The Plan will ensure Conservation of approximately 2,182 of these acres. The Plan will also ensure Conservation of the watersheds for these washes, which are already protected in Joshua Tree National Park.

6. ***Desert Tortoise and Linkage.*** There are approximately 13,564 acres of desert dry wash woodland mapped in this Conservation Area, including some large areas from Pinkham and Cottonwood Canyons south to the Mecca Hills. The Plan will ensure Conservation of approximately 12,800 of these acres. The ability for floodwaters to continue to pass under Interstate 10 is essential to the maintenance of desert dry wash woodland in this Conservation Area.

7. ***Mecca Hills/Orocopia Mountains.*** There are approximately 9,409 acres of desert dry wash woodland mapped in this Conservation Area, including extensive stands in Box Canyon and the alluvial fans south of Box Canyon. The Plan will ensure Conservation of approximately 8,999 of these acres. Most of the desert dry wash woodland is already protected in the Mecca Hills and Orocopia Mountains Wilderness Areas.

8. ***Dos Palmas.*** There are approximately 1,856 acres of desert dry wash woodland mapped in this Conservation Area. The Plan will ensure Conservation of approximately 1,773 of these acres. The Plan will also ensure Conservation of the hydrological regime, including potential for flooding, in that most of these desert dry wash woodlands are associated with washes emanating from the Orocopia Mountains Wilderness.

9. ***Santa Rosa and San Jacinto Mountains.*** There are approximately 3,958 acres of desert dry wash woodland mapped in this Conservation Area, primarily at the east end of the Santa Rosa Mountains. The Plan will ensure Conservation of approximately 3,635 of these acres. The Plan will also ensure Conservation of the hydrological regimes that maintain these dry wash woodlands.

Conservation and Disturbance Levels. The MSHCP Reserve System would provide protection of desert dry wash woodland in nine Conservation Areas: Whitewater Canyon Conservation Area, Willow Hole Conservation Area, Thousand Palms Conservation Area, Indio Hills Palms Conservation Area, Joshua Tree National Park Conservation Area, Mecca Hills/Orocopia Mountains Conservation Area, Dos Palmas Conservation Area, Santa Rosa and San Jacinto Mountains Conservation Area. In addition to conserving currently unprotected

Habitat, the Plan benefits this natural community by securing the hydrological regimes that maintain this riparian Habitat and by addressing threats to this community as they are identified through Adaptive Management.

Conservation of at least 30,734~~30,716~~ acres, or 76%, of desert dry wash woodland will ensure that this natural community is sustained and restored within the Plan area.

Table 10-26: Summary of Natural Community within Conservation Areas: Desert Dry Wash Woodland

CONSERVATION AREA	*Land within the Conservation Areas*				
	Total Acres of Natural Community in Conservation Area	*Total Acres Subject to Impacts*[2]	*Acres within Existing Conservation Lands*	*Remaining Acres to be Conserved*	*Total Acres to be Conserved in MSHCP Reserve System*
STUBBE & COTTONWOOD CANYONS	289	26	34	229	263
UPPER MISSION CREEK/ BIG MORONGO CANYON	280~~260~~	17~~15~~ [1]	112	151~~133~~	263~~245~~
THOUSAND PALMS	748	4	710	34	744
INDIO HILLS PALMS	79	4	42	33	75
JOSHUA TREE NATIONAL PARK	2,195	13	2,063	119	2,182
DESERT TORTOISE & LINKAGE	13,564	764	5,920	6,880	12,800
MECCA HILLS/ OROCOPIA MTNS.	9,317	318	6,138	2,861	8,999
DOS PALMAS	1,856	83	1,027	746	1,773
SANTA ROSA & SAN JACINTO MTNS.	3,958	323	2,157	1,478	3,635
TOTAL	**32,286~~32,266~~**	**1,552~~1,550~~**	**18,203**	**12,531~~12,513~~**	**30,734~~30,716~~**

[1] ~~Includes 6 acres within the Morongo Wash Special Provisions Area~~.

10.8.2.4 Natural Community Account: Background

Description. The desert dry wash woodland community is an open to dense, drought-deciduous, microphyllous thorn scrub woodland to 30 - 60 feet tall, dominated by any of several members of the bean family including palo verde (*Cercidium floridum*), ironwood (*Olneya tesota*), and smoketree (*Psorothamnus spinosus*). Associated species include desert lavender (*Hyptis emoryi*), cheesebush (*Hymenoclea salsola*), catclaw acacia (*Acacia greggii*), and desert willow (*Chilopsis linearis*) (Baldwin and Martens 2002). It occurs in washes subject to intermittent flooding, but without perennial water. These washes are associated with canyon mouths and alluvial fans in the Santa Rosa, San Bernardino, Little San Bernardino, Cottonwood, Eagle, and Orocopia Mountains, and the Mecca Hills The margins of arroyos in the Colorado Desert support a relatively dense growth of trees. It occurs in washes associated with canyon mouths and alluvial fans in the Santa Rosa, Little San Bernardino, Cottonwood, Eagle, and Orocopia Mountains, and the Mecca Hills. There are some 40,549 acres of desert dry wash woodland in the Plan Area; 45% currently occurs on public or private Existing Conservation Land

Distribution within the Coachella Valley. Within the MSHCP Reserve System, desert dry wash woodland is mapped in nine of the Conservation Areas:

1. Stubbe and Cottonwood Canyons Conservation Area
2. Upper Mission Creek/Big Morongo Canyon Conservation Area
3. Thousand Palms Conservation Area
4. Indio Hills Palms Conservation Area
5. Joshua Tree National Park Conservation Area
6. Desert Tortoise and Linkage Conservation Area
7. Mecca Hills/Orocopia Mountains Conservation Area
8. Dos Palmas Conservation Area
9. Santa Rosa and San Jacinto Mountains Conservation Area

Comparison with *Manual of California Vegetation*. Ultimately, the Plan will use the vegetation classification system in the MCV (Sawyer and Keeler-Wolf 1995). The natural community described by the Holland system as desert dry wash woodland would compare with one or more of the following MCV series:

1. Blue palo verde - ironwood - smoke tree series

Associated Covered Species. Covered Species associated with this community are Palm Springs pocket mouse, desert tortoise, Le Conte's thrasher, triple-ribbed milkvetch (in Mission Creek and Dry Morongo Creek), Mecca aster, little San Bernardino Mountains linanthus (in Mission Creek and Dry Morongo Creek), and Orocopia sage. This natural community may be

used during migration by riparian birds. Peninsular bighorn sheep may also use these areas where they occur adjacent to their mountainous Habitat.

Essential Ecological Processes. Maintenance of the watershed and hydrological regimes that support the washes where this natural community occurs are essential. The potential for flooding to continue to occur along these washes is also necessary.

10.9 Pinyon and Juniper Woodland Communities

This section contains a summary description, including natural community characteristics, typical species, and significant threats, for each of the two pinyon and juniper woodland communities proposed for coverage in the Plan. General Conservation measures, which are common to all both of these communities, are listed below.

1. Through the Monitoring and Management Programs, develop appropriate management prescriptions for pinyon-juniper woodland natural communities. This may include the use of prescribed fire and/or standards for controlling wildfires to maintain or restore these communities.

10.9.1 Mojavean Pinyon-Juniper Woodland

10.9.1.1 Natural Community Conservation Goals and Objectives

Conserve and manage occurrences of this natural community within the MSHCP Reserve System according to the following criteria:

Goal 1: Conserve natural community occurrences representative of the range of environmental conditions within which the community is known to occur. Incorporate a range of environmental gradients (e.g. slope, elevation, aspect) and high Habitat diversity.

Objective 1. Ensure Conservation of this natural community within the following Conservation Areas:

- Upper Mission Creek/Big Morongo Canyon Conservation Area
- Joshua Tree National Park Conservation Area

Goal 2: Protect Essential Ecological Processes necessary to maintain this natural community.

Objective 2. Ensure protection of Essential Ecological Process areas through Conservation Area Conservation Objectives for Essential Ecological Processes.

Goal 3: Ensure Conservation of Habitat quality through protection, monitoring and Adaptive Management, and restoration where necessary, to contribute to maintenance of this community within Conservation Areas.

Objective 3. Implement biological monitoring and Adaptive Management actions to ensure Conservation of this natural community.

10.9.1.2 Threats, Limiting Factors, and Adaptive Management

Threats to this natural community in the Plan Area would include changes to the fire regime and, perhaps, invasive non-native grasses and forbs.

The following actions may be needed to ensure persistence of this natural community if biological monitoring indicates that such actions are warranted. This list is not comprehensive but identifies some of the known or likely threats to Mojavean pinyon-juniper woodland. In addition to conserving the Mojavean pinyon-juniper woodland natural community, the Plan will integrate biological monitoring and management actions into the Management and Monitoring Programs for this natural community. The Monitoring Program will be designed to provide feedback so that management activities can be adjusted to maximize natural community Conservation. More detailed and specific information on the biological monitoring and management actions described here and proposed for this natural community can be found in Section 8.0, MSHCP Reserve Management and Monitoring Program. Actions may include:

1. Control and manage activities that degrade Mojavean pinyon-juniper woodland.
2. Identify actions to reduce impacts from invasive species if it is determined from monitoring results that there are impacts to Mojavean pinyon-juniper woodland community.

10.9.1.3 Natural Community Conservation Analysis

Conservation Area Reserve Design. The Conservation Areas in the MSHCP Reserve System include occurrences of this natural community judged by the Planning Team to be likely to be sustained long-term. This determination was based on the presence of a relatively intact natural community, the absence of fragmentation impacts, and the presence of intact Essential Ecological Processes necessary to maintain this community.

The occurrence of Mojavean pinyon-juniper woodland is limited within the Plan Area to two Conservation Areas, Upper Mission Creek/Big Morongo Canyon Conservation Area and Joshua Tree National Park Conservation Area. The presence of this natural community within each of the Conservation Areas is shown in Table 10-27. The Planning Team identified and assessed Conservation for this natural community in the following Conservation Area:

1. ***Upper Mission Creek/Big Morongo Canyon.*** There are approximately 13 acres of Mojavean pinyon-juniper woodland mapped in this Conservation Area. The Plan will ensure Conservation of all 13 of these acres which are within Existing Conservation Lands.

2. ***Joshua Tree National Park.*** There are approximately 30,653 acres of Mojavean pinyon-juniper woodland mapped in this Conservation Area. The Plan will ensure Conservation of approximately 30,519 acres of this pinyon-juniper woodland.

Conservation and Disturbance Levels. The MSHCP Reserve System would provide protection of Mojavean pinyon-juniper woodland in two Conservation Areas, Upper Mission Creek/Big Morongo Canyon Conservation Area and Joshua Tree National Park Conservation Area. In addition to conserving currently unprotected Habitat, the Plan benefits this natural community by addressing threats to this community as they are identified through Adaptive Management.

Conservation of 30,532 acres, or 99%, of Mojavean pinyon-juniper woodland will ensure that this natural community is sustained and restored within the Plan Area.

Table 10-27: Summary of Natural Community within Conservation Areas: Mojavean Pinyon-Juniper Woodland

CONSERVATION AREA	*Land within the Conservation Areas*				
	Total Acres of Natural Community in Conservation Area	*Total Acres Subject to Impacts*[2]	*Acres within Existing Conservation Lands*	*Remaining Acres to be Conserved*	*Total Acres to be Conserved in MSHCP Reserve System*
UPPER MISSION CREEK/ BIG MORONGO CANYON	13	0	13	0	13
JOSHUA TREE NATIONAL PARK	30,653	134	29,311	1,208	30,519
TOTAL	**30,666**	**134**	**29,324**	**1,208**	**30,532**

10.9.1.4 Natural Community Account: Background

Description. Mojavean pinyon-juniper woodland is an open woodland dominated by pinyon pine (*Pinus monophylla*) and California juniper (*Juniperus californica*), with an open shrubby understory of species commonly found in adjacent non-forested stands. Understories are more diverse in shrubs than most pinyon-juniper types, and may actually exceed tree cover. Dominant shrubs include big sagebrush (*Artemisia tridentata*), desert scrub oak (*Quercus turbinella*), Mojave yucca (*Yucca schidigera*), and birchleaf mountain mahogany (*Cercocarpus betuloides*). This community typically occurs between 4,000 and 8,000 feet in elevation in desert mountain ranges. It often intergrades with Mojavean juniper woodland and scrub. In the Plan Area, approximately 30,666 acres occur in the Little San Bernardino Mountains, 96% of which is within Joshua Tree National Park.

Distribution within the Coachella Valley. Within the MSHCP Reserve System, Mojavean pinyon-juniper woodland is mapped in two of the Conservation Areas:

1. Upper Mission Creek/Big Morongo Canyon Conservation Area
2. Joshua Tree National Park Conservation Area

Comparison with *Manual of California Vegetation*. Ultimately, the Plan will use the vegetation classification system in the MCV (Sawyer and Keeler-Wolf 1995). The natural community described by the Holland system as Mojavean pinyon-juniper woodland would compare with one or more of the following MCV series:

1. California juniper series and Single-leaf pinyon series

Associated Covered Species. The Covered Species associated with this community is the gray vireo.

Essential Ecological Processes. Consideration should be given to fire regimes in this natural community as the Management Program is developed.

10.9.2 Peninsular Juniper Woodland and Scrub

10.9.2.1 Natural Community Conservation Goals and Objectives

Conserve and manage occurrences of this natural community within the MSHCP Reserve System according to the following criteria:

Goal 1: Conserve natural community occurrences representative of the range of environmental conditions within which the community is known to occur. Incorporate a range of environmental gradients (e.g. slope, elevation, aspect) and high Habitat diversity.

Objective 1. Ensure Conservation of this natural community within the following Conservation Area:

- Santa Rosa and San Jacinto Mountains Conservation Area

Goal 2: Protect Essential Ecological Processes necessary to maintain this natural community.

Objective 2. Ensure protection of Essential Ecological Process areas through Conservation Area Conservation Objectives for Essential Ecological Processes.

Goal 3: Ensure Conservation of Habitat quality through protection, monitoring and Adaptive Management, and restoration where necessary, to contribute to maintenance of this community within Conservation Areas.

Objective 3. Implement biological monitoring and Adaptive Management actions to ensure Conservation of this natural community.

10.9.2.2 Threats, Limiting Factors, and Adaptive Management

Threats to this community include invasive non-native grasses and other annuals that may create continuous fuels that can carry a fire. Fire is not a typical ecosystem process in this peninsular juniper woodland and scrub community so increased fuels may alter the fire frequency. The stands of Peninsular juniper woodland and scrub are also subject to some fragmentation by low density residential Development in the Pinyon Flat and Pinyon Crest areas. Highway 74 also bisects the otherwise contiguous stand of this natural community.

The following actions may be needed to ensure persistence of peninsular juniper woodland and scrub if biological monitoring indicates that such actions are warranted. This list is not comprehensive but identifies some of the known or likely threats to peninsular juniper woodland and scrub. In addition to conserving the peninsular juniper woodland and scrub natural community, the Plan will integrate biological monitoring and management actions into the Management and Monitoring Programs for this natural community. The Monitoring Program will be designed to provide feedback so that management activities can be adjusted to maximize natural community Conservation. More detailed and specific information on the biological monitoring and management actions described here and proposed for this natural community can be found in Section 8.0, MSHCP Reserve Management and Monitoring Program. Actions may include:

1. Control and manage activities that degrade peninsular juniper woodland and scrub.
2. Identify actions to reduce impacts from invasive species if it is determined from monitoring results that there are impacts to peninsular juniper woodland and scrub community.

10.9.2.3 Natural Community Conservation Analysis

Conservation Area Reserve Design. The Conservation Areas in the MSHCP Reserve System include occurrences of this natural community judged by the Planning Team to be likely to be sustained long-term. This determination was based on the presence of a relatively intact natural community, the absence of fragmentation impacts, and the presence of intact Essential Ecological Processes necessary to maintain this community.

The occurrence of peninsular juniper woodland and scrub is limited within the Plan Area to one Conservation Area, the Santa Rosa and San Jacinto Mountains Conservation Area. The presence of peninsular juniper woodland and scrub within each of the Conservation Areas is shown in Table 10-28. The Planning Team identified and assessed Conservation for this natural community in the following Conservation Area:

Table 10-28: Summary of Natural Community within Conservation Areas: Peninsular Juniper Woodland & Scrub

CONSERVATION AREA	*Land within the Conservation Areas*				
	Total Acres of Natural Community in Conservation Area	*Total Acres Subject to Impacts*[2]	*Acres within Existing Conservation Lands*	*Remaining Acres to be Conserved*	*Total Acres to be Conserved in MSHCP Reserve System*
SANTA ROSA & SAN JACINTO MTNS.	37,229	771	30,382	6,076	36,458
TOTAL	**37,229**	**771**	**30,382**	**6,076**	**36,458**

1. ***Santa Rosa and San Jacinto Mountains.*** There are approximately 37,229 acres of peninsular juniper woodland and scrub mapped in this Conservation Area. The Plan will ensure Conservation of approximately 36,458 acres of this Peninsular juniper woodland and scrub.

Conservation and Disturbance Levels. The MSHCP Reserve System would provide protection of peninsular juniper woodland and scrub in one Conservation Area, Santa Rosa and San Jacinto Mountains Conservation Area. In addition to conserving currently unprotected Habitat, the Plan benefits this natural community by addressing threats to this community as they are identified through Adaptive Management.

Conservation of 36,458 acres, or 97%, of peninsular juniper woodland and scrub will ensure that this natural community is sustained and restored within the Plan Area.

10.9.2.4 Natural Community Account: Background

Description. This is somewhat dense woodland dominated by California juniper and associated pinyon pine. Litter layers are restricted to directly beneath tree driplines. Other species include desert scrub oak, Mojave yucca, beargrass (*Nolina parryi*), four-leaf pinyon pine (*Pinus quadrifolia*), and big sagebrush. In the Plan Area, this community occurs on the desert slopes of the San Jacinto and Santa Rosa Mountains at elevations between 3,500 and 5,500 feet. Fire is not a typical element in this community as fuel loads are usually insufficient to carry a fire. Juniper and pinyon do not tolerate fire well and fires may result in a type conversion to semi-desert chaparral. There are approximately 37,544 acres of peninsular juniper woodland and scrub, of which 81% currently occurs on Existing public or private Conservation Land.

Distribution within the Coachella Valley. Within the MSHCP Reserve System, Peninsular juniper woodland and scrub is mapped in one of the Conservation Areas:

1. Santa Rosa and San Jacinto Mountains Conservation Area

Comparison with *Manual of California Vegetation*. Ultimately, the Plan will use the vegetation classification system in the MCV (Sawyer and Keeler-Wolf 1995). The natural community described by the Holland system as peninsular juniper woodland and scrub would compare with one or more of the following MCV series:

1. California juniper series
2. Parry pinyon series

Associated Covered Species. The Covered Species associated with this community are the desert tortoise, gray vireo, and the peninsular bighorn sheep.

Essential Ecological Processes. Consideration should be given to fire regimes in this natural community as the Management Program is developed.

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Acronym List

ACEC Area of Critical Environmental Concern

BLM Bureau of Land Management
BMPs Best Management Practices
BOR Bureau of Reclamation

Caltrans California Department of Transportation
CDCA California Desert Conservation Area
CDFG California Department of Fish and Game
CEQA California Environmental Quality Act
CESA California Endangered Species Act
C.F.R. Code of Federal Regulations
CNDDB California Natural Diversity Data Base
CNLM Center for Natural Lands Management
CNPPA California Native Plant Protection Act
COE U.S. Army Corps of Engineers
CVAG Coachella Valley Association of Governments
CVCC Coachella Valley Conservation Commission
CVFTL Coachella Valley Fringe-toed Lizard
CVMC Coachella Valley Mountains Conservancy
CVWD Coachella Valley Water District

EIR Environmental Impact Report
EIS Environmental Impact Statement

FESA Federal Endangered Species Act

GIS Geographic Information Systems

HCP Habitat Conservation Plan

IA Implementing Agreement
IID Imperial Irrigation District
ISA Independent Science Advisors

LAFCO Local Agency Formation Commission

MBTA Migratory Bird Treaty Act
MOU Memorandum of Understanding
MPA Monitoring Program Administrator
MSHCP Coachella Valley Multiple Species Habitat Conservation Plan
MSWD Mission Springs Water District

NCCP Natural Community Conservation Plan
NECO Northern and Eastern Colorado Desert Plan
NEPA National Environmental Policy Act
NPS National Park Service

O&M	Operation and Maintenance
PAG	Project Advisory Group
RMOC	Reserve Management Oversight Committee
RMU	Reserve Management Unit
RMUC	Reserve Management Unit Committee
RMUP	Reserve Management Unit Plan
SAC	Scientific Advisory Committee
SR	State Route
SSC	Species of Special Concern (State of California)
TNC	The Nature Conservancy
UC	University of California
UCNRS	University of California Natural Reserve System
URTD	Upper Respiratory Tract Disease
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

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Purpose of Appendix I

The purpose of this appendix is to provide documentation and/or elaboration of information presented in the MSHCP Plan document. For the reader's convenience, the content of the appendix follows the same number system as the Plan. Thus, appendix items referenced in Section 1 of the Plan are found in Section 1 of the appendix, and so on.

Data in this appendix are circa 2003 and have not been updated as part of the Recirculated Plan. This appendix provides background information for certain Plan discussions, but the Recirculated Plan should be relied upon for quantitative information.

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1.0Background, Purpose, Scope, Process, and Regulatory Context

Section 1 of the Plan document describes the background, purpose, scope, and planning process of the Coachella Valley Multiple Species Habitat Conservation Plan/Natural Community Conservation Plan (Plan).

1.1 Public Meetings Held

Development of the Plan has been discussed at a variety of public meetings since 1995. These include Project Advisory Group meetings, CVAG Energy and Environment Committee meetings, CVAG Technical Advisory Committee meetings, CVAG Executive Committee meetings, public forums, Scoping meetings for the EIR/EIS, presentations to individual jurisdictions and entities at public meetings, and public meetings related to trails planning. The Plan, at its various stages of preparation, was discussed at the meetings listed below.

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Project Advisory Group

1997
11-12-97

1998
1-21-98
2-25-98
3-18-98
4-29-98
5-27-98
6-24-98
7-29-98
9-03-98
9-30-98
10-30-98

1999
2-04-99
3-04-99
4-01-99
5-06-99
6-24-99
8-19-99
9-23-99
11-22-99
12-16-99

2000
1-27-00
2-24-00
5-25-00
6-22-00
8-17-00
10-26-00

2001
1-25-01
2-22-01
3-22-01
4-26-01
5-24-01
6-28-01
7-26-01
9-27-01
10-25-01
12-06-01

2002
1-24-02
2-28-02
3-28-02
4-25-02
5-23-02
6-27-02
7-08-02
7-25-02
9-26-02
10-24-02

2003
1-23-03
2-27-03
3-27-03
4-24-03
5-22-03
6-26-03
7-24-03

CVAG Energy and Environment Committee Presentations

1997
12-11-97

1998
2-12-98
3-12-98
5-14-98
7-16-98
9-10-98
11-19-98
12-10-98

1999
1-14-99
3-11-99
9-9-99

2000
1-11-00
1-20-00
2-10-00
3-23-00
5-11-00
6-8-00
7-13-00
9-14-00
11-9-00
12-14-00

2001
1-11-01
2-8-01
3-8-01
4-12-01
6-10-01

2002
3-14-02
9-12-02

2003
1-7-03
7-10-03

CVAG Technical Advisory Committee

1998
5-8-98

1999
1-8-99
3-12-99
4-9-99
9-10-99
11-12-99
12-3-99

2000
1-14-00
1-11-00
4-14-00
5-12-00
6-9-00
7-21-00
10-13-00
11-17-00
12-8-00

2001
3-9-01
4-13-01
5-11-01
6-8-01
9-14-01

2002
2-8-02
5-10-02
6-14-02
9-13-02

2003
1-10-03
4-11-03
6-13-03
7-11-03

CVAG Executive Committee Presentations

1998
9-28-98
10-26-98

1999
1-25-99
9-27-99
12-6-99

2000
1-31-00
2-28-00
4-24-00
6-26-00
7-31-00
9-25-00
10-30-00
12-04-00

2001
3-26-01
4-40-01
9-24-01

2002
2-25-02
7-29-02
9-30-02
1-27-03

2003
2-24-03
6-30-03

EIR/EIS Public Scoping Meetings

7-10-2000 Cathedral City Hall
7-12-2000 La Quinta City Hall

Other Public Meetings

2-20-01	Desert Hot Springs City Council
8-8-01	County of Riverside Planning Commission
9-7-01	BLM Desert Advisory Group
9-26-01	Cathedral City Council
12-01	Riverside County General Plan Advisory Committee
12-01	Santa Rosa San Jacinto National Monument Advisory Committee
4-01-02	Desert Hot Springs City Council
10-10-01	Riverside County Planning Commission
1-16-03	California Resources Agency

Table A3-1: Workshops Held as Part of Trails Planning Process

Public Meetings/Workshops	Date
Trails, Bighorn Sheep and You, Session I Living Desert	January 16, 1997
Trails, Bighorn Sheep & You, Session II Living Desert	June 24, 1999
An Informational Forum: Trails and Bighorn Sheep Palm Springs City Hall	October 26, 1999
Public Scoping Meeting, Notice of Preparation Cathedral City Hall	July 11, 2000
Trails and Bighorn Sheep Working Group Meetings	**Date**
Trails & Bighorn Sheep Working Group	August 19, 1999
Trails & Bighorn Sheep Working Group	September 30, 1999
Trails & Bighorn Sheep Working Group	November 4, 1999
Trails & Bighorn Sheep Working Group	November 23, 1999
Trails & Bighorn Sheep Working Group	December 16, 1999
Trails & Bighorn Sheep Working Group	January 13, 2000
Working Group - New /Perimeter Trails Subcommittee	January 18, 2000
Trails & Bighorn Sheep Working Group	February 10, 2000
Trails & Bighorn Sheep Working Group	March 9, 2000
Working Group - New/Perimeter Trails Subcommittee	March 30, 2000
Trails & Bighorn Sheep Working Group	March 30, 2000
Trails & Bighorn Sheep Working Group	April 20, 2000
Trails & Bighorn Sheep Working Group	October 5, 2000
Trails & Bighorn Sheep Working Group	July 19, 2001
Working Group - New/Perimeter Trails Subcommittee	July 25, 2001
Trails & Bighorn Sheep Working Group	November 8, 2001

The following is a list of experts and participants in the working group and public meetings.

Table A3-2: Participants in the Bighorn Sheep and Trails Working Group

Name	Title	Affiliation
Katie Barrows	Working Group Co-Leader, Associate Director	Coachella Valley Mountains Conservancy
Jim Foote	Working Group Co-Leader, Recreation Specialist	Bureau of Land Management – Palm Springs
Fred Baker	Planning Department	City of La Quinta
Ray Barmore		Coachella Valley Trails Council
Eric Baecht, Ken Church		Coachella Valley Hiking Club
Tom Burks, Nguyen T. Quynh Van		Nellie Coffman School Bicycle Club; Desert Bicycle Club
Paul Campbell		Coachella Valley Trails Council
Kim Clinton	Planning Department	City of Rancho Mirage
Joe Cook	Attendee	Personal use of mountains
John Criste		Terra Nova Planning and Research, Inc.
Melissa Davis		Agua Caliente Band of Cahuilla Indians
David Dawson		City of Palm Springs
Phil Drell	Planning Director	City of Palm Desert
Doug Evans	Planning Director	City of Palm Springs
Diane Freeman	Wildlife Biologist	U.S. Forest Service - Idyllwild
Curtis Galvez		Bureau of Land Management
Carol Gans		Equestrian/Desert Riders
Danella George	Associate Field Manager	Bureau of Land Management – Palm Springs
Wayne Hancock		Building Industry Association – Desert Chapter; KSL Development Corp.
Tom Harney	Member	Riverside County Trails Committee
Jerry Herman	Community Development Director	City of La Quinta
Bill Hillman		Equestrian/Desert Riders
Michael Kellner		Agua Caliente Band of Cahuilla Indians
Jim Kenna	Field Manager	Bureau of Land Management – Palm Springs
Ed Kibbey	Executive Director	Building Industry Association – Desert Chapter
Cynthia Kinser	Planning Director	City of Cathedral City
Bob Leo, Jodi Madigan, Tim Jones		Palm Springs Aerial Tramway
Morgan Levine		Ecotourism/Desert Adventures
Paul Maag	President	Coachella Valley Cycling Association
Matt McDonald	Biologist	U.S. Fish and Wildlife Service – Carlsbad

Table A3-2: Participants in the Bighorn Sheep and Trails Working Group

Name	Title	Affiliation
Steve Nagle	Director of Environ-mental Resources	Coachella Valley Association of Governments
Dan Nove		Riverside County Park and Open Space District
Bruce Poynter		Ecotourism/Desert Adventures
Doug Pumphrey	District Ranger	U.S. Forest Service - Idyllwild
Joel Schultz	Wildlife Biologist	Bureau of Land Management
Joan Taylor	Conservation Chair	Sierra Club
Jeff Winklepleck	Parks Director	City of Palm Desert
Gavin Wright	Wildlife Biologist	Bureau of Land Management – Palm Springs
Michael Young	President	Coachella Valley Hiking Club
Dr. Tim Vail	Attendee	Interested in wildlife and trails
Wildlife Agency Biologists		
Kevin Barry Brennan	Wildlife Biologist	California Department of Fish and Game
Ken Corey	Desert Branch Chief	U.S. Fish and Wildlife Service
Scott McCarthy	Wildlife Biologist	U.S. Fish and Wildlife Service
INVITED EXPERTS PRESENT AT OCTOBER 26, 1999 WORKSHOP		
Dr. Walter Boyce	Faculty member	Department of Veterinary Pathology, Microbiology, and Immunology at University of California, Davis
Tom Davis	Director of Planning	Agua Caliente Band of Cahuilla Indians
Jim DeForge	Executive Director	Bighorn Institute
Mark Jorgensen	Resource Ecologist	California State Parks – Anza Borrego Desert State Park and Mt. San Jacinto State Wilderness
Ray Lee	Wildlife Biologist	Arizona Department of Game and Fish
Stacey Ostermann	Research Biologist	Bighorn Institute
Esther Rubin	PhD candidate	University of California, Davis
Oliver Ryder	Kleberg Chair in Genetics	Center for Reproduction of Endangered Species, San Diego Zoo
Steve Torres	Bighorn Sheep and Mountain Lion Program Coordinator	California Department of Fish and Game

2.0Plan Area Profile

There is no information in this Appendix relevant to Section 2 of the Plan.

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3.0Plan Development

This section of the Plan document describes the development of the Plan, including the conservation planning methodology, the species and natural communities addressed in the Plan, the mapping process used to identify areas of high conservation value, the review by a group of independent scientists, and the alternatives considered. The resulting conservation plan is described in Section 4 of the Plan document.

3.1 Composition and Role of the Scientific Advisory Committee (SAC)

As noted in Section 3.1.1 of the Plan, the development of this Plan placed major emphasis on the integration of defensible science throughout all phases of the planning process. Indeed, recommendations on how to improve the HCP process by various reviewers focus on incorporating state-of-the-art, independent biological expertise (Thomas 2001, Kareiva et al. 1999; Defenders of Wildlife 1998; Anderson and Yaffee 1998). Biological expertise was incorporated in this Plan primarily through the establishment of a Scientific Advisory Committee (SAC) and through continuous liaison with knowledgeable experts. The SAC was established as a subcommittee to the Project Advisory Group (PAG) to provide biological and ecological oversight in the development of the conservation plan. After completion of the Scoping Study and initiation of the formal HCP/NCCP process, the SAC continued as an integral part of Plan development.

The SAC is composed of local biologists with knowledge of the target species and ecological systems within the Plan Area. In particular, biologists from the Center for Natural Lands Management and the University of California Natural Reserve System attended virtually every meeting and effectively functioned as the core of the SAC. In addition, agency biologists from BLM, the National Park Service, U.S. Forest Service, and the Coachella Valley Water District, and one non-biologist who provided liaison with the PAG, participated in the SAC. USFWS and CDFG biologists also attended most SAC meetings. The SAC met on an approximately monthly basis. A list of the core members of the SAC and all others who participated at some time in SAC meetings is given in Table A3-3.

The SAC was charged with developing a recommendation for a biologically based conservation plan for the protection of the Covered Species and conserved natural communities in the Plan. The SAC worked in collaboration with staff from the Coachella Valley Mountains Conservancy, as the consultant drafting the Plan, the agency biologists, and other meeting participants. The SAC ultimately reviewed all aspects of the biological elements of the Plan, but the focus of their efforts was on the following tasks:

1. Compilation of data on all species under consideration for coverage in the Plan.
2. Identification and mapping of natural communities within the Plan Area. In particular, the core SAC members assisted in delineation of sand dune/sand field types.
3. Identification and mapping of ecosystem processes, including sand transport systems.
4. Development and review of species distribution map methodology. Review all species distribution maps (including numerous iterations since initial maps).
5. Assist in design of Site Identification methodology. Once the initial Site Identification Process was established, the SAC reviewed and evaluated iterations of the analysis.
6. Definition and development of key concepts including Core Habitat, corridors and linkages. Consistent with their area of expertise, SAC members assisted with the mapping of Core Habitat for particular species.
7. Development of Reserve Design Criteria.
8. Review and evaluation of iterations of proposed conservation alternatives, using Reserve Design Criteria.
9. Development of and justification for Conservation Alternative 2.
10. Development of and justification for the Preferred Alternative, prior to review by wildlife agencies and jurisdictions.

Table A3-3: Participants in the Scientific Advisory Committee

Name	Title	Affiliation
CORE SCIENTIFIC ADVISORY COMMITTEE MEMBERS		
Cameron Barrows	Regional Director	Center for Natural Lands Management
Mark Fisher	Biologist	University of California, Deep Canyon Desert Research Center
Al Muth	Director	University of California, Deep Canyon Desert Research Center
AGENCY BIOLOGISTS		
Rob Bundy (1998-1999)	Refuge Biologist	U.S. Fish and Wildlife Service CV National Wildlife Refuge
Roland DeGouvenain (1996-1997)	Botanist	Bureau of Land Management Palm Springs Field Office
Diane Freeman (1996 to 12/00)	Wildlife Biologist	U.S. Forest Service Idyllwild Ranger District
Patricia Locke-Dawson (1997)	Wildlife Biologist	Bureau of Land Management Palm Springs Field Office
Rachelle Huddleston - Lorton (1/01 to 7/03)	Wildlife Biologist	Bureau of Land Management Palm Springs Field Office

Table A3-3: Participants in the Scientific Advisory Committee

Name	Title	Affiliation
Don Mitchell (6/00 to 1/03)	Biologist	Coachella Valley Water District
Anne Poopatanapong (As of 1/01)	Wildlife Biologist	U.S. Forest Service Idyllwild Ranger District
Rich Thiery (Prior to 12/99)	Biologist	Coachella Valley Water District
Gavin Wright (through 2000)	Wildlife Biologist	Bureau of Land Management Palm Springs Field Office
REGULATORY WILDLIFE AGENCY STAFF		
Sherry Barrett	Assistant Field Supervisor	U.S. Fish and Wildlife Service Carlsbad Field Office
Caitlin Bean	Staff Environmental Scientist	California Department of Fish and Game
Glenn Black	Senior Environmental Scientist	California Department of Fish & Game
Marina Brand	Environmental Specialist	California Department of Fish & Game
Kevin Barry Brennan	Associate Biologist	California Department of Fish & Game
Ken Corey	Desert Branch Chief	U.S. Fish and Wildlife Service Carlsbad Field Office
Jim Dice (thru 12/00)	Botanist	California Department of Fish and Game
Brenda Johnson	Staff Environmental Scientist	California Department of Fish and Game
Eddy Konno	Associate Biologist	California Department of Fish and Game
Debbie McAller (prior to 8/00)	Botanist	U.S. Fish and Wildlife Service Carlsbad Field Office
Brenda McMillan (1997 only)	Biologist	U.S. Fish and Wildlife Service Carlsbad Field Office
Kim Nicol	Senior Environmental Scientist	California Department of Fish and Game
Alan Pickard	Deputy Regional Manager (Environmental Program Manager)	California Department of Fish and Game
Ron Rempel	Deputy Director, Habitat Conservation	California Department of Fish and Game
Pete Sorensen	Division Chief	U.S. Fish and Wildlife Service Carlsbad Field Office
Dee Sudduth	Deputy Regional Manager	California Department of Fish and Game

Table A3-3: Participants in the Scientific Advisory Committee

Name	Title	Affiliation
PLAN PREPARATION TEAM		
Katie Barrows	Associate Director	Coachella Valley Mountains Conservancy
John Criste	EIR/EIS Consultant	Terra Nova Planning
Bill Havert	Executive Director	Coachella Valley Mountains Conservancy
Ingrid Johnson	GIS Specialist	Bureau of Land Management Palm Springs Field Office
Larry LaPre	Biological Consultant	AMEC Environmental
Jim Sullivan (Steve Nagle before 12/00)	Dir. of Environmental Resources	Coachella Valley Association of Governments
Richard Tull	GIS	Coachella Valley Association of Governments
Brian Vanko, Nathan Mendenhall, Nick Peihl	GIS	Coachella Valley Association of Governments
OTHER OCCASIONAL PARTICIPANTS IN SAC MEETINGS & WORKSHOPS		
Gillian Bowser (1997-1998)	Biologist	Joshua Tree National Park
Dick Crowe	Project Director	BLM – Northern & Eastern Colorado Desert Plan
Doug Evans (prior to 2000)	Planning Director	City of Palm Springs
Kevin Hansen (prior to 12/00)	Dos Palmas Preserve Manager	Bureau of Land Management Palm Springs Field Office
Cheryl Hickam (1996 to 1997)	GIS Specialist	BLM – California Desert District Office
Henry McCutcheon	Resources Chief	Joshua Tree National Park
Kevin O'Connor	Biologist	California Dept. of Fish and Game
Nanette Pratini	GIS Specialist	University of California, Riverside & BLM – Desert District Office
Dr. Laszlo J. Szijj	Professor of Biological Sciences	Cal Poly University – Pomona (for Torres Martinez Indians)
Joan Taylor	Conservation Chair	Sierra Club San Gorgonio Chapter
Genea Warner	Project Assistant	BLM – Northern & Eastern Colorado Desert Plan
BIOLOGISTS CONSULTED DURING PROCESS		
Greg Ballmer	Entomologist	Dept. of Entomology University of California, Riverside

Table A3-3: Participants in the Scientific Advisory Committee

Name	Title	Affiliation
Betsy Bolster	Biologist – Bats	California Department of Fish & Game
Jim Cornett	Natural Science Curator	Palm Springs Desert Museum Palm Springs, CA
Jim DeForge	Executive Director	Bighorn Institute Palm Desert, CA
Shana Dodd	Biological Consultant - PS Pocket Mouse	S.C. Dodd Biological Consulting San Diego, CA
Mark Dodero	Biological Consultant - PS Ground Squirrel	RECON San Diego, CA
Dave Hawks	Biological Consultant - invertebrates	Hawks Biological Consulting
George Helmkamp	Amateur Botanist	Morongo Valley, California
Bob James	Biologist	U.S. Fish and Wildlife Service Carlsbad, CA
Mark Jorgensen	Biologist	Anza Borrego Desert State Park Borrego Springs, CA
Sharon Keeney	Biologist - Desert Pupfish	California Dept. of Fish & Game Indio, CA
Ed LaRue	Biological Consultant	BLM – Northeastern Mojave Desert Plan
Jeff Lovich	Biologist	Biological Resources Division U.S. Geological Service
Chet McGaugh	Biological Consultant - Birds	Tierra Madre Consultants Riverside, CA
Robert McKernan	Curator of Biology	Dept. of Biology San Bernardino County Museum
Steve Myers	Biological Consultant - Birds	Tierra Madre Consultants Riverside, CA
Will Miller	Biologist	U.S. Fish and Wildlife Service Carlsbad, CA
Stacey Ostermann	Biologist	Bighorn Institute Palm Desert, CA
Nanette Pratini	GIS Specialist	Bureau of Land Management Riverside, CA
Gordon Pratt	Entomologist	Dept. of Entomologist University of California, Riverside
Esther Rubin	Researcher - Bighorn Sheep	University of California, Davis
Andrew Sanders	Botanist Herbarium Curator	Herbarium University of California, Riverside
Marcus Speigelberg	Biological Consultant (now with CNLM)	RECON San Diego, CA

Table A3-3: Participants in the Scientific Advisory Committee

Name	Title	Affiliation
INVITED EXPERTS CONSULTED DURING PROCESS		
Nick Lancaster	Research Professor	Desert Research Institute Reno, NV
Reed Noss	Ecologist and Conservation Biologist	Conservation Biology Institute
Howard Snell	Professor of Biology	Department of Biology University of New Mexico
Michael Soule	Conservation Biologist	
C. Richard Tracy	Professor of Biology and Director	Biological Resources Research Ctr. University of Nevada, Reno
John Rotenberry	Professor of Biology	Department of Biology University of California, Riverside
John Willoughby	State Botanist	Bureau of Land Management

In addition to local experts and agency biologists who regularly attended SAC meetings, other scientific experts were consulted at various stages during the Plan development process. Due to the commitment of time necessary to participate regularly in SAC meetings, some of the individuals with expertise on a given species or taxonomic group were not available on an ongoing basis. Efforts to involve these individuals occurred at workshops convened by the SAC throughout the Plan development process. Staff from the Coachella Valley Mountains Conservancy made visits to selected experts at various times throughout the Plan preparation process as well.

In 2000 a team of scientists was engaged to prepare a hydrology report focusing on the sand source/sand transport system for two areas: 1) the Whitewater Floodplain Preserve, and 2) the Willow Hole/Edom Hill and Flat Top Mountain areas. A copy of the resulting report, Long-term Sand Supply to Coachella Valley Fringe-toed Lizard (*Uma inornata*) Habitat in the Northern Coachella Valley, California (United States Geological Survey, 2002), is available for review at CVAG.

During the planning process, a number of workshops were convened to bring in experts to provide review and recommendations for various elements of the conservation plan. A list of workshops held is given in Table A3-4.

Table A3-4: Workshops Held as Part of Planning Process

Workshop Title	Date
Reserve Design and Connectivity Criteria Workshop	November 14-15, 1996
Species Distribution and Conservation Needs Workshop	September 23-25, 30, 1997
Gap Analysis and Reserve Design Workshop	March 25-27, 1998
Reserve Design and Conservation Planning Workshop	April 21-22, 1998
Essential Habitat Boundary for Peninsular bighorn sheep	March 2, 2000
Ecological Monitoring and Adaptive Management Workshop	November 28, 2000

Early in the process, the SAC convened a Reserve Design and Connectivity Criteria Workshop to obtain input from three noted conservation biologists: Reed Noss, Michael Soule, and C. Richard Tracy. This workshop was focused on receiving input and direction from these conservation biologists with respect to the recommended approaches to reserve design, target species selection and habitat modeling, and a wide range of topics related to HCP development. In September 1997, the SAC invited biologists with expertise on a given species or taxonomic group to provide input on the status and distribution of proposed target species; these experts reviewed known location maps and very preliminary species distribution maps. This workshop was very useful in gathering available information on the distribution of proposed target species.

In April 1998, the SAC scheduled another workshop, the Reserve Design and Conservation Planning Workshop, with the three conservation biologists listed above. Prior to this workshop, the SAC met in late March of 1998 to review the results of the Gap Analysis and the preliminary Site Selection and Reserve Design analyses. This workshop, which primarily involved SAC members, wildlife agency biologists, and other interested individuals, provided a review of the reserve design process that would be presented to the conservation biologists in April.

At the April 1998 workshop, a preliminary presentation of the site selection and reserve design program was made. The results of the first run of the quantitative site selection algorithm were presented to the conservation biologists and other workshop participants. The objectives of this workshop were to obtain peer review and input from conservation biologists on the conservation planning methodology, including species habitat modeling, gap analysis, site selection and evaluation, and related reserve design issues. The conservation biologists provided significant

input regarding additional data and analyses that would enhance the conservation planning methodology, selection, and design of the proposed reserves.

In March 2000, the CVMC invited city/county planning directors, agency biologists, landowners, and other interested persons to provide input on a map delineating the essential habitat boundary for the Peninsular bighorn sheep. The essential habitat line defines the area within which the recovery plan for bighorn sheep will

In November 2000, the SAC invited individuals with expertise in biological monitoring to an Ecological Monitoring and Adaptive Management Workshop. These experts provided important input and recommendations prior to the development of a Draft Ecological Monitoring and Adaptive Management Plan.

The core members of the SAC demonstrated an exceptional level of commitment to the planning process, devoting their time outside of SAC meetings to make site visits to various locations during the reserve design process, providing assistance in the identification and delineation of species' habitat parameters, ecosystem processes, and other significant features in the GIS mapping effort, and making themselves available to review map products and draft documents whenever necessary. In addition, other scientists listed above, including workshop participants and individuals with particular species expertise, graciously made themselves available whenever their input was requested.

3.2 Conservation Planning Methodology

3.2.1 Best Available Science Standard

From the outset, a goal was established to base the preparation of this Plan on a strong foundation of scientific data and ecological principles. The importance of establishing a baseline of scientifically credible data has been emphasized in several recent reviews of the HCP process (Noss et al. 1997, Hood 1998, Harding et al. 2001). The USFWS addresses the need for use of the "best available" science in their policy documents on HCP preparation, including the Habitat Conservation Planning Handbook (USFWS and NMFS 1996). This handbook calls for the availability of up-to-date biological information on the species being considered within the Plan Area. It also recognizes, however, that for habitat-based HCPs the protection of habitat types for a particular species through an HCP and associated mitigation program may obviate the need for additional distribution studies. The California Natural Communities Conservation Plan (NCCP) guidelines state as a criterion: "The plan provides a conservation strategy that is based on recognized principles of conservation biology, as well as the best available scientific information about species and habitats."

In the initial phases of this Plan's development efforts were focused on gathering all available information on the Covered species and conserved natural communities. The effort to obtain and review up-to-date biological information was ongoing throughout the preparation of the Plan.

The SAC and the Planning Team used the best available scientific data in developing a recommended conservation plan. There were, however, some constraints that had to be acknowledged and dealt with. One constraint was the ability to conduct biological surveys in all desired areas. Two factors combined to pose limits: available funding and lack of permission from some landowners to conduct surveys on their property. Within those limits, surveys were conducted for species for which the existing data were believed by the SAC to be inadequate. Surveys for each of these species were conducted in locations where biologists with expertise in the species believed the habitat was suitable. The locations were also selected to reflect the likely limits of distribution of the species in the Plan Area. A list of these field surveys is given in Section 3.4 of this appendix. An additional constraint was the fact that appropriate conditions for annual plant species occur only in years with appropriate amount and timing of rainfall. In most years there is minimal or no germination of the annual plant species to be covered in the Plan.

Constraints existed for the analytical process as well. Population Viability Analyses (PVAs) did not exist, and the available data would not support preparation of PVAs for the species being covered. Nor did the Plan preparers have the technical expertise or budget to use sophisticated GIS programs or models to assess the biological resource value of each unit of land, regardless of scale, in the Plan Area. As noted below, a coarse filter approach was employed, with emphasis on protecting the Core Habitat areas for target species, the processes that sustain them, and protecting linkages to maintain connectivity. The Plan also provides for natural community conservation.

Notwithstanding the limits on available data and analytical methods, the Plan preparers believe that the expertise of the SAC and other biologists who contributed information, combined with the conservation focus described in the preceding paragraph, have generated a functional Plan that will conserve the Covered Species and conserved natural communities in the Plan. In providing a thorough critique of the Plan, the Independent Science Advisors' Review of the Plan, dated April 13, 2001 (Noss et al. 2001), did "commend the Scientific Advisory Committee (SAC) and others who contributed to the Draft Plan for producing what is sure to be one of the most scientifically defensible and thorough HCPs or NCCPs ever developed." (See Section 3.3 in this appendix for a description of the Independent Science Advisors and their report.)

3.2.2 Planning Objectives and Key Concepts

As noted by Beatley (1994) the HCP process generally involves a central strategy of identifying and protecting certain high value habitat areas. Within this central strategy, greater emphasis has been placed on planning beyond the single-species level to concentrate on ecosystem-based planning (Noss et al. 1997; O'Connell 1997; Margules and Pressey 2000; The Nature Conservancy 2000). Within the framework of HCP and NCCP guidelines, this Plan was designed to emphasize ecosystem-level conservation. Indeed, the ecosystems of the Coachella Valley, including the dynamic sand dunes on the valley floor, essentially required that the participants in this Plan look beyond protection of the habitat for a given suite of species. The character of these dynamic ecosystems required that ecosystem processes, including large-scale disturbance events including flooding and sand transport, be incorporated into the conservation plan. As described below, the Planning Team incorporated planning at various levels of biological organization, using both a coarse and a fine filter approach, and employing certain key concepts described below.

3.2.2.1 Planning at Species, Community, and Ecosystem Levels

The multiple species concept embraces the need to go beyond the habitat needs of a single species to look at other levels of biological organization at which targets for conservation could occur. In their handbook on ecoregional conservation planning, the Nature Conservancy (2000) emphasizes the importance of planning at multiple spatial scales and multiple levels of biological organization. This Plan incorporates these three levels of biological organization: species, terrestrial ecological communities, and ecological systems. The identification of these levels is central to the coarse filter approach discussed below. For this conservation plan, the term natural communities is used to describe terrestrial ecological communities; these natural communities are named based on plant community types defined at the "plant association level" (Nature Conservancy 2000, Sawyer and Keeler-Wolf 1995). The ecological systems, or landscape level, element of this plan is perhaps its most significant feature, in that this is the level at which ecosystem processes are incorporated. The Planning Team identified ecological system elements including both biotic (such as individual species life history characteristics) and abiotic (particularly sand source/sand transport and hydrological processes) components as targets for conservation. This emphasis on natural community and ecosystem-level planning is consistent with the theoretical basis for the NCCP program (Noss et al. 1997), and the NCCP element of this Plan. These levels of biological organization are also used in the Monitoring and Adaptive Management Plan, in which three levels of monitoring are addressed including species-specific, habitat-natural community, and landscape or ecosystem.

3.2.2.2 Coarse Filter and Fine Filter Approach

The Nature Conservancy developed the concept of coarse and fine filters in conservation planning (Noss 1987; Noss and Cooperrider 1994) in response to the sometimes inefficient and ineffective species-by-species approach (Noss et al. 1997). The "coarse-fine filter strategy" is described as a working hypothesis that assumes conservation of multiple, viable examples of all coarse-filter targets (communities and ecological systems) will also conserve the majority of species (The Nature Conservancy 2000). To work as coarse filters, ecological communities and ecosystems must be conserved as part of dynamic, intact landscapes, with some level of connectivity between them, and be represented across environmental gradients to account for ecological and genetic variability. The fine filter approach focuses on those species, such as very rare, extremely localized, or narrowly endemic species, that cannot be reliably conserved with the coarse filter approach (The Nature Conservancy 2000). The SAC adopted this strategy early in the process as part of a general approach for conservation planning. The adoption of this strategy was based on several considerations, notably that the coarse filter would better incorporate the ecological processes and landscape level features that are significant to the target species, and that limitations on data would make it difficult to accomplish fine filter planning for many of the species. The Planning Team recognized that conserving adequate portions of natural communities, including the ecological and physical processes that sustain them, would reduce the need for detailed studies and population viability analyses for individual species.

Some examples of species requiring a fine filter approach include the Palm Springs pocket mouse, Coachella Valley round-tailed ground squirrel, and triple-ribbed milkvetch. Species for which the coarse filter approach is appropriate include the riparian birds, gray vireo, burrowing owl, Coachella Valley Jerusalem cricket, and Le Conte's thrasher.

3.2.2.3 Key Concepts

The process of designating areas of high biological value that were incorporated into the reserve design process, and ultimately into the conservation plan, was based on a number of key concepts identified by the SAC. These key concepts were used to identify and to evaluate potential conservation areas.

The SAC's intention was to preserve multiple Core Habitat areas for each species. Each Core Habitat area was assessed for viability (adequate size, intact natural processes, appropriate corridors) to the extent possible. For those species within the aeolian sand system each site had a discrete sand source. Having multiple, discrete sites provided assurance that catastrophic climatic or environmental events would be unlikely to decimate all populations of target species. Within the multiple-site requirement the SAC also attempted to include the current range of climatic and elevation conditions occupied by each species. Conserved areas in both the cooler, wetter, western end of the Plan Area, and the hotter, drier, central-eastern end of the Plan Area

were included to provide the range of conditions a given species inhabits. Therefore the likelihood is increased that some refugia for each of the species will be maintained if climatic conditions change over time. In this section these key concepts will be defined as they pertain to the Plan, especially in the Core Habitat selection and assessment process.

Core Habitat. As defined by the SAC, Core Habitat for a given species is a habitat patch or aggregation of habitat patches that (1) is of sufficient size to support a self-sustaining population of that species, (2) is not fragmented in a way to cause separation into isolated populations, (3) has functional Essential Ecological Processes, and (4) has effective Biological Corridors and/or Linkages to other habitats, where feasible, to allow gene flow among populations and to promote movement of large predators.

Population Viability. Core Habitat must contain enough individuals of a target species to assure a high probability of long-term survival (viability). It must surpass the minimum (effective) population size below which extinction is likely in the short term (Soulé and Simberloff 1986). The scant data available for any of the target species covered in the Plan precluded doing a Population Viability Analysis (PVA; Gilpin and Soulé 1986) because the lack of solid data to establish estimating parameters for the PVA causes uncertainty in extinction predictions (Taylor 1995). Thus the SAC assessed the criterion of viability in the context of habitat patch size. In particular, the SAC assessed whether the habitat patch is of sufficient size to maintain a viable population of the target species. Four factors affect the viability of populations: 1) genetic factors that, through chance events, affect negatively the ability of a population to adapt to a changing environment (founder effect, inbreeding depression, random fixation); 2) demographic factors (e.g., sex ratio, reproductive output, age at sexual maturity); 3) environmental factors, whether relatively short-term (drought or flood) or long-term (climatic change or changes in habitat characteristics); and 4) natural catastrophes such as fire. Genetic and demographic factors are inherent to small populations (Roughgarden 1975; Shaffer 1981, 1985, 1987; Soulé 1980, 1987; Lande and Barrowclough 1987). The SAC attempted to ensure viability by preserving a sufficiently large population in each Core Habitat area to overcome extinctions caused by chance genetic or demographic events, and to negate the chance of extinctions caused by environmental factors or natural catastrophes by creating multiple Core Habitat areas for each target species.

Soulé (1987) proposed that a minimum population size in the low thousands would be needed to support a viable population of vertebrates for several centuries. Thomas (1990) proposed a target of a geometric mean of 5,500 individuals. Insufficient data for nearly all target species allowed calculation of neither geometric mean population sizes nor static population estimates. So the SAC, using the minimum viable population sizes of Soulé (1987) and Thomas (1990) as a guide, decided that the habitat must be of sufficient size to contain at least 5,000 to 10,000 individuals of a target species to satisfy the criterion requiring that Core Habitat be able to support a viable population for that species. This does not mean that Core Habitat was delineated based on this population size range but, instead, potential Core Habitat was first delineated on the basis of

habitat size and shape (low perimeter to area ratio) and secondarily assessed to see if it satisfied the viability criteria by supporting 5,000 to 10,000 individuals. Estimating population size involved using the best estimates of experts based on known densities or on short-term trapping or sighting data. In addition to Core Habitat, some small populations of many target species are found in habitat that was preserved for other purposes (e.g., sand source areas, Core Habitat for a different species). Although their ability to persist long term is less certain, these populations may enhance the genetic variability of nearby Core Habitat areas (Gilpin 1987).

Multiple Core Habitat Areas. Management can never foresee catastrophic events and thus assure the survival (probability = 1.0) of any population (Shaffer 1990). A single site may be susceptible to destruction by catastrophic climatic or environmental events (e.g. fire). Protecting multiple unconnected environments is a way of maximizing the likelihood that some populations will persist as not all will be affected, or affected equally, by the event (Soulé 1987). Margules and Pressey (2000) recommend preserving "at least three occurrences of each species." In light of this, the SAC identified multiple, discrete Core Habitat areas for each target species, where practicable. By discrete the SAC implies that the sites are geographically, climatically, or ecologically distinct. Each Core Habitat area has intact ecological processes with discrete sources. With the multiple-site requirement the SAC also attempted to include the current range of climatic and environmental conditions occupied by each species. So to satisfy the population viability criterion, a Core Habitat area must have a large population size, and there must be three or more of these Core Habitat areas whenever possible.

Ecosystem Processes. To be considered Core Habitat according to the SAC's criteria, the habitat must have intact ecological processes. Information about the habitat requirements of each species, and the ecological processes that maintain these habitats, was assembled from literature sources, field studies, and consultation with experts.

Community ecologists focus on the minimum area required for preservation, whereas population biologists focus on the minimum population size or density required for the long-term survival of a species. The two are intimately interrelated; to have long-term viability necessitates protecting a species' habitat, and to protect habitat requires the ecological processes be intact. To best protect ecological processes, as much habitat as possible should be protected, as well as non-habitat areas (for the target species) that directly or indirectly affect that habitat (e.g., watershed areas or sand source areas). To this end, substantial portions of each natural community are to be preserved.

A central goal of this Plan is to ensure the protection of important ecological processes that maintain the natural communities and habitat for target species. Many ecological processes are relevant in this regard but the Plan placed special significance on protection of sand source/sand transport systems for the aeolian sand habitats and of hydrological processes that are significant to many of the natural communities, in particular riparian areas, mesquite hummocks, desert fan

palm oases, and desert dry wash woodlands. Sand transport systems and hydrological processes are discussed in greater detail below.

Natural communities ranging in elevation from toe-of-slope up to the upper limit of the bighorn sheep habitat (approximately 4600 feet) will be protected by the Plan. Habitats above this elevation are offered high to moderate protection by the Plan as they occur on primarily public lands. These public land areas, many designated as wilderness, provide the large size and connectivity required to protect communities at the landscape level. Target species that live in habitats encompassed by this mosaic of hillside habitats will likewise be protected (e.g. riparian species: least Bell's vireo, southwestern willow flycatcher, summer tanager, yellow-breasted chat, and yellow warbler).

Below the hillside habitats protected by the Plan lie the aeolian sand habitats, the natural communities most endangered by development and other anthropogenic disturbances in the Coachella Valley. The following natural communities comprise the aeolian sand habitat: active desert dunes, stabilized and partially stabilized desert dunes, active desert sand fields, ephemeral desert sand fields, stabilized and partially stabilized desert sand fields, stabilized shielded desert sand fields, and mesquite hummocks. Those communities categorized as "shielded" have disrupted ecological processes. The aeolian sand system in the Coachella Valley has been described by various studies (Turner et al. 1981; The Nature Conservancy 1985; Lancaster et al. 1993; Meek and Wasklewicz 1993; Wasklewicz and Meek 1995; Barrows 1996, USGS 2002).

Sand Source and Sand Transport Processes. The abiotic ecological processes that drive the aeolian sand habitat extend far beyond the actual habitat and require both a sand source and strong prevailing winds. The source for the blowsand is the erosion of the mountains and hills that surround the valley. Weathering frees sediment and washes it downstream, eventually intersecting an area where fluvial dispersal is replaced by aeolian dispersal. The sediment that arrives on the valley floor contains particle sizes ranging from fine silts and clay through sands and gravels to cobbles and large rocks. High winds sort the sediment; transportability of the differently sized particles is revealed as a positive correlation between wind energy and particle mass. Fine soils like silt and clay are carried aloft and, remaining suspended, are carried away from the region. Sand-sized particles are dispersed downwind during periods of strong winds. Gravels, cobbles, and rocks remain in the sorting area. The San Gorgonio Pass constricts the dominant northwest winds, increasing wind velocity (energy) through the valley and causing the strong, characteristic winds in the vicinity of the pass. Downwind (east and southeast) from the pass, the wind velocities lessen. This means that the stronger winds nearer the pass can carry larger, heavier particles than can winds farther down valley, and larger particles are deposited at the point where the wind no longer has sufficient energy to move them. Thus, average sand particle size decreases with increasing distance from the pass. Downwind from a source area is a transport corridor in which, over the long-term, the wind regime can transport more sand than is normally available to it. Farther downwind, the sand-carrying capability of the wind decreases,

and more sand is available than can be transported, resulting in a net accumulation of sand in the depositional area. Periodic influx of new sand in the depositional area maintains an unstable surface.

Any portion of this aeolian sand system can be interrupted. The fluvial portion can be interrupted by flood control structures that impound or divert sediment-laden floodwaters. Barriers in the sand transport corridor can impound sand and block the wind. A barrier creates a leeward wind shadow that extends a distance of roughly ten times the height of the barrier before wind velocities at ground level approach the magnitude of those on the windward side of the barrier. This leads to a gradual depletion of leeward sand, eventually stabilizing the surface.

The blowsand regions in the valley are supplied by myriad sources. The following summary of the aeolian sand habitats, categorized by Conservation Area, describes their primary sand sources and sand transport routes. The Preferred Alternative Conservation Area containing each is named parenthetically, where applicable.

- Snow Creek/Windy Point Conservation Area. This is the westernmost extreme of aeolian habitat in the Coachella Valley. Coastal influence makes this area cooler and wetter than other blowsand habitat, and its proximity to the pass gives it higher velocity winds. The primary sand sources are the San Gorgonio River to the west and the Whitewater River at its confluence with the San Gorgonio River near, Windy Point. Both rivers have their origin in the San Bernardino Mountains; lesser sources occur in smaller canyons in both the San Bernardino and the San Jacinto ranges. Sand that reaches the riverbed from these sources is blown to adjacent habitat by the predominantly west winds, or is carried downstream by floods to supply other habitat areas.

- Whitewater Floodplain Conservation Area. This transport and deposition area is supplied by sediment-laden floodwaters in the Whitewater River that breach the "sugar dikes" at the Coachella Valley Water District settling ponds, just east of Windy Point. These sugar dikes are designed to shunt small flows into the settling ponds, but break away in high volume floods > 500 c.f.s. (Don Mitchell, Coachella Valley Water District, pers. comm.). Floods deposit their sediment load east of the settling ponds, where sand is then transported east onto the Whitewater Floodplain Preserve by the prevailing west winds. In the western portion the wind can transport more sand than is available to it in most years, resulting in sand accumulating only on the lee side of shrubs (accretion dunes or hummocks). To the east, the wind velocity decreases slightly, and these sand accretions periodically coalesce into sand fields (ephemeral sand fields). A secondary sand source for this area is Mission Creek, which transports sediment fluvially from the eastern San Bernardino Mountains. Mission Creek will be protected by the Plan as a sand transport system. The 300-foot total width will allow channel widening, if necessary, albeit with the stipulations that a soft bottom is retained and no debris basins or settling ponds are

built. The primary sand transport system, the Whitewater River channel, will be protected as a fluvial sand source from the Snow Creek/Windy Point Conservation Area to where the river channel crosses Indian Avenue on the western edge of the Whitewater Floodplain Preserve.

- The Big Dune. This is the historical terminus for most sand originating from the San Gorgonio and Whitewater River sand sources. Historically, strong episodic winds from the west-northwest transported sand across the Whitewater Floodplain then deposited it where the wind velocity decreased away from the San Gorgonio Pass, forming the large sand pile that comprises the so-called Big Dune. Presently, the sand transport system is permanently blocked by development upwind, so the region is undergoing the slow process of stabilization. The Nature Conservancy (1985, figure II-6) identified it as a "shielded or stabilized area due primarily to urban development (roads, buildings, canals, dikes)." In addition to the lack of an intact sand source, the region is highly fragmented by roads. The largest undeveloped plot that is not divided by two to four-lane roads contains 273 hectares (674 acres). This area is not included in the Preferred Alternative.

- Willow Hole and Edom Hill Conservation Areas. Fault-dammed ground water at the Banning branch of the San Andreas Fault supplies water to honey mesquites. These shrubs impound blowsand, forming hummocks and a portion of the mesquite hummock natural community. The Nature Conservancy (1985) identified three sand source areas for Willow Hole-Edom Hill. The Morongo Wash source supplies sand from the west, and the Willow Hole and Long Canyon watersheds drain through the preserve from north to south. Morongo Creek carries sediment originating in the Little San Bernardino Mountains in Morongo Canyon. Long Canyon also originates in the Little San Bernardino Mountains. The Willow Hole watershed originates in the western Indio Hills and acts to redeposit sand into the Willow Hole area after being carried out by prevailing winds. Additionally, aerial photographs reveal that the Morongo Wash source is augmented by sediment from Mission Creek, which has the San Bernardino Mountains as its source. These sand transport routes, as well as the Willow Hole watershed, are to be protected by the Plan. Mission Creek and Morongo Wash will include 150 feet on each side of the midline of each wash; Long Canyon will be protected with a flood control levee on the west side, along Mountain View Road and without a flood control barrier on the east side. The entire Willow Hole watershed is contained in a portion of the Indio Hills that will be protected.
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- Flat Top Mountain—Stebbins Dune (portion of Willow Hole Conservation Area). This area immediately south of Willow Hole had historically three major sand sources. Blowsand that was transported across the northern portion of the Whitewater River floodplain area (just south of Garnet Hill) continued east over the top of Flat Top Mountain. It, along with sand from the other sources, formed a veneer over Flat Top

such that it resembled a large dune (Donald Weaver, pers. comm.), with extensive drift deposits on the lee side. But in the early 1960s, the Southern Pacific Railroad planted tamarisk trees to protect their equipment from windblown sand. These trees blocked the sand transport system from this source (Turner et al. 1981, 1983). The two other sources are Mission and Morongo Creeks. These two washes provide sand to the area between I-10 and the Banning branch of the San Andreas Fault, from where prevailing winds transport it around the north end of Flat Top Mountain, then southwest to Stebbins Dune. The fluvial transport routes of Mission and Morongo Creeks, as well as the aeolian transport area south of the fault line, are to be preserved by the Plan.

- Thousand Palms Conservation Area. The dunes within the Thousand Palms Preserve are supplied by two major sources, from Thousand Palms Canyon and from sand-bearing alluvium in the Indio Hills, west of Thousand Palms Canyon. Donald Weaver, in a short-term study for The Nature Conservancy (1985), estimated mean annual supply of sand by the drainages in the Indio Hills and concluded that Thousand Palms Canyon supplies the majority of sediment to the dunes within the Thousand Palms Preserve. However, subsequent studies of aerial photos (Lancaster et al. 1993), geochemical composition (Meek and Wasklewicz 1993; Wasklewicz and Meek 1995), and enhanced satellite imagery (Cameron Barrows, pers. comm.) have determined that drainages west of Thousand Palms Canyon, in the Indio Hills, supplied most of the sand that is present today. These drainages are to be included in the Plan as sand sources, and a proposed flood control structure is designed to direct sediment-laden floodwaters to a sorting area directly upwind of the Preserve. The Thousand Palms Canyon sand source remains intact under the Plan.

- East Indio Hills Conservation Area. The sand source and transport systems to the west of this area (Whitewater River, Mission and Morongo Creeks, Thousand Palms Canyon, etc.) are blocked by development upwind. This leaves only the sand sources in the adjacent Indio Hills and the Little San Bernardino Mountains to supply all the sand for this area (see Independent Science Advisors' Review, Noss et al. 2001). The viability of the remaining aeolian sand habitat here is uncertain.

Habitat Fragmentation. Another criterion that must be satisfied for a Covered Species' habitat to be considered core is that it must not be fragmented: there can be no impervious barriers to target animal movement, or to pollinators or seed dispersal agents of target plants. Effective barriers lead to genetic differentiation among isolated populations, diminish recolonization ability, and decrease the effective size of the population leading to a decrease in viability (Soulé 1986). Habitat can be fragmented by roads or by unsuitable habitat.

The negative effects of roads on species in adjacent communities have been well documented (for review, see Trombulak and Frissell 2000). Roads as barriers are species-specific in their

effectiveness to exclude species; this effectiveness as a barrier is linked to road width and traffic volume. Even relatively narrow, lightly traveled roads have been demonstrated to be significant barriers to some arthropods (Mader 1984; Mader et al. 1990; Seibert and Connover 1991), and to some small rodents (Merriam et al. 1989; Oxley et al. 1974; Swihart and Slade 1984). Isolation by roadways has led to significant genetic differentiation between the isolated populations (Reh and Seitz 1990). Oxley et al. (1974) found wide roads to be so effective as barriers to dispersal of small forest mammals that they are equivalent to a body of water twice as wide. In the Coachella Valley there are very few paved roads that are only two-lanes wide and even fewer with light traffic volume. These roads, except perhaps Snow Creek Road, will increase in traffic volume (and will subsequently be widened) as the human population increases locally. Although there is no information available concerning the effectiveness of roads as barriers to the target species, it is the SAC's opinion that wide roads with heavy traffic form effective barriers to all target animal species with the exception of birds and bats.

Linking habitat patches using bridges or culverts has ameliorated the impact of roads as barriers (Reed et al. 1975; Hunt et al. 1987; Woods 1990; Yanes et al. 1995; Romin and Bissonette 1996; Keller and Pfister 1997; Clevenger and Waltho 2000). Efficacy is species-specific, so it is important to know if the target species will use a culvert or bridge and, if so, if the benefit to the population caused by the connection outweighs the impact to the population caused by increased mortality adjacent to the road. A large, landscape-scale preserve is better than smaller preserves linked by narrow corridors (Simberloff et al. 1992). That said, if a potential habitat core is insufficient to meet the criterion of viable population size, but can be connected to nearby habitat via a bridge or culvert so that the area in total is sufficient, then the use of culverts and bridges should be considered. The uncertainties alluded to by Simberloff et al. (1992) prompted the SAC to first select core areas in habitat without roads; but if a potential Core Habitat area satisfied all criteria except size, then the SAC considered linking that habitat to adjacent habitat using a bridge or culvert.

Fragmentation of a Covered Species' habitat patches by intervening unsuitable habitat would prove as detrimental a barrier as are manmade barriers, especially when habitat patches are relatively small within a matrix of unsuitable habitat. An example is the blowsand habitat that is restricted to isolated pockets in the Indio Hills (Barrows 1997). These pockets are surrounded by a non-habitat matrix of rocky alluvium. The SAC did not include these as Core Habitat, even though many contained some of the target species, because the habitat patches were small and widely spaced. Although Ricketts (2001) found that different types of non-habitat matrices differ in their resistance to movement between habitat patches by individuals, there was no attempt to qualitatively analyze the matrix in this way. Instead, this type of fragmentation was filtered out at the species modeling process by the level of resolution used. Habitat was categorized by its predominant constituent, so the habitat patches in Core Habitat were always substantially larger in area than the non-habitat matrix.

Biological Corridors and Linkages. A Linkage is "habitat that permits the movement of organisms between ecological isolates" (Newmark 1993) and that will "enhance or maintain the viability" of target species in those ecological isolates (Beier and Noss 1998). Linkages allow for migration in wide-ranging animals, plant propagation, interchange of genetic material among populations, movement in response to environmental change or natural disasters, and recolonization following extirpation (Beier and Loe 1992). Biological Corridors (wildlife movement areas that are constrained by existing development, freeways, or other impediments) are of particular importance in that they give large predators access to otherwise isolated preserves. Large predators play an important role in controlling populations of mesopredators, which in turn prey upon target species (Crooks and Soulé 1999). Biological Corridors may also aid in the function of ecosystem processes, such as sand transport. Considerable discussion of Biological Corridor and Linkage benefits and disadvantages exists in the literature (for example, Simberloff and Cox 1987; Noss 1987). In essence, Linkages should resemble the habitat they are connecting, they must be wide enough to lessen edge effects, and they must connect habitat that was originally interconnected. The longer a Biological Corridor, the more important that it be wide and that it contain the habitat requirements of a target species. Biological Corridors and Linkages may have disadvantages, as they may serve as the potential avenue for transmitting disease, fire, exotic weeds, and other catastrophes.

Following is a list of Biological Corridors and Linkages addressed by the Plan and the function of each:

> The San Gorgonio Pass separates populations of montane species in the Peninsular Range from Transverse Range populations, which are connected in turn to populations in the Sierra Nevada to the north. A corridor here connects populations in Southern California and Baja California with central and northern California populations (M.E. Soulé, pers. comm.). Large species, especially those that show some migratory behavior, probably used this corridor in the past (mule deer, mountain lions, coyotes, bobcats, etc). The I-10 freeway and Highway 111 form barriers that would be impervious without the bridges and culverts located at the washes. The under crossing at Stubbe Canyon is large and is included in the conservation area. Future development adjacent to other bridges and culverts would further limit their effectiveness.
>
> The Whitewater River and adjacent floodplain is a sand source corridor primarily, but also serves as a corridor for Coachella Valley milkvetch between Snow Creek/Windy Point Conservation Area and the Whitewater Floodplain Preserve. Heavy traffic volume on Indian Avenue will not affect dispersal of plant seeds, but will stop movements by animals. A bridge or very large culverts, installed at the point where the Whitewater River normally flows across Indian Avenue, would allow animal and sand movement below the road while keeping the road open to traffic during flood events. Although this corridor is many times larger than the home range size of any of these animal species, it

contains pockets of habitat and so would function as a conduit for gene flow between the two Conservation Areas.

Mission Creek is identified as a sand source corridor for the Whitewater Floodplain Preserve and the Willow Hole and Edom Hill Conservation Areas. It may also function as a large-predator corridor, specifically for coyotes, for these preserves.

Morongo Wash The wash is narrow (300 feet) and in some areas is bordered by low-to medium-density residential development. It is identified as a sand source corridor for the Whitewater Floodplain Preserve and the Willow Hole and Edom Hill Conservation Areas. It may also function as a large-predator corridor, specifically for coyotes, for these preserves, and may provide habitat connectivity between the Upper Mission Creek/Big Morongo Canyon Conservation Area and the Willow Hole Conservation Area.

Indio Hills/Joshua Tree National Park Linkage is a corridor connecting the Indio Hills and the Thousand Palms Preserve with the Little San Bernardino Mountains and the protected areas of Joshua Tree National Park. This ensures a source for species that formerly moved freely between the two areas, such as desert bighorn sheep, coyotes, kit foxes, gray foxes, badgers, chuckwallas, desert tortoise, etc.

Desert Tortoise Linkage Conservation Area in the eastern portion of the Plan Area links the Mecca Hills and the Orocopia Mountains with the Little San Bernardino and Eagle Mountains. It is a habitat corridor for the desert tortoise and serves as a movement corridor for many other species.

Climate Change. The 20th century ended with one of the warmest decades since climate data were recorded instrumentally, and probably the warmest since the 1400s (Hulme and Sheard 1999). Globally, the average surface temperature increased 0.6°C in the last century caused, in large part, by increased atmospheric "greenhouse gasses" (Wigley 1999). Recent computer models estimate temperature increases to about 0.5°C by the year 2060 in the southwestern United States (Giorgi et al. 1998; Doherty and Mearns 1999). For a perspective, global temperatures increased only about 0.5°C since the Ice Age 18,000 years ago.

Changes in precipitation are less easy to model because of the diverse topography of the southwestern United States. Coarse-resolution models such as the Canadian Centre for Climate Modeling and Analysis model and the Hadley Centre for Climate Prediction and Research model predict substantial increases in annual precipitation, while a high-resolution, regional model depicts a slight decrease in precipitation relative to present averages (Doherty and Mearns 1999; Mearns et al. 1999). The high-resolution, regional model differs from the others in that the jet stream shifts to the north rather than to the south as in the other two models. None of these models are yet capable of incorporating the effects of El Niño/La Niña or the North Pacific

Oscillation and so, could be further refined. Temperature change is positively correlated with the frequency of El Niño events (Hunt 1999a, b) and its complementary, La Niña. El Niño typically results in cooler winters with higher rainfall, while La Niña results in warm, dry winters. Thus the increased variation caused by El Niño/La Niña events may accompany the trend toward an increase in temperatures in the region (Hunt 1999a, b; Timmerman et al. 1999).

The range of climatic conditions in which a species or vegetation type occurs, its climate envelope, has been used to predict how climate change might affect its distribution. It assumes that the geographic range of a species or vegetation type is defined by current climatic conditions in that range. Increases in global temperatures result in poleward shifts (or upward shifts in mountainous areas) of the climatic envelopes, followed by a similar, poleward migration of the species or vegetation types as the climate in their existing locale becomes unsuitable (Box 1981; Emanuel 1985). This type of migration occurred during the Pleistocene in North America as plant species moved north and south in response to intermittent periods of glaciation (Brown and Lomolino 1998). But the rapid pace of the current warming trend is a cause of concern, as it is not known if plant species are capable of migrating that quickly. As climatic conditions warmed following the last Ice Age, trees migrated, on average, about 1 km per decade to keep pace with the changing climate. However, estimates for global warming rates predict a tenfold increase, requiring 10 km per decade migration rates (Davis 1989; Dyer 1995). Fortunately, the steep topography surrounding the Coachella Valley permits a spatial propinquity of life zones so migrations need only be of a few kilometers rather than hundreds of kilometers.

The Preferred Alternative will preserve the majority of land from the toe of slope to the ridgeline of mountains surrounding the Coachella Valley. This landscape-scale protection promotes the upward migration of species and vegetation types in response to global warming. There is a distinct possibility that the highest elevation ecosystems could be reduced or lost entirely, a consequence that cannot be ameliorated by the Plan. Additionally, the climate envelope approach does not account for species and vegetation types that are adapted to specific soil types (Malcolm and Pitelka 2000). The aeolian sand inhabitants, for example, are restricted to blowsand, regardless of climate changes. Part of the rationale for the SAC's criteria of preserving multiple habitat cores for each target species is that the Core Habitat areas will include the current range of climatic and environmental conditions occupied by each species. For example, the Coachella Valley fringe-toed lizard has a Core Habitat at Windy Point (elevation 1000 feet, 305 m); another site 5 miles (8 km) east at Whitewater Floodplain reserve (elevation 600 feet, 180 m); a third site another 3 1/2 miles (5.6 km) east-northeast at Willow Hole (elevation 750 feet, 230m); and the fourth site another 9 miles (14.5 km) from Willow Hole at the Thousand Palms Preserve (elevation 200 feet, 60 m). These sites are spread out over a distance of over 18 miles (29 km), and each has a distinct assemblage of sand sources (see above). There is also a descending gradient in annual precipitation at points increasingly distant (farther east) from the San Gorgonio Pass. Annual rainfall for the following centers, arranged from west to east, is as follows: Palm Springs, 5.31" (134.9 mm); Indio Fire Station, 3.81" (96.8

mm); Thermal F.A.A. Airport, 3.16" (80.3 mm); Mecca Fire Station, 2.94" (74.7 mm) (U.S. Climatological Records 2000). So, by including geographically distinct sites, the multiple sites criterion will include the range of conditions a given species inhabits today. As the climate changes in the future, there is a possibility that the habitat at one or more sites will become unsuitable for a target species. But preserving multiple sites in this manner will increase the likelihood that some refugia for each of the species will be maintained if climatic conditions change over time.

Reserve Size. The theory of island biogeography (MacArthur and Wilson 1963, 1967) was applied early on to habitat preserves (Diamond 1975; Wilson and Willis 1975). In particular, 1) the number of species should be an increasing function of a preserve's area; 2) the extinction rate should be a decreasing function of a preserve's area; and 3) the relationship between area and survival probability differs among species (Diamond 1975). MacArthur and Wilson (1963, 1967) describe the number of species on an island as an equilibrium between immigration rate and extinction rate. The intent of preserves is to prevent extinction for the long term, so extinction rate is of particular importance. A smaller island or preserve will normally contain fewer individuals of a target species making it vulnerable to extinction through stochastic causes: 1) genetic factors that, through chance events, affect negatively the ability of a population to adapt to a changing environment (founder effect, inbreeding depression, random fixation); and 2) demographic factors (e.g., sex ratio, reproductive output, age at sexual maturity) (Shaffer 1981, 1987; Soulé 1980, 1987; Lande and Barrowclough 1987). Richman et al. (1988) found that land-bridge islands had an elevated extinction parameter caused, in part, by species' susceptibility to fluctuations in climate. This elevation of the extinction parameter decreases with increase in island area. Like islands, larger preserves may contain more topographic relief and habitat heterogeneity, providing refuges from which the preserve can be repopulated and thus have lower extinction rates (den Boer 1981).

Preserves identified by the Plan contain Core Habitat for target species. This Core Habitat, as discussed previously, is considered large in that each Core Habitat area alone consists of sufficient area to maintain a viable population. Multiple core areas that are interconnected by corridors or by management practices allow recolonization if climatic fluctuations or environmental catastrophes cause the complete loss of a population.

Edge Effects. A habitat edge is a discontinuity in habitat features that can be perceived by a target species and that, in turn, affects the species' behavior or performance (Lidicker 1999). Conservation biologists refine the definition as it pertains to preserve design to include changes in a natural community caused by the rapid creation of abrupt edges in what were previously undisturbed habitat patches (Lovejoy et al. 1986; Soulé 1986). Of particular interest are the negative effects of edges. Conservation Areas in the Plan Area will, eventually, be nearly surrounded by human-altered habitat that is not suitable for target species within the preserve. Roads, railroads, urban and agricultural developments, greenbelts, etc., will all affect species

within the Conservation Areas they surround. Road mortality may depress populations in adjacent habitat; predation from pets and children will increase as urban housing is built to the habitat edge; overspray of pesticides and herbicides can affect some species in habitat adjacent to agriculture. The depth that edge effects penetrate a preserve varies by target species, by habitat type within a preserve, and by type of edge. For example, Winter et al. (2000) found that mesopredators affect nesting success of grassland-nesting sparrows 30 to 50 meters from an edge formed by shrubs, but that roads, agricultural fields, and forests had no effect. But Rosen and Lowe (1994) suggested that snake mortality on roads affected the population well away from the road and into wilderness areas. Studies show that effects diminish with increasing distance into the habitat from the edge (Gates and Mosher 1981; Wilcove et al. 1986; Andrén and Angelstam 1988; Winter et al. 2000). It is difficult to measure the width of edge effects but Newmark (1993) used a performance measure for the target species across the edge to determine the width of edge effects in a Tanzanian forest by measuring encounter distance of birds from the forest edge. Encounters of the target species increase with distance from the edge to a point where the number of encounters remains constant. This distance was, again, species specific.

Edge effects are directly related to perimeter length. Because area increases geometrically with increase in perimeter length, an increase in area results in a decrease in perimeter-to-area ratio (assuming shape remains unchanged). So a large preserve can minimize edge effects when its area is large enough that the portion affected by proximity to the edge is insignificant relative to the entirety. Thus, a large preserve is internally buffered. Such a large preserve may not be an option because there is either insufficient undeveloped habitat, or the habitat by its nature is small. When this is the case, it may be possible to lessen the edge effects by choosing the type of edge that will impact the target species least. The SAC ranked the common types of edges in increasing order of impact: 1) nonhabitat matrix (a natural habitat that is unsuitable for the survival of the target species); 2) very low-density residential development (one dwelling per 5 or more acres); 3) greenbelt or agricultural development; 4) roads with high traffic volume; 5) high density residential development (one dwelling per less than 1 acre). So, isolating habitat from high-density urban areas with a buffer of nonhabitat matrix will lessen the impacts to the target species dependent on that habitat. High-density residential development affects nearby habitat greater than other edge types because house cats, dogs, and opportunistic mesopredators such as raccoons, opossums, skunks, crows and ravens are subsidized by garbage and pet food (Wilcove 1985; Friesen et al. 1995), especially in the absence of larger predators which act to control numbers of mesopredators (Wilcove 1985; Crooks and Soulé 1999). The SAC considered roads, as edges, to be preferable to high-residential development because the roads would serve as a barrier to mesopredators, a benefit that would outweigh the cost to target species of mortality from vehicles. Additionally, roads can be fenced to prevent mortality if monitoring demonstrates the need.

Preserve shape can also minimize edge effects. A circular preserve, for example, has a much lower perimeter-to-area ratio than does a long, thin preserve. The SAC attempted to minimize

perimeter-to-area ratios when delineating preserves that encompass Core Habitat of target species.

Section 3.7 in this appendix explains the Site Identification Process used to develop the Conservation Alternatives.

3.3 Independent Science Advisors

As previously noted, Michael O'Connell of The Nature Conservancy facilitated an outside peer review by a team of independent scientists. This team was provided with a series of questions and asked to respond to the questions in their review. The questions were assembled through suggestions from the SAC, the USFWS, and the Department of Fish and Game. In addition, the CVAG Project Advisor Group provided an opportunity for any interested person to propose a question. In January 2001, documents providing information on the conservation planning process, including copies of a January 2001 revision of the Administrative Review Draft, maps of Conservation Alternatives 1, 2, and 3, species distribution models and known occurrence maps and associated documentation, maps illustrating land ownership, natural features, parcel boundaries, and conserved natural communities within the Plan Area, and a draft Technical Appendix, which included target species and natural community conservation strategies, were distributed to the Independent Science Advisors. A meeting with the science advisors and the SAC was held in early February to provide an opportunity for the independent science advisors to discuss the conservation planning process with the SAC. The Independent Science Advisors (ISA) also met with outside participants to discuss the Plan. In mid-April they submitted a report detailing their findings. The report, "Independent Science Advisors' Review: Coachella Valley Multiple Species Habitat Conservation Plan/Natural Communities Conservation Plan (MSHCP/NCCP)" is included in this section in its entirety.

[NOTE: all references in the ISA report on the following pages to conservation alternatives 1, 2, and 3, refer to the initial alternatives prepared in 2000, not the alternatives contained in the Plan. Section 3.7.2 of this appendix provides additional information on these three alternatives.]

Independent Science Advisors' Review: Coachella Valley Multiple Species Habitat Conservation Plan/ Natural Communities Conservation Plan (MSHCP/NCCP)

Reviewers: Drs. Reed Noss (Editor), Edith Allen, Greg Ballmer, Jay Diffendorfer, Michael Soulé, Richard Tracy, and Robert Webb

Michael O'Connell, Facilitator

April 13, 2001

This report constitutes the peer review of the Coachella Valley Multiple Species Habitat Conservation Plan/Natural Communities Conservation Plan (MSHCP/NCCP) by a group of independent science advisors. Three of the reviewers—Reed Noss, Michael Soulé, and Dick Tracy—participated previously as peer reviewers of early phases of the planning process in the Coachella Valley at two workshops organized by the Coachella Valley Mountains Conservancy, in 1996 and 1998. We otherwise played no role in the development of this plan until being convened for this review. Two additional advisors, Robert Fisher and Robert McKernan, participated in a workshop (described below) on Feb. 12-13, 2001, but did not join in the writing of this review.

We were provided a list of 32 questions under which to organize our review. The questions were developed by the U.S. Fish and Wildlife Service, California Department of Fish and Game, the Coachella Valley Mountains Conservancy, and the Coachella Valley Association of Governments, and grouped into sections considering general habitat and landscape issues, species issues, habitat monitoring and adaptive management, geomorphology, and species modeling (Appendix 1). A draft set of questions was revised in response to comments by Mike O'Connell, Reed Noss, and others. Although we used these questions to organize our comments in this report, in many cases we found that currently available data do not allow us—or probably anyone—to answer the stated question effectively. In several cases we lumped related questions for the sake of efficiency.

In conducting our review we referred to several documents and a substantial series of maps prepared by the Coachella Valley Mountains Conservancy with the assistance of the participating agencies. The primary document was the January 2001 Administrative Review Draft (ARD) of the Coachella Valley MSHCP/NCCP. Supplementary documents included a Technical Appendix, a document on Species Distribution Model Parameters and Known Locations, an Adaptive Management and Monitoring Program, and the Coachella Valley Draft Water Management Plan. Maps included general geographical information, vegetation (including historic for a portion of the study area), plan alternatives, a species richness and ecological diversity model, and species distribution models. We benefited tremendously from a

workshop held in Palm Desert on February 12-13, 2001, during which members of the Science Advisory Committee (SAC) which developed the core of the plan, the Coachella Valley Mountains Conservancy, and other participating agencies presented the conceptual approach, major data, and assumptions underlying the plan to our team of reviewers and responded to our questions. Our review team then met separately for the second day of the workshop, discussed our initial responses to the questions, and made assignments to our individual members to take the lead on particular questions.

Although we are technically individual science advisors and reviewers, this review represents a consensus and the collective opinion of our team. This report consists of two sections: 1) a brief overview stating our general impressions of the draft plan and its three biological alternatives; and 2) responses to the specific questions provided to us by the agencies and planners.

We also want to note that we are explicitly aware that the success of the Coachella Valley MSHCP will depend not only on a scientifically-supported conservation program but one that can be implemented successfully given socioeconomic and political constraints. Our comments in this document are made with the knowledge that these other factors may weigh heavily on the final conservation plan. The primary task of the planning team is to weigh the conservation program against these issues. It is our firm belief, however, that the biological conservation program itself – particularly as reflected in the alternatives – should not be compromised in its initial stages based on estimations of the political economy of the planning area. It is essential that a supportable biological alternative be offered that can be evaluated in the context of politics and economics. It is with this perspective in mind that we offer our comments.

General Impressions of the Plan and Its Alternatives

First, we want to commend the Scientific Advisory Committee (SAC) and others who contributed to the Draft Plan for producing what is sure to be one of the most scientifically defensible and thorough HCPs or NCCPs ever developed. Although our comments in this review take the form of a critique, as they must in order to constitute a substantive review, we do not mean to imply failure on the part of the planners. We recognize that substantial effort and analysis have gone into the Draft Plan, and in our view it has no fatal flaws. Our comments are meant instead to point out areas where the plan can be shored up or improved based on our collective knowledge and review of the technical documents.

The main stimulus for the Coachella Valley MCHCP/NCCP is the requirement under Section 10(a) of the U.S. Endangered Species Act for a habitat conservation plan to be approved before "incidental take" of listed species (animal species) on private lands is permitted. The ongoing conversion of natural habitats within the Coachella Valley to other land uses and the consequent reduction in acreage and alteration of the structure and processes of those habitats has placed many species at risk of extinction. To be effective, the Plan must identify the species at risk, their

distributions, and the factors necessary to maintain their essential habitats. The Plan must also include a means to preserve and manage those species and their habitats together with the geophysical and biological factors that maintain them. Because the Plan is not just a MSHCP, but also a NCCP, it must provide a means to conserve the natural communities of the Plan Area, not just an assortment of individual species.

On a continental scale, the Coachella Valley is a hot spot of biodiversity, distinguished by high endemism, rarity, and richness of several taxa. For example, researchers with The Nature Conservancy and the Association for Biodiversity Information identified this portion of Southern California as one of six regions in the United States that rank in the top tier of conservation priority based on a rarity-weighted richness index (S. Chaplin et al. 2000, Chapter 6 in *Precious Heritage: The Status of Biodiversity in the United States*, Oxford University Press). Common sense suggests that one should not develop or impact resources in a hot spot, because the chances for conflict with conservation objectives are extremely high. Neither common sense nor a conservation ethic has prevailed in past land-use decisions, however. In the case of the Coachella Valley, the most important habitats for biodiversity are largely private land and very expensive, many have been developed for decades, and the pace of development remains rapid. A credible conservation plan for the Coachella Valley will be difficult to forge but is required to resolve continuing conflicts.

We agree in principle with the general planning paradigm of the SAC, i.e., that any action taken in the Plan, for example, establishment of a conservation area or corridor, must be both sufficient and essential (C. Barrows, pers. comm.). We interpret "sufficient" to mean that it will assure the stated goal or objective (e.g., maintenance of viable populations of covered species) and "essential" to mean that, without the action, the goal or objective will not be attained. Hence, superfluous actions are avoided. In practice, however, the thresholds of sufficiency and necessity are always ill-defined. Estimates of what is sufficient or essential are subjective and highly uncertain, informed as much by individual experience and intuition as by hard data and rigorous analysis. We suspect that much of the apparent disagreement about which biological alternative in the plan should be preferred reflects such individual differences in perspective.

One of the major concerns of our team regarding the planning process and the general content of the biological alternatives in the Draft Plan is that scientific information was often mixed with pragmatism and perceived political reality, without any documentation of how these two classes of knowledge were combined. We believe the credibility of the Plan would be enhanced by addressing ecological issues as objectively and scientifically as possible, free from the constraints of perceived political reality. Socioeconomic and political factors can be considered later as a "cost screen" overlaid on planning alternatives. We address this issue in more detail in some of the responses to our assigned questions.

In cases of high uncertainty and high risk, the precautionary principle suggests that it is better to err on the side of protecting too much habitat than too little, that is, to err on the side of sufficiency rather than necessity. Of course, too great an error in either direction will condemn a plan to political, legal, or economic failure. The best way to minimize the chances of error, and hence meet the sufficiency-necessity standard, is through rigorous science. In practice, however, data, funding, and time are usually insufficient for highly rigorous scientific investigations on the scale of a regional conservation plan. This is the case here. The sufficiency-necessity problem remains, and we would like to see this problem receive more explicit attention in the MSHCP/NCCP.

The Draft Coachella Valley MSHCP/NCCP proposes three conservation design alternatives. Alternative 1 would protect only those lands already in public ownership. We can consider this alternative a null hypothesis that can be easily rejected, as it clearly falls short of meeting the requirements of law (e.g., U.S. Endangered Species Act, California Natural Communities Conservation Planning Act). The Draft Plan properly concludes that Alternative 1 does not contain sufficient natural habitats and associated resources to fulfill essential goals. Alternatives 2 and 3 encompass all lands in Alternative 1 and contain additional private lands. Alternative 3, which was developed based on recommendations from state and federal agencies, is the largest in acreage and subsumes Alternative 2. There is some difference of opinion among the public agencies and other stakeholders regarding the adequacy of Alternative 2 and the need to include some or all of the additional lands identified in Alternative 3. The possibility also exists that even Alternative 3 does not include sufficient habitat and/or other resources to sustain the covered species. Uncertainties remain concerning the minimum habitat areas for particular species, the importance of specific areas as habitat for these species, and the value of potential corridors for flow of individuals and genes and/or maintenance of critical geophysical processes, such as sand and water sources and fluvial and aeolian sand transport.

The Draft Plan should account for the need of covered species to track changes in the distributions of their habitats over time in response to climatic or other environmental changes. In this regard, it is notable that species distributions are often correlated with temperature and moisture gradients, which are likely to shift in response to climatic change. Thus, a warmer, drier climate is likely to cause species associated with higher moisture and/or cooler temperature regimes to be reduced in numbers or eliminated from existing occupied habitat lands where climatic conditions are currently marginal. Such species could become more restricted to the western portion of the Plan Area (Whitewater-Snow Creek-Windy Point areas). Conversely, in the event of climatic cooling, which is a probable successor to the current warming phase, species associated with warmer and drier habitats may become more restricted to the valley floor and southeastern portions of the Plan Area. Maintaining well-connected, heterogeneous landscapes with multiple microhabitats and potential refugia is a sensible strategy in the face of climate change in any direction (R. Noss, 2001, *Conservation Biology* 15: in press). Thus, long-term conservation planning for the Coachella Valley must consider maintenance of physical

linkages over a range of existing temperature-moisture regimes and elevations. We note that the Draft Plan gives scant attention to such long-term issues.

The Plan, especially Alternative 3, maintains considerable landscape connectivity around the margins of the valley, which are mostly mountainous terrain, but much more tenuous linkage opportunities across or longitudinally through the valley. To a large extent the opportunities for such linkages are precluded by agricultural and, to a greater extent, urban land uses. Nevertheless, some opportunity exists to use the Whitewater River channel, the railroad right-of-way, and even highway rights-of-way to maintain some level of connectivity through the length of the valley. The Whitewater River in particular seems to be a good candidate for maintaining a linkage for a number of habitats. Serious discussion of this option should be included in the Plan. Of course, regulatory agencies must consider the costs and benefits of conserving particular areas relative to other potential sites in the planning area before they enter negotiations with stakeholders.

Responses to Specific Questions Posed to Science Advisors

The general reaction of our team to the questions provided is that many of them are questions best addressed to the planners, not to reviewers. In many cases data that would allow us, or anyone, to answer the questions are not available. The four geomorphology questions are a case in point: Answering any of these questions would require substantial new research. Nevertheless, in all cases we have provided our best answers, given the best available information. In some cases we suggest the kinds of field studies and analyses that would be necessary to answer the questions definitively.

I. Habitat/Landscape Level Questions:

1. Evaluate each Conservation Alternative using the attached "Criteria for Evaluating Site Identification Maps." (Conservation Alternatives are described on pages 90-105 of Administrative Review Draft).

Choosing among alternatives boils down to an exercise in best professional estimation. High quality data sufficient to make a defensible choice of an alternative are simply not available. This lack of data is par for the course in conservation planning. As noted earlier, we believe that in the face of poor data, the precautionary principle should hold. In all of the 11 specific areas of contention (i.e., areas of land included in Alternative 3 but not Alternative 2), and all else being equal, we can be sure that the Plan would be improved by the inclusion of additional habitat. Thus, the burden of proof should rest on showing that excluding the additional areas in Alternative 3 will not jeopardize the ability of the plan to sustain viable populations of the covered species. Because the SAC included their estimation of socioeconomic and political criteria in decisions that, at this point in the process, should have been made purely on

biological/ecological grounds, we do not believe they placed the burden of proof on the correct side in developing Alternative 2. This is particularly important given that precisely how socioeconomic and political criteria influenced their decisions is not documented in the Draft Plan.

The SAC's general approach in developing Alternative 2 was to suggest that adding extra habitat would not increase the Plan's ability to sustain populations. They appeared to be influenced more by necessity than sufficiency. In several cases we believe the SAC overemphasized potential negative aspects of sites suggested by the agencies in Alternative 3, or at least did not provide adequate documentation for these assumed negative aspects. For example, in arguing against the inclusion of the "Flat-top Mountain and Dune Area North of I-10" (p. 106 of the Administrative Review Draft [ARD] and in comments during the February workshop), the SAC's argument for not including the area was that the dunes were no longer active, and this, combined with the high per-acre value of property in the dunes meant that the area was not necessary for protection of the species on the proposed covered species list. The idea that the area, though sub-optimal, might serve as a buffer for the more intact areas to the north was not considered or documented explicitly, nor were potential management practices apparently considered, such as active disturbance to reactivate dunes or human-assisted movement of sand into the system. Such procedures, while expensive and intensive, might be necessary for the conservation of some species or natural communities.

In another case, "the area between Date Palm and the extension of Duval Road" (pg 110 ARD) Alternative 2 appears to exaggerate the potential negative effects of human structures on the conservation value of the site, or at least does not provide adequate documentation to support the conclusion that these structures eliminate the area for conservation purposes. During the workshop the SAC indicated that the primary reason they did not include this area in Alternative 2 was the presence of a road that bisects it. In the ARD the SAC also discusses the small size of the area. Aerial photographs of the site indicate that large portions of the area are not bisected by roads and that the area, while small, could sustain large populations of some of the endemic insects and plants covered in the Plan. This area may have been dismissed too quickly and the presence of a road weighed too heavily in the decision-making process. Although substantial scientific literature suggests that roads have negative effects on many taxa, making the presence of a single, two-lane road the primary reason for rejecting a site overextends the scientific evidence for negative effects of roads. Many assumed barriers are better seen as filters, as some movement of organisms occurs across them. We understand that plans to widen this road exist, but the Alternative did not consider the possibility of designing a road to include underpasses for animals.

Moreover, it is not enough to do conservation on maps. As pointed out later in our comments, especially with regard to adaptive management, the Plan must specify the ways in which mistakes or omissions in the Plan will be corrected in the future. Ideally, each conservation sub-

area requires its own plan with explicit biological objectives and management approaches identified.

As suggested earlier, the documents seem to have taken a largely static view of the ecosystems of the Coachella Valley. In some cases they are perhaps too narrowly focused on the notion of a pristine, self-managing system as the only kind of habitat that should be included in a reserve. The documents appear to have given little attention to options such as maintaining habitat for the covered species via active management. The plan also does not explicitly consider the possibility that habitats disturbed by human activities may recover over time or be restored to provide suitable habitat in the future (see R. Webb et al., 1988, The effects of disturbance on desert vegetation in Death Valley National Monument, Cal. *USGS Bulletin* 1793). Recovery from soil compaction requires about 80-120 years in the Mojave Desert (R. Webb et al., 1986, *Soil Science Society of America Journal* 5): 1341-1344).

The inclusion or deletion of lands proposed for conservation in Alternatives 2 and 3 must be based on sound principles of conservation biology and factual evidence or strong inference of conservation value. Because the additional lands proposed for inclusion in Alternative 3 are scattered throughout the Plan Area and because their proposed inclusion is based on diverse factors, each must be considered separately. We do this briefly below for several of the areas under discussion.

Expanded Snow Creek Area between Interstate 10 and California Highway 111, west of the Whitewater River.

This area is located within an important transient sand source and sand transport area and provides habitat for sand endemics such as the Coachella Valley Jerusalem cricket, Coachella Valley Giant Sand-treader cricket, and Palm Springs pocket mouse. Although this land currently may not be crucial to the protection of these species, it offers a refugium during major flood events that could affect the adjacent Snow Creek/San Gorgonio Wash habitat area and provides a broader contact zone between that area and Whitewater Canyon. Additionally, it should be noted that many sand endemic species (including those mentioned above) are distributed primarily in the northwestern end of the Coachella Valley and are probably limited by moisture and temperature gradients. Ongoing climate change will alter the existing temperature/moisture gradient and, thus, the distribution of suitable habitats for many species. Some species already concentrated in the northwestern portion of the Plan Area are likely to become more confined to it, as they are eliminated from areas further east. Use of this land for wind-generated electric power might be compatible with both the conservation of covered species that persist under this form of land use and perhaps for the conservation of natural communities.

Although Alternative 2 concludes that natural ecological processes for this land have been compromised by the railroad and by Highway 111, the habitat in this area has similar value to

that in the adjacent areas of Snow Creek/San Gorgonio River Wash, and Windy Point. In Greg Ballmer's experience, the arthropods are the same and may even be more abundant in the proposed expansion area of Alternative 3. Highway 111 and the railroad are not absolute barriers to movement of either the sand-inhabiting arthropods or the sand in this area.

This triangular-shaped parcel, bounded by major highways to the north and south and the Whitewater River to the east, could be a major refugia for animals dependent on local aeolian systems. The San Gorgonio River is isolated from this parcel owing to the barrier formed by California 111, and the Whitewater River is channelized as it passes north to south along its east end. Small, relatively active areas of sand exist in this parcel, suggesting that it might be marginal habitat for sand-preferring organisms covered under the MSHCP. In addition, several species have known distributions in this area, which is relatively pristine in comparison to similar areas towards the northeast. The assumption that the natural ecological processes for this parcel have been compromised is not entirely correct, but public agencies are regularly bulldozing the Whitewater River channel in this area with the apparent goal of eliminating riparian vegetation that uses Colorado River aqueduct water destined for the recharge galleries downstream. Because this practice effectively eliminates cover that might provide a wildlife-migration corridor, the MSHCP should explicitly suggest that the practice be eliminated. If it is eliminated, the value of the triangular parcel would be greatly increased.

Expanded Mission Creek Area

This area may provide low-density habitat for a few vertebrate species, such as desert tortoise. Its inclusion in the reserve system would also provide a more defensible perimeter and buffer for the adjacent Mission Creek conservation area. It would be useful to have more information on the biological resources of this expansion area and an analysis of potential damage to the Mission Creek area if it were urbanized or converted to other uses. Additionally, it should be noted that a recent finding of the Coachella Valley Jerusalem cricket in a patch of aeolian sand atop the bluffs on the north side of Whitewater Canyon (wind farm area) indicates that this species is somewhat more widespread than previously thought and may occur in the expanded Mission Creek area. Further surveys for this species are probably warranted in this area.

One of the major rationales for including this expansion in Alternative 3 is the belief from previous reports that the area provides a significant source of fluvial sand that could be entrained and moved downstream to the aeolian source area. This belief is incorrect; most of the sand supply transported in Mission and Morongo Creeks comes from areas upslope from this parcel, which mostly serves as a zone of transport from mountain front to depositional area. Channelization of Mission Creek in this area could improve sand delivery from the sources in the San Bernardino Mountains to the depositional area south of the Banning fault by improving hydraulic conveyance across the alluvial fan (which is built from sedimentation from Mission

Creek and Morongo Wash) to the depositional plain west of Willow Hole and minimize within-channel storage of sand that is unavailable for aeolian transport.

Expanded Whitewater Preserve Area

The water recharge basins along the Whitewater River south of I-10 and north of Highway 111 are in the middle of a potential sand transport area. However, the configuration of the basins greatly impedes sand transport—dunes are present on the downwind sides of the basins and are effectively trapped until released by dredging. The river floodway is routed around the basins and, thus, does not interdict much of the sediment flow. It may become possible to reorient the basins at some time in the future to increase the rate of aeolian sand transport, while also reducing basin maintenance costs. As the basins are designed to wash out in a major flood event, there seems to be no urgency in altering their orientation at this time. It would be appropriate to discuss such matters with the water district staff to determine the feasibility of future alterations.

Also, the presence of the basins serves as a wind shadow for significant areas downwind of the basins but upwind of the Preserve that could be viable habitat for several species covered under the MSHCP. The presence of wind generators on this land, plus its prime location as depositional area for Whitewater River, plus the potential for aeolian transport across it makes it a prime candidate for restoration. One potential means would be to alter the configuration of the main northern dike that protects the recharge galleries from the Whitewater River at flood stage by shortening it (not adding dredged material as is done currently). This would allow large floods to spread out sooner, dropping their sand loads upwind from the Whitewater Preserve instead of enhancing the probability that floodwaters will pass down river toward Palm Springs.

Expanded Willow Hole and Sand Source Area and Flat-top Mountain and dune area north of I-10

Alternative 2 envisions protection of a relatively narrow pair of active stream channels (Mission Creek and Morongo Wash) east of Highway 62 to maintain sediment transport to the valley floor where it can be redistributed by aeolian processes to feed the active dunes in the Willow Hole area. Expanded protection of this area, as proposed in Alternative 3, may increase protected habitat for a few vertebrate species and improve the value of this corridor for animal movement over a range of elevations. More data is needed to determine the real value of this area to the Palm Springs pocket mouse and other species, which may use it as Core Habitat or as a movement corridor.

Expansion of this conservation area could potentially give greater protection from potential future flood control alterations. Observations in late February, after the February 12-13 storm, indicates that much of the depositional area for Mission and Morongo Creeks north of I-10 is

inundated even during relatively light runoff events. Channelization of this area would be devastating to the Willow Hole sand-delivery system.

On the other hand, Mission Creek is already channelized between the San Andreas (Banning) fault and about California 62. It performs the desired function: it delivers sand with minimal storage on the alluvial fan west of Desert Hot Springs. Morongo Wash, however, is not channelized and does store sediment in that same area. The channelization of Mission Creek also retains sand from being lost owing to aeolian activity, while the unchannelized Morongo Creek is losing sand, which is stored in aeolian dunes east of its channel. (This, of course, suggests management just east of Morongo Wash for species dependent on aeolian habitat.) Channelization is beneficial in certain circumstances related strictly to fluvial sand delivery systems. Most floods already are caused by rainfall (the most severe rain on snow), so climatic change—unless it shifts storms from winter to summer—may not be a major issue for this area. We expect such floods to cause degradation in the channels upslope, which means more sand is moved into the depositional plain that is the target of the MSHCP. What is most needed is a ban on channelization south of the San Andreas (Banning) fault, either north or south of I-10 and the railroad. Deposition south of I-10 benefits the Whitewater River Preserve, so this is a case where preservation of the entire system greatly benefits the aeolian-dependent species.

In addition, recent field work of Robert Webb and colleagues suggests a more direct source for aeolian sand to Willow Hole than Mission/Morongo. There are several canyons in the Little San Bernardino Mountains due north of Willow Hole—Long Canyon, West End Canyon, and East End Canyon—as well as a drainage in the Indio Hills due east of Willow Hole that appear to be potential major contributors of fluvial sand. West End and East End Canyons are blocked by a long dike system that effectively stores all sediment at the mountain front while releasing water through a long, mostly underground culvert that flows to the southwest and away from Willow Hole. Active management of undeveloped parts of the Seven Palms Valley, particularly related to channelization of distributary flow channels from Long Canyon, could be helpful to the Willow Hole sand-delivery system while allowing development upslope.

Big Dune South of I-10

The major controversy for this site seems to be economic cost versus biological benefit. It may very well be too costly in terms of money and/or political capital to protect. Nevertheless, the biological value of this site should determine whether to include it within the scope of the conservation program in the Draft Plan. Much of the rationale for excluding it seems to be a presumption that it is a “dead” dune, cut off from the sand source that is needed to maintain it as an active dune. However, some of the covered species do quite well in stabilized dunes and may inhabit the Big Dune. Further survey work is needed to determine if it is an important site for Coachella Valley Jerusalem cricket, for example. This area is very near the easternmost record

for this species (adjacent to I-10 at the Thousand Palms off-ramp. See also our response to Question #1, Species Level, All Species.

East End of the Indio Hills

The dunes in this area are well separated from others to the west, and land use changes have all but eliminated sandy habitat connections between them. The formerly robust sand delivery system from the Whitewater River - Mission Creek - Morongo Wash has been completely truncated, leaving only sand sources in the Indio Hills and the Little San Bernardino Mountains. The biotic community of the eastern dunes is somewhat different from those of dunes further west; this difference provides an argument for their inclusion in the Draft Plan in order to cover all habitat types and natural communities. It seems that there is not enough survey information currently to determine the value of this area for a number of covered species that may use it. Again, it is worth mentioning that climate change may result in the geographic range of this community type, or at least of some of its components, either expanding or contracting in the future. Under a warmer, drier climate this community is likely to expand or shift to the west; while a cooler, moister climate could result in its displacement by other species, which currently have a more western distribution within the valley (if landscape linkages are maintained). The isolation of this area from other dunes argues against its value in contributing in a major way to genetic or demographic interchange with populations elsewhere. However, given the abundance of dune endemics (especially plants and insects) throughout the Southwest, one cannot dismiss the possibility that a number of species could survive and maintain their evolutionary potential even if this dune area becomes increasingly isolated.

Conclusion:

In considering how to distribute conservation areas in the Coachella Valley, two opposing considerations should be kept in mind: 1) the need to distribute reserves throughout the planning area in order to provide for multiple populations (redundancy) of the covered species and to represent communities across their natural range of variation; and 2) the need to concentrate conservation areas in portions of the Valley that are biologically richest (i.e., hot spots) or where habitat quality if highest and persistence of populations over time is most probable. These two considerations need to be balanced in the Plan. The argument for concentrating reserves in the western portion of the planning area, where precipitation is higher and population densities of covered species are generally higher, is attractive, and makes even more sense in the context of global warming. Nevertheless, such a strategy could be counterproductive if it results in loss of population redundancy and reduced representation of natural communities across the Valley. Moreover, a reserve system concentrated in any one portion of the Valley would be more vulnerable to “contagious catastrophes” (i.e., disease, extreme weather episodes, geomorphic change) and other synchronized environmental events that could extinguish local populations.

Alternative 1 does not provide for the sand delivery systems that affect major habitat in the northern Coachella Valley. Alternative 2, while much better, relies too heavily on terrain and climatic features (e.g., windy area won't be developed into housing units) to preserve the integrity of the sand delivery systems. Alternative 3 may go too far in some areas by assuming that significant sand is generated on alluvial fans instead of upslope in the San Bernardino and Little San Bernardino Mountains and the Indio Hills.

We have not undertaken a thorough analysis of the potential effects of the three planning alternatives on covered species and natural communities, which we believe is outside the scope of a peer review. This topic is reasonably well covered in the Draft Plan, given the limitations of available data. In any case, these limitations prevent us from saying much more about the potential population viability of any of these species under the Plan alternatives. Some notes on the covered invertebrate species, prepared by Greg Ballmer, are in Appendix 1. In addition, the team botanist and restoration ecologist, Edith Allen, provides some comments on the plant species and natural communities:

Overall, Alternative 1 is unacceptable for two of the five plant species, but Alternative 2 is acceptable for all five, with reasoning as follows:

Alternative 1 is clearly unacceptable for the little San Bernardino Mountains linanthus, which has only three known locations that lie in lands protected by Alternative 1. Only 18% of the modeled habitat for the Coachella Valley milkvetch lies in Alternative 1 protected lands. Of the five plant species, only the triple ribbed milkvetch would be unaffected if Alternative 1 is chosen.

The difference between Alternatives 2 and 3 is relatively small or not different for LSBM linanthus, triple ribbed milkvetch, and Orocopia sage. The Mecca aster would lose about 20% of its habitat if Alternative 2 is chosen, which is probably not a threat to its existence. The C.V. milkvetch is the most extensive of the five plant species, and will lose the most acreage if alternative 2 rather than 3 is chosen. However, protection under Alternative 2 will probably not threaten its persistence. Of the 5 plant species, the C.V. milkvetch is the only one known to occur on the Big Dune. The C.V. milkvetch occurs on stabilized as well as active dunes, and would likely survive on Big Dune even though the geomorphic processes of dune building are no longer active. The other four species are in river washes, dry fans, creosote scrub, and other communities, but are not sand-obligate species.

Eleven of the 26 natural communities have only about 1300 acres or less in the planning area. Alternative 1 gives insufficient protection to at least 8 of the natural communities (under a 50% protection criterion for the communities of limited area). At least seven of these small communities are wetland ecosystems that should be conserved as much as possible because of the critical habitat they provide for target and non-target species. Losing wetlands and springs

would obviously endanger additional species not currently covered. Under Alternative 2 all these small community types would achieve up to 98% protection, except for mesquite hummocks. Mesquite hummocks would be protected up to 50% under Alternative 3.

Two larger community types deserving special protection are the active sand fields that provide sand for other sites as well as habitat for sand-requiring species, and the dry wash woodlands that are habitat for many target species. The active sand receives 75% and 93% protection under Alternatives 2 and 3, respectively, but deserves as much protection as possible to preserve other sand-dependent habitats downwind. The dry wash woodland is quite extensive (some 40,000 acres) but is important habitat for desert tortoise, bighorn sheep, several target bird species, other migratory birds, and is the only habitat for the LSBM linanthus. Preservation of dry wash woodland on the northeast Salton Sea (under Alternative 3) may be important for animal movement. Some of this woodland has been converted to exotic tamarisk, but would still be valuable habitat and corridor if restored.

In summary, we offer the following brief responses to the "criteria for evaluating site identification maps" as a way of comparing alternatives 1,2, and 3, emphasizing that such a comparison is more appropriately made by the planners (i.e., the SAC) than by reviewers.

1. **Are the habitat patches within the sites large enough to sustain the species/natural community?** It is important to recognize that patch size cannot be considered independently from patch configuration; these qualities interact to influence population viability. Two or more small patches within dispersal distance and not separated by movement barriers may be treated as one larger patch by a species. This question is also highly species-specific. As we have noted, data are generally insufficient to answer this question, and no PVAs have been conducted. Nevertheless, Alternative 1 seems to be insufficient for many species. Alternative 2 would provide patches large enough for many or most of the covered invertebrates and plants, barring major environmental change. The larger, better connected patches in Alternative 3 would offer higher probabilities of persistence for most species, but especially the vertebrates.

2. **How many of the existing sites where the species or natural community occurs in the Plan Area would be protected under this Site Identification Alternative? Is this considered to be sufficient by biologists with expertise on this species or natural community?** Please refer to our discussion above. This is not really an appropriate question for reviewers.

3. **Are connections to other sites essential? If so, do meaningful connections exist, and can they be maintained?** For many or most covered species, and speaking generally, we can say with confidence that connections to other sites are essential, especially in the long term and considering the inevitability of environmental change. Some meaningful

connections certainly exist, but exactly how meaningful needs to be determined by research. Alternative 3 provides more connectivity than Alternative 2. Whether that additional connectivity is essential has yet to be established, but the precautionary principle suggests maintaining existing connections where possible, until the necessary research has been conducted. As noted elsewhere, connectivity across highways and other potential barriers could be improved through engineering approaches.

4. **Is the site large enough to sustain any keystone species, such as large predators necessary to maintain essential ecological processes?** There is insufficient attention to large predators (e.g., mountain lion, bobcat, coyote) in the Plan. These are not considered covered species, for good reason, but could serve as focal species for designing the reserve network. For these species, no single site is large enough to sustain a population, so connectivity is the key issue.

5. **Are the sites representative of the range of environmental conditions...under which the species or natural community occurs in a viable population?** Insufficient data are provided to answer this question. As discussed above, a network of conservation areas well distributed across the Valley would be preferred for this purpose over a design concentrated in one portion of the Valley.

6. **Can necessary physical and ecological processes be maintained?** This question is highly site-specific, and is addressed elsewhere (to the extent possible, given data limitations) in this report.

7. **Is there a significant potential for adverse edge effects from adjacent land uses? Could these be so severe as to jeopardize the viability of the site? Could these edge effects be successfully managed?** Edge effects are virtually unstudied in the Valley. Research elsewhere suggests that edge effects could be pervasive, but are manageable to some extent by such means as constructing "hard edges" (e.g., fences impermeable to opportunistic predators such as house cats and raccoons) around small isolated reserves, managing invasive species, and maximizing reserve size generally. In addition to the probability of biological edge effects, aeolian areas have strong edge effects related to stability and mobility of sand sheets. In effect, this is a natural edge effect comparable to that of habitat fragmentation. Because of this, we believe it is better to err on the side of too much conservation than too little when it comes to the aeolian-dependent species.

8. **Is there a significant potential for impacts from deleterious activities on the site, such as illegal dumping, off road vehicle activity, shooting, or illegal collecting? Could these be so severe as to jeopardize the viability of the site? Could these edge effects be successfully managed?** As in our response to question #7 (above), these kinds

of edge effects are probable. Although they have not been studied in the Valley, efforts to reduce their potential impacts should be taken.

9. Is there a potential for exotic species to adversely impact the site? Could these be so severe as to jeopardize the viability of the site? Could these edge effects be successfully managed?

Same response as above.

2. Did the site identification process and development of conservation areas follow a systematic, stepwise process, including the appropriate use of species models?

Of fundamental concern in any conservation plan is whether the process of identifying sites and designing conservation areas was systematic and rigorous. Chris Margules and Bob Pressey (2000, *Nature* 405:243-253) note that systematic conservation planning is highly superior to opportunistic or politically-biased planning and has several key attributes: 1) it requires clear choices about the features to be used as surrogates for overall biodiversity, 2) it is based on explicit goals, preferably translated into quantitative, operational targets, 3) it recognizes the extent to which conservation goals have been met in existing reserves, 4) it uses simple, explicit methods for locating and designing new reserves to complement existing ones in achieving goals, 5) it applies explicit criteria for implementing conservation action on the ground, and 6) it adopts explicit objectives and mechanisms for maintaining the conditions within reserves that are required to foster the persistence of key natural features, together with an effective monitoring and adaptive management program.

The approach taken in development of the conservation alternatives meets most of the criteria of systematic conservation planning in a general sense. For example, clear choices were made about the species and communities to be used as surrogates; the conservation goals are reasonably explicit; the limitations of the current reserve network are recognized; and the methods and site selection criteria are fairly explicit. We are concerned, however, that modern, quantitative tools were not employed to accomplish the required tasks. Hence, the process of site selection was more subjective and less transparent than it would have been if more rigorous methods had been applied. For example, there was no use of sophisticated habitat suitability models, PVAs, or site selection algorithms (e.g., SITES, a program developed by The Nature Conservancy for ecoregional conservation planning; S. Andelman et al., 1999. *SITES V 1.0: an analytical toolbox for designing ecoregional conservation portfolios*, The Nature Conservancy). Rather, selection of sites was based on GIS overlays and expert opinion. The failure to apply rigorous models reflects, in large part, the paucity of data on the species and communities concerned. Nevertheless, we feel that a more technically rigorous and sophisticated site evaluation process could have been applied and would result in a more defensible Plan. (See our

response to question #6 in this section, below, and response to question #4 under Species Modeling.)

The site-identification process involved both scientific and non-scientific analyses. The scientific analyses are reasonably well documented for most species, but the non-scientific analyses, which involve issues such as monetary value of property as an inhibition to purchase, and prior land-use history, are not well documented. These two analyses need to be clearly separated, and the separation could explain, in part, the reason for the differences between Alternatives 2 and 3 and make the choice between the two – or, alternatively, a hybrid of the two – more objective.

The justification for the site-identification process appears in the ARD (p. 65-67). It is somewhat unusual that this plan uses GIS analysis with definite equations between data layers, yet no equations are presented in the documentation and the descriptions are somewhat vague. For example, multipliers are discussed but the final values are not given or referenced in the text. The "Relative Conservation Value" ranges from 0-25, yet there is no conversion equation given to combine "Covered Species Richness" (number of target species, ranges 0-31); "Covered Natural Communities Richness" (number of natural communities, possible range of 1-46 but probably never greater than 2-5); "Habitat Heterogeneity" (number of natural communities plus landform types, possible range given as 1 to >10); and "Habitat Fragmentation" (explicitly defined, 0-100%). It would appear that "Covered Species Richness" is double weighted, the combination of "Covered Natural Communities Richness" and "Habitat Heterogeneity" represents a double weight, and "Habitat Fragmentation" is a single weight, but it would be valuable to see this in equation form, for example:

RCV = f5*(2*f1*CSR + (f2*CNCR+f3*HH) + f4*HF)
where the f's are conversion factors to obtain the units of RCV. This would help the scientific credibility of the document as well as provide the more technically inclined audience to understand the basis for the plan.

The species models appear to be derived from considerable information, both in terms of mapped habitat information in GIS formats and the long experience and personal observations of the members of the SAC. As noted in the ARD (p. 64), species such as the ones covered in this MSHCP are difficult to map because of highly specific habitat requirements (which map require map units far larger in scale than the quarter section analysis used in the ARD) or the habitat requirements may only be vaguely known.

Most of the maps depicting current and/or historical distributions of species and the corresponding habitat model appear to be consistent and credible. For some species, like the desert slender salamander, the ARD leaves absolutely no doubt what is required for management of the species. However, some of the credibility of the ARD is damaged by seemingly incongruous information presented in map form or omissions from the documentation. For the

Coachella Valley fringe-toed lizard, all the documentation is presented in the 1985 HCP and none of the information is repeated, even in summary form in the Technical Appendix. This needs to be corrected by providing a good summary that references the previous work. The only real information on this species appears on the map depicting the species distribution model, and this has semantics problems that beg explicit documentation in the ARD or the Technical Appendix. For example, distributions pre- and post-1979 appear to be issues on this map—why? If pre-1979 distributions are irrelevant, as appears to be implied by the "Potential Distribution" model, then why are they included? Should "Potential Distribution" be renamed "Potential Distribution, Post-1979"? How is it that some "Known Locations, Post-1979" fall outside the potential distribution? These issues need to be dealt with on the map and in the documentation.

Other maps appear to be contradictory, although that appearance may arise solely from inadequate documentation or insufficient labels on the maps. For example, for the Yuma Clapper Rail, at least three "Known Locations" are outside of the "Potential Distribution," which would raise questions about the validity of the potential distribution and the expert opinion model on which it is based. It is possible that those dots hide mapped potential distribution and therefore cannot be seen at the scale of this map, but that should be explained in the caption. For certain species—particularly the Coachella Valley giant sand treader cricket, the Palm Springs pocket mouse, the Coachella Valley milk vetch, the Crissal thrasher, the Palm Springs ground squirrel, the flat-tailed horned lizard, and the Mecca aster -- significant differences are depicted between "Known Locations," "Potential Distribution," and "Core Habitat." How can a known location be outside a potential distribution? If this isn't simply a semantics problem, this needs to be explained in detail or the credibility of the species model is seriously jeopardized. How is it that in many cases (see Palm Springs pocket mouse) the number of "Known Locations" is much higher outside of the "Core Habitat" than inside? Does the "Core Habitat" imply that points are not depicted within its boundaries because of the number of observations? Some of these maps show known locations in urban areas—does this mean that these species can adapt to urban environments and do not require specific areas to be set aside for special habitat management? For many bird species, the potential migratory areas and potential breeding areas are different from the observed locations of the species, in some cases with little or no overlap, and this <u>appears</u> to be a problem. Some species do not have potential distribution models, and, although this is discussed in the Technical Appendix, it should be noted on the map caption.

As these questions might indicate, the maps leave open alternative interpretations which may undermine the credibility of the MSHCP. For example, one might interpret the depictions of some Core Habitats as extremely conservative to the point of potential jeopardy for the species being managed, and therefore criticize the plan as insufficient to protect that species. Alternatively, given certain species' occurrence in highly urbanized areas, one might question the need for management of those species by setting aside lands or limiting development when they appear to tolerate existing developments. The point is that the species models appear to require much more documentation, particularly on the maps and their captions since they are

separated from the Technical Appendix. Our general conclusion is that the species models are probably adequate but their documentation falls short. This shortfall affects the perceived credibility of the plan in general and must be rectified.

Certain non-scientific issues appear to be presented as scientific issues, such as habitat fragmentation (ARD, p. 66). However, data on fragmentation are never presented in map form to allow the readers to evaluate for themselves the amount of fragmentation that exists on areas adjacent to alternative 2 areas, or whether alternative 2 areas themselves are already fragmented. Also, certain species may not be affected by habitat fragmentation as depicted in the ARD, and this interaction may be desirable as a way of differentiating habitats as favorable for some species but unfavorable for others. As discussed during our February 12 meeting, land valuation had a major influence on exclusion of certain potential habitats from alternative 2. We believe that some form of land valuation should be depicted in map form for the ARD if this alternative is to be included.

3. Is thorough documentation provided for the methodology and the data used to identify Core Habitat areas?

Regarding documentation, please refer to our response to the previous, related question (#2). For many species, core-habitat areas are not depicted and the reasons appear to be documented in the Technical Appendix. In general, no documentation of core-habitat delineation for species in general is presented either in the ARD or the Technical Appendix. As noted under question 2, the documentation for certain species models with core-habitat areas is inadequate as presented in map form, which is the only way it is shown in the documentation we were given. In many cases, the documentation for the methodology and the data used to identify core-habitat areas are sufficient even in the absence of an overall description of how core areas were delineated, particularly for a number of bird species. In some very noteworthy cases (*e.g.*, the Coachella Valley fringe-toed lizard), the methodology and data used are nearly all contained in an old (1985) habitat conservation plan which may be unavailable to someone reviewing this document. A summary of this HCP needs to be provided.

Because of the lack of an explicit scientific discussion of delineation of core-habitat areas, one is left to speculate as to how these areas were delineated. That such speculation is possible, of course, undermines somewhat the scientific credibility of the MSHCP. One possibility that explains the discrepancy between mapped Core Habitat and known distributions is that a political filter, such as cost of land acquisition or known opposition from developers or land owners, may have been overlain on the known distribution. The core-habitat areas for some species appear to broadly follow the outlines of known distributions of aeolian sand, particularly given historical development patterns, and if so, this should be simply stated. As this discussion indicates, thorough documentation has not been provided concerning the delineation of core-habitat areas and this problem needs to be rectified.

4. What are the limitations in the site identification process?

A significant limitation is that the methods (see pages 64-70 of the ARD) fail to recognize that the 31 focal species have very different spatial and temporal scales at which their population dynamics play out across the planning area. As such, the ranking criteria used may be inappropriate for some of the larger species. For many of the 31 species (those where population dynamics play out a smaller spatial scales), the methods described may be appropriate because many, if not all of the factors driving viability in the planning area will be driven by local processes that determine births and deaths within habitats. However, for larger bodied species, whose population dynamics occur at larger spatial scales, the spatial patterns of how reserves are configured, the size of the core areas, and the pattern and effectiveness of linkages between these cores become critical to maintaining viable populations. Thus, for these species, the issue of reserve design becomes one of dealing with dispersal and other demographic processes within and between core areas. The methods described on pages 64-67 demonstrate little awareness of the importance of patch size and configuration on viability for such species.

Another major limitation is the discrepancy between mapped points of "Known Distribution" versus the "Potential Distribution" outlines derived from GIS analysis. Either 1) very few observations have been made on many of these species, lowering the information content needed to depict potential distribution, or 2) not all known distribution points are included on the maps. As discussed in the Technical Appendix, some of these species have highly specific habitat preferences that are difficult to plot at the 1/4 section level in map form, much less at the scale given on the oversize map sheets.

Furthermore, there does not appear to be much if any discussion on adaptive plasticity, where species may adapt to different habitat conditions if ones they previously occupied are degraded. In the case of the Coachella Valley fringe-toed lizard, there was some discussion that as active sand area decreased in natural habitats, the lizards may have switched to habitats created artificially by berms and a landfill. Other species appear to have adapted already to urban environments; we suggest the documents should discuss the implications of this potential adaptation. The site-identification process is in some ways hindered by the assumption that conditions at the time of the plan are representative of the full adaptation of the species without consideration of the potential full range in habitat variability.

We are also concerned that the "site identification mapping" methodology (section 3.6.1, pp. 65-67 of the ARD) is inadequate for conservation of natural communities. Because the Plan is also a NCCP, not just a MSHCP, adequate representation and conservation measures for natural communities are essential. As noted on p. 89 of the ARD, natural communities are considered in the Plan only in terms of providing habitat for covered species. This purpose is obviously redundant with the accompanying goal of protecting habitat of covered species. Instead, natural

community conservation might be seen as a coarse filter that complements the fine filter of species conservation. The coarse filter is predicted to capture species about which little is known (e.g., poorly surveyed taxa such as many invertebrates, fungi, bryophytes, and bacteria) and serves to protect a higher level of biological organization—the community or ecosystem—which may be considered valuable in its own right.

The selection algorithm also may have been applied at an inappropriate spatial scale. Applying this simplistic algorithm to quarter-sections selects for a fine-grained, as opposed to coarse-grained, environment. High beta diversity (turnover of species along gradients, as reflected in "covered species richness," "covered natural community richness," and "habitat heterogeneity") is selected at the expense of larger, potentially more intact, blocks of particular habitats or communities. Considerable redundancy exists in these criteria, particularly between natural community richness and habitat heterogeneity. It would have been preferable to set separate targets for representation of viable occurrences of each covered species and natural community, rather than using simple richness criteria.

We suggest the planners refer to The Nature Conservancy's ecoregional planning materials (e.g., C. Groves et al., 2000, *Designing a Geography of Hope: A Practitioner's Guide to Ecoregional Conservation Planning*, 2nd ed.) and consider using more sophisticated selection algorithms (e.g., SITES, cited above), which would provide more quantifiable results than the methodology represented in the Draft Plan. SITES has been used as an aid for designing and analyzing alternative portfolios in a number of TNC ecoregional plans, including the Northern Gulf of Mexico, Cook Inlet, Klamath Mountains, Sierra Nevada, Middle Rocky Mountains-Blue Mountains, Utah-Wyoming Rocky Mountains, and Southern Rocky Mountains ecoregions. SITES utilizes an algorithm called "simulated annealing with iterative improvement" as a heuristic method for efficiently selecting regionally representative sets of areas for biodiversity conservation. It is not guaranteed to find "the best" solution. Nevertheless, the algorithm attempts to minimize conservation "cost" while maximizing attainment of conservation goals in a compact set of sites. It has been used effectively in study areas with poorer data availability than the Coachella Valley.

5. *Have information gaps been identified and does each alternative adequately consider uncertainty in the design of the conservation areas?*

When three of us (Noss, Soulé, and Tracy) were empanelled as early reviewers five years ago, we suggested that alternative reserve designs be set up as a hierarchy along a gradient of ignorance. Specifically, it can be argued that the highest probability of success in conserving the species in Coachella Valley is to protect all historic habitat, and the advisors recommended presentation of many alternative reserve designs including that mentioned above without regard to the difficulty of implementation. Thus, the designs would be considered on their biological

basis alone at first, then later within a socio-political context (i.e., a cost screen would be applied to plan alternatives).

Even a reserve design based upon all historic habitat provides no certainty of success in preserving the covered species. This is especially the case because habitat is only one element necessary to protect species from extinctions. For example, noxious exotic species are now considered the second most important threat to species worldwide, next to loss of habitat. Thus, protection of habitat needs to be put into a context of the needs to manage species vis-a-vis manifold needs within the protected habitats.

The drafters of the MSHCP reserve design have, in some cases, not considered the uncertainties of identified stressors to the covered species. Moreover, as discussed earlier, it appears that financial and political implementation impediments were folded into the conservation program in addition to biological requirements. This means that the biological needs of species may have been considered by the SAC only through the filter of their personal understanding of implementation constraints which have not been addressed explicitly in the document. As noted earlier, we detect an implicit concern with the necessity requirement that threatens to overwhelm the sufficiency requirement. This became particularly obvious in the presentations to our team as the concepts of new viaducts (e.g., underpasses for wildlife) were discussed as a means to mitigate the negative effects of roads as barriers. Members of the SAC expressed doubt that such mitigation was possible, hence their preference for Alternative 2, which considered habitat areas separated by major roads as essentially permanently isolated. A more precautionary approach would have left open options for restoring lost connectivity. This in fact may become a viable alternative if other habitat areas are lost due to political or economic factors.

An important principle in developing reserve designs is to admit ignorance of biological properties and processes and consider the consequence of that ignorance as alternative designs are proposed. Our assessment based on the documentation and discussions is that ignorance and uncertainty have not been considered explicitly in the comparison of any of the alternative designs.

6. Are adequate buffers provided for conservation, assuming full build-out under each jurisdiction's general plan?

There are no buffer zones *per se* or other transitional areas around reserves identified in the design alternatives. Any buffer function is implicitly assumed to be provided by the outer zone of each reserve. Given the well-documented problem of edge effects (physical, biological, human, etc.), we believe the buffer zone issue should be addressed in the final plan. Evidence from several studies suggests that agricultural or low-density residential development around reserves results in less severe edge effects (e.g., nest predation on birds) than when reserves are surrounded by high-density residential development. This is probably due to higher densities of

house cats and opportunistic mesopredators, such as raccoons and opossums, subsidized by garbage and pet food, in high-density residential areas (D. Wilcove, 1985, *Ecology* 66:1211-1214; L. Friesen et al., 1995, *Conservation Biology* 9:1408-1414; R. Blair, 1996, *Ecological Applications* 6:506-519). On the other hand, buffers sometimes can be population sinks, potentially draining a source population in a reserve (R. Noss and A. Cooperrider, 1994, *Saving Nature's Legacy*, Island Press). In such cases it may be preferable to surround a reserve with a "hard edge," such as a tall fence, impervious to mesopredators (M. Groom et al., 1999, Pages 171-197 in M. Soulé and J. Terborgh, eds., *Continental Conservation*, Island Press). We suggest hard edges may be most appropriate for isolated reserves, where the potential for restoring connectivity for native species is low but the probability of severe edge effect is high.

7. What are the limitations in the site identification process?

See above (grouped with #2 and #3)

8. Are sufficient data provided to determine the effects of roads on population viability for target species?

Roads, especially major ones, are assumed in the Draft Plan to represent strong fragmenting factors. A habitat fragmentation value was assigned to each mapping unit based on the extent of fragmentation by roads, with roads divided into three categories of width and each road "buffered" to include an additional area one-half the width of the road on each side. Habitat areas separated by major roads are generally assumed to be functionally isolated from one another (although, paradoxically, some of the corridors proposed in the Plan alternatives cross several major roads). We agree that many studies support the assumption that roads are major threats to biodiversity. Potential effects of roads include barriers to movement of organisms and sand, sources of direct mortality (road kill), access to disruptive human activities (e.g., poaching, collecting, ORV use), and spread of invasive exotic species.

No data are provided, however, on the effects roads may have on the covered species and natural communities in the Plan Area. Apparently no studies have been conducted. Nor are potential mitigation measures (e.g., road closures, tunnels, overpasses, fences) considered in any detail. We recommend that the adaptive management and monitoring plan include research on the effects of roads. Moreover, we recommend that specific mitigation measures to reduce the likely impacts of roads be considered in the planning alternatives.

9. Can the target species be grouped into categories that reflect general area requirements related to viability? What are those categories and general area requirements?

The ability to group species into "conservation guilds" should be taken as a testable hypothesis to be considered as part of the monitoring and adaptive management program. Possible answers

to the first question posed above are "yes," "yes, under certain circumstances," or even "no." However, it is likely that some lumping of species into conservation guilds is possible. This question needs to be investigated as one of the first implementation programs of the HCP insofar as it could make considerably more efficacious the management prescriptions in preserved habitat. It certainly seems that the sand-dependent species may have needs in common allowing some lumping, but this should be taken as an hypothesis. Whether area requirements alone would serve as a basis for grouping species into categories is questionable. A more fruitful approach may be one suggested by R. Lambeck (1997, *Conservation Biology* 11: 849-856), which is to group species into vulnerability guilds (e.g., area-limited, dispersal-limited, resource-limited, process-limited) and then identify the species in each guild that is most demanding. These species would then serve as potential umbrella species for the others in their guild. This process would need to be repeated for each major habitat type in the planning area, as well as for the area as a whole.

Asking "what are the categories and what are the general area requirements?" is outside of the scope of a peer review. As reviewers, we suggest that planners make an attempt to lump species based upon hypothesized common needs and vulnerabilities. Outside reviewers could review the evidence for lumping, but the process of testing the efficacy of lumping should be proposed as an activity in the adaptive management program of the HCP.

10. Does the prescribed CVWD groundwater management plan provide adequate water table levels to sustain the target natural communities and species? If not, what additional data are needed?

Several natural communities that affect the species covered under the MSHCP are strongly affected by groundwater levels: mesquite hummocks, Sonoran cottonwood-willow riparian forest, southern arroyo willow riparian forest, southern sycamore-alder riparian woodland, mesquite bosque, and coastal and valley freshwater marsh. Of these, the freshwater marsh is probably most strongly affected by agricultural drainage, wastewater effluent, and urban runoff; those ecosystems used by bird species adjacent to the head of the Salton Sea are more affected by its water levels than groundwater; and the Sonoran cottonwood-willow riparian forest, southern arroyo willow riparian forest, southern sycamore-alder riparian woodland, and mesquite bosque appear to be mostly out of the area of active groundwater management. Therefore, the natural community type most affected by groundwater withdrawals are mesquite hummocks.

The CVWD water management plan calls for a preferred Alternative 4, which differentially affects the "Upper Valley" from the "Lower Valley" (division line at approximately perpendicular to the valley at La Quinta). The distinction between the two areas is that the Upper Valley is mainly a tourism based economy with water used for urban environments, domestic and resort usage, and golf courses, whereas the Lower Valley is heavily dominated by agricultural usage. Alternative 4 calls for elimination of groundwater overdraft throughout the

basin by importing and recharging water from the Colorado River, eliminating the decline in groundwater levels in the Upper Valley, increasing groundwater levels in the Lower Valley, and promoting water conservation. All the alternatives are compared using a groundwater flow model that excludes the Desert Hot Springs area, which is one of the key areas with respect to the MSHCP.

Mesquite hummocks are found in two distinct places with regards to groundwater: on or near active faults, such as the San Andreas, and scattered among stabilized dunes on the valley floor. The former habitat is not directly addressed by the CVWD plan and may be the most threatened of the two types owing to pumpage for the rapidly enlarging cities of Desert Hot Springs ~~(which is not a Permittee)~~, Cathedral City, and Indio. Alternative 4 calls for eliminating the decline in groundwater in the Upper Valley, which would include most of the mesquite hummock habitat along the faults, but the modeling may be insufficient to consider flow upslope from the faults. Despite urbanization upslope from the faults at Desert Hot Springs, the flow model doesn't cover this part of the aquifer and therefore the possibility exists that the flow system feeding the mesquite hummocks in Willow Hole may be neglected in the planning process.

Alternative 4 as stated will likely positively affect the remaining mesquite hummocks scattered around the floor of the Coachella Valley in the Lower Valley. Although groundwater overdraft has been extensive, restoration of groundwater levels (as stated in the preferred alternative) could save these unique habitats and possibly aid many of the target species in the MSHCP.

We suggest that monitoring wells be installed at selected areas in the preserves, ACECs, and other areas with significant riparian vegetation as a part of the adaptive management plan. These are relatively cheap and objective ways of evaluating whether or not groundwater levels are declining and may affect riparian ecosystems.

II. Species Level Questions:

All Species

1. *If the conservation areas for sand dependent species are concentrated in the dune systems north of Interstate 10, will this be sufficient for those species over the long term if the dune systems south of Interstate 10 are eliminated?*

Regarding the sufficiency of the dunes conserved north of I-10 for long-term needs of sand dependent species, the short answer is not for all species. Although some species have relatively broad tolerances for temperature and moisture regimes, others have much more narrow tolerances. For the latter species (especially those unable to fly), it is critical to maintain landscape linkages to allow them to track the changing limits of their essential habitat parameters. Historically, the largest contiguous dune system was south of I-10; it linked dune

habitats in the center of the Valley with sandy habitats and sand sources extending to the western limits of the Plan Area. This dune system spanned a relatively broad and dynamic gradient of temperature and moisture conditions, permitting similarly dynamic range adjustments for many species. The central dune system is now fragmented and can no longer support such species range adjustments. Dunes north of I-10 are much less extensive and less connected to one-another; they are also cut off from the remnant southern dunes by I-10 and by the railroad. Thus, linkages among the dunes north of I-10 are tenuous and the ability of their flightless inhabitants to track climate-related changes in habitat distribution are impaired. The physical isolation of dunes north of I-10 makes their sand-dependent inhabitants more vulnerable to extirpation when climatic or other external conditions change, than would the same species in the southern dune system prior to its fragmentation

Only one covered plant species is known to occur on the Big Dune south of I-10, the CV milkvetch. This species occurs in active and stabile sand and has a high probability of persistence on the Big Dune even though it is no longer geomorphically active. Alternatively, CV milkvetch distribution is extensive enough elsewhere that it will survive even without protection of Big Dune.

A more definitive answer to the question proposed here is strongly desirable, but it will require—as a start—biological surveys of the Big Dune. In the interim, we suggest that the Big Dune be protected from development. Although it seems certain that the Big Dune is limited on process (i.e., sand movement), this does not entirely negate its habitat values. Whether or not to include the Big Dune in the proposed reserve system should be decided on the basis of adequate biological data. While data may eventually confirm the availability of the Big Dune for economic development, we believe it should not be eliminated up front simply on the basis of high land values and little or no biological information.

2. *If full build-out were to occur under each jurisdiction's general plan up to the boundary of the conservation areas, and 10% of each parcel inside the conservation areas could be developed, which target species might be affected and how; particularly in areas with multiple small parcels?*

Again, this is a question that peer reviewers cannot answer acceptably. It is impossible to answer this question without knowledge of the exact pattern and nature of each development project. At this point in time, data do not exist to understand the mechanisms by which this level of build-out will affect the Coachella Valley ecosystem. Nevertheless, the notion of 10% build-out on each parcel inside the conservation areas is one of the most troubling aspects of the Draft Plan. It is certain to lead to habitat fragmentation within reserves unless the development process can be intelligently regulated such that habitat destruction is limited to marginal areas. Clustering, especially on reserve margins rather than centrally, is a much less disruptive pattern of development than scattered build-out. Roads would increase greatly under a scattered vs. a

clustered pattern, perhaps to the point that the total surface area occupied by roads constitutes a substantial loss of habitat reserve-wide. Unfortunately, we do not find a rigorous assessment of this problem in the Draft Plan.

A number of covered species can be expected to decline unless the 10% build-out allowance is eliminated or confined to reserve areas with low habitat values. For example, given the probable increase in a highly subsidized cat population in the vicinity of residential subdivisions, the two small mammals covered in the Plan (Palm Springs ground squirrel, Palm Springs pocket mouse) will be negatively affected. Fire frequency also can be expected to increase, with uncertain effects on covered species. With regard to the covered sand-inhabiting orthopteroid insects (CVJC, CVG, CVGSC), simply taking out 10% of the habitat on each parcel (e.g. paving over 10%) would probably cause a simple 10% reduction in population size. However, the loss could be much greater depending on how the land is modified. For example, landscape trees and shrubs could alter sand deposition, introduce invasive weedy plants, and alter insolation by shading. This uncertainty might be overcome by implementing strict land use guidelines for landscaping, such as prohibiting certain invasive species and prohibiting or limiting the height of ornamental trees and shrubs. It would be helpful if only native plants were used in landscaping.

3. *Were area requirements, habitat and connectivity needs and life histories adequately addressed and documented for each species in the development of conservation areas?*

Our general answer to this question is "apparently not," but we acknowledge that data to consider area requirements, habitat affinities, and connectivity requirements from the standpoint of each species' autecology were sparse. The Draft Plan gave general consideration to autecological requirements in constructing the species-specific habitat models. Nevertheless, the Plan should have considered connectivity issues, in particular, more thoroughly. See our response to question #4 under Species-Specific for some suggestions concerning connectivity.

4. *Were appropriate biological parameters and/or landscape features used to estimate a minimum patch size of suitable habitat for inclusion in the conservation area design for each species?*

This question has two basic components. First, "Were appropriate biological parameters . . . used to estimate a minimum patch size of suitable habitat for inclusion in the conservation area design for each species?" Many people use the term "parameter" (meaning a value or state of a variable) as a synonym for "variable." Because the context does not help in figuring out which concept was meant, we assume both were meant. In general, we believe the planners used reasonable factors (variables) in the conservation area design. In many cases, of course, data were not available, so surrogate variables were used. We are impressed by the knowledge and skill of the biologists working on this project (i.e., the SAC) and have no reason to doubt that reasonable (best available) variables were used.

With regard to "parameter" selection, the models used to determine suitable habitat for the various covered species are not formal population viability (PVA) models (see our response to Species Modeling questions); in other words, they do not involve the use of precise parameter estimation and testing. Therefore, although this question is interesting, it is not relevant at this stage. It might become relevant, however, as time goes by and PVAs are carried out as part of implementation, monitoring, and adaptive management.

Second, "Were appropriate . . . landscape features used to estimate a minimum patch size of suitable habitat for inclusion in the conservation area design for each species?" In most cases, this question is the same as the question above assuming that "landscape variables" and "variable" mean the same thing. Where adequate knowledge of particular species is available, we support the choice of landscape variables used in the models.

The more important issue, perhaps, is that of "minimum patch size." We assume that the questioner has in mind some minimum (critical) area necessary for the persistence of the species population over a reasonable length of time. It is impossible, however, to engage in a serious discussion of this question unless the issues of "how long" and "probability of persistence" are specified for each covered species individually. To do this, of course, requires many years of demographic information and a formal PVA. At best, these data are available for one or two species, so the question, on its face, could be described as academic.

To be fair, however, we should address the underlying issue, which is "does the minimum patch size (or overall area protected) for each covered species make sense based on the intuition of conservation biologists?" Unfortunately, though, even this question requires some information about the annual variability of the relevant ecological variables, knowledge of existing or potential edge effects, consideration of demographic stochasticity, degree of connectivity for each species, etc. For example, a small patch that can sustain a mean population of 10 individuals of an animals species with an average lifetime movement distance from the natal site of 300 meters and located several kilometers from other patches would fail to pass the "laugh test." On the other hand, such a patch located between 200 and 400 meters from a larger site might constitute a reasonable conservation site in a metapopulation model, assuming there were no impassable barriers to dispersal.

As noted elsewhere, we are concerned that the suite of potential reserves in Alternative 2 is potentially insufficient from a biological standpoint. Yet how much of Alternative 3 is beyond the necessary amount of habitat to sustain the covered species and natural communities is highly uncertain, largely because of data limitations. Most importantly, the question of how much habitat is needed cannot be answered without considering details of management. Hence the importance of having an adequate adaptive management plan. Without ecological management,

much larger areas of habitat are usually necessary to sustain a suite of target species. Conversely, smaller areas can be adequate given sufficient management.

Insufficiency is an almost inevitable result of considering non-biological factors, such as cost of purchasing private property, in the initial selection of conservation areas. If one were less concerned with land costs and availability, it would be prudent and ethical to give the benefit of the doubt to the species—to employ the precautionary principle with regard to rejecting possible sites. This is particularly reasonable when little is known about the critical factors that determine long-term persistence, which is generally the case for the covered species in the Coachella Valley. Certainly non-biological factors, such as economics, must inform the final selection of conservation areas and the mechanisms by which these areas are protected and managed. Our concern is that when economic and political factors are brought into consideration early in the design and planning process, they constrain biological options and make the choice of conservation areas less defensible scientifically. As we have stated earlier, it may be that the final plan must balance the economic and political feasibility of some of the proposed biological conservation areas with their necessity as protected areas. But to make that judgment at the selection stage, particularly in the absence of documentation about what those non-biological factors are, undermines the defensibility of the proposed conservation program.

To the best of our knowledge, the best available information was used to determine the habitat needs of the covered insect species. Unfortunately, there are no definitive values for minimum habitat patch size for any of these species. Furthermore, the rapid pace of habitat conversion to other uses, together with habitat fragmentation and other environmental changes, does not permit an accurate assessment of long-term effects on species viability with respect to habitat patch size. This information can only come from future studies. This is why an effective adaptive management plan is so important.

5. *Are the data provided on the habitat requirements and ecology of narrowly distributed endemics sufficient to design conservation alternatives and management methods?*

This question has two parts. First, one must understand what a "narrowly distributed endemic" is. Second, one must decide if the understanding of these species' life histories, population dynamics, and habitat requirements is sufficient to design conservation alternatives.

Based on species descriptions in the Technical Appendix, the following species are found only in Coachella Valley and might be considered narrowly distributed endemics: CV Jerusalem cricket, Casey's June beetle, Coachella Valley giant sand-treader cricket, triple-ribbed milkvetch, and the CV fringe-toed lizard. Additional species are found primarily in the planning area, with some populations located outside: CV milkvetch, little San Bernardino Mountains linanthus, Mecca aster, Orocopia sage, Palm Springs ground Squirrel, and the Palm Springs pocket mouse.

In general, knowledge of the above species consists primarily of distributional data and perhaps estimates of abundance in each location. (Obviously, the level of information varies across species, with the perhaps the best data being available for the Fringe-toed lizard.) Virtually nothing is known about the demographic or genetic patterns and processes in most of these species. Thus, designing conservation alternatives for these species cannot, at present, be based on high quality, rigorously collected data.

Specifically, understanding how alternatives 2 and 3 will differentially change the ability of the Plan to conserve viable populations of the above species is fraught with high levels of uncertainty. The primary method of comparison is to overlay Alternatives 2 and 3 on the predicted distribution for each species and determine which alternative covers a sufficient amount of the predicted distribution for each species.

There are a number of reasons why this method may contain substantial error. First, the predicted species distribution maps may not be correct. In rare cases, so little is known about a species that a predicted distribution was not created (i.e. Jerusalem cricket). In cases where the species distributions were predicted using GIS overlays, there is no information regarding the validity of these distributions. Validation could be achieved by surveying randomly selected locations within and outside the predicted distribution of each species, then determining how frequently the GIS model correctly classified a location in terms of presence or absence.

Second, errors of omission could lead to substantial uncertainty when designing or choosing between alternatives. The current comparative method does not include information regarding how population dynamics and genetic structure will interact with each of the alternatives to determine overall viability of the narrow endemics. This is not a fault of the SAC, but merely a limitation of the data available. Nevertheless, the simplistic methods used create uncertainty in the design and selection process that should be acknowledged.

Species-Specific

1. *Is it critical to maintain the habitat at the east end of the Indio Hills to sustain populations of the Palm Springs ground squirrel and the Palm Springs pocket mouse rangewide?*

Information provided on the biology of this species and the spatial configuration of the Plan is not adequate to answer this question with a high level of certainty. The ability of the Plan (or any given alternative) to cover the squirrel will depend on the interaction between the spatial ecology of the squirrel (i.e. how population dynamics occur across space) and the final spatial configuration of the Plan. The following types of information would increase our ability to understand how habitat in the east end of Indio Hills affects the ability of an alternative to sustain the squirrel:

A) Higher quality distribution maps. Currently, the distribution map for this species consists of 103 locations across a predicted 103,207 acres, or 1 point per 1,000 acres. Data on habitat requirements consists of descriptions of habitats in which the species was found. Detailed, longer-term studies of spatial variation in density, reproductive success, survivorship, and other demographic parameters across habitat gradients are lacking. Thus, there is the potential for error in the identification of the Core Habitat for this species.

B) Understanding how the species responds to habitat fragmentation. Given the relatively low density of this species reported in the technical appendix, large areas may be required to maintain viable populations within any given area of the Plan. How habitat fragmentation, including low levels of development within conservation areas, affects population dynamics and dispersal is critical to understanding the contribution of habitat east of Indio Hills toward overall viability.

C) Factors regulating population size. Generalizing points 1 and 2 above, little is known about the factors that regulate population size in this species. Preferred habitat seems somewhat identifiable, but having a detailed understanding of those factors influencing density at a given locality would increase our ability to identify suitable habitat and determine management strategies.

D) The dispersal ability of the species/historic patterns of gene flow. One argument against including habitat east of Indio hills in the Plan is that it represents a disjunctive population and hence adds little to the overall population throughout the reserve. However, we know nothing about the dispersal biology of this species, average dispersal distances and how connected populations were prior to the current urbanization of the Valley. Given such a dearth of information, we do not know if populations in eastern part of the reserve were always disjunctive from more western populations or were recently isolated. Indeed, we do not know if the habitat connections between the core areas found in both alternatives in the western part of the reserve are even necessary to maintain demographically critical dispersal or gene flow.

Understanding the dispersal biology of the species would allow one to understand the spatial distances at which populations of ground squirrels become demographically isolated and what habitat types make corridors functional for this species. In addition, many small mammal species show sex and age biases in dispersal. This information may be critical in designing translocation programs, if they are needed. Genetic data would greatly assist the decision making process by

describing the historic patterns of gene flow, and hence historic connections between populations, prior to urbanization. This information would improve substantially the identification of core areas and critical habitat linkages. In addition, the data would be useful in adaptive management because they may suggest specific translocation scenarios in situations where creating or maintaining habitat corridors is impossible.

E) A better understanding of how build-out will take place within the planning area. Despite the focus on Alternatives 2 and 3, both represent general "outlines" of the ultimate hard boundaries of the Plan. Particular pieces of land designated as reserve in the Alternatives may be considered critical for development by stakeholders or too expensive to add to public ownership. As such, we cannot be certain of the final spatial configuration of the plan or the densities of urbanization in particular areas of build-out. Hence, the east end of Indio Hills may end up supporting a key population(s) of the squirrel depending on how areas to west are ultimately delineated during the negotiation process between stakeholders and the wildlife agencies.

2. *Is the proposed corridor between the east end of the Indio Hills and Dos Palmas sufficient to maintain potential for demographic interchange for the Palm Springs ground squirrel and the Palm Springs pocket mouse?*

In short, there is insufficient information to answer this question. The data needed to answer this question are described in the response to the previous question regarding the dispersal ability of the species and historic patterns of gene flow.

Nevertheless, given the large distances involved and documented dispersal distances of similarly sized small mammals, it is unlikely that populations separated by the distances between Indio Hills and Dos Palmas were ever "demographically" connected in the sense that dispersal from Indio Hills populations had regular (annual or within a generation), demographic impacts on populations in Dos Palmas or vice-versa. Metapopulation-like colonization events probably took place between the two areas in the past (or even now), which would have connected the populations genetically as multiple generations of dispersing individuals moved genes between the areas, but there is no evidence of such connection.

3. *Is a linkage between Willow Hole and the upper Mission Creek necessary for the long term persistence of the Palm Springs pocket mouse?*

This question boils down to whether or not the different levels of connection between Willow Hole and Upper Mission Creek proposed in the alternatives will differentially impact the long-term persistence of the pocket mouse. There are two critical biological issues that must be

resolved to answer the question. The first is basically the question asked of the review panel, is immigration between the populations on either side of the proposed corridor necessary for persistence? However, another question is critical as well: Will the corridor function differently (or at all) under the two alternatives?

Insufficient data exists to answer either question adequately. The following types of information would help determine the role of immigration to overall persistence.

A) The population demography of pocket mice. If populations show large fluctuations in numbers and local extinctions, then immigration between locations will become critical for recolonizing sites. If populations are more stable and rarely go extinct, immigration between sites is demographically less important. What role immigration plays in overall population persistence in this species is not known.

B) Estimates of gene flow between pocket mouse populations on either side of the proposed corridor. If these populations are genetically distinct with little gene flow, then historical immigration between the populations was rare. In this case, immigration may not be critical to long-term persistence. The alternative is that the populations are genetically indistinguishable and gene flow did occur. Analyses using mitochondrial DNA would be appropriate given the distances between populations.

In order to determine the difference between the two alternatives in their ability to promote movement of pocket mice between populations, information is needed on the spatial distribution of pocket mice in the area. If pocket mice are found in the two drainage canals, then it may be possible that they would continue to use these features in the future. This assumes that use of the drainages by pocket mice will not change as development takes place or if the design of the drainages is altered. Detailed demographic studies in these canals could determine if they are used for dispersal (short persistence times and no reproductive activity), or actually support populations of mice (longer persistence times, newly weaned offspring occurring seasonally, reproductive activity).

If surveys indicate the mouse is found in the contested area (i.e. Alt. 3), but not in the drainage systems (Alt. 2), then Alternative 3 would be preferred, assuming additional build-out of the current low density urbanization in the Alt. 3 area does not continue.

It is obviously desirable to maintain suitable habitat wherever possible. The area in question, however, already is partially developed and disturbed and could even be (or shortly become) a demographic sink for this species. Moreover, there is an approved specific plan for development in the future. This raises many questions. Would restrictions on off-road-vehicle use in the area

be reasonable, practical, and beneficial? Also, given increasing density of housing and the vast increase in subsidized house cats that this implies, is survival of the mouse likely in this area? (Even low-density housing in the area could restrict opportunities for the survival of a viable population.) Would it be possible to design and protect a linkage zone connecting these two localities? Would fencing of such a linkage keep out cats and human recreational use that would compromise the biological utility of the linkage?

Ultimately, whether or not a linkage between Willow Hole and Upper Mission Creek is needed is unknown given all the uncertainties of current and future distribution of the mouse, not to mention the absence of reasonably good PVA for the species; such a PVA is probably not a realistic expectation given the level of information now available. If funding were to become available, however, such a PVA should be performed. Because the mouse is known to exist at several localities between Willow Hole and the Salton Sea along the eastern side of the Coachella Valley (a distance of about 50 miles), a barrier to movement between Willow Hole and Upper Mission Creek is not likely to jeopardize persistence during the next century or so, depending, of course, on the development pattern in the planning area as a whole.

4. Have adequate connections been maintained within the Plan Area and to populations outside of the Plan Area for target species?

Connectivity for genetic exchange and to assure repopulation of depleted populations (the "rescue effect") are important features of any conservation plan. Although an argument has been made (for example, by Dan Simberloff and colleagues) that corridors without proven values for species are ill-considered, this suggestion poses a high risk of Type II error. Natural landscapes are fundamentally connected, but this connectivity is often broken by human activities. Conservation strategies do not attempt to create corridors between habitats that were naturally isolated, but rather to maintain, and where possible restore, natural connections (R. Noss, 1987, *Conservation Biology* 1:159-164). The precautionary principle suggests that the appropriate null hypothesis is that severing natural connections has no ill effects on biodiversity. Accepting this null hypothesis, if it is incorrect, would have serious consequences. Hence, the burden of proof should be placed on those who would reduce natural levels of connectivity (P. Beier and R. Noss, 1998, *Conservation Biology* 12:1241-1252). Again, we urge more consideration to assuring sufficiency and less to proving necessity.

The Coachella Valley Plan has one major connection across the Valley in the north, crossing Rt. 111, I-10, and Dillon Road. It consists of Alternative 2 and 3 patches. In some areas Alternative 2 forms a narrow corridor, and addition of Alternative 3 lands would increase the width and possibly the security of the corridor. Target animals such as desert bighorn sheep may not necessarily use this corridor, as they usually will not cross highways, but the corridor may provide connectivity for other large mammals not covered by the Plan, as well as potentially

many smaller-bodied animals, especially if modifications of roads (wildlife crossings) can be made.

A second potential major connection not addressed in the Plan is the Whitewater River channel. It runs east-west across the Valley through Palm Desert and Indio, then south to the Salton Sea. It is not currently a viable connector for many species, as it has been channelized. However, it is not fenced, and might be a connection for species not highly sensitive to urbanization such as coyotes. Coyotes, in turn, can help maintain populations of native birds through their top-down regulation of opportunistic mesopredators (K. Crooks and M. Soulé, 1999, *Nature* 400:563-566). The possibility of preserving lands to increase animal movement via the Whitewater River should be pursued, as well as potential restoration of the river channel that might make it a corridor for additional animal species. A north-south linkage could be restored by stopping dredging and clearing the Whitewater River upstream from its juncture with the San Gorgonio River and the triangular area were added, as proposed under Alternative 3.
Other potential wildlife corridors running east-west through the Valley are railroad and highway rights-of-way, which might also be restored. Furthermore, canals are likely barriers to movement of a number of species. Land bridge (i.e., running the canal below ground) in strategic places could significantly reduce the barrier effects. The potential of these options to improve connectivity for covered and uncovered species should be addressed in the Plan.

A third major connection across the Valley is on the north end of the Salton Sea. This is currently mapped as agricultural, but salinization is increasingly causing abandonment of farmland adjacent to the sea. Native saltbush and exotic tamarisk are colonizing this land. Even though it is not pristine habitat, it may be a useful dispersal corridor. Although much of the land in this area is Indian-owned and therefore outside the jurisdiction of the Plan, other lands that are not yet developed should be considered in the Plan. Again, restoration is a major issue in considering these lands.

Several additional smaller-scale connections occur in the Valley. The unexpected development plans between Dillon road and Joshua Tree National Park need to be countered by preservation of additional adjacent lands to improve connectivity to the Park. Desert washes should be preserved as corridors where they may provide for animal movement, for instance in the Alternative 3 lands on the northeast of the Salton Sea. The “sand channels” north of I-10 may also be corridors for animal movement, especially if the adjacent lands are not developed any more densely than at present.

We emphasize, again, that while a corridor is often a hypothesis rather than proven fact, the option for keeping corridors should not be closed until the function of the purported corridor is known. Corridors may be especially important for movement of organisms during times of environmental stress. Global change may bring warmer temperatures and possibly higher rainfall to the Coachella Valley, and may necessitate animal dispersal as natural habitats change. The

future of vegetation change in the Coachella Valley is uncertain, but allowing natural movement is one way to allow organisms to search out suitable habitat. Maintaining as much connectivity as possible is a safeguard against future extinctions.

Species that require connectivity at very broad spatial scales in the planning area include large mammals that are not covered by the plan (e.g., mountain lion). Bighorn sheep are thought not to move across freeway underpasses, so the opportunity for movement of this species may already be lost. (On the other hand, it is not unlikely that very wide underpasses, or better yet, land bridges, would be used for movement.) Historically genetic exchange occurred mainly when individual rams would move between populations, as has been documented for Rocky Mountain bighorn sheep. The existing and potential corridors outlined in our response to the previous question will be more useful to vagile non-target mammals, mainly predators.

In the event of climate change, it is almost certain that some populations of species dependent on narrow environmental parameters will dwindle in size and may be extirpated, while others may flourish. Populations of flightless sand-dependent organisms are now largely fragmented by transportation corridors and other anthropogenic habitat alteration activities which have carved up the once-contiguous large dune systems. To a large extent species persistence will depend on whether habitat linkages to potential refugia are maintained. The insect most likely to be adversely affected is Casey's June beetle. Because the females are flightless, this species cannot adjust its range rapidly. This species is already essentially locked into a few small enclaves surrounded by urban barriers to dispersal.

Connections between the Coachella Valley planning area and other landscapes are potentially important for several species. Again, adequate data are lacking, but a precautionary approach dictates conservation of existing linkages. Species in this category include large mammals (e.g., bighorn sheep and such uncovered species as mountain lion, coyote, bobcat, and kit fox), the desert tortoise, and the CV milk vetch, little San Bernardino Mountains linanthus, Mecca aster, Orocopia sage, Palm Springs ground squirrel, and Palm Springs pocket mouse. Research is needed on the dispersal behaviors of these species in order to identify plausible corridors.

III. Habitat Monitoring and Management Questions.

1. What basic principles and testable hypotheses for monitoring and adaptive management would be appropriate in the Plan Area? Are these included in the proposed management program?

Please refer to Appendix B for a summary of what our team feels a defensible science-based adaptive management program might look like. The current proposal for monitoring and adaptive management in the Coachella Valley MSHCP is based entirely upon a one-species-at-a-time process, which we do not believe is the most efficient or auspicious approach. The Adaptive

Management and Monitoring Program document we reviewed is confusing and statistically difficult to defend. Moreover, it is probably not an optimal use of the limited funds likely available for management.

The essence of the currently proposed program consists of gathering count data on various species while simultaneously measuring a host of independent, potentially explanatory variables, then using multivariate analyses to partition the variation in numbers of individuals across the suite of explanatory variables. Unfortunately, the population dynamics of desert species are typically so dramatic and precipitous (in response to natural fluctuations in the environment) that it is nearly impossible discern anthropogenic causes of change. Hence, the data derived from a monitoring program of this sort is unlikely to provide information to managers that will be useful for adaptive management, that is, for changing management practices to better serve the goals of the conservation plan.

The proposed Coachella Valley monitoring program suggests using a less volatile measure of populations such as reproductive output. However, this method has been hypothesized to work for fringed-toed lizards only because there are 1.5 decades of data upon which the approach has been evaluated. The method would be much less appropriate for other covered species in the HCP, for which data are considerably more limited. Considering each covered species individually also has considerable drawbacks (R. Noss, M. O'Connell, and D. Murphy, 1997, *The Science of Conservation Planning*, Island Press). As discussed earlier, a more promising approach would be to classify species into conservation guilds (for example, vulnerability guilds or habitat guilds). In such an approach, similarities in habitat affinities, life histories, and responses to habitat alteration and management would need to be identified quantitatively enough that the wildlife agencies would be convinced that conservation of some species, through habitat protection and management, will also conserve other species in the covered list.

The most promising kind of monitoring currently proposed for the CV-MSHCP appears to be that used to assess the extent of various kinds of sand using digital IR and GIS. For some species, this method measures the extent, and potentially the fragmentation, of suitable habitat. Hence, this approach could be used to assess trends in habitat patterns quickly and effectively. We suggest that this approach be pursued at the initiation of the adaptive management program.

At the very least, the monitoring and adaptive management program should develop process models of how the systems work. Validation monitoring (see Appendix B) should be an important aspect of the program from the outset. It will be necessary to establish a record of implementation of management prescriptions and devise a plan to assess the efficacy of those prescriptions. This requires hypothesis testing and validation research as well as effectiveness monitoring.

We recommend using Appendix B as a template of how to structure a monitoring and adaptive management program in the Coachella Valley. Furthermore, two issues not directly addressed by the Plan, but which will affect future management, are global warming and air pollution. In addition to becoming warmer in response to elevated CO_2, the Southern California deserts will receive more moisture under one global warming scenario (R. Nielson, 1998, Pp. 439-456 in R. Watson et al., eds. The Regional Impacts of Climate Change. An Assessment of Vulnerability. *Special Report of Intergovernmental Panel on Climate Change Working Group II.* Cambridge University Press). The net impact to flora and fauna is impossible to predict, but monitoring is needed to detect vegetation change. Invasions of exotic plant and animal species are occurring rapidly and may be exacerbated by climate change. Exotic *Bromus rubens* responds to elevated CO_2 by increased growth more than native species, which may in part explain its increasing abundance in recent decades (Smith et al. 2000, *Nature* 408:79-82.). The monitoring in this Plan will not detect the causes of vegetation change, but will point to the need for research to determine the causes of plant and animal invasions.

Air pollution is of increasing concern in the desert as coastal urban areas grow and as local growth in the desert creates its own air pollution. The main concerns for vegetation are nitrogen oxides and ozone that originate from automobile exhaust. Ozone levels are likely not high enough to cause acute physiological damage in vegetation, although effects of long-term, low levels are more difficult to predict (E. Allen et al., in press, *Air Pollution and Vegetation Change in* Southern California *Shrublands. Proceedings of the Symposium on "Planning for Biodiversity: Bringing Research and Management Together" Feb. 29-Mar. 3, 2000*). Nitrate deposits on plant and soil surfaces and accumulates in the soil, unlike ozone, which dissipates. The Coachella Valley may also experience ammonium deposition from agricultural fertilization and possibly emissions from the Salton Sea. Nitrogen deposition is known to cause vegetation change in ecosystem types globally. It may enhance invasions of exotic species by differentially increasing their productivity compared to native species. There is evidence for this in Southern California coastal sage scrub (E. Allen et al., 1998, *Proceedings of the International Symposium on Air Pollution and Climate Change Effects on Forest Ecosystems, Riverside, CA February 5-9, 1996;* E. Allen et al., in press, *Ibid*).

Nitrogen fertilization in the desert caused an increase in the exotics Mediterranean split grass and storksbill* (M. Brooks, 1998, *Ecology of a Biological Invasion: Alien Annual Plants in the Mojave Desert. Ph.D. Dissertation, University of California, Riverside;* M. Brooks, 2000, *American Midland Naturalist* 144:92-108). Increased productivity is expected only in wet years, which may be followed by fire in the next dry season. Thus nitrogen deposition may be enhancing the fire cycle, which was previously virtually unknown in the desert. Remote sensing methods need to be calibrated to detect these invasions. The intensive density counts of exotics proposed in the monitoring plan are probably not required. Air pollution is monitored by the California Air Quality Management District in stations in Palm Springs, Indio, Joshua Tree NP, and other desert locations (http://www.arb.ca.gov/aqd/namslams/map_all.pdf), so data will be

readily available to local land managers. Again, the cause of vegetation change is a research question. Nevertheless, nitrogen deposition and global change should be listed in the models as potential drivers of weed invasion, along with fragmentation and land disturbance.

*Mediterranean split grass (*Schismus barbatus*) and storksbill (*Erodium* spp.) are not listed in the text as two of the major invasive species. As they increase, they may be responsible for a decrease in native plant species richness.

2. *What management actions can be taken to minimize the impacts of roads on species and habitats?*

This topic is essentially unexplored in the Draft Plan. As noted earlier, the Plan implicitly assumes that the barrier and other effects of roads cannot be modified to reduce their impacts. Experience in many regions, however, has demonstrated that wildlife crossings, ranging from culverts to overpasses to land bridges, can be effective in reducing the barrier effects of roads, as well as roadkill. Responses are highly species-specific, however, so mitigation measures must be carefully tailored to the species in question (e.g., V. Keller and H. Pfister, 1997, Pp. 70-80 in K. Canters, ed. *Habitat Fragmentation and Infrastructure*; A. Clevenger and N. Waltho, 2000, *Conservation Biology* 14:47-56). We recommend that this topic receive increased attention in the final draft of the Plan.

Insofar as ground-dwelling sand-dependent arthropods are concerned, minimizing the number of roads would have a salutary effect. Where roads cannot be avoided it may be better to pave them than to leave them unpaved. At least some ground-dwelling beetles avoid non-habitat substrates. Thus, a hard paved surface could create a minor barrier to such insects while a soil-surface road might not. The benefit of the former depends on how frequently the road is traveled. Frequent traffic on an unpaved road might cause more road-kills than on a paved road. This hypothesis has been tested in Europe but needs confirmation with regard to the local fauna and habitat conditions.

3. *As part of the monitoring program, is a set, quantitative Trigger Number the best method to detect declines in populations and to initiate management responses, or can deleterious trends be separated from expected fluctuations to more accurately trigger a management response?*

This issue is addressed in Appendix B. Although some form of monitoring to provide a measure of a species population status over time is often desirable, it is often not possible to set any particular trigger number to initiate management responses. This is especially true for short-lived species, such as annual plants and most insects. Normal annual or seasonal fluctuations in populations of such short-lived organisms usually cannot be distinguished from declines based on habitat degradation. Instead, management decisions should be based on other measurable

factors, such as changes in sand deposition patterns and habitat invasion by exotic weedy plants and animals. For long-lived plants and animals (e.g. desert bighorn sheep, Orocopia sage), real deleterious trends in population size are more easily detected and a quantitative trigger might be appropriate to initiate corrective management practices. Nevertheless, trends analysis can often be more useful than the setting of simplistic management thresholds.

Regarding the Coachella Valley giant sand-treader cricket and Coachella Valley Jerusalem cricket, population monitoring, if desired, can be accomplished by oatmeal baiting as an alternative to pit-fall trapping. The use of oatmeal bait trails for surveying crickets of many types is commonplace and can be superior to pit-fall trapping. The oatmeal bait method generally produces quicker results with greater probability of locating crickets during a given evening (when they are active) than does pit-fall trapping. The bait survey also eliminates the possibility of unwanted cricket mortality; they desiccate rapidly and are also more prone to predation if rodents or scorpions end up with them in the pit-fall trap. The main drawback to oatmeal trapping is that it requires intensive labor.

IV. Geomorphology:

In general, the four questions posed here are too specific for the advisory committee to respond to in a quantitative fashion, as is implied by the specifics of the questions. For the most part, these are questions to guide future research, not questions for peer reviewers. Nevertheless, we offer preliminary responses to these questions below.

1. *What is the relative contribution of sediment from each canyon in the Little San Bernardino Mountains to the Thousand Palms dune system?*

This is a question that would require a research project to answer accurately, but a rough estimation could be gleaned from sediment-yield estimation techniques developed from other desert regions. There are numerous ways for estimating fluvial sediment yield, separated in part by approach. Some methods are purely empirical, fitting statistical functions (typically power functions) to empirical data (K. Renard, 1972, Sediment problems in the arid and semi-arid southwest, in *Proceedings, 27th Annual Meeting, Soil Conservation Society of America: Portland, Oregon*, p. 225-232). Other approaches include more-intensive statistical modeling (E. Flaxman,1972, Predicting sediment yield in Western United States, *Journal of the Hydraulics Division, Proceedings of the American Society of Civil Engineers*, HY 12, p. 2073-2085) and deterministic sediment-yield models that are highly data intensive (e.g., J. Gilley et al., 1988, USDA Water erosion prediction project. Symposium proceedings, pub. 07-88). In the Coachella Valley, where little sediment data has been collected, the best technique is to apply an empirical function from another region. For example, from the Colorado Plateau, one estimator is of the form:

$Q_s = 193 \cdot A^{1.04}$

where Q_s = sediment yield (Mg/yr) and A = drainage area (km^2) (R. Webb et al., 2000, *Geological Survey Water Resources Investigations Report* 00-4055, 67 p.). The point is that sediment yield generally is a strong power function of drainage area, although often the relation is nearly linear (exponent about equal to 1). Therefore, sediment yield (and therefore the sediment contribution) can be estimated primarily from the drainage area. Several canyons then become important, particularly Long Canyon upslope from Desert Hot Springs and Fan Hill Canyon, upslope from Thousand Palms Canyon. West Wide and East Wide Canyons are blocked by a dike that effectively removes sediment from floodwaters, eliminating these canyons as sediment sources.

At this time, canyons from the Little San Bernardino Mountains and the Indio Hills are the only significant sources of sediment available for aeolian entrainment and transport. The significance of the sediment yield from these canyons is better evaluated in terms of areas of deposition, which generally are higher on the alluvial fans of Seven Palms Valley and Fun Valley than would be useful for aeolian replenishment of the Thousand Palms Preserve. The major sand source for this preserve was once the Whitewater River system (including Mission Creek and Morongo Wash), but freeway and railroad construction have effectively eliminated this source except during extremely high windstorms.

From a casual examination, it would appear that the Thousand Palms dune system receives sand in several ways: 1) direct sand input from Whitewater River system (now closed off); 2) direct sand input from drainages of the Little San Bernardino Mountains and the Indio Hills (partial closure owing to development of depositional plains); 3) indirect sand input from fluvial sand originating in the Whitewater River system, mobilized into aeolian sand, deposited in the Indio Hills, remobilized in the fluvial system of the Indio Hills, deposited upwind from Thousand Palms Canyon, and mobilized into aeolian sand (see 2); and 4) aeolian sand from Mission Creek, Morongo Wash, and other small valleys north of the Indio Hills that is mobilized into aeolian sand, crosses the divide between Seven Palms Valley to Fun Valley, is mobilized in the distributary flow system on the alluvial fans, and is aeolian entrained and transported into the Thousand Palms Preserve (disrupted by development). Historically, the Whitewater River system was probably the most important source. Now, it would appear that the most important sources are from the Indio Hills and Fun Valley.

2. *Is the sand transport system to the east end of the Indio Hills intact? How does agricultural development affect the sand transport system in that area? To what extent did the developed areas on the south side of the Indio Hills provide sand to the east end historically?*

As mentioned in response to question #1, above, historically the major source of aeolian sands to the east end of the Indio Hills probably was the Whitewater River system. This source is completely cut off with the exception of sand recycled from the Indio Hills or transported directly during rare, extreme windstorms. Agricultural development will impede the sand transport system in that area or any area upwind of aeolian dunes in the Coachella Valley. The developed areas on the south side of the Indio Hills probably provided little sand but instead were minor fluvial deposition areas from drainages emanating from the Indio Hills. Instead, the major function of this area probably was as an aeolian transport zone where sand originating from the Whitewater River system moved across an aeolian plain and into the Thousand Palms dune system. Freeway and railroad construction have effectively ended this source, so those developed lands probably would have little influence on the aeolian dunes in the Thousand Palms Preserve.

3. Does the Willis Palms drainage supply sediment to the Thousand Palms sand corridor?

This question is too specific given the overall context of the MSHCP; the Willis Palms drainage does not appear on any maps and does not appear to be mentioned in the ARD. However, SAC members have told us the canyon is on the southeast corner of the Indio Hills and deposits fluvial sediments just upwind from the Thousand Palms Preserve. Therefore, it likely is a significant source of aeolian sands for this preserve, given the closure of other major historical sources.

4. How stable are the dunes south of Interstate 10, even if sand sources are reduced or eliminated?

The stability of dunes may be evaluated on several levels. The dunes themselves appear to be very stable, unlike the unidirectional sand-transport systems that characterize the sources for the Whitewater River and Thousand Palms preserves. These dunes appear to be stopped from east-southeastward movement owing to the presence of railroad and freeway berms. Unlike other dune systems in the vicinity, some perennial vegetation has colonized these dunes, further causing stability. However, within the area of dunes, active sand movement is undoubtedly occurring, which potentially creates habitat for both animals that simply require aeolian sand as well as animals that require active, loose aeolian sand.

The stability of Big Dune is unknown in geomorphic terms, with the exception of information from Lancaster (1993). Stability has two connotations: whether the dune has an active surface layer, which may promote some endemic animals and plants, or whether the sand supply has been cut off. The answer to the latter question is a decided yes. As to the former question, deflation of the dune with no addition of sand may continue to provide habitat for some endemics, particularly insects, and therefore this habitat should not be discarded without significant consideration in the MSHCP.

The true level of stability of this dune system must be evaluated by a combination of historical analysis (using aerial photography and other techniques) as well as monitoring under the Adaptive Management Plan. We suggest that aeolian sand-transport monitors be installed in this area, in addition to sand depth monitoring and photographic monitoring, to determine just how stable this dune system is over the long term.

V. Species Modeling

1. Was enough information on habitat quantity and quality, and species distribution and abundance, available to create accurate models?

This question is impossible to answer until the models have been validated by new survey data or other independent data sets. An accurate model would be one that successfully predicts the location of new data points.

2. Are the assumptions in the species models supported by literature?

Although the "Species Distribution Model Parameters and Known Locations" report documents the decision-making process for including or rejecting GIS layers for the individual species models, we found no detailed discussion of the modeling process or its assumptions and limitations. Except for a couple general references on modeling, no literature is cited to support the use of these particular models or their limitations.

3. Was the process for creating the species models scientifically reasonable and defensible based on available data?

The species models in the Draft Plan are simple GIS overlays and can be described as spatially-explicit conceptual models. Such models are superior to abstract or spatially non-explicit models and they are arguably the best that could be produced, given the limited available data. For some of the better-studied taxa, however, particularly the CV fringe-toed lizard but also perhaps several other species with relatively abundant data points, more rigorous models with better predictive power could be developed.

Examples of more rigorous predictive models are several recent approaches based on resource selection functions (M. Boyce and L. MacDonald, 1999, *Trends in Ecology and Evolution* 14:268-272). Using multiple logistic regression, occurrences of a given species are graphed against a series of potential predictor variables. When the relationships are statistically significant (tighter than expected by chance), those variables enter into the habitat suitability model for that species, which is displayed in GIS. An advantage of this approach is that predictions of habitat suitability can be extended geographically beyond the areas for which

sightings exist, but within the documented range of the species. For example, C. Carroll et al. (1999, *Conservation Biology* 13:1344-1359) developed a spatial habitat model for the fisher in northwestern California and adjacent Oregon, based on 682 previously surveyed locations, satellite imagery, and derived indices of vegetation composition. The model was validated with new data from 468 survey stations with sooted track plates, at which vegetation measurements also were taken. Habitat quality, measured by number of fisher detections at each station was successfully predicted by the model, with nearly 80% correct classification. The importance of field validation cannot be overstated. Just because a habitat appears suitable—and even if that suitability has been well validated in other landscapes—does not mean it is being used by the species in question.

The next step beyond such static habitat suitability models are dynamic, spatially-explicit population models (SEPM), a class of individual-based simulation models that incorporate additional biological realism as habitat-specific demographic parameters. Because both static and dynamic models have strengths and weaknesses, a combined approach offers a unified population viability analysis framework. In SEPMs, individuals not only move between cells, but grow, reproduce or not, and die. Model output from SEPMs may include the mean population size, mean time to extinction, or the percentage of suitable habitat occupied. The development of SEPMs has allowed data gathered from intensive demographic studies to be combined with GIS maps of landscape composition and pattern. These models permit analysis of both equilibrium behavior (i.e., can current habitat sustain the current species distribution for 100 years?) and transient behavior (e.g., can a species recolonize from current refugia or would active reintroduction be necessary?). Analysis of relaxation times, i.e. the time to and pattern of loss of a population after habitat change occurs, allows estimates of the "extinction debt" in the region due to past habitat change. We urge development of these combined models in the Coachella Valley for those species for which adequate distributional data and estimates of demographic parameters are available or become so during the adaptive management and monitoring process.

4. What limitations in the species modeling process may result in inadequate or erroneous maps of potential habitat for any of the target species? What might those errors be?

Small sample sizes (few records) and limited knowledge of autecology are obvious limitations for many of the covered species. The potential for errors of omission (failing to predict the actual occurrence of a species) or commission (predicting occurrence where the species is not found) are correspondingly high. The magnitude of these errors can be determined only through intensive field validation.

5. *Does an analysis of "known locations conserved" provide enough information to make decisions about the adequacy of conservation for species without models? Should any other factors be considered? What are the potential risks of basing conservation of a species solely on known locations?*

Species distribution models should be dynamic, as distributions change over time. Historic distribution records can yield clues about possible future changes in distributions. There are inherent risks in basing a long-term conservation plan solely on known locations. One must also consider likely future changes in the distribution of essential habitat parameters. Furthermore, records for some species (especially insects) are largely artifacts of convenient accessibility. Insect collectors and bird watchers (as opposed to researchers) often return to the same known locations year after year while ignoring many other sites where a given species may occur, but simply has not been reported. There is no substitute for systematic on-the-ground surveys covering all likely or possible locations for a species within a region.

6. *To what extent is historical location information useful in creating models and proposing conservation areas?*

See previous response.

7. *Are there any sources of information not on the list of Source of Biological Data in Table 3.2 that should be consulted?*

We are not aware of specific sources of information. This question is best addressed to local biologists.

Appendix A (by Greg Ballmer, Ph.D.)

NOTES ON COVERED INVERTEBRATES

Casey's June Beetle (*Dinacoma caseyi*)

Most records of this species are from the edge of the desert floor where it meets the boundary of the San Jacinto Mountains. Recent records are from a very few locations on the Agua Caliente Indian Reservation at the mouth of Palm Canyon and from private land within the Smoke Tree Ranch residential community. Historic records from elsewhere in Palm Springs and nearby communities pertain to areas that have been thoroughly developed or otherwise altered and presumably no longer have appropriate habitat. Other potential habitat identified by Frank Hovore seems to have a low likelihood of occupancy, but needs to be surveyed to determine whether the species is present. If this species were found to occur within the Plan Area further west (Snow Creek/San Gorgonio River Wash is perhaps the most likely place to look), one would be warranted in expressing greater optimism about its chances of long-term persistence. In the absence of evidence that it occurs elsewhere, preservation of this species may depend entirely on the good will and conservation efforts of the Agua Caliente Indians (not included in the Plan) and other private landowners. The Draft Plan contains no guarantees that either the Indians or other private landowners will take steps to preserve this species.

Furthermore, in the event of a significant climate shift it seems unlikely that this species will be able to track the likely changes in the distribution of its habitat, as it is probably already cut off from that option. One must question the premise that the Draft Plan offers long-term protection for this species. In order to offer realistic coverage for this species it will be necessary to determine more accurately the extent of its occupied habitat both in known locations and at other sites where potential habitat has been identified. Another possible conservation measure could be active management, including captive breeding and re-release into other suitable areas within the Plan Area. Success of such measures is speculative and not recommended at this time.

Coachella Valley Giant Sand-treader Cricket (CVGSC) (*Macrobaenetes valgum*)

This species is a sand endemic restricted to the western portion of the Plan Area from Fingal's Finger to the Coachella Valley Fringe-toed Lizard Preserve. Its range is probably determined by the presence of aeolian sand and a suitable temperature/moisture regime. Plan Alternatives 2 and 3 preserve 39% and 66%, respectively, of this species' current habitat. It should be noted that significant climatic warming is likely to shift the range of this species toward the western (cooler, moister) portion of its range and, thus, reduce the useful extent of its protected habitat. In that event the additional western lands identified in Alternative 3 might provide significantly more useful habitat and commensurately greater protection from decline and extinction. It seems likely that sufficient habitat will be protected for this species in both Alternatives 2 and 3 if its current range does not shift greatly.

Coachella Valley Jerusalem Cricket (CVJC) (*Stenopelmatus cahuilaensis*)

The range of this sand endemic is skewed toward the western end of the Coachella Valley, with known locations primarily from Palm Springs Airport westward to Fingal's Finger. This correlates with winter precipitation patterns, which are generally higher and more stable in the west than elsewhere in the valley. Only two records for this species are known from north of I-10. The westernmost of these was reported just this season from a windmill farm on the bluff along the north side of Whitewater Canyon. The extent of this population is unknown but could extend through scattered patches of aeolian sand at the base of the bluffs, as well as further to the north and east toward Mission Creek. The easternmost record for this species is at the Thousand Palms off-ramp from the I-10 freeway. This record is probably an outlier, as surveys elsewhere within the community of Thousand Palms and further to north and east have failed to find it. This species could occur nearby on the south side of I-10 in the vicinity of the Big Dune. In view of predicted climatic shift toward warmer and drier conditions, it seems most important for this species to protect habitat at the western end of its range (especially along the Whitewater River wash from Palm Springs westward to Fingal's Finger), including the expanded lands included in Alternative 3.

Coachella Valley Grasshopper (CVG) (*Spaniacris deserticola*)

This species is a hot desert endemic which does well at elevations around sea level (primarily the valley floor and adjacent bajadas) where its host-plant, *Tiquilia palmeri*, occurs. Several historic sites for this species in the Coachella Valley no longer support habitat. It may now be restricted to sites north of I-10, including portions of the CVFTL Preserve and Willow Hole areas. The distribution of this species further to the south and east needs to be determined. As for the records of this species reported by Matt McDonald from Dos Palmas, near the Salton Sea, and the east end of the Indio Hills, at least some are misidentifications. If historic populations in Imperial County have been extirpated, then those remaining in the Coachella Valley should be considered far more important. Alternative 3 would protect considerably more of the few known sites for this species than would Alternative 2, although there is some question as to whether some of the reported sites covered by Alternative 3 are for misidentified specimens.

Pratt's blue (*Euphilotes enoptes cryptorufes*)

Pratt's blue is confined to the higher elevation chaparral belt in the San Jacinto-Santa Rosa Mountains range. This is a rarely encountered taxon with perhaps no more than three adult individuals having been found in the wild. Most museum specimens were reared from larvae found on the host-plant, Eriogonum davidsonii, which grows in openings in the chaparral and along trails. Because all known habitat occupied by this species lies within the Santa Rosa Mountains National Monument and/or National Forest land, the main responsibility for protecting it lies with federal agencies. Protection should entail proper land management to ensure that the habitat is maintained to conserve the host plant. This would logically entail a more-or-less natural fire regime and exclusion of activities which could destroy the habitat. It seems likely that the management plan for this species is adequate.

Appendix B (by Dick Tracy, Ph.D.)

ADAPTIVE MANAGEMENT/MONITORING PROGRAM

Background

The initial conservation measures under the MSHCP start a process of accumulating experience and knowledge. That is, the MSHCP contains a programmatic core feature that is "adaptive management". The initial MSHCP management actions are those hypothesized to be necessary to mitigate threats to all covered species. However, it is important for the permit holders to admit that:

1. Currently identified threats are **hypotheses** about threats rather than certain knowledge.
2. Initial management actions emanate from **hypotheses** about what is needed to militate against identified threats.

Proposed management actions thus are guesses as to what is needed to militate against guessed-at threats. These guesses (or hypotheses) must be replaced by better knowledge as part of the "management actions" of the MSHCP. This additional knowledge will only come from a science-based adaptive management program (SBAMP). The work of this program must be entrusted only to those who normally test hypotheses using scientific methods to generate new knowledge.

Those in charge of the Adaptive Management Program must recognize that environmental conditions for species will change, and potentially change dramatically, with time. This is especially true in Coachella Valley where new species will invade the system (e.g., exotic invader species like salt cedar, red brome, argentine ants, etc.). Moreover, physical/chemical changes will occur at high rates (e.g., roads are created or expanded, urban development is created or expanded, fertilizer and/or pesticides are blown into to spring, etc.). New, or modified, management actions will be necessary to respond to continued changes in the environment.

In addition, even after "correct" management actions are identified and implemented, the effectiveness of these actions must be assessed. The process of acquiring and using new knowledge to prescribe changes in management represents the science-based adaptive management necessary to assuage Service concerns about the efficacy of the plan behind the 10A permit.

Adaptive management is a flexible, iterative approach to long-term management of biological resources. Adaptive management is directed over time by the results of ongoing monitoring activities and other information. This means that biological management techniques and specific

objectives are regularly evaluated in light of monitoring results and new information on species needs, land use, and a variety of other considerations. These periodic evaluations are used to adapt both management objectives and techniques to achieve overall management goals better. In the case of the MSHCP, these goals broadly include maintenance of the long-term net habitat values of the ecological communities in project area with a particular emphasis on covered species. This includes recovery of listed species, conservation of unlisted covered species, and evaluation of other species for status as covered under the Section 10(a) permit to the Permittees.

Science-Based Adaptive Management

Science-based adaptive management is the approach preferred by many resource managers when scientific resources and funding are available. Adaptive management provides resource managers with objective scientific data and analysis upon which to base management decisions. Adaptive management provides those who fund resource management and conservation actions with objective and scientifically valid evaluations of the needs for various actions and a basis for assessing the effectiveness of those actions.

A critical element of a science-based adaptive management program is the database upon which management decisions are made. Such a database can provide the basis for evaluating species, ecosystem, and/or landscape status and trends, and it can be used to evaluate management actions directed at conservation of biological resources. Adaptive management requires a scientifically valid program for collecting scientific data, coupled with supervision of an accessible database by a competent scientific authority and quantitative evaluation of emerging data.

Biological recommendations emanating from the SBAMP for inventory, monitoring, and research ordinarily would be used to establish funding, management, and monitoring priorities.

The primary focus of a SBAMP should be the evaluation of the status of species and ecosystems within the project areas to bear on land-use decisions potentially affecting biological resources in these areas. Specifically, the SBAMP must develop methods to monitor the effectiveness of management actions in meeting MSHCP objectives. For the service, this also requires tracking how the status of each element of the project (e.g., each species) can be assessed under the monitoring scheme.

The SBAMP must establish a geographic information system database for all inventory, monitoring, and research data, and a reliable entity must be invested with authority to keep the database and make it available to all agencies, municipal and county authorities, scientists, and NGOs involved with the project. This entity must ensure long-term maintenance of the database and review of the validity and reliability of the database.

Elements of SBAMP

The inventory and monitoring component of the SBAMP ordinarily would include six steps which, when appropriately linked to decision making, would maximize the collection and integration of objective, reliable data into the decision-making process and help in making decisions about management actions.

A. Identification of Explicit (Quantifiable) Scientific Goals and Objectives

The goals of the scientific program should include "targets" of study at a variety of spatial scales and levels of ecological complexity. Targets of study should range from highly restricted spatial scales for species such as narrow endemics found only in individual desert springs to broad spatial scales for species ranging over most of the Valley in multiple habitat types. Targets of study may range from individual populations to entire ecosystems and landscapes and the physical processes upon which those ecosystems and species depend. Among those targets of study should be specific population characteristics of select species of concern, including federally listed threatened and endangered species, "candidate" species and/or sensitive species, and other species of special conservation concern. Targets of study for ecological communities and ecosystems may include variables associated with composition (which species are present), structure (characteristics like shrub sizes and shapes), and function (such as presence of pollinators, nitrogen fixers, keystone species, and physical processes required by the system). Landscape-level studies will identify targets of study that can be remotely sensed from aerial photography and/or data logging systems. The scientific goals and objectives ordinarily have to be dynamically optimized to incorporate the most current scientific information and respond to changes in goals and direction from those in charge of managing the project.

B. Identification of Likely Environmental Stressors

The SBAMP will identify likely sources of ecological disturbance that can compromise ecosystems and their constituent species. Environmental stressors include both natural and anthropogenic phenomena including climate change, fire, loss of habitat due to fire, toxic pollutants, flood, water diversions, wind breaks, invasions of exotic species, overharvest of species, and so on. Identification and verification of stressors will be the product of research to establish mechanistic links between environmental phenomena and stress to populations, species, and ecosystems.

C. Construction of Conceptual Models Describing Crucial Ecosystem Interactions

Models will outline interconnections (linkages) among physico-chemical ecosystem processes, among ecological communities, and among species and processes within communities. Models are important in developing an understanding of the key ecosystem processes and properties and in developing an understanding of how environmental stressors affect processes predicting extinction events. The models will be important in delimiting the boundaries of what constitutes natural variation in population and ecosystem processes and describing the role of humans in stressing natural processes. Models will incorporate the latest scientific concepts and paradigms, the application of which can contribute to keeping conservation costs low and scientific understanding high.

D. Identification of Indicators

Indicators serve as surrogates and allow inference to be drawn regarding population or ecosystem processes of concern. They can be species or ecosystem components, or characteristics that are easy to measure and exhibit dynamics and responses that parallel more difficult to measure population or ecosystem processes of concern. Indicators are selected because they demonstrate low natural variability but respond measurably to environmental change. Indicators will include population sizes and distributions of select species, physical and biotic variables associated with ecological communities and vegetation types readily assessed by remote methods. Establishing an indicators program requires research into correlative relationships among focal populations and ecosystem and habitat properties and processes. The cost, relative efficacy, and anticipated benefits of such research should be regularly evaluated (along with other alternative conservation measures, alternatives, and proposals) by those implementing the HCP as well as the FWS.

E. Development of Sampling Design to Estimate Status and Trends of Indicators

Hypothesis testing, trend analyses, model development, and statistical inference are elements of a scientific program that will be subjected to independent scientific review. Monitoring exercises must be statistically rigorous so that the program will have the highest probability of detecting ecologically important trends. Sampling design, hypothesis testing, and trend analyses are all scientific processes that continually become more efficient as scientific knowledge increases; thus, experimental design requires continuous evaluation.

F. Determination of Threshold Values That Will Trigger Proposals for Management Changes

Status and trends of species and communities must be used to trigger proposals for adjusting land management and policy. Such data provide the basis for establishing dynamic policies and management aimed at producing the desired ecological condition and the conditions required by the U.S. Fish and Wildlife Service.

Appropriately integrated, an adaptive management program will use direct measurements and surrogate variables (indirect measures of the status of ecosystem processes or species) to determine the status and trends of ecosystems and their constituent species. Resulting data and analyses can lead to recommendations for adaptive management. It is critical to this process that the integrity of inventory, monitoring, and research be assured using the highest standards of scientific accountability and peer review in order for any adaptive management program to promote change to management in the project area, the USFWS, resource managers, and regulatory agencies with reliable and objective.

Adaptive Management Decision Making

An adaptive management framework can allow information to be transferred directly to decision makers and land and resource planners (e.g., BLM, USFS, USPS, Boulder City, etc.) for integration into MSHCP implementation. This information transfer could follow that proposed for effectiveness monitoring for the Northwest forests (see Effectiveness Monitoring for the Northwest Forest Plan - Draft 7 August 1997). The process involves four steps:

- Provide a range of possible management responses
- Determine the potential alternative ecological outcomes associated with specific phenomena being monitored
- Assess the probabilities associated with each possible interpretation of monitoring data
- Identify the management decision that maximizes the overall "utility" of each decision and outcome (involving considerations of the costs of misinterpretations of monitoring data and/or costs of wrong decisions)

To the extent feasible, species and habitat linkages will be addressed to produce proposals for management that maximize the conservation of ecosystems upon which “covered” species depend and that minimize financial costs and disruption of public activities. By linking statistically validated sampling designs with explicit consideration of environmental stressors, any MSHCP would move beyond traditional census approaches that document trends but rarely

explain phenomena causes. This will allow the SBAMP process to provide land managers with the scopes of work to support defensible land management decisions.

Inventory, Research, and Monitoring

Inventory, research, and monitoring (IRM) are necessary and important activities for long-term, multiple species HCPs (Fig. 1). Nevertheless, there is confusion about incorporating these activities into conservation planning. The lines separating monitoring and research are not sharp. Indeed, apposite monitoring requires research methods to provide more than anecdotal information; and anecdotal information will be inadequate for both economy-seeking permit holders and for regulatory agencies. Additionally, where monitoring methods do not yet exist, research must be conducted to develop efficacious means to assess the effectiveness of the MSHCP.

Definitions

Inventory, according to Webster's New International Dictionary (Merriam-Webster 1986), is an itemized list of current assets; as a survey of natural resources such as a survey of wildlife of a region.

Monitoring, according to Webster's New International Dictionary (Merriam-Webster 1986), is to watch, observe, or check especially for a purpose.

Research, according to Webster's New International Dictionary (Merriam-Webster 1986), is to search or to investigate exhaustively.

Inventory

A conservation plan designed to protect sensitive populations of wildlife and plants must be based upon knowledge of the status of those populations. The size and spatial distribution of populations are critically important pieces of information upon which management prescriptions can be made. If the status of any population is not known, then aspects of that status can be assessed through an inventory of biological resources, and that inventory should be conducted at the earliest possible time in the planning process. If knowledge about the status of populations is not known before the 10(a) permit is requested, then that inventory should be performed as one of the first actions under the HCP.

Monitoring

A monitoring program without a goal might be viewed as more dangerous than no program at all. Monitoring without goals can consume valuable resources that may be used in other conservation actions and incorrect information from improper monitoring can mislead and direct

dangerous management decisions. Monitoring must be conducted with adequate sampling and scientifically defensible sampling protocols. Data must be replicable and have determinable probability of being correct.

There are numerous purposes for monitoring plans, and different kinds of monitoring are necessary and important to a successful HCP. Monitoring is important to validate management actions, to provide better data for adaptive management, and to obtain advanced capacity to respond unforeseen circumstances that. Monitoring can be categorized as implementation monitoring, effectiveness monitoring, or validation monitoring (USFWS 1994). The first two of these forms of monitoring meet the traditional definition of monitoring, but the validation monitoring may be viewed as a form of research (see below).

Implementation Monitoring: Implementation monitoring provides a permanent record of the mitigation and *management actions* under the MSHCP. Implementation monitoring should assess conservation actions such as fencing along roads, recreation restrictions within reserves, prescribed burns or floods, stream and range improvements, pollution regulation, vegetation restoration, and grazing management. Implementation monitoring should also assess the impacts of "natural implementations" such as occurrences of drought, natural fires, invasion of exotic species.

Effectiveness Monitoring: Effectiveness monitoring is used to record *responses* of biological resources to management actions and other important natural and anthropogenic events as well as random, year-to-year changes. With sufficient data from different sites through time analyses should be able to separate out non-random changes from a background of random changes. For example, analyses of data from effectiveness monitoring could be used to assess the efficacy of off-highway vehicle restrictions on vegetation or dune systems. They could be used to estimate the impacts of natural and anthropogenic fires or floods. They can be used to assess the growth in animal populations freed from mortality caused by vehicles on roads passing through semi-natural areas. Importantly, analyses from effectiveness monitoring also can be used to assess the loss of biological resources due to aggressive competition, predation, or parasitism by exotic species.

Validation Monitoring: Validation monitoring (USFWS 1994) is actually a form of research. Its purpose is to determine if a "conceptual model" of ecological systems is valid. If the conceptual model is correct, then correct prescriptions for adaptive management can be made. Validation monitoring determines if the predictions and assumptions of adaptive management are appropriate to attain the desired objectives. Validation monitoring generally requires experimentation and long-term tracking of ecosystem responses to create a database necessary to validate results from the effectiveness monitoring. Validation monitoring/research thus can be used to assure that the benefits from management actions are not wrongly attributed.

Relationships among Monitoring, Research and Adaptive Management

Adaptive management in the context of a conservation plan requires assessment of the effectiveness of management actions. That assessment occurs through monitoring. Importantly, some monitoring cannot be implemented without preliminary research. The efficacy of a conservation plan requires evaluation of the effects of management in light of hypothesized responses to that management. Different kinds of monitoring are required to make a decision to alter current management practices to reach the desired objectives of the Clark County HCP (see Fig. 1).

"Short cuts" in monitoring

The information necessary to alert managers to conservation challenges of destructive, non-random ecosystem changes must come from monitoring and research. In complex multiple species HCPs, it is rarely possible to measure all populations covered by the Section 10(a) permit. Time and money are usually inadequate to allow such extensive monitoring; therefore, "short cuts" are necessary to evaluate the efficacy of the plan. Several possible categorizations of MSHCP elements can be helpful in meeting MSHCP goals. These include surrogate species, which can convey substantial information about the status of other ecosystem elements. All species covered under the MSHCP may not be equal in terms of their importance to or influence on other species in the MSHCP, and some species may not correlate in their reaction to environmental events. Below are possible categories of species that can be helpful in assessing the efficacy of the conservation planning.

Indicators: Indicators are those ecosystem elements (populations, habitat, other) are correlated with populations of covered species or ecosystem elements targeted for conservation. This correlation allows us to measure the dynamics of one population and infer the dynamics of others. Correlations among species generally come from similar reactions by species to similar stressors. For example, if several species are sensitive to drought and all decline in population numbers in the presence of drought, then documented declines in one species allows us to infer that other correlated populations also will decline. Debate over the efficacy of indicator species exists, particularly regarding ecological communities dominated by density-dependent dynamics. It is not possible to identify indicators without research documenting the correlated responsiveness of populations.

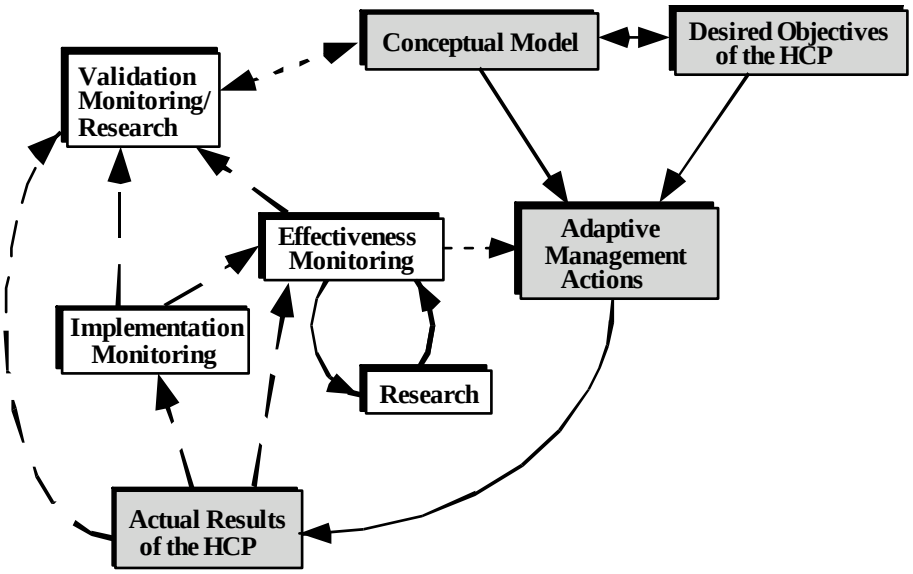

Fig. 1. Relationships among the desired objectives of the HCP, a conceptual model of the functional relationships among species, and monitoring activities in the adaptive management of the HCP.

Keystone species: Keystone species are those species that have an influence on the population dynamics (and even presence) of a number of other species, often far out of proportion to their own numbers or biomass. For example, the absence of a keystone predator might release prey species from population control that can result in competitive exclusion among other species. The presence of keystone species often promotes species richness in an ecosystem.

Umbrella species: Umbrella species are species with very large home ranges, comparatively small population densities, and narrow habitat requirements (e.g., northern spotted owl, desert tortoise). Protection of the habitats that support such ostensibly can confer protection the habitats of many other species.

Flagship species: Flagship species are large and/or charismatic species (e.g., pandas, lions, bison, bald eagles) that "represent" the habitat protected. Protection of such species may not protect other species, but it may create support for conservation efforts among voters or financial donors.

Focal species: Focal species are simply species to which particular attention is paid in conservation efforts. Species like the marbled murrelet are neither charismatic nor are they keystones. However, they are the focus of attention in conservation efforts because they are sensitive species within the Northwestern temperate rainforest ecosystem.

Invader species: Invader or exotic species are species that have not evolved within the ecosystem in which they are now found. Some invader species are dangerously aggressive competitors or predators and can cause the extirpation of native species. Invader species include salt cedar, which threatens persistence of native willows, or bullfrogs which threatens persistence of many true frogs in the western United States.

The Role of Research

Research is essential to effective monitoring. Selecting indicators requires research to identify ecosystem elements that correlate in their responses to changes in environmental conditions. Establishing statistically defensible correlations among species or other elements in their responses to the environment is the only effective method for establishing indicators.

Research is necessary for the development, and amendment of conceptual ecosystem models. An incorrect conceptual model can lead to inappropriate adaptive management action. A conceptual model might posit for example, that paved roads are damaging to nocturnal snake populations because individual snakes seek warm places at night to thermoregulate. This hypothesis requires testing. The test would not simply count the number of snakes that become road kills on paved roads. It would assess threats to the persistence of snakes with known population dynamics given that certain numbers of individual snakes will die on roads.

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3.4 Field Surveys Completed during Plan Preparation

Throughout the Plan preparation, field surveys were conducted to assess the occurrence and distribution of target species of plants and animals. These surveys were conducted by members of the Scientific Advisory Committee, staff from the Bureau of Land Management, California Department of Fish and Game, Coachella Valley Mountains Conservancy, U.S Fish and Wildlife Service, and consultants hired by CVAG. Surveys completed specifically for this Plan are shown in the following Table A3-5.

Table A3-5: MSHCP Biological Surveys

Survey Title/Target Species	Conducted by	Date(s)
Surveys for Palm Springs pocket mouse	Shana Dodd S.C. Dodd Biological Consulting	1995 1999
Surveys for Palm Springs ground squirrel (on potential conservation areas)	Mark Dodero RECON	1995
Survey for five rare plants at selected locations in the Coachella Valley	Andy Sanders, UCR Thomas Olsen Associates	Spring 1995
Surveys for Palm Springs ground squirrel (on existing preserves)	Katie Barrows, CVMC (with Jennifer Purcell)	1995
Surveys for Coachella Valley milkvetch (on existing preserves)	Katie Barrows, CVMC (with Jennifer Purcell)	1995
Surveys for riparian birds along Whitewater Channel, Salton Sea/Delta area	Patricia Locke-Dawson BLM	Spring 1995
Surveys for sensitive insects of concern to the CVMSHCP	Dave Hawks Hawks Biological Consulting	1995
Surveys for flat-tailed horned lizards	Kim Nicol, CDFG; Patricia Locke-Dawson, BLM; Sharon Keeney, CDFG	October 1995
Surveys for flat-tailed horned lizards: East end of Indio Hills	Will Miller, USFWS; Kim Nicol, CDFG; Katie Barrows, CVMC	May 1997
Survey for riparian birds	Peter Beck (contract with USFWS)	Spring 1997
Survey for flat-tailed horned lizard habitat: E. of Coachella Canal (Gravel Pit) to Box Canyon	Kim Nicol, CDFG; Gavin Wright, Ingrid Johnson, Karen Dortweiler, BLM	Spring 1997
Survey for flat-tailed horned lizard habitat: Indio Hills to Dos Palmas	Mark Fisher UCNRS, Deep Canyon Reserve	March 1997
Survey for flat-tailed horned lizard habitat/linkage: East of Coachella Canal	Will Miller, USFWS Katie Barrows, CVMC	June 20, 1997
Survey for Palm Springs ground squirrel: Snow Creek	Kim Nicol, CDFG; Ingrid Eleck, BLM; Cam Barrows, CNLM; Katie Barrows	June 1997
Survey of Mission Creek and Big Morongo Wash	Katie Barrows, CVMC; Ingrid Eleck, BLM; Cam Barrows, CNLM	July 29, 1997

Table A3-5: MSHCP Biological Surveys (continued)

Survey Title/Target Species	Conducted by	Date(s)
Surveys for Coachella Valley round-tailed ground squirrel and Palm Springs pocket mouse	Bob James, USFWS	1997
Survey for triple-ribbed milkvetch	Will Miller, USFWS	April 1997
Surveys for Little San Bernardino Mountains linanthus	Will Miller, USFWS	March-April 1997
Surveys for Coachella Valley giant sand treader cricket and Jerusalem cricket	Cameron Barrows CNLM	Jan-April 1998
Surveys for various bat species	Kim Nicol, CDFG and other SAC members	May 1998
Surveys for Casey's June beetle	Cameron Barrows CNLM	1998
Rare Plant Survey: East End of Indio Hills	Jim Dice, CDFG; Will Miller, USFWS; Walt Sniegowski, CVMC Volunteer	April 1998
Survey for Coachella Valley milkvetch: East of Washington St. (Fleming Ranch) & East Indio Hills (West of gravel pit)	Will Miller, USFWS Dennis Hebert, UCNRS	April 14, 1998
Survey for triple-ribbed milkvetch: Mission Creek	Will Miller, USFWS; Ingrid Eleck, BLM; Katie Barrows, CVMC; Jennifer Purcell, CVMC Volunteer	May 1998
Survey for triple-ribbed milkvetch: Agua Alta Canyon	Will Miller, USFWS Pete Sorensen, USFWS	April 15, 1998
Surveys for flat-tailed horned lizard: East Indio Hills	Gavin Wright, BLM	1998-1999
Surveys for Coachella Valley round-tailed ground squirrel	Matt McDonald, USFWS.	April – Aug. 1999
Surveys for Casey's June beetle	Cameron Barrows, CNLM Mark Fisher, UCNRS	Summer 2000
Survey for Little San Bernardino Mountains linanthus, Coachella Valley milkvetch	Ken Corey, Gary Wallace, Pete Sorensen, USFWS; Mark Porter, Rancho Santa Ana Botanic Garden	May 2001
Surveys for soil conditions in habitat for Little San Bernardino Mountains linanthus and triple-ribbed milkvetch	Peter Fahnestock, USGS; Robin Kobaly, BLM; George Helmkamp; Katie Barrows; Gary Wallace, Matt McDonald, USFWS; Mark Porter,	November 2001
Surveys for Coachella Valley round-tailed ground squirrel	Paul Beattie, Matt McDonald, Lianne Ball, USFWS, to test monitoring protocol	April – July 2002
Surveys for Covered Species as part of initial evaluation of Monitoring protocols. See Table 8-7a in Plan for species included in surveys	UC Riverside, Center for Conserv. Biology staff; Cam Barrows, CNLM; Angela Gatto, CDFG	2003 – 2007

3.5 Natural Communities Mapping

3.5.1 Natural Communities Map

The natural communities map found in Section 3.2.2 of the Plan delineates the occurrence and distribution of natural communities or vegetation types in the Plan Area. The land-cover map (vegetation layer) for the Sonoran Desert Region from the Gap Analysis of Mainland California (CA-GAP) (1994) was used as a baseline. This gap map was produced by the University of California Santa Barbara (UCSB) using a minimum mapping unit of 100 ha (1 km^2) and a scale of 1:100,000. Details of the CA-GAP mapping process are provided in Davis et al. (1995). To better describe and map the distribution of natural communities within the Plan Area, including threatened or rare natural communities, the GIS Team (Conservancy, BLM, and County GIS staff) refined this gap map as described below.

The names of the natural community types are based on the natural communities classification system of Holland (1986), the classification system that has been widely used by the California Natural Diversity Data Base (CNDDB), and other regional, state and federal resource managers. Recently, the CNDDB has adopted the natural communities classification system developed by Sawyer and Keeler-Wolf (1995) for the California Native Plant Society; it is intended that a cross-walk of the Holland classes with the CNPS system will be developed for the natural communities map.

Five new community types were added to the Holland system to enhance the ability to characterize the sand dune communities, in particular with respect to their habitat features. These community types include Active Desert Sand Fields, Active Shielded Desert Dunes, Ephemeral Desert Sand Fields, Stabilized Shielded Desert Sand Fields, and Mesquite Hummocks. The "mesquite hummock" type was added to describe this once common community type that is distinguished from the Mesquite Bosque of Holland (1986). Scientific Advisory Committee members Dr. Alan Muth and Mark Fisher from the University of California Boyd Deep Canyon Natural Reserve (UCNRS), and Cameron Barrows from the Center for Natural Lands Management assisted us in developing the classification of seven sand dune community types, including three previously described by Holland (Active Desert Dunes, Stabilized and Partially Stabilized Desert Dunes, and Stabilized and Partially Stabilized Desert Sand Fields). In addition to vegetation features, these seven types reflect temporal (e.g. ephemeral) and other characteristics (e.g. active, stabilized) of each major sand-dominated community. Descriptions of these community types are given in Section 4.2.3, Conservation Strategies for Natural Communities. The classes for non-vegetated surfaces and human dominated land uses follows that of the CA-GAP map (1994), with the addition of the following types: 1) Rural, very low density, rural residential areas; 2) Landfill, for landfill/waste disposal facilities; 3) Wind Energy, for wind energy parks, which retain some native vegetation cover.

The GIS Team refined the UCSB Gap Analysis Map using a combination of source data: 1) geo-referenced June 1992 Landsat (Thematic Mapper or TM) satellite imagery; 2) 1996 and 1998 1:1000-scale blue-line copies of black and white aerial photographs supplied by the Coachella Valley Water District (CVWD); 2) color infrared aerial photographs at various scales; 3) USGS 7.5 minute (1:24000) topographic quad maps; and 4) field surveys and ground-truthing between 1995 and 2000. The steps involved in the map preparation are:

1. The GIS Team imported the CA-GAP map to the BLM-Palm Springs GIS system and amended it to include only the area within the Plan boundary. It was also necessary to correct some obvious labeling errors of the natural community types. Other necessary baseline data, such as Landsat (TM) satellite imagery and color infrared aerial photographs, were obtained from USGS/EROS Data Center. A reference document (data dictionary) that identifies all map elements and associated data has been prepared.

2. Initially, the GIS Team attempted to assign the natural community types unique to the Plan Area based on a supervised classification process (as in Dorweiler 1997) done in the ARC/INFO GRID module (ESRI). An active sand dune located on the Thousand Palms Preserve was used as a test case, with the assumption that the Landsat image cell values representing the dune would be very clear-cut, and the formula used in GRID would easily select other like cells. The process, however, selected other types of sand formations, such as Stabilized and Partially Stabilized Desert Dunes. Computer selection by the GRID classification process was not adequate to distinguish between very similar natural community types, given the available software. The team chose not to use supervised classification, as it did not provide the necessary accuracy for this mapping process.

3. As an alternate method, the GIS Team digitized natural community information directly on-screen using the Landsat satellite imagery as a frame of reference. Natural community boundaries were mapped using photo interpretation of patterns in the satellite imagery, supplemented by 1:1000 blue line copies of black and white aerial photographs and color infrared aerial photographs. Typically, review of CVWD aerial photographs, other available aerial photographs, and field reconnaissance, in an iterative process, followed digital delineation of a given natural community on the satellite imagery. The refinement of the CA-GAP map, through the addition of more detailed mapping of the target natural communities, was produced using a minimum mapping unit of 30 meters. This minimum mapping unit was determined based on the average size of a mesquite hummock, the smallest natural community. After each community was digitized, the team updated the CA-GAP map with the new vegetation layer coverages to produce the natural communities map for the Plan Area.

4. Before the mapping process began, surveys of selected natural community types, in

particular those proposed for inclusion in the Plan, were conducted. Due to the sparse cover in desert ecosystems and limits of time and personnel, the GIS Team used the releve method (Mueller-Dombois and Ellenberg 1974) to describe plant species composition and estimate plant cover. These surveys were used to establish baseline descriptions of the natural community types.

3.5.2 Accuracy Assessment

Because the natural communities map of the Plan Area is an important component of the species distribution modeling process, and will also contribute to decisions about land acquisition and preserve design, it was deemed essential that adequate accuracy assessment and ground-truthing of the map be done. Based on an initial evaluation of the level of accuracy for the natural communities mapped, stratified random points were identified in the Plan area. Biologists from the CDFG, CVMC, UC Deep Canyon Desert Research Center, and volunteers visited these points to complete a vegetation sample using a releve (Mueller-Dombois and Ellenberg 1974). The individuals doing the field sampling did not know how the point had been classified in the natural communities map. A releve was completed at each of 250 random points. Not all random points were visited due to constraints of available staff and volunteers. The results of the releves were entered in a data base to permit an objective classification of the vegetation sampled. The releve data were evaluated in a community analysis using PC-ORD, which incorporates the TWINSPAN (two-way indicator species analysis) program (Hill 1994), to classify the samples. The results of this analysis are available upon request. In addition to the releves, biologists, GIS personnel, and volunteers have used field reconnaissance, walking or driving to check the accuracy of the natural communities map. The results of these field inspections were used to update and increase the accuracy of the map.

As another means of evaluating the natural communities map accuracy, personnel from the Center for Conservation Biology at University of California, Riverside completed a field assessment. The results of this analysis were provided to CVAG in an unpublished report, "Report to the Coachella Valley Association of Governments: I – Assessment of Vegetation Map Boundaries" (Allen et al. 2002). They found the map to be accurate and noted that discrepancies were primarily due to the difficulty of identifying boundaries between sand types. They also noted that the 30 meter pixel satellite images used for the map affect the accuracy and recommended the application of newer satellite images.

3.5.3 Historical Natural Communities Map

A historical natural communities map (see Figure A3-1) was prepared by digitizing natural communities information from 1939 (U.S. Engineer 1939) aerial photos. A limited set of aerial photos from the 1930s was also obtained for the Palm Springs area only. The 1939 photos were

used as the basis for a historical vegetation map; these 1939 photos (scale 1:2000) were only available for the valley floor of the Coachella Valley from approximately Cathedral City east to the Salton Sea. Historical photo coverage for other parts of the Plan Area was either unavailable or incomplete, such that too much interpretation would be necessary to piece together a map of the natural vegetation. Ultimately, the 1930s photos for the Palm Springs area were not used for the present version of the historical natural communities map because of time limitations and difficulty incorporating this area within the area represented by the Coachella Valley Water District photos. Please note that, even within the historical natural communities boundary, there are some natural community types, such as desert dry wash woodland, that are not mapped completely. This is due to the inability to discern, in some cases, boundaries between types of communities.

The historical natural communities map was used to generate statistics regarding the relative distribution of natural communities on the floor of the Coachella Valley in 1939 compared with today; many of these natural communities have been most impacted by land use changes in the Plan Area in the last 60 years. The historical natural communities map statistics are presented in Table A3-6. The steps involved in the preparation of the historical natural communities map are:

1. For reference purposes, the GIS team visited the Coachella Valley Water District office and photocopied the 1939 photos described above. In addition, the team traced the major features and natural communities as shown on the original photos onto Mylar for scanning into a digital format.

2. The GIS team intended to scan the photos, and then use a software program that would convert each scanned image to a GIS coverage. This process was partially successful and coverages were produced. However, excessive 'noise' (unnecessary lines, etc.) appeared in the coverages, which would have required extensive clean up. Because technology that may have reduced some of this 'noise' was not available, the team decided that it would be more efficient to digitize on-screen using the GIS coverage as a back image for reference purposes.

3. The GIS team digitized as many of the natural communities as described by Holland (1996) that could be distinguished on the photos. The team decided that the historical information was not adequate to accurately map some natural communities such as coastal and valley freshwater marsh, desert fan palm oasis woodland, tamarisk scrub (introduced in the 1950s), lake (Salton Sea), and Sonoran cottonwood willow riparian forest. These communities were likely present in 1939 but not discernable in photographs.

   The GIS team also followed the general guidelines described below:

a. The team digitized the extant desert dry wash woodland of the Santa Rosa and San Jacinto Mountain "cove" areas that could be distinguished in the 1939 photos.
b. All reservoirs and quarries represented in the current natural communities coverage were deleted in the historical natural communities coverage since they did not exist in 1939.
c. The team made the general assumption that natural communities in the surrounding mountains of the Plan Area (Santa Rosa and San Jacinto Mountains to the south and Little San Bernardino Mountains to the north) had not significantly changed other than at the urban interface areas. The fire regime of the mountain areas over the past 7 decades has possibly impacted the natural communities, but no data were available for representing this possible change. The team digitized natural communities at the urban interface to the extent that they could be distinguished on the 1939 photos.
d. The currently developed area of Desert Hot Springs and surrounding rural areas were labeled as Sonoran creosote bush scrub for the historical natural communities map. The city of Banning was labeled as rural, Cathedral City Cove was labeled as urban, and the northern part of Palm Springs where development had occurred was labeled as urban.
e. Because it was difficult to differentiate between desert saltbush scrub and desert sink scrub on the photos, the GIS team determined a line separating the two communities based upon current distribution.
f. An additional classification called Mission Creek Floodplain was added, based upon an extensive area evident in the 1939 photo. Apparently, this was debris deposited by the hurricane event in 1938.

4. Because the 1939 aerial photographs were not georeferenced (georeferencing establishes the relationship between objects on a planar map and known real-world coordinates), the coverages were transformed into a 'real-world' view. This was accomplished by digitizing tic marks representing coordinates for the UTM projection (Universal Transverse Mercator) for each photo in its corresponding GIS coverage. In order to produce the most accurate transformation, a minimum of four tics were used. The tics were established by marking known locations, such as intersections of roads that existed in 1939. Then the UTM coordinates were identified on the current roads GIS coverage. When roads were not available, the GIS team used the intersection of section lines where the photos clearly showed the delineation of these lines. When possible, the tics were placed in four opposite corners in order to achieve the maximum dimensionality possible. When this was not possible, a rubber sheeting process was applied to bring a known area that was skewed back into alignment. For example, this process was used in the Deep Canyon area to correct the alignment of the desert dry wash woodland. Because the configuration of the canyon has not changed significantly since the 1930s, the GIS team was confident that they could make this correction with reasonable accuracy.

5. After the GIS coverages representing each photo had been transformed, the coverages were joined together into one seamless coverage. The GIS team ensured that all natural communities were labeled. The team then digitized a boundary coverage indicating the extent of the 1939 photos and incorporated this boundary into the historical natural communities coverage. The GIS team added an explanatory note to the map emphasizing historical natural community information applies only within this boundary. The statistics comparing the historical natural communities of 1939 with the natural communities present today are only for the area within this boundary in both cases.

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Table A3-6: Comparison of Historical and Current Distribution of Conserved Natural Communities[1]

NATURAL COMMUNITY	HISTORICAL DISTRIBUTION 1939 (Acres)	CURRENT DISTRIBUTION 1998 (Acres)[2]
ACTIVE DESERT DUNES	8,710	429
ACTIVE SHIELDED DESERT DUNES	0	94
ACTIVE DESERT SAND FIELDS	12,492	4,762
STABILIZED & PARTIALLY STABILIZED SAND FIELDS	23,849	3
STABILIZED SHIELDED DESERT SAND FIELDS	3,221	11,752
MESQUITE HUMMOCKS	8,309	870
SONORAN CREOSOTE BUSH SCRUB	48,955	20,259
SONORAN MIXED WOODY & SUCCULENT SCRUB	18,756	17,235
DESERT SALTBUSH SCRUB	47,910	8,373
DESERT SINK SCRUB	8,209	3,948
DESERT DRY WASH WOODLAND	5,102	3,714
TAMARISK SCRUB	0	1,924
URBAN	1,642	53,160
AGRICULTURE	26,277	84,480
LAKE	14,682	16,458
QUARRY	0	369
RESERVOIR	0	168
LANDFILL	0	8
MISSION CREEK FLOODPLAIN[3]	710	0

1 For a limited area as defined by the historical natural communities boundary, based on availability of 1939 aerial photos.

2 Additional natural communities not delineated on the historical natural communities map include desert fan palm oasis woodland, Sonoran cottonwood willow riparian forest, and freshwater marsh. These communities were likely present in 1939 but not discernable in photographs.

3 An extensive area evident in 1939 photo; apparently debris deposited by the hurricane event in 1938.

3.6 Species Habitat Distribution Modeling

3.6.1 Overview of the Modeling Process

The conservation planning methodology outlined for this Plan required the preparation of maps that indicate the occurrence and distribution of known locations, occupied habitat, and potential habitat for each covered species. These species distribution maps are predictions, based on the assumption that a species has a high probability of occurrence in appropriate habitats within its known range (Csuti 1994). The process of developing a species distribution model is considerably influenced by the available data for a given species.

There are inherent limitations in the use of ecological modeling. The processes that are being modeled are typically highly variable, and there is usually an incomplete understanding of these processes. Further, changing climatic conditions, difficulties in estimating abundance and movement rates, and lack of knowledge about the nature of functional relationships makes it difficult to accurately describe a particular system, such as a population of Palm Springs ground squirrels, or to predict its condition into the future. It is important to treat the model as a hypothesis or as a mathematical expression of one's provisional understanding of how a system might work, instead of as a prescription determining how it will look. Further verification, or testing, of the model needs to be done to gather more knowledge of the system being modeled and to gauge if it is an accurate predictor. Management, integrated with research and monitoring, assures that the information gathered is relevant to decision making. Used in this manner, models can be an important part of conservation planning (Conroy, 1997).

The species distribution models developed for this Plan can be described as spatially explicit conceptual models (Independent Science Advisors' Review, Noss et al. 2001). The models attempt to provide a picture of the connection between landscape patterns and species viability (Ruckelshaus et al. 1997). They are simple GIS overlays, based upon known occurrences of the species, literature surveys of habitat variables, and expert knowledge. The various accuracies and scales of the data that were incorporated into each model are also important to recognize.

The modeling process is not without shortcomings. One difficulty associated with this kind of model is that it usually predicts habitat 'potential' rather than occupancy or other observable phenomenon, so that verification of habitat may be problematic (Conroy, 1997). More sophisticated modeling techniques are available, each with their limitations. One example is the spatially explicit population model which can represent realistic behavior with parameters that reflect the mechanisms thought to be responsible for a species' being at risk in fragmented habitats. This type of model allows a landscape to be described in as much detail as a GIS database can support. However, it requires data that may not be available or that can be difficult to obtain, and there is a strong possibility that errors can be made in estimating parameters.

These errors may be so severe that the models become compromised as management tools (Ruckelshaus et al. 1997).

For most of the target species in this Plan, the data necessary for a more complex modeling effort with any degree of accuracy have not been collected. Data, such as population numbers necessary to maintain viability, the effects of roads as barriers, and other baseline habitat variables, were simply not available for many of the species. Given the limited available data, time, and funding provided for this Plan, the models developed are the best that could be produced, to satisfy an important component of the overall conservation planning effort. In keeping with the theory that each model is a 'hypothesis,' each needs to be tested for further knowledge and validity, and is subject to update. It is recognized that the adaptive management and monitoring process will play an integral role in the validation of the models. It may become possible, with the additional data, to move to a more complex modeling process and be able to combine this process into a unified population viability analysis framework, as recommended in the Independent Science Advisors' Review (Noss et al. 2001).

The habitat distribution maps were prepared in a stepwise process that involved continual input and feedback from the members of the SAC and other individuals with expertise or knowledge of a given species or taxonomic group.

For each covered species, a map indicating the location of known occurrences of the species was prepared. The sources used for these data, including CNDDB records, biological surveys completed for the Plan, environmental documents, museum records, published records, and consultation with biologists knowledgeable about a given species, are described in section 3.2. Known occurrences were mapped using the standards established by the California Natural Diversity Data Base (CNDDB). Each known occurrence is represented in the GIS database by a point. As the exact location of an observation or occurrence may not be known, some inaccuracies may be found on point maps. These points have varying degrees of mapping precision based on the original source of location information; they may include a circular area surrounding the point with a radius of 451.5 m (1,505 feet) for more precise locations, to 1,584 m (5,280 feet) for less precise locations (CNDDB 1992). The known occurrences describe locations where a given covered species has been observed or collected. These data do not, however, represent a systematic survey of all areas within the Plan boundary where a given species could be expected to occur. The absence of a record for a species in a given location does not necessarily indicate that the species does not occur there.

Maps of the known occurrences for each covered species were used to prepare models of the occupied and potential habitat for these species. The distribution of each covered species for which adequate information was available was delineated using known occurrences and habitat associations available from field survey data compiled for the Plan, literature review, other field surveys, and consultation with outside experts and the SAC.

Just as the absence of a record for a species in a given location does not necessarily indicate that the species does not occur there, conversely, the location of a species in an area that has not been identified as modeled habitat for that species does not necessarily negate the accuracy or credibility of that model. First, it is important to remember that all of the models reflect available data. Second, various situations may exist to account for the occurrence of known locations outside the modeled habitat.

The species that appear to be associated with sandy habitats, such as the Palm Springs pocket mouse and Coachella Valley giant sand treader cricket, each have a few known locations that do not occur on modeled habitat. A possible explanation is that there are additional sandy areas that were not mapped due to the minimum mapping unit, or were not visible on the aerial photography or the Landsat satellite imagery. In some cases soil data were not available for areas within the Plan boundary. So for example, the Palm Springs pocket mouse model shows some known locations in the vicinity of Thermal Canyon for which no soil data were available. All of the known locations for riparian birds may not be found on modeled habitat. Again, seeps or other riparian areas may not have been mapped due to minimum mapping limitations or because they were not visible on source documents. In the case of the Crissal thrasher, two known locations are documented where the habitat is now dominated by tamarisk, not the selected natural communities for this bird. However, the sightings may have been in the channel where the birds were dispersing in the saltbush areas between the dikes.

Other occurrences of species on apparently developed areas and not on modeled habitat may be accounted for by the fact that small patches of habitat may still persist in these areas, but due to the minimum mapping unit or lack of visibility on the source document, these areas were not mapped.

There are a few cases where it is recognized that the model needs to be refined. An example is the Mecca aster; however, due to a lack of necessary information, the model will need to stay ‘as is’ for now. In some modeled species, field checks may need to be done to confirm suitability of questioned habitat.

Known locations of species are an important part of the planning database, but it is also recognized that there are limitations associated with the use of these data. To prevent basing the long-range conservation plan on known locations alone, further systematic surveys will be done to identify all potential locations for a given species. As noted by the Independent Science Advisors (Noss et al. 2001) there is no substitute for systematic surveys to evaluate all likely locations for a species within a region. The species models are dynamic, subject to distribution changes over time, and as more data are gathered on given species, the models can be updated.

3.6.2 Parameters for Each Species Distribution Model

For each species, as much information as available was gathered on the following list of habitat parameters. At the same time individual data layers on each of these habitat parameters were incorporated in the GIS database:

Natural community associations. The natural communities map was used as the basis for the distribution of natural community associations used by each species. The list of natural communities included in a given species model was developed through consultation with individual experts and literature review.

Soils. The maps of the soils in the Soil Survey of Riverside County California, Coachella Valley Area, published by the USDA Soil Conservation Service and the University of California Agricultural Experiment Station (1974) were used. For the valley floor areas where species are strongly associated with sandy substrates, the soil survey maps were digitized from 7.5 minute quadrangles (1:24000) into a GIS data layer, which was used in the habitat models. For those species for which soil character was known to be significant, the mapped known locations were used to identify the relevant soil types. In some cases, recommendations from knowledgeable biologists on soil types for a given species model were used.

Sand source associations. Sand source and sand transport areas were digitized in a natural features GIS layer based on photo interpretation of satellite imagery, aerial photos, and field reconnaissance. These ecological process areas were shown as an overlay on models for those species for which they were deemed essential by knowledgeable biologists. In some cases, sand source maps were used in part to predict the occurrence of species associated with washes, as the washes often coincide with sand source areas.

Landforms associations. A map indicating the common landforms within the Coachella Valley area, prepared by the BLM-Desert District, was available to select landforms that would be utilized as habitat for a given species.

Topographic characteristics. Topographic characteristics of habitat, primarily occurrence above or below the toe of the slope, were also delineated. Habitat distribution models for species not known to occur in hillside or mountainous areas were limited by a GIS layer delineating the toe of slope.

Specific boundary/range limits. For some species whose known range was limited such that there was an absence of occurrences in areas initially modeled as habitat, range limits (east, west, north, south or other non-topographic limits) were imposed. These limits were imposed as boundaries delineated on topographic maps and digitized as part of the habitat model, or merely described and digitized by using known features already present in other GIS coverages.

Elevation limits. A review of the literature and supporting data from the species accounts and known occurrences was used to assign an elevation range for each species. Actual elevations were derived from Digital Elevation Model (DEM) data.

Other factors. Specific factors that were relevant to a given species were also incorporated in the model.

Field observations. Where review of the models by CDFG, USFWS, and the SAC resulted in questions about aspects of a model, field visits were made to assess the model's accuracy, and adjustments were made as necessary.

The habitat parameters were organized in table format for each species to prepare for the completion of the habitat distribution models. Once all of the appropriate habitat parameters were identified for a given species, a stepwise process of compiling GIS data layers was used to prepare the models. This process involved the selection of relevant data from GIS layers and the elimination of data that did not correspond to the model parameters (for example, elimination of areas above a prescribed elevation limit).

3.6.3 Species for Which No Model Was Developed

Insufficient data on its habitat parameters made it difficult to develop an acceptable model for the burrowing owl. This is a widely distributed species and occurs in a variety of habitat types below toe of slope. The habitat distribution map for this species shows known occurrences only.

3.6.4 Review and Validation of Species Distribution Models

At each step of the model development process, members of the SAC and other biologists with knowledge of a given species were consulted. Draft species distribution maps were prepared and reviewed by these individuals in a series of workshops hosted by the SAC. In September 1997, a workshop was held to receive input on draft species distribution models. The species habitat distribution maps used in the Site Identification process were developed to represent both the known and potential habitat for the covered species. In some cases, modifications were made to the models based on the recommendations of an individual scientist with expertise on a given species. Updates and corrections to the models continued to be made. In November 1999,

modifications to the models were made, based on input received from USFWS and CDFG biologists and the SAC. These updated models were submitted to the USFWS and CDFG as part of a review process in a report entitled "A Biological Analysis of Three Conservation Alternatives" (CVAG 2000). Additional recommendations for final modifications to the habitat distribution models were received in October 2000 from USFWS and CDFG biologists; habitat distribution models were revised again in January 2001. These modifications were made only after careful research and documentation was completed to support each recommendation.

To incorporate independent peer review of the species distribution models, knowledgeable individuals with expertise on one or more target species have been asked to review, critique, and sign a written endorsement of habitat distribution models for these species.

3.7 Site Identification Process

The Site Identification Mapping process entailed mapping and analyzing the biological data gathered for the planning process. The process involved creating a series of layers using GIS, assigning values to the mapped elements, and aggregating the values to identify sites of the highest conservation value in the Plan Area, emphasizing the Covered Species and conserved natural communities. These sites are the focal point for conservation measures to protect the Covered Species and conserved natural communities. Initially three iterations of mapping occurred at the SAC level, before presentation to the Project Advisory Group.

3.7.1 Iterative Site Identification Process

The Site Identification Process developed for this Plan was the result of an iterative process, including "test runs" to evaluate the effects of incorporating various ecological features in the analysis. As indicated previously, a "Reserve Design and Conservation Planning Workshop" was held in April 1998 to present a preliminary site selection and reserve design program to invited conservation biologists (Dr. Reed Noss, Dr. Michael Soulé, and Dr. Richard Tracy). At the workshop, the preliminary results of the first iteration site identification analysis described below were presented for review, discussion, and recommendations by conservation biology advisors and other attendees.

3.7.1.1 First Iteration of Site Identification Mapping: Quantitative GIS Analysis

The first iteration of Site Identification Mapping entailed a quantitative evaluation of the entire Plan Area using GIS. This GIS analysis was based on selection algorithms developed for this and other regional planning efforts, such as Northern and Eastern Colorado Desert Plan, at the BLM Desert District office in Riverside, California (Zmudka 1998). For comparative purposes, the

mapping was initially conducted with two different units of analysis. The units were: (1) a section (approximately 1 square mile or 640 acres), and (2) a quarter section (approximately 160 acres). After comparing the two sets of maps, the SAC determined that the quarter section analysis was more useful as it represented a higher degree of resolution. Further mapping was conducted only at the quarter section level, and only that level of mapping is described here.

In the development of this initial analysis, "test runs" were completed using mapped information on other ecological features, such as perennial water sources. The layers ultimately agreed upon by the SAC to prepare the first iteration Site Identification Maps are described below.

Covered Species Richness. This layer measures the relative importance of each mapping unit (quarter section) as habitat for the species for which coverage is sought in the Plan. A species richness value was assigned to each mapping unit based on the number of target species present in the unit as delineated by the species habitat distribution models and points of known occurrences for each species for which coverage is being sought. When aggregating the scores for the site identification map, a multiplier of two was applied to the scores in this layer to emphasize the relative importance of covered species richness as compared with other layers.

Conserved Natural Communities Richness. This layer measures the relative importance of each mapping unit for the conserved natural communities in the Plan. A natural community richness value was assigned to each mapping unit based on the number of natural communities present in the unit as delineated by the natural communities map. When aggregating the scores for the site identification map, it was intended that a multiplier of two be applied to the scores in this layer to emphasize its relative importance over the habitat heterogeneity and habitat fragmentation layers. A multiplier was not applied as the natural communities were effectively scored twice by virtue of adding in the habitat heterogeneity layer, which includes all natural community types.

Habitat Heterogeneity. This layer provides a measure of the relative value of each mapping unit in terms of overall biological diversity. A value for habitat heterogeneity was assigned to each mapping unit based on the number of natural communities and landform types in each mapping unit. The Scientific Advisory Committee recognized that these are but two elements of habitat heterogeneity, and that habitat heterogeneity may not be a good indicator of high quality habitat diversity, especially with small patch size. The scale values ranged from low (one to three natural community and landform "types") to high (more than 10 "types").

Habitat Fragmentation. This layer provides a measure of the degree to which the habitat value of each mapping unit may have been impacted by fragmentation. A value was assigned to each mapping unit based on the extent of habitat fragmentation from roads. Roads were divided into three categories based primarily on their width, including interstate highways (300 feet wide), major roads (50 feet wide), and minor roads (30 feet wide or less), including some dirt roads

(four-wheel drive roads, power-line roads). Each separate road was buffered to include an additional area of one-half the width of the road, on both sides of the road. Within each sample section (1/4 section) the percent of undisturbed habitat was used to assign a "fragmentation value", ranging from high (0 to 20% undisturbed) to low (81 to 100% undisturbed).

Each quarter section was assigned a value for each of the layers described above. Several different versions of this analysis were conducted for comparison purposes. One version was run with multipliers applied to the Covered Species Richness and Natural Communities Richness layers, and one without, to comparatively assess the effect of the multiplier. The SAC determined that the multipliers added due emphasis to the species and natural communities layers since these reflect a primary goal of the Plan, which is to provide for long-term conservation of the species and the natural communities conserved by the Plan. Another version was run with higher values, based on a vulnerability score assigned to endemic species, disjunct populations, highly vulnerable species (based on the level of existing protection for a given species), and highly vulnerable natural communities applied to the Covered Species Richness and Natural Communities Richness layers for comparative purposes. The SAC determined that these weightings should not be used since coverage was sought for species regardless of whether they were endemic, disjunct, or highly vulnerable.

To establish a standard classification system for each data layer in the site identification analysis, a program was written to classify the data by standard deviation from the mean (Zmudka 1998). Each quarter section was classified using a standard deviation multiplier of 0.35 (thirty-five one-hundredths of a standard deviation) to establish six classes: high, medium-high, medium, low medium, low, and N (little or no effect). Thus, for example, the medium (M) class includes values 0.35 of a standard deviation above and below the mean. Values were classified as having little or no effect if they were less than 100 meters for line features, 25 acres for area features, and 0 for point features.

Aggregation of the values from each of the above layers resulted in a map color-shaded to depict the relative conservation value of each mapping unit in the Plan Area. Relative conservation values were sorted into five categories from highest to lowest, with 25 as the maximum score. Mapping units with a score from 21 to 25 are shaded the darkest hue, deep red, and so on down to mapping units with the lowest scores from one to five, shaded a pale, dotted yellow. A "little or no effect" level, N, includes the mapping units that had no score or a statistically insignificant score. Habitat, based on known locations only, for endemic and near endemic species, and disjunct populations, was identified with diagonal line shading. This did not affect the score for any quarter section, but served to emphasize that these habitats were important even if they did not score high in overall species richness.

The layers and the aggregate value maps described in this section were used to develop the set of first iteration Site Identification Maps described in Section 3.7.1.2. An aggregate value map was developed for each of the site identification alternatives described in the following section.

3.7.1.2 First Iteration Site Identification Alternatives

The following set of first iteration Site Identification Maps was prepared to identify areas of high biological resource values based on an array of parameters. Some of the alternatives were included based on input from the Project Advisory Group for the Plan.

Site Identification Alternative 1. This alternative was created by selecting the highest three categories (aggregate scores 11-25) identified through the Initial Site Identification Mapping process. The lands selected through this process have the highest biological value for all Covered Species and conserved natural communities under the Plan.

Site Identification Alternative 2. This alternative was created by selecting all lands in the highest two categories (aggregate scores 16-25) identified through the Initial Site Identification Mapping process. As compared to Alternative 1, the lands selected for this alternative reflect a further narrowing of the lands with highest biological value for all the Covered Species and conserved natural communities under the Plan. The species and natural communities included in this alternative are the same as for *Site Identification Alternative 1*.

Site Identification Alternatives 3a and 3b. These alternatives were designed to cover only currently listed species, disjunct populations, and endemic and near endemic species, i.e. species whose complete range or the majority of whose range occurs in the Plan Area. Only the habitats of currently listed species, disjunct populations, and endemic and near endemic species, and the natural communities in which they occur, were considered in developing and assessing the Species Richness and Natural Communities Richness layers for the Initial Site Identification Mapping process. From the resulting map, the highest three categories were selected to comprise Alternative 3a, and the highest two categories comprise Alternative 3b.

Site Identification Alternatives 4a and 4b. These alternatives were designed to cover only currently listed species and the natural communities in which they are found. Only the habitats of currently listed species and the natural communities in which they occur were considered in developing and assessing the Species Richness and Natural Communities Richness layers for the Initial Site Identification Mapping process. From the resulting map, the highest three categories were selected to comprise Alternative 4a, and the highest two categories comprise Alternative 4b.

Site Identification Alternatives 5a and 5b. These alternatives were designed to cover only animal species. Plant species were not considered in that they do not always have the same status under the Endangered Species Act. Only the habitats of all animal species and the natural communities in which they occur were considered in developing and assessing the Species Richness and Natural Communities Richness layers for the Initial Site Identification Mapping process. From the resulting map, the highest three categories were selected to comprise Alternative 5a, and the highest two categories comprise Alternative 5b.

Site Identification Alternative 6. This alternative included only lands with conservation management status 1, 2, and 3. No new lands would be acquired, but existing public lands not now managed for species protection purposes would have new management prescriptions adopted to provide species and habitat protection. Coverage would be sought only for those species that would be adequately protected on public and private lands (e.g., the Center for Natural Lands Management) with active conservation management or on which agreements could be made with the management entities to include additional management prescriptions.

Site Identification Alternative 7. This alternative included only those lands that currently have conservation management status 1 and 2. Areas with conservation management status 1 and 2 include only those where a primary management goal is the protection of habitat values. Coverage would be sought only for those species that would be adequately protected on these public and private lands (e.g., the Center for Natural Lands Management). This alternative reflects the level of protection that would be afforded to the species and natural communities if no changes were made in existing management of public lands.

A map for each of the first iteration site identification alternatives is available for inspection at CVAG.

3.7.1.3 Second Iteration of Site Identification Mapping: Incorporation of Ecosystem Processes, Endemic Species, and Conservation Status

The first iteration Site Identification Maps were modified to incorporate significant features that could not readily be assigned a quantitative value or score. The first iteration maps were refined by the following process to produce a second iteration of maps:

1. For each alternative, an overlay of vital ecological and physical processes, such as sand source areas, was used to identify areas not identified in the Initial Site Identification Mapping process that are necessary to maintain the long-term viability of the high conservation value areas. This overlay was added to the map to indicate that maintaining these processes intact is essential in order to maintain the viability of the habitat areas for the species to be covered under the Plan. Two of the natural communities where ecological processes are no longer intact, active shielded desert dunes and stabilized

shielded sand fields, were excluded.

2. To ensure they receive adequate consideration in the Plan, known occurrences of endemic and near endemic species, and disjunct populations that did not occur within the areas identified by the Initial Site Identification Mapping process as having high overall biological value were highlighted on the map, with the color green. This was done to emphasize these species and populations even though their habitat may not score high using the general criteria of species richness, natural community richness, habitat heterogeneity, and lack of fragmentation.

3. All public and private lands with conservation management status 1, 2, and 3 were added, as these lands already have some conservation purpose and add to the Plan's overall conservation value.

4. All currently developed areas were removed, including areas mapped as urban, agricultural, rural, reservoir, quarry, and landfill.

The resulting second iteration Site Identification Maps represented a range of conservation alternatives based on a quantitative biological analysis conducted using GIS and modified by the addition of ecological and physical process areas and the inclusion of all public and private lands with a degree of conservation management. Statistics regarding the acres of land identified for each species and natural community on each map were also prepared to provide gross quantitative information about potential conservation of the species and communities.

At this point, the SAC compared all of the alternatives and determined that several were sufficiently similar as to warrant elimination of some of the alternatives. Alternatives 1, 2, 4b, 6, and 7 were retained. A map for each of the second iteration site identification alternatives is available for inspection at CVAG.

3.7.1.4 Third Iteration of Site Identification Mapping: Identification of Highest Conservation Value Areas

The second iteration of alternatives displayed on the preceding maps represented a range of approaches to conservation, from public lands only to various configurations of high value conservation lands. The purpose of the third iteration was to develop alternatives that were further refined to focus on the highest conservation value areas that would conserve all the target species and natural communities and reflect the actual "on the ground" situation in terms of topography, and other pertinent features such as roads, canals, and existing development. These alternatives combine the quantitative analysis of the first two iterations with a qualitative analysis by the SAC. The alternatives were developed as follows:

On the habitat distribution map for each species, the SAC identified Core Habitat areas, defined as "areas where natural processes that maintain habitat mosaic are still intact, and there is a lack of fragmentation such that populations are of sufficient size to allow long-term viability." For some species where the SAC was uncertain of the long-term viability of the habitat in some areas, the areas were identified as possible Core Habitat areas. Core Habitat areas for each species were prepared on Mylar overlays; these overlays were combined in a single Mylar overlay which included a perimeter incorporating all the areas identified as Core Habitat for each target species for which it was defined. The identification of Core Habitat was later refined by the SAC using the standards described in the key concepts discussion in Section 3.2.2.3. This Core Habitat process is addressed in the individual species conservation strategies in Section 9 in the Plan document.

The second iteration Site Identification map for each alternative listed in Section 3.7.1.2 was compared with the Mylar overlay of Core Habitat areas for all the species. The closest match was Site Identification Alternative 2, with the two highest aggregate scores from the first iteration. Areas on this Alternative that did not have value as either Core Habitat for the species included in the Plan, linkage and connecting corridor, or ecological and physical processes were deleted.

Aerial photos (primarily CVWD 1:1000 photos from 1998) were used to describe boundaries for the high conservation value areas identified in Alternative 2 that conformed to natural features such as ridges, alluvial fans, toe of slope, stream courses, etc., rather than the ¼-section line boundaries from the GIS analysis. In this process, the SAC and biologists from USFWS and CDFG made numerous field visits to various potential reserve sites to better evaluate and map these boundaries. The sand source and sand transport areas were more completely mapped after the initial mapping identified in the second iteration process described in Section 3.7.1.3; this revised ecological process mapping, including identification of important watershed features, was incorporated into the third iteration map. Through field visits and aerial photo analysis, potential habitat linkage and corridor areas were more accurately mapped and incorporated into the third iteration Site Identification map. The map was evaluated for adequate buffers to habitat and linkage areas; these buffer areas were included within all proposed conservation areas, where adequate undeveloped land was available for this purpose. Aerial photos were also used to exclude existing land uses, such as roads, levees, and developed areas.

During this phase of the site identification process, the Plan Area was divided into “subunits” to allow for evaluation at a finer scale; these subunits, including western, central, eastern, and Santa Rosa/San Jacinto Mountains portions of the Plan Area, were for discussion purposes only. The use of these subunits allowed the SAC, and the Project Advisory Committee, to focus on specific areas within the Plan boundary.

The SAC reviewed, made some adjustments to, and approved the third iteration Site

Identification map, which was designed to include a low acreage conservation alternative and a high acreage conservation alternative. The third iteration map identifies high value conservation areas that include: (1) Core Habitat areas that would be protected under a low acreage conservation alternative only; (2) additional habitat areas that would be protected under a high acreage conservation alternative; (3) essential ecological process areas; and (4) linkage areas. It should be noted that these categories describe the primary, rather than the exclusive, function of the land. For example, land in an ecological process area or a corridor may still have habitat value, but the primary value of the land is ecological process or connectivity rather than Core Habitat.

A map for each of the first iteration site identification alternatives is available for inspection at CVAG.

The high and low acreage conservation alternatives and the Existing Conservation Lands alternative were submitted to USFWS and CDFG for review along with a conservation analysis for each species and natural community (CVAG 1999). This reference document, titled "A Biological Analysis of Three Conservation Alternatives" is available at CVAG for inspection.

3.7.2 Development of Initial Conservation Alternatives

In their response to the alternatives and conservation analyses submitted to them for review in the "Biological Analysis of Three Conservation Alternatives" (CVAG 1999), USFWS and CDFG identified additional areas that they believed should be considered by the SAC for inclusion in Conservation Areas. The SAC subsequently evaluated the additional areas suggested for consideration by USFWS and CDFG. The SAC's evaluation led to the development of a new alternative, referred to as the Core Habitat, Essential Ecological Processes, and Linkages alternative. In Section 3.7.2.2, this is presented as Initial Alternative 2. Initial Alternative 1 includes the existing public lands and private conservation lands alternative. Initial Alternative 3 is the former high conservation acreage alternative with the addition of those areas that USFWS and CDFG recommended to the SAC for consideration.

3.7.2.1 Initial Conservation Alternative 1

This alternative would include all local, state, private conservation, and federal agency lands in the Plan Area with conservation management status 1, 2, and 3 (see Section 2.4 in the Plan document for a description of these categories). This alternative would also include private conservation lands that have habitat for the species included in the Plan or have one of the conserved natural communities included in the Plan. No new areas would be acquired for Plan purposes. The local jurisdictions would contribute to the management of the existing conservation areas as mitigation for the habitat loss allowed under the Plan.

This alternative is depicted in Figure A3-2. Substantial areas would be protected in the mountainous portions of the Plan Area: the San Gorgonio wilderness and Whitewater Canyon ACEC in the San Bernardino Mountains; Mission Creek west of Highway 62, Morongo Canyon ACEC, and Joshua Tree National Park, in the Little San Bernardino Mountains; the Coachella Valley Fringe-toed Lizard Preserve in the Indio Hills; the Mecca Hills wilderness in the Mecca Hills; the Orocopia Mountains wilderness in the Orocopia Mountains; the Santa Rosa Mountains wilderness, Deep Canyon Desert Research Center, Hidden Palms Ecological Reserve, Carrizo Canyon Ecological Reserve, Magnesia Springs Ecological Reserve and portions of the new Santa Rosa and San Jacinto Mountains National Monument in the Santa Rosa Mountains; and portions of the Santa Rosa and San Jacinto Mountains National Monument, the San Jacinto wilderness, Mount San Jacinto State Park, and Oasis de los Osos in the San Jacinto Mountains. Some of these areas are well protected, but habitat fragmentation is a problem in other areas where considerable private lands still exist. On the valley floor, the only significant conservation areas would be the three existing Coachella Valley fringe-toed lizard preserves and Dos Palmas ACEC. The sand sources for the Coachella Valley fringe-toed lizard preserves are not adequately protected, and, collectively, the valley floor preserves do not provide adequate habitat for most of the species proposed for coverage.

Tables 3-7 and 3-8 identify the number of acres that would be protected for each species and natural community under this alternative. Because this alternative entails no land acquisition, only Core Habitats, essential ecological processes, and linkages that happen to be on existing public lands or private conservation lands would be protected. As a result, sand transport, watershed, and other ecological processes are not well protected and linkages are not maintained between major habitat areas. Core Habitat is often fragmented or occurs in small blocks. As a result, it is not expected that USFWS and CDFG would issue incidental take permits for most of the Covered Species proposed for inclusion in the Plan. By not securing incidental take permits for the majority of the species proposed for coverage, this alternative would not be expected to achieve the Plan objectives.

Table A3-7: Conservation of Species, Initial Alternative 1

SPECIES	**TOTAL ACRES OF HABITAT IN PLAN AREA**	**INITIAL ALTERNATIVE 1: EXISTING CONSERVATION LANDS**		
		LEVELS[1] 1 & 2 (%[2])	LEVEL [1] 3 (%[2])	TOTAL ALTERNATIVE 1[3]
ARROYO TOAD [4,5]	1	0 (0%)	0 (0%)	0 (0%)
BURROWING OWL [4,5]	40	10 (25%)	8 (20%)	18 (45%)
CALIFORNIA BLACK RAIL	1,331	384 (29%)	140 (11%)	524 (40%)
CASEY'S JUNE BEETLE	797	21 (3%)	0 (0%)	21 (3%)
COACHELLA VALLEY GIANT SAND TREADER CRICKET	23,015	3,813 (17%)	1,926 (8%)	5,739 (25%)
COACHELLA VALLEY GRASSHOPPER [4,5]	17	7 (41%)	0 (0%)	7 (41%)
COACHELLA VALLEY JERUSALEM CRICKET [4,5]	14	0 (0%)	4 (29%)	4 (29%)
COACHELLA VALLEY MILK VETCH	57,212	5,950 (10%)	3,930 (7%)	9,880 (17%)
CRISSAL THRASHER	8,932	746 (8%)	108 (1%)	854 (9%)
DESERT PUPFISH	0.15	0.04 (27%)	0.01 (7%)	0.05 (34%)
DESERT SLENDER SALAMANDER	325	325 (100%)	0	325 (100%)
DESERT TORTOISE	489,815	249,970 (51%)	69,008 (14%)	318,978 (65%)
FLAT-TAILED HORNED LIZARD	28,907	5,804 (20%)	1,185 (4%)	6,989 (24%)
GRAY VIREO	104,112	70,057 (67%)	22,764 (22%)	92,821 (79%)
LEAST BELL'S VIREO	63,551	13,981 (22%)	13,827 (22%)	27,808 (44%)
LE CONTE'S THRASHER [4,5]	26	5 (19%)	3 (12%)	8 (31%)
LITTLE SAN BERNARDINO MOUNTAINS GILIA [4,5]	52	3 (6%)	0 (0%)	3 (6%)
MECCA ASTER	29,531	15,245 (52%)	4,367 (15%)	19,612 (67%)
OROCOPIA SAGE	79,024	34,147 (43%)	16,597 (21%)	50,744 (64%)
PALM SPRINGS (CV) ROUND-TAILED GROUND SQUIRREL	106,636	10,697 (10%)	9,009 (8%)	19,706 (18%)
PALM SPRINGS POCKET MOUSE	145,173	15,154 (10%)	14,572 (10%)	29,726 (20%)

Table A3-7: (cont.) Conservation of Species, Initial Alternative 1

SPECIES	**TOTAL ACRES OF HABITAT IN PLAN AREA**	**INITIAL ALTERNATIVE 1: EXISTING CONSERVATION LANDS**		
		LEVELS[1] 1 & 2 (%[2])	LEVEL [1] 3 (%[2])	TOTAL ALTERNATIVE 1[3]
PENINSULAR BIGHORN SHEEP	127,767	80,046 (63%)	3,579 (3%)	83,625 (66%)
PRATT'S BLUE BUTTERFLY [4,5]	1	0 (0%)	1	1 (100%)
SOUTHERN YELLOW BAT	1,356	540 (40%)	123 (9%)	663 (49%)
SOUTHWESTERN WILLOW FLYCATCHER	62,992	13,731 (22%)	13,814 (22%)	27,545 (44%)
SUMMER TANAGER	62,072	13,138 (21%)	13,679 (22%)	26,817 (43%)
TRIPLE-RIBBED MILK VETCH [4,5]	34	25 (74%)	4 (12%)	29 (86%)
YELLOW-BREASTED CHAT	63,145	13,196 (21%)	13,687 (22%)	26,883 (43%)
YELLOW WARBLER	63,388	13,801 (22%)	13,821 (22%)	27,622 (44%)
YUMA CLAPPER RAIL	2,375	449 (19%)	57 (2%)	506 (21%)

[1] Indicates number of acres for conservation management levels, as described in Section 2.5, on public and private conservation lands. Levels one and two are combined and level three is shown separately.

[2] Numbers given in parentheses indicate acres within each conservation level, or combination of conservation levels, as a percentage of total acres of habitat for each species in the Plan area.

[3] Indicates total of levels one, two and three; the numbers in parenthesis indicates the acres in Alternative 1 as a percentage of the total acres of habitat for each species in the Plan area.

[4] No species distribution model was prepared for this species. The number given is the total number of known locations within the entire Plan area or within the boundaries of each alternative. For each species and alternative, the number of known locations is underlined.

[5] Percentages given indicate known locations conserved as a percentage of total known locations in the Plan Area.

Table A3-8: Conservation of Natural Communities, Initial Alternative 1

NATURAL COMMUNITY	TOTAL ACRES IN PLAN AREA	INITIAL ALTERNATIVE 1: EXISTING CONSERVATION LANDS		
		LEVELS[1] 1 & 2 (%[2])	LEVEL[1] 3 (%[2])	TOTAL ALTERNATIVE 1[3]
ACTIVE DESERT DUNES	561	434 (77%)	52 (9%)	486 (86%)
STABILIZED & PARTIALLY STABILIZED DESERT DUNES	192	21 (11%)	0	21 (11%)
ACTIVE DESERT SAND FIELDS	5,016	2,306 (46%)	57 (1%)	2,363 (47%)
STABILIZED & PARTIALLY STABILIZED SAND FIELDS	1,332	112 (8%)	183 (14%)	295 (22%)
EPHEMERAL DESERT SAND FIELDS	4,598	884 (19%)	1,110 (24%)	1,994 (43%)
STABILIZED SHIELDED SAND FIELDS	14,528	434 (3%)	867 (6%)	1,301 (9%)
MESQUITE HUMMOCKS	1,035	122 (12%)	3 (0.3%)	125 (12%)
SONORAN CREOSOTE BUSH SCRUB	405,785	191,050 (47%)	60,471 (15%)	251,521 (62%)
SONORAN MIXED WOODY & SUCCULENT SCRUB	136,017	71,995 (53%)	5,282 (4%)	77,277 (57%)
MOJAVE MIXED WOODY SCRUB	104,214	67,335 (65%)	9,073 (9%)	76,408 (74%)
DESERT SALTBUSH SCRUB	5,572	80 (1%)	0	80 (1%)
DESERT SINK SCRUB	9,740	2,257 (23%)	546 (6%)	2,803 (29%)
SOUTHERN ARROYO WILLOW RIPARIAN FOREST	117	101 (86%)	0	101 (86%)
SONORAN COTTONWOOD WILLOW RIPARIAN FOREST	1,180	394 (33%)	28 (2%)	422 (35%)
SOUTHERN SYCAMORE-ALDER RIPARIAN WOODLAND	669	498 (74%)	15 (2%)	513 (86%)
COASTAL AND VALLEY FRESHWATER MARSH	64	0	1 (2%)	1 (2%)
CISMONTANE ALKALI MARSH	321	247 (77%)	11 (3%)	258 (80%
DESERT DRY WASH WOODLAND	40,551	8,245 (20%)	12,936 (32%)	21,181 (52%)
DESERT FAN PALM OASIS	1,355	539 (40%)	123 (9%)	662 (49%)
ARROWWEED SCRUB	277	137 (49%)	7 (3%)	144 (52%)
MESQUITE BOSQUE	481	154 (32%)	0	154 (32%)
SEMI-DESERT CHAPARRAL	22,619	15,377 (68%)	5,031 (22%)	20,408 (90%)
CHAMISE CHAPARRAL	2,794	2,229 (80%)	0	2,229 (80%)
REDSHANK CHAPARRAL	13,282	279 (2%)	9,760 (73%)	10,039 (75%)
PENINSULAR JUNIPER WOODLAND & SCRUB	37,545	24,022 (64%)	7,973 (21%)	31,995 (85%)
MOJAVEAN PINYON-JUNIPER WOODLAND	30,666	30,380 (99%)	0	30,380 (99%)

[1] Indicates number of acres for conservation management levels, as described in Section 2.5, on public and private conservation lands. Levels one and two are combined and level three is shown separately.

[2] Numbers given in parentheses indicate acres within each conservation level, or combination of conservation levels, as a percentage of total acres of each natural community in the Plan Area.

[3] Indicates total of levels one, two and three; the numbers in parenthesis indicates the acres in Alternative 1 as a percentage of the total acres of each natural community in the Plan Area.

3.7.2.2 Initial Conservation Alternative 2

This alternative would establish conservation areas that protect Core Habitat for the Covered Species and conserved natural communities included in the Plan, ecological processes necessary to sustain these habitats, and linkages. The conservation areas include the Alternative 1 lands as well as private lands essential for Core Habitat, ecological processes, and linkages. New management prescriptions are proposed for the existing public and private conservation lands where needed. Private lands would be protected through the implementation program, by means of acquisition, general plan policies, ordinances, and other planning tools. Conservation biology principles were used in preserve design to assure long-term viability and adequate conservation for the Covered Species and conserved natural communities. These principles are:

1. Species well distributed across their native range are less susceptible to extinction than species confined to small portions of their range.
2. Large blocks of habitat, containing large populations, are better than small blocks with small populations.
3. Blocks of habitat close together are better than blocks far apart.
4. Habitat in contiguous blocks is better than fragmented habitat.
5. Interconnected blocks of habitat are better than isolated blocks.
6. Blocks of habitat that are roadless or less accessible to humans are better than roaded and accessible habitat blocks.

This conservation area alternative is depicted in Figure A3-3. This alternative would protect private lands in the mountains necessary to avoid habitat fragmentation, protect essential ecological processes, and maintain linkages. On the valley floor, this alternative would build on the existing Coachella Valley fringe-toed lizard preserves and Dos Palmas ACEC by adding adjacent habitat for the Covered Species and conserved natural communities included in the Plan, protecting the essential ecological processes that maintain the habitat areas, and protecting linkages between the major mountains ranges. In addition, this alternative would create new preserve areas in the Snow Creek area, east of Highway 62 along Mission Creek and Morongo Wash, and at the Whitewater River delta at the northwest end of the Salton Sea.

Tables 3-9 and 3-10 identify the number of acres that would be protected for each species and natural community under this alternative.

Table A3-9: Conservation of Species, Initial Alternative 2

SPECIES	**TOTAL ACRES OF HABITAT IN PLAN AREA**	**INITIAL ALTERNATIVE 2: CORE HABITAT, ECOSYSTEM PROCESSES & LINKAGES**	
		ACRES[1]	% OF TOTAL[2]
ARROYO TOAD [3,4]	1	1	100
BURROWING OWL [3,4]	40	28	70
CALIFORNIA BLACK RAIL	1,331	1,221	92
CASEY'S JUNE BEETLE	797	328	41
COACHELLA VALLEY GIANT SAND TREADER CRICKET	23,015	8,904	39
COACHELLA VALLEY GRASSHOPPER [3,4]	17	11	65
COACHELLA VALLEY JERUSALEM CRICKET [3,4]	14	9	64
COACHELLA VALLEY MILK VETCH	57,212	21,979	38
CRISSAL THRASHER	8,932	3,173	36
DESERT PUPFISH	0.15	0.06	40
DESERT SLENDER SALAMANDER	325	325	100
DESERT TORTOISE	489,815	432,413	88
FLAT-TAILED HORNED LIZARD	28,907	12,729	44
GRAY VIREO	104,112	91,092	87
LEAST BELL'S VIREO	63,551	48,238	76
LE CONTE'S THRASHER [3,4]	26	14	54
LITTLE SAN BERNARDINO MOUNTAINS GILIA [3,4]	52	51	98
MECCA ASTER	29,531	21,060	71
OROCOPIA SAGE	79,024	69,811	88
PALM SPRINGS (CV) ROUND-TAILED GROUND SQUIRREL	106,636	36,513	34
PALM SPRINGS POCKET MOUSE	145,173	58,194	40

Table A3-9: (cont.) Conservation of Species, Initial Alternative 2

SPECIES	**TOTAL ACRES OF HABITAT IN PLAN AREA**	**INITIAL ALTERNATIVE 2: CORE HABITAT, ECOSYSTEM PROCESSES & LINKAGES**	
		ACRES [1]	% OF TOTAL[2]
PENINSULAR BIGHORN SHEEP	127,767	126,978	99
PRATT'S BLUE BUTTERFLY [3,4]	2	2	100
SOUTHERN YELLOW BAT	1,356	1,330	98
SOUTHWESTERN WILLOW FLYCATCHER	62,992	47,852	76
SUMMER TANAGER	62,072	46,919	76
TRIPLE-RIBBED MILK VETCH [3,4]	34	25	74
YELLOW-BREASTED CHAT	63,145	47,980	76
YELLOW WARBLER	63,388	47,248	76
YUMA CLAPPER RAIL	2,375	1,552	65

[1] Indicates number of acres of habitat for each species within the boundaries of Alternative 2, or number of known locations (underlined) for species with no habitat distribution model.

[2] Numbers given indicate acres of habitat within Alternative 2, as a percentage of total acres of habitat for each species in the Plan Area.

[3] No species distribution model was prepared for this species. The number given is the total number of known locations within the entire Plan area or within the boundaries of each alternative. For each species and alternative, the number of known locations is underlined.

[4] Percentages given indicate known locations conserved as a percentage of total known locations in the Plan Area.

Table A3-10: Conservation of Natural Communities, Initial Alternative 2

NATURAL COMMUNITY	TOTAL ACRES OF COMMUNITY IN PLAN AREA	INITIAL ALTERNATIVE 2: CORE HABITAT, ECOSYSTEM PROCESSES & LINKAGES	
		ACRES[1]	% OF TOTAL[2]
ACTIVE DESERT DUNES	561	547	98
STABILIZED & PARTIALLY STABILIZED DESERT DUNES	192	192	100
ACTIVE DESERT SAND FIELDS	5,016	3,749	75
STABILIZED & PARTIALLY STABILIZED SAND FIELDS	1,332	415	31
EPHEMERAL DESERT SAND FIELDS	4,598	3,806	83
STABILIZED SHIELDED DESERT SAND FIELDS	14,528	1,573	11
MESQUITE HUMMOCKS	1,035	327	32
SONORAN CREOSOTE BUSH SCRUB	405,785	319,031	79
SONORAN MIXED WOODY & SUCCULENT SCRUB	136,017	99,798	73
MOJAVE MIXED WOODY SCRUB	104,214	86,005	83
DESERT SALTBUSH SCRUB	5,572	1,370	25
DESERT SINK SCRUB	9,740	8,876	91
SOUTHERN ARROYO WILLOW RIPARIAN FOREST	117	117	100
SONORAN COTTONWOOD WILLOW RIPARIAN FOREST	1,180	1,166	99
SOUTHERN SYCAMORE-ALDER RIPARIAN WOODLAND	669	669	100
COASTAL AND VALLEY FRESHWATER	64	61	95
CISMONTANE ALKALI MARSH	321	321	100
DESERT DRY WASH WOODLAND	40,551	31,530	78
DESERT FAN PALM OASIS WOODLAND	1,355	1,329	98
ARROWWEED SCRUB	277	267	96
MESQUITE BOSQUE	481	481	100
SEMI-DESERT CHAPARRAL	22,619	9,785	43
CHAMISE CHAPARRAL	2,794	2,376	85
REDSHANK CHAPARRAL	13,282	13,230	99.6
PENINSULAR JUNIPER WOODLAND & SCRUB	37,545	37,411	99.7
MOJAVEAN PINYON-JUNIPER WOODLAND	30,666	30,666	100

[1] Indicates number of acres of each natural community within the boundaries of Alternative 2.

[2] Numbers given indicate acres within Alternative 2, as a percentage of total acres of each natural community in the Plan Area.

3.7.2.2 Initial Conservation Alternative 3

This alternative would expand Alternative 2 by including the high conservation acreage alternative areas and additional areas that were recommended for further consideration by USFWS and CDFG in their response to the third iteration of Site Identification Maps. Figure A3-3 depicts this alternative.

Tables 3-11 and 3-12 identify the number of acres that would be protected for each species and natural community under this alternative.

Table A3-11: Conservation of Species, Initial Alternative 3

SPECIES	TOTAL ACRES OF HABITAT IN PLAN AREA	INITIAL ALTERNATIVE 3: ENHANCED CONSERVATION	
		ACRES [1]	% OF TOTAL[2]
ARROYO TOAD [3,4]	1	1	100
BURROWING OWL [3,4]	40	30	75
CALIFORNIA BLACK RAIL	1,331	1,221	92
CASEY'S JUNE BEETLE	797	328	41
COACHELLA VALLEY GIANT SAND TREADER CRICKET	23,015	15,149	66
COACHELLA VALLEY GRASSHOPPER [3,4]	17	15	88
COACHELLA VALLEY JERUSALEM CRICKET [3,4]	14	13	93
COACHELLA VALLEY MILK VETCH	57,212	35,926	63
CRISSAL THRASHER	8,932	3,382	38
DESERT PUPFISH	0.15	0.06	40
DESERT SLENDER SALAMANDER	325	325	100
DESERT TORTOISE	489,815	445,169	91
FLAT-TAILED HORNED LIZARD	28,907	18,888	65
GRAY VIREO	104,112	91,234	88
LEAST BELL'S VIREO	63,551	53,673	84
LE CONTE'S THRASHER [3,4]	26	16	62
LITTLE SAN BERNARDINO MOUNTAINS GILIA [3,4]	52	52	100
MECCA ASTER	29,531	28,548	97
OROCOPIA SAGE	79,024	78,364	99
PALM SPRINGS (CV) ROUND-TAILED GROUND SQUIRREL	106,636	65,500	61
PALM SPRINGS POCKET MOUSE	145,173	97,001	67

Table A3-11: (Cont.) Conservation of Species, Initial Alternative 3

SPECIES	**TOTAL ACRES OF HABITAT IN PLAN AREA**	**INITIAL ALTERNATIVE 3: ENHANCED CONSERVATION**	
		ACRES [1]	% OF TOTAL[2]
PENINSULAR BIGHORN SHEEP	127,767	126,978	100
PRATT'S BLUE BUTTERFLY [3,4]	2	2	100
SOUTHERN YELLOW BAT	1,356	1,330	100
SOUTHWESTERN WILLOW FLYCATCHER	62,992	47,852	85
SUMMER TANAGER	62,072	46,919	84
TRIPLE-RIBBED MILK VETCH [3,4]	34	25	74
YELLOW-BREASTED CHAT	63,145	47,980	83
YELLOW WARBLER	63,388	47,248	85
YUMA CLAPPER RAIL	2,375	1,552	65

[1] Indicates number of acres of habitat for each species, or the number of known locations, within the boundaries of Alternative 3.

[2] Numbers given indicate acres within Alternative 3, as a percentage of total acres of habitat for each species in the Plan Area.

[3] No species distribution model was prepared for this species. The number given is the total number of known locations within the entire Plan area or within the boundaries of each alternative. For each species and alternative, the number of known locations is underlined.

[4] Percentages given indicate known locations conserved as a percentage of total known locations in the Plan Area.

Table A3-12: Conservation of Natural Communities, Initial Alternative 3

NATURAL COMMUNITY	TOTAL ACRES OF COMMUNITY IN PLAN AREA	INITIAL ALTERNATIVE 3: ENHANCED CONSERVATION	
		ACRES[1]	% OF TOTAL[2]
ACTIVE DESERT DUNES	561	552	98
STABILIZED & PARTIALLY STABILIZED DESERT DUNES	192	192	100
ACTIVE DESERT SAND FIELDS	5,016	4,670	93
STABILIZED & PARTIALLY STABILIZED SAND FIELDS	1,332	1,319	99
EPHEMERAL DESERT SAND FIELDS	4,598	4,225	92
STABILIZED SHIELDED SAND FIELDS	14,528	6,466	45
MESQUITE HUMMOCKS	1,035	520	50
SONORAN CREOSOTE BUSH SCRUB	405,785	349,938	86
SONORAN MIXED WOODY & SUCCULENT SCRUB	136,017	109,955	81
MOJAVE MIXED WOODY SCRUB	104,214	88,740	85
DESERT SALTBUSH SCRUB	5,572	1,386	25
DESERT SINK SCRUB	9,740	8,876	91
SOUTHERN ARROYO WILLOW RIPARIAN FOREST	117	117	100
SONORAN COTTONWOOD WILLOW RIPARIAN FOREST	1,180	1,171	99
SOUTHERN SYCAMORE-ALDER RIPARIAN WOODLAND	669	669	100
COASTAL AND VALLEY FRESHWATER MARSH	64	61	95
CISMONTANE ALKALI MARSH	321	321	100
DESERT DRY WASH WOODLAND	40,551	36,681	90
DESERT FAN PALM OASIS WOODLAND	1,355	1,352	99.8
ARROWWEED SCRUB	277	267	96
MESQUITE BOSQUE	481	481	100
SEMI-DESERT CHAPARRAL	22,619	9,785	43
CHAMISE CHAPARRAL	2,794	2,376	85
REDSHANK CHAPARRAL	13,282	13,239	100
PENINSULAR JUNIPER WOODLAND & SCRUB	37,545	37,545	100
MOJAVEAN PINYON-JUNIPER WOODLAND	30,666	30,666	100

[1] Indicates number of acres of each natural community within the boundaries of Alternative 3.

[2] Numbers given indicate acres within Alternative 3, as a percentage of total acres of each natural community in the Plan Area.

3.7.3 Evaluation of Initial Conservation Alternatives

The SAC evaluated the three conservation alternatives described in Section 3.7.2 using the following measures of adequacy.

1. **Size of habitat patches**. For each Covered Species, the SAC assessed whether a Conservation Area provided Core Habitat. The Core Habitat concept was not applied to species that were considered to occur as metapopulations; these are burrowing owl, Le Conte's thrasher, Yuma clapper rail, California black rail, the riparian bird species, and southern yellow bat. A Conservation Area was not deemed inadequate because of the lack of Core Habitat for these species. The concept of Core Habitat was not used with natural communities.

2. **The number of Core Habitat areas protected in Conservation Areas for each Covered Species**. Where possible, the SAC sought to conserve a minimum of three Core Habitat areas for each Covered Species. In some cases, more than three Core Habitat areas for a Covered Species occurred in the Conservation Areas. In other instances, fewer than three Core Habitat areas for a Covered Species occurred in the Plan Area.

3. **Representative range of environmental conditions, including temperature, moisture, and elevation gradients, under which the species or natural community occurs in a viable population**. For each Covered Species, the SAC assessed whether the Conservation Areas included Other Conserved Habitat that provided for the conservation of the range of environmental conditions in which the species occurs in the Plan Area.

4. **Essential Ecological Processes**. These could include hydrological processes (both subsurface and surface), blowsand movement, erosion, deposition, substrate development, soil formation, and biological processes such as reproduction, pollination, dispersal, and migration. The SAC assessed the Conservation Areas to evaluate whether the Essential Ecological Processes necessary to sustain the Covered Species' habitats and conserved natural communities present were included in the Conservation Areas.

5. **Biological Corridors and Linkages**. For each Covered Species, the SAC assessed whether connectivity of the population in each Conservation Area was maintained with populations in other Conservation Areas and to populations outside the Plan Area to the maximum extent feasible.

The tables in Section 9 in the Plan document show the extent to which the Conservation Areas in the Preferred Alternative, which evolved from the Conservation Alternative 2 developed by the SAC at this stage of the process, contain Core Habitat (and how many Core Habitat areas) and

Other Conserved Habitat. The Conservation Analysis for each Covered Species in Section 9 in the Plan document describes the protection of Essential Ecological Processes in the Conservation Areas and the Biological Corridors and Linkages between Conservation Areas that are protected.

The SAC concluded that Conservation Alternative 1 did not satisfy the above criteria for the Covered Species and conserved natural communities because of the degree of fragmentation in the Existing Covered Lands and the lack of protection of Essential Ecological Processes and Biological Corridors and Linkages. The SAC also concluded that Conservation Alternative 3 provided the same benefits as Conservation Alternative 2, included some potentially useful additional areas, and included some additional areas that did not appear to meet the criteria. Section 3.7.4 describes the process used to develop the Preferred Alternative.

3.7.3.1 Statistical Analysis of Alternatives

The basic steps in the statistical analysis involved the preparation of various map layers including the natural communities (vegetation) map and species habitat distribution maps, and comparison of these maps with additional map layers that contain land management and ownership information. This process essentially creates the opportunity for comparison between the habitat distribution map for a given species or each natural community and the map for a given Site Identification Alternative or conservation alternative in order to evaluate the amount of area where they coincide. This information is used to identify the relative level of conservation for each Covered Species and natural community under the different alternatives.

Initially, a statistical analysis was carried out to evaluate the level of protection afforded each Covered Species and natural community for each of the site identification alternatives identified in Section 3.7.1 (site identification alternatives 1, 2, 4b, 6, 7). Subsequently, a statistical analysis was conducted of Alternatives 1, 2, and 3 as described in Section 3.7.2. For each alternative, the number of acres included within it for each species and natural community is expressed as a percent of the total acres of habitat. The results of the statistical analyses for the three Conservation Alternatives considered in the Plan are shown in the tables in Sections 3.7.2.1, 3.7.2.2, and 3.7.2.3.

3.7.3.2 Administrative Review Draft

An Administrative Review Draft was distributed to the Wildlife Agencies and all other signatories to the Planning Agreement in August 2000. This Administrative Review Draft, while not a complete MSHCP, included a discussion of the site identification and reserve design process, the three initial conservation alternatives described in Section 3.7.2, the proposed conservation plan, summary conservation strategies for all Covered Species and conserved natural communities, and a preliminary discussion of the implementation program. This draft

provided an additional opportunity for the jurisdictions and the Wildlife Agencies to provide input into the development of the Plan. This reference document is available for review at CVAG's office.

3.7.3.3 SITES Model

Based on the recommendations of the ISA after their review of the January 2001 Administrative Review Draft, the SITES model (SITES V.1.0: An Analytical Toolbox for Designing Ecoregional Conservation Portfolios, The Nature Conservancy) was used to complete an analysis of the reserve design for the MSHCP. SITES V.1.0 runs on an Arcview GIS 3.2 platform. It uses a heuristic method to choose a reserve system or "conservation portfolio" from a larger set of "planning units" within an ecoregion. Given a set of goals (number of species or amount of habitat to protect) for an ecoregion, it uses a process termed Simulated Annealing to choose an optimal reserve design. In all cases the "optimum" reserve is the solution that protects the greatest number of species/habitats using the smallest land area. The simulated annealing process chooses an initial random selection of planning units and then determines how well they accomplish the stated conservation goals in the form of model parameters. The program then randomly adds and subtracts planning units for 1,000,000 iterations, checking each solution against specified parameters. Planning units that add to the goals are retained while planning units that detract are removed. The strength of this program is its non-linear structure, which prevents formation of local optima, intermediate solutions that contribute greatly early in the iterative process but force a less than optimal final solution. As the program runs, it becomes more and more selective, incorporating only those planning units that add to the designated goals. Because the program randomly selects a different group of planning units at the beginning of each run, it could choose somewhat different results for the same data set. SITES V. 1.0 is designed to run the same data set 10 times and presents the solution that comes closest to the provided goals; how often a particular parcel of land is chosen provides a good indication of its value within the preserve's design constraints. Using the SITES V. 1.0 program, a reserve design very similar to the Preferred Alternative was selected. Observed differences were minor, and primarily appeared related to the scale the program chose for planning units; high-priority vegetation types were selected preferentially even if they were only a small portion of the planning unit; i.e. an entire section (640 acres) was chosen when only a few acres of the desired vegetation type occurred in the section. This evaluation is described in a report from the University of California, Riverside, Center for Conservation Biology (Allen et al. 2002) which is available from CVAG.

3.7.4 Development of Draft Preferred Alternative

The three conservation alternatives were reviewed by the ISA in 2001, resulting in preparation of a report titled "Independent Science Advisors' Review: Coachella Valley Multiple Species

Habitat Conservation Plan/Natural Communities Conservation Plan (MSHCP/NCCP)". In addition, in 2002 a preliminary draft of a study titled Long-term Sand Supply to Coachella Valley Fringe-toed Lizard (*Uma inornata*) Habitat in the Northern Coachella Valley, California (United States Geological Survey, 2002) was made available to the SAC. In response to the ISA report and additional information provided by the USGS study, the SAC analyzed additional areas for potential inclusion in the Conservation Areas. This analysis included review of the additional information provided, field visits, and meetings with other biologists. Based on this analysis, the SAC recommended addition of some areas to Conservation Alternative 2 and a new conservation alternative was developed for further discussion. This alternative was discussed in a series of meetings among CDFG, USFWS, CVAG staff, and local jurisdictions to obtain additional information, including biological and land use information. Through this process, the SAC's revised conservation alternative was further revised. In no case were the resulting Conservation Area boundaries less than those recommended by the SAC. The result was the preferred conservation alternative presented in Section 4 of the Plan document.

3.8 Species Considered but Not Included in the Plan

3.8.1 Review of Species Identified in the Original MOU

The original Planning Agreement among the local, state, and federal agencies comprising the Plan participants identified 52 species to be considered for inclusion in the Plan and identified all the natural communities in the Plan Area. This original list was compiled by requesting input from biologists with expertise in the Coachella Valley area, agency biologists, and consulting other lists (e.g. California Native Plant Society, CDFG, USFWS, NDDB, etc.). As information was gathered through the planning process, the Planning Team continuously reviewed the list. Other experts on individual species were also consulted. A number of species were subsequently deleted from consideration. Table A3-13 identifies the species from the original Planning Agreement that are not proposed for coverage and the reasons why not.

Table A3-13: Species Not Proposed for Coverage under the Plan

Species	Status	Reasons for not Including in Plan	Potential Future Actions
California leaf-nosed bat *Macrotus californicus*	CSC	Insufficient information is available at this time. The species is known to occur in one natural cave in the Santa Rosa Mountains. This species formerly occurred at Bat Cave Buttes also, but this site has been heavily vandalized and no longer has any California leaf-nosed bats. Surveys were not conducted as part of this planning effort due to funding constraints.	Before it would be feasible to include the species in the Plan, it would be necessary to determine if they utilize any of the desert dry wash woodlands within the Plan Area by mist netting. If the California leaf-nosed bat is foraging in an area, the nearby areas should be surveyed for potential caves, and these should be inspected to determine if the bats are roosting there.
Yuma myotis *Myotis yumanensis*	CSC	A literature search has indicated no known occurrences in the Plan Area. If it does occur, it will likely be in the upper, forested elevations. Localities within the Plan Area would be at the edge of its range. Surveys were not conducted as part of this planning effort due to funding constraints.	If it is later discovered that the species occurs in the Plan Area, the species could be considered for inclusion in the Plan through an amendment. Surveys would be needed to determine the distribution and status of the species.
Long-eared myotis *Myotis evotis*	CSC	A literature search has indicated no known occurrences in the Plan Area. If it does occur, it would be expected only in the forested zones of the Plan Area, at the eastern edge of its range. Surveys were not conducted as part of this planning effort due to funding constraints.	If it is later discovered that the species occurs in the Plan Area, the species could be considered for inclusion in the Plan through an amendment. Surveys would be needed to determine the distribution and status of the species.
Long-legged myotis *Myotis volans*	CSC	A literature search has indicated no known occurrences in the Plan Area. If this species occurs in the Plan Area, it would be expected only in the forested zones. Localities in the Plan Area would be at the eastern edge of its range. Surveys were not conducted as part of this planning effort due to funding constraints.	If it is later discovered that the species occurs in the Plan Area, the species could be considered for inclusion in the Plan through an amendment. Surveys would be needed to determine the distribution and status of the species.

Table A3-13: Species Not Proposed for Coverage under the Plan (cont.)

Species	Status	Reasons for not Including in Plan	Potential Future Actions
Western small-footed myotis *Myotis ciliolabrum*	CSC	A literature search has indicated no known occurrences in the Plan Area. If this species occurs in the Plan Area, it would be expected only in the forested zones of the Plan Area, at the eastern edge of its range. Surveys were not conducted as part of this planning effort due to funding constraints.	If it is later discovered that the species occurs in the Plan Area, the species could be considered for inclusion in the Plan through an amendment. Surveys would be needed to determine the distribution and status of the species.
Fringed myotis *Myotis thysanodes*	CSC	A literature search has indicated no known occurrences in the Plan Area. The nearest known locality is one record from 1992 listed as Joshua Tree National Monument. Surveys were not conducted as part of this planning effort due to funding constraints.	If it is later discovered that the species occurs in the Plan Area, the species could be considered for inclusion in the Plan through an amendment. Surveys would be needed to determine the distribution and status of the species.
Townsend's (Western) big-eared bat *Corynorhinus townsendii pallescens*	CSC	There is one record of this species in the Plan Area in Whitewater Canyon from 1915. It is unknown if the locality where the species was found in Whitewater Canyon is still viable. Surveys were not conducted as part of this planning effort due to funding constraints.	If it is later discovered that the species occurs in the Plan Area, the species could be considered for inclusion in the Plan through an amendment. Surveys would be needed to determine the distribution and status of the species.
Pallid bat *Antrozous pallidus*	CSC	Pallid bats are known to occur in the vicinity of Bat Cave Buttes, Painted Canyon, the Eagle Mountains, and Cottonwood Spring (Joshua Tree National Park). The population at Bat Cave Buttes has been severely impacted by recreational use of the caves (P. Brown, pers. comm.). The population at Painted Canyon could also be impacted by recreational use. Surveys were not conducted as part of this planning effort due to funding constraints.	Before specific conservation measures could be formulated for this species in the Plan Area, more information is needed on the status of the populations. Survey needs include determining their status at Bat Cave Buttes, Painted Canyon, and other comparable habitat using netting and acoustic surveys. Because this is a species that is commonly found under bridges, it would be worthwhile to check bridges for guano and staining.

Table A3-13: Species Not Proposed for Coverage under the Plan (cont.)

Species	Status	Reasons for not Including in Plan	Potential Future Actions
Pocketed free-tailed bat *Nyctinomops femorosaccus*	CSC	There is little information available on this species. The type locality is from Palm Springs. It is also known to occur in Painted Canyon in the Mecca Hills. It is not known whether these are roosting colonies or not. The population in Painted Canyon could be impacted by recreational use. Surveys were not conducted as part of this planning effort due to funding constraints.	To add this species to the Plan, additional surveys would be needed in the Mecca Hills area and throughout the Plan Area in appropriate habitat to determine the distribution and status of this species.
California (Western) mastiff bat *Eumops perotis californicus*	CSC	There are two records for this species within the Plan Area. One is from Cottonwood Spring in Joshua Tree National Park and the other is from Painted Canyon in the Mecca Hills. The Joshua Tree National Park population is probably fairly secure. The locality in Painted Canyon is subject to disturbance from recreation. Surveys were not done for this species due to funding constraints.	To add this species to the Plan, additional surveys would be needed in the Mecca Hills area and throughout the Plan Area in appropriate habitat to determine the distribution and status of this species.
Desert slender salamander *Batrachoseps aridus*	FE/SE	There are only two known occurrences of this species, both of which are protected on Existing Conservation Lands. There is no need for additional protection.	Should a need arise in the future, this species could be become a Covered Species through Plan and Permit Amendments.
California red-legged frog *Rana aurora draytonii*	FE	There is an historic record for one location in the Plan Area. The species is believed to have been extirpated from that location, which is on Indian Reservation land.	If it is later discovered that the species occurs in the Plan Area, the species could be considered for inclusion in the Plan through an amendment. Surveys would be needed to determine the distribution and status of the species.
Mountain yellow-legged frog *Rana muscosa*	no official status	There are two records, in Andreas Canyon (Indian land) (1979) and Snow Creek (1979-1980). The species is thought to be extirpated from these locations. Potential habitat is mostly on public land. Surveys were not done due to funding constraints.	If it is later discovered that the species occurs in the Plan Area, the species could be considered for inclusion in the Plan through an amendment. Surveys would be needed to determine the distribution and status of the species.

Table A3-13: Species Not Proposed for Coverage under the Plan (cont.)

Species	Status	Reasons for not Including in Plan	Potential Future Actions
California legless lizard *Anniella pulchra pulchra*	CSC	The species is known from the Santa Rosa Mountains, but there is little information on its distribution there. This would be near the edge of its overall range. There is insufficient information to include the species in the Plan and no perceived threat to warrant inclusion.	If it is later determined that inclusion of the species is warranted, the species could be considered for inclusion in the Plan through an amendment. Surveys would be needed to determine the distribution and status of the species.
San Diego horned lizard *Phrynosoma coronatum blainvillei*	No official status	The species is known to occur in the westernmost portion of the Plan Area. It is primarily, however, a species of the coastal plains and mountains. Its distribution in the Plan Area is not regarded as significant to the survival of the species.	If it is later determined that inclusion of the species is warranted, the species could be considered for inclusion in the Plan through an amendment. Surveys would be needed to determine the distribution and status of the species.
Lowland leopard frog *Rana yavapiensis*	CSC	There are no records for this species in the Plan Area. The closest known location is an isolated population in the San Felipe Creek area in Imperial County.	If it is later discovered that the species occurs in the Plan Area, the species could be considered for inclusion in the Plan through an amendment. Surveys would be needed to determine the distribution and status of the species.
Casey's June beetle *Dinacoma caseyi*	No official status	While it has no official status, this species is a narrow endemic, known to occur only in the Plan Area in an area of approximately 160 acres. More than half of this is controlled by a single landowner. Efforts to work with this landowner to develop a conservation strategy have not yet come to fruition. Therefore, the species could not be included as a Covered Species. Efforts to work with this landowner are ongoing.	At such time as a conservation strategy that can be implemented can be developed, this species may be added as a Covered Species through Plan and Permit Amendments.
Coachella Valley grasshopper *Spaniacris deserticola*	No official status	This species is known from several locations in the Coachella Valley, and is widespread in the desert beyond the Plan Area. Its existence in the wild does not appear to be threatened.	To add this species to the Plan, field surveys would be needed in appropriate habitat to determine the distribution and status of this species.

Table A3-13: Species Not Proposed for Coverage under the Plan (cont.)

Species	Status	Reasons for not including in Plan	Potential future actions
Pratt's dark aurora blue butterfly *Euphilotes enoptes cryptorufes*	No official status	This species is known from two locations in the national forest in the San Jacinto and Santa Rosa Mountains. Insufficient information makes it currently infeasible to develop a conservation strategy such that the species could be a Covered Species.	To add this species to the Plan, field surveys would be needed in appropriate habitat to determine the distribution and status of this species.
Morongo desert snail *Eremarionta morongoana*	No official status	A report was prepared on this species based on aerial photo analysis and literature searches. The species is known to occur in or immediately adjacent to the Plan Area. There is potential habitat in the Plan Area; however, no field surveys have been conducted to verify known locations and identify other potential occurrences.	To add this species to the Plan, field surveys would be needed in appropriate habitat to determine the distribution and status of this species.
Thousand Palms desert snail *Eremarionta millepalmarum*	No official status	A report was prepared on this species based on aerial photo analysis and literature searches. The species is known to occur in the Plan Area north and northeast of Thousand Palms in the Little San Bernardino Mountains; however, no field surveys have been conducted to verify known locations and identify other potential occurrences.	To add this species to the Plan, field surveys would be needed in appropriate habitat to determine the distribution and status of this species.
Glandular ditaxis *Ditaxis clariana*	CNPS List 2	According to the Jepson Manual, this species is rare in California, but occurs in the Coachella Valley. Surveys did not locate any individuals, but fall surveys in a favorable weather year were not conducted.	To add this species to the Plan, field surveys would be needed in appropriate habitat under favorable conditions to determine the distribution and status of this species.
California ditaxis *Ditaxis californica*	CNPS List 2	USFWS and CDFG recommended deletion because of uncertainty about its taxonomic status and a lack of knowledge of its distribution and ecological requirements. Most known locations occur on public land.	If it were determined in the future that this species should be covered, the Plan would serve as a good base for seeking coverage as its known occurrences in the Plan Area are within areas to be conserved by the Plan.

Table A3-13: Species Not Proposed for Coverage under the Plan (cont.)

Species	Status	Reasons for not including in Plan	Potential future actions
Robison's monardella *Monardella robisonii*	No oficial status	There is one record northwest of Desert Hot Springs near the border with San Bernardino County. It is also known to occur in the Morongo Valley area and in Joshua Tree National Park in San Bernardino County. Surveys to determine its potential occurrence in the Plan Area have not been conducted. Given its habitat preferences, if it does occur more widely in the Plan Area, it would be expected to be found primarily on protected lands in the Morongo Canyon ACEC and in the National Park.	To add this species to the Plan, field surveys would be needed in appropriate habitat to determine the distribution and status of this species.
Cliff spurge *Euphorbia misera*	CNPS List 2	There is one historic record for this shrub in the Plan Area. It appears that this was a relict population. The species is otherwise known from coastal bluffs and rocky slopes in coastal California, the Channel Islands, and Baja California. Surveys in 1995 did not locate any occurrences in the Plan Area.	If it is later discovered that the species occurs in the Plan Area, the species could be considered for inclusion in the Plan through an amendment.
Flat-seeded spurge *Chamaesyce platysperma*	No official status	The historic range of this annual is the Sonoran Desert in the Coachella Valley, southwestern Arizona, and Sonora, Mexico. It occurs in sandy soils. It has generally not been seen in California since the early 1900's. There is a possible recent record from the Palm Springs area, but 1995 surveys did not locate any occurrences in the Plan Area.	If the species still does occur in the Plan Area, it is likely that it would be found in areas that would be protected for other sandy soil-associated species.

3.9 Natural Communities Not Included in the Plan

The original Planning Agreement listed 23 natural communities believed to occur in the Plan Area. Through the planning process a total of 46 natural communities were identified in the Plan Area. Of these, 26 natural communities provide habitat for the covered species and are the focal point for establishment of conservation areas. The other natural communities were not included in the reserve design process and development of conservation areas established under this Plan. However, with two exceptions, these other natural communities are adequately protected in the Plan Area on public and private conservation lands. This existing protection adds to the overall conservation value of the Plan in protecting watersheds, providing habitat for large predators, protecting overall biological diversity in the Plan Area, providing buffers for conservation areas established under this Plan, and providing areas that could become important to covered species with potential future changes in environmental conditions (including climatic change). The two exceptions that are not either currently protected or proposed for protection under this Plan are Active Shielded Desert Dunes and Tamarisk Scrub. All of the natural communities that are not specifically included in the Plan are described in Table A3-14, along with the reason why these communities are not included.

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Table A3-14: Natural Communities Not Included in the Plan

Natural Community	Description	Reasons for not Including in the Plan
Active Shielded Desert Dunes	Areas of actively moving sand, but with one or more physical processes (wind corridor, sand source) interrupted (shielded) by roads, buildings, trees, or other barriers to sand transport and ecological processes.	Only one small dune system of less than 124 acres, surrounded by urbanization, exists south of Hovley Lane on Portola Avenue in Palm Desert. It is not included in the Plan because it is a habitat fragment, the essential ecological processes for which are not intact.
Tamarisk Scrub	This is a weedy, virtual monoculture of any of several Tamarix species, usually supplanting native vegetation and using large amounts of water. About 3,365 acres occur in the Plan Area, primarily near the Salton Sea. It is considered to have significantly lower habitat values than the native communities it displaces.	In some instances restoration efforts to restore the displaced native community could be beneficial, but the tamarisk scrub community itself is not desirable to protect.
Riversidean Sage Scrub (Desert)	This is the most xeric expression of coastal sage scrub. Typical stands are fairly open and dominated by sagebrush (*Artemisia californica*), California buckwheat (*Eriogonum fasciculatum*), and Foxtail chess (*Bromus madritensis* ssp. *rubens)*.	This community is restricted to the San Gorgonio Pass in the Plan Area, where about 8,279 acres are found. It is more common in the western part of the County, where it is addressed in the Western Riverside County MSHCP.
Mojave Mixed Steppe	A fairly dense grassland dominated by big galleta grass (*Pleuraphis rigida*), with several shrubby species from Mojave mixed woody scrub scattered throughout. It is found in dry, sandy or gravelly places from 2,000' to 7,000' elevation.	Just over 400 acres occur on some of the upper bajadas and lower slopes of the Little San Bernardino Mountains, where it is 100% protected in Joshua Tree National Park.
Blackbrush Scrub	This community consists of low, often intricately branched shrubs, 0.5 to 1 meter tall, with crowns usually not touching and with bare ground between plants, typically occurring between 4,000' to 7,000' elevation.	Nearly 8,500 acres occur in the Little San Bernardino Mountains, where 100% of it is protected in Joshua Tree National Park.

Table A3-14: Natural Communities Not Included in the Plan (cont.)

Natural Community	Description	Reasons for not Including in the Plan
Upper Sonoran Mixed Chaparral	This is a dense chaparral community lacking dominance by any one species or shrub group. Typical species include chamise (*Adenostoma fasciculatum*), manzanitas (*Arctostaphylos* spp.), *Ceanothus* species, and live oaks (*Quercus* spp.). It may intergrade with other chaparral types. This community occurs on the slopes of Cottonwood and Stubbe Canyons in the San Bernardino Mountains at the western edge of the Plan Area, where the coastal influence results in higher available moisture.	Of the approximately 2,600 acres in the Plan Area, 100% is protected on public lands.
Upper Sonoran Manzanita Chaparral	A dense chaparral to 5 meters (15 feet) in which dominance is shared by chamise and various species of manzanita. Most stands appear to be disturbance followers, establishing after fire or other disturbance.	Only 3 acres occur in the Plan Area, on existing public land.
Mixed Montane Chaparral	This community is characterized by 1 to 3 meters tall, mostly sclerophyllous chaparral dominated by *Ceanothus* and manzanita (*Arctostaphylos* spp.) species. Understories are typically very sparse. Most plants are less than 2 meters (5 feet) tall.	The less than 200 acres occurring in the Plan Area in the San Jacinto Mountains are protected on public land.
Northern Mixed Chaparral	This is a type of chaparral dominated by broad-leaved sclerophyll shrubs, 2 to 4 meters (6 to 12 feet) tall, forming dense often nearly impenetrable stands of vegetation dominated by chamise (*Adenostoma fasciculatum*), scrub oak (*Quercus dumosa*), manzanita (*Arctostaphylos* spp.) and *Ceanothus* species. It is found in the San Jacinto Mountains and, to a lesser extent, in the San Bernardino Mountains.	Approximately 40% of this community, of which just over 8,500 acres occur in the Plan Area, is protected on public lands.

Table A3-14: Natural Communities Not Included in the Plan (cont.)

Natural Community	Description	Reasons for not Including in the Plan
Scrub Oak Chaparral	A dense evergreen chaparral to 7 meters (20 feet) tall, dominated by scrub oak (*Quercus dumosa*) with considerable mountain mahogany (*Cercocarpus betuloides*). It occurs in two locations in the San Bernardino and San Jacinto Mountains.	Approximately 96% of the roughly 2,550 acres in the Plan Area is protected on public lands.
Canyon Live Oak Forest	This is a dense forest dominated by Canyon live oak (*Quercus chrysolepis*), and with little understory. Trees may reach up to 20 meters (60 feet) in height in canyons or on north-facing slopes. Trees may have multiple trunks.	In the Plan Area, less than 200 acres occur in one area of the San Jacinto Mountains west of Palm Canyon. 100% of it occurs on San Bernardino National Forest lands in steep, rather inaccessible terrain.
Black Oak Forest	This is a persistent subclimax forest dominated by black oak (*Quercus kelloggii*), with scattered emergent ponderosa pine (*Pinus ponderosa*) or Jeffrey pine (*Pinus jeffreyi*). Most stands are even-aged, reflecting past disturbances.	This community has one occurrence in the Plan Area of about 3,400 acres in the San Jacinto Mountains. About 71% of this is in the San Bernardino National Forest, with 25% in wilderness.
Coulter Pine Forest	This is an open forest of scattered Coulter pines (*Pinus coulteri*) and black oak (*Quercus kelloggii*), with an understory of shrubs typically associated with Upper Sonoran Mixed Chaparral. Some stands are dense enough to suppress the shrubby layer.	About 5,000 acres occur in scattered locations in the San Jacinto Mountains in the Plan Area; 89% of this is in the San Bernardino National Forest, with 55% of the total in wilderness.
Big Cone Spruce-Canyon Live Oak Forest	This community is an open (on steep slopes) to dense (on flats) forest dominated by big cone spruce (*Pseudotsuga macrocarpa*), 17 to 27 m (50 to 80 feet) tall, over a dense canopy of canyon live oak (*Quercus chrysolepis*), and a very sparse herb layer. It is usually found in a chaparral matrix.	A large stand occurs in the San Bernardino Mountains, and a small stand in the San Jacinto Mountains, together totaling less than 2,700 acres, with 100% in wilderness.

Table A3-14: Natural Communities Not Included in the Plan (cont.)

Natural Community	Description	Reasons for not Including in the Plan
Westside Ponderosa Pine Forest	This is an open park-like forest of coniferous evergreens to 70 meters tall, dominated by ponderosa pine (*Pinus ponderosa*). The understory is typically sparse, consisting of scattered chaparral shrubs and young trees.	In the Plan Area, about 8,500 acres occur at higher elevations in the San Jacinto Mountains, where 99% of it is in either the San National Forest or the state park, with 59% of the total in wilderness.
Sierran Mixed Coniferous Forest	This is similar to Westside Ponderosa Pine Forest, but denser with the crowns often touching, and often slightly taller (to 75 meters), and with several dominant species, including white fir (*Abies concolor*), ponderosa pine (*Pinus ponderosa*), Jeffrey pine (*Pinus jeffreyi*), and sugar pine (*Pinus lambertiana*).	In the Plan Area, roughly 3,300 acres occur in several locations above 7,000 feet in the San Jacinto Mountains, where 84% of it is in either the San Bernardino National Forest or the state park, with 66% of the total in wilderness.
Jeffrey Pine Forest	This community is a tall, open forest dominated by Jeffrey pine (*Pinus jeffreyi*), with a sparse understory of species from the Mixed Montane Chaparral or Sagebrush Scrub communities. It is similar in aspect to the Westside Ponderosa Pine forest.	In the Plan Area, nearly 4,500 acres occur at up to 9,000 feet elevation in the San Jacinto Mountains, with 100% of it in wilderness.
Jeffrey Pine-Fir Forest	This is similar to Sierran Mixed Coniferous Forest, but not quite so tall (up to 60 meters). The understory is open, consisting primarily of scattered Mixed Montane Chaparral and small trees. Dominant species are white fir (*Abies concolor*) and Jeffrey pine (*Pinus jeffreyi*).	In the Plan Area, this community is adequately protected; approximately 3,200 acres occur at up to 9,000 feet elevation in the San Jacinto Mountains, with 70% of it either in the San Bernardino National Forest or the State Park.
Southern California Subalpine Forest	This is an open or clumped timberline forest dominated by Lodgepole pine (*Pinus contorta murrayana*) and Limber pine (*Pinus flexilis*). The understory is typically very sparse	In the Plan Area, less than 2,000 acres occur on San Jacinto Peak, where 99% of it is in the wilderness.

3.10 Sources of Biological Data

Biological data for the Plan were obtained from a wide variety of sources. The management and storage of the information collected was designed to follow existing data collection and storage protocols. For example, species location data are stored according to the standards of the California Natural Diversity Data Base. To the extent possible, all data were compiled in a GIS ARC/INFO database associated with GIS coverages. The center for collection and storage of these data was at the Bureau of Land Management Palm Springs Field Office. Particular attention was paid to the clear and complete documentation of all data used, all sources of information, and all updates and changes made to data layers and GIS coverages. The data were compiled, analyzed, and stored to support various components of the Plan preparation and implementation process. The sources of data used in this Plan include:

I. Known location information for Covered Species and conserved natural communities. These data are maintained in GIS (digital) coverages and on GIS maps that can be identified by area based on jurisdiction boundaries, township/range information or other map parameters. These data were compiled from various sources:

1. Field data collected during surveys for the CVMSHCP in 1995, 1997, 1998, and 1999. These surveys were conducted by participating agency biologists and biologists working under contract to conduct focused surveys for some of the covered species. Surveys were generally conducted during the spring months. Survey protocol were developed and approved by USFWS and CDFG. Information on location, habitat characteristics, range and other variables for species surveyed were described in written reports submitted to the SAC.
2. Environmental Impact Reports (EIRs), Biological Assessments, and other environmental documents prepared throughout the Plan Area since 1979.
3. California Natural Diversity Data Base (NDDB) records. Data from the NDDB were from 1992 and 1997. Additionally, some older records obtained from this source were archived if the known habitat for a given species was no longer extant at the location described in the record.
4. California Department of Fish and Game, Bureau of Land Management, National Park Service (Joshua Tree National Park), California State Parks, and U.S. Fish and Wildlife Service data.
5. Data collected from biologists knowledgeable about the Plan Area and/or a given species. Data from individual biologists were obtained in meetings and workshops hosted by the SAC. Records provided by individuals were carefully documented; records were mapped on 7.5 minute topographic quads and later digitized into a GIS data layer. Relevant information was obtained on each record before it was included in the database.

6. A September 1997 workshop held to gather known locations and information about the distribution of target species. Biologists and other individuals with expertise on one or more of the species participated in the workshop.
7. Location data from voucher specimens held in museums, herbaria, and public-trust institutions. In the spring of 2001, museums were contacted directly to request information on their records of target species (see Section 3.3.1.3).
8. Published records and species distribution information from peer-reviewed journal articles, where information on species or natural community distribution has been described at an appropriate scale.
9. Data gathered by University of California, Riverside, Center for Conservation Biology from 2003 - 2007 as part of the initial evaluation of Monitoring protocols.

II. Species Information Summaries on each species included in the Plan. These summaries, prepared by members of the SAC or Coachella Valley Mountains Conservancy staff, give general status, habitat, and life history information for each species, including general descriptions of the known distribution of each species within the Plan Area. These were augmented by literature searches. These species information summaries have been incorporated in the Conservation Strategies for Covered Species included in the Section 4.2.2.

3.10.1 List of Reports Consulted for Species Distribution Information

When the process of gathering information on the target species began, a thorough review of environmental documents, including biological assessments and environmental impact reports, was completed. As new information became available in subsequent environmental documents it was added to the database. Reports consulted to date are included in the following list. A review of more recent environmental documents was completed in April 2003. Additional records for target species derived from this review were added to the database; these records will be used to assess, in part, the accuracy of species distribution models.

AMEC Earth and Environmental. 2001. WECS Section 12 Sites Biological Survey. Prepared for Whitewater Energy Corporation.

Baxter Consulting Services. 1996. Jurisdictional Wetlands Delineation for the 62nd Avenue at Whitewater Stormwater Channel Bridge Channel Bridge Project. Prepared for the County of Riverside Transportation Department.

BonTerra Consulting. 2000. Draft Initial Study and Mitigated Negative Declaration for Rio

Vista Village. Prepared for Burnett Companies.

BonTerra Consulting, 2001. Biological Constraints Survey for the Bob Hope Drive/ Dinah Shore Drive Widening Project. Prepared for RBF Consulting. Located as Appendix 6.4 of The Initial Study/ Environmental Checklist Bob Hope Drive/ Dinah Shore Drive Widening Project.

Brandman, Michael, Associates. 1994. Draft Environmental Impact Report. Mid-Valley Parkway Project. Prepared for the Coachella Valley Association of Governments, the City of Palm Springs, the City of Cathedral City, the City of Rancho Mirage, the City of Palm Desert, and the County of Riverside.

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3.10.2 Museums Contacted for Specimens from Target Species List

In May and June of 2001, the following museums were contacted to request any recorded data on the target species within their collection. Responses from many of these museums have been received and are currently being processed. Ultimately, these data will be compared with existing records for each of the target species and new information will be added to the database. As noted by Margules and Pressey (2000) however, "museum and herbarium data on the locations of taxa are notoriously biased, having been collected for a different purpose (systematics), and often in an opportunistic manner." The museum records, particularly older records based on collections, are often very imprecise in terms of the location and may not be as useful for that reason. Nevertheless, every effort is being made to completely assess the records from the following museums:

Arboretum, University of California, Santa Cruz
Western Foundation of Vertebrate Zoology
The Living Desert
San Francisco Zoological Gardens
Hi-Desert Nature Museum
The Academy Of Natural Sciences
Field Museum of Natural History
Peabody Museum of Natural History
Louisiana State University Herbarium
Arboretum, University of California Davis
Santa Barbara Museum of Natural History
Anza-Borrego Desert State Park
World Museum of Natural History

Santa Ana Zoo
Oregon Museum of Science and Industry
American Museum of Natural History
Carnegie Museum of Natural History
Harvard Museum of Natural History, Harvard University
Natural History Museum and Biodiversity Research Center, University of Kansas
Museum of Vertebrate Zoology, University of California Berkeley
California Academy of Sciences
Oakland Museum of California
Riverside Municipal Museum
Mousley Museum of Natural History
Burke Museum of Natural History
National Museum of History
The Cornell Plantations
Museum of Natural History, Princeton University
Science Museum of Minnesota
James Ford Bell Museum of Natural History
Museum of Southwestern Biology, University of New Mexico
Museum of Zoology, University of Michigan
Natural History Museum of Los Angeles
Oklahoma Museum of Natural History, University of Oklahoma
Arizona State Museum, University of Arizona
University of Wisconsin Zoological Hall
San Bernardino County Museum
Texas Natural History Collections, University of Texas
Barrick Museum, University of Nevada
San Diego Natural History Museum

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4.0Establishment of the MSHCP Reserve System

4.1 Analysis of Other Conserved Habitat for Covered Species and Broadly Distributed Natural Communities Conserved through Other Conservation Objectives

Specific Conservation Objectives for Other Conserved Habitat are generally not delineated in the Plan because Other Conserved Habitat overlaps with and will be protected in conjunction with attaining other Conservation Objectives such as conserving Essential Ecological Process areas, Biological Corridors and Linkages, or Core Habitat for other Covered Species. Similarly, specific Conservation Objectives are not articulated in the Plan for the more broadly distributed conserved natural communities because sufficient amounts of these communities are conserved in conjunction with attaining other Conservation Objectives.

Table A4-1 summarizes the extent to which conservation of Other Conserved Habitat and the more broadly distributed conserved natural communities is achieved in each Conservation Area through other Conservation Objectives. As shown in the table, in most Conservation Areas, the entire Conservation Area is covered by one or more Conservation Objectives. As a result, Other Conserved Habitat and the more broadly distributed conserved natural communities are protected in these Conservation Areas, and no additional analysis is needed. In those Conservation Areas where the entire Conservation Area is not covered by one or more Conservation Objectives, additional explanation is provided in Tables 4-2 through 4-7b of how conservation is achieved for Other Conserved Habitat for various species and known Occurrences, and for the more broadly distributed conserved natural communities through other Conservation Objectives.

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Table A4-1: Identification of Conservation Objectives That Cover 100% of Other Conserved Habitat and Broadly Distributed Natural Communities in the Conservation Areas

Conservation Area	*The Conservation Objective or Combination of Conservation Objectives that Cover 100% of Other Conserved Habitat and Broadly Distributed Natural Communities in the Conservation Area*					
	Core Habitat	***Other Conserved Habitat***	***Sand Source***	***Sand Transport***	***Linkage***	***Natural Community***
Cabazon[1]				X		
Stubbe & Cottonwood Cyns.			X	X		
Snow Creek				X		
Whitewater Canyon			X	X		
Highway 111/I-10[2]		X				
Whitewater Floodplain Preserve				X		
Upper Mission Creek/Big Morongo Canyon	See Table A4-2					
Willow Hole			X	X		
Long Canyon[3]						
Edom Hill			X	X		
Thousand Palms						
West Deception[1]			X			
Indio Hills/Joshua Tree National Park Linkage			X	X		
Indio Hills Palms					X	
East Indio Hills	See Table A4-3					
Joshua Tree National Park	See Table A4-4					
Desert Tortoise & Linkage	X	X			X	
Mecca Hills/Orocopia Mtns.	X	X			X	X
Dos Palmas	See Tables 4-5a and 4-5b					
CV Stormwater Channel & Delta	See Tables 4-6a and 4-6b					
Santa Rosa/San Jacinto Mountains	See Tables 4-7a and 4-7b					

[1] A portion of the Conservation Areas has a Conservation Objective to maintain fluvial sand transport only; there is no specific Conservation Objective for species or natural communities in these areas. This table applies only to the portion of the Conservation Area in which there are species or natural communities related Conservation Objectives.

[2] Modeled habitat for desert tortoise, Coachella Valley round-tailed ground squirrel, Le Conte's thrasher, and Palm Springs pocket mouse each cover 100% of this Conservation Area.

[3] The only Conservation Objective in this Conservation Area is to maintain fluvial sand transport.

Table A4-2: Acres Covered by Other Conservation Objectives Upper Mission Creek/Big Morongo Canyon Conservation Area

Conservation Area Natural Community	***Total Acres in Conservation Area***	***Acres Covered by Conservation Objectives***	***Acres Not Covered by a Conservation Objective***	***Land Ownership of Acres Not Covered by a Conservation Objective***
Upper Mission Creek/Big Morongo Canyon	29,317	29,310	7[1]	Private – 6; BLM - 1

[1] All of these acres are in Blind Canyon which USGS indicates does not contribute to sand source or sand transport. They were included for reserve design purposes.

Table A4-3: Analysis of Certain Conserved Natural Communities Covered by Other Conservation Objectives East Indio Hills Conservation Area

Conservation Area Natural Community	***Total Acres in Conservation Area***	***Acres Covered by a Conservation Objective***	***Acres Not Covered by a Conservation Objective***	***Land Ownership of Acres Not Covered by a Conservation Objective***
East Indio Hills	4,225	4,027	198	Private – 129; CVWD – 50; BLM - 19
Sonoran creosote bush scrub	*3,002*	*2,969*	*33*[1]	--
Tamarisk scrub	*N/A*	--	*64*[1,2]	--
Agriculture/Urban/Quarry	*N/A*	--	*52/35/14*[1,2]	--

[1] Occurs within the 198 acres not protected by a Conservation Objective.
[2] Tamarisk scrub is not on the list of conserved natural communities included in the Plan; agriculture, urban and quarry are developed areas.

Table A4-4: Analysis of Certain Conserved Natural Communities Covered by Other Conservation Objectives Joshua Tree National Park Conservation Area

Conservation Area Natural Community	*Total Acres in Conservation Area*	*Acres Covered by a Conservation Objective*	*Acres Not Covered by a Conservation Objective*	*Land Ownership of Acres Not Covered by a Conservation Objective*
Joshua Tree National Park	161,927	161,102	825	NPS – 825
Sonoran creosote bush scrub	*N/A*	--	*92*[1]	*NPS - 92*
Blackbrush scrub	*N/A*	--	*730*[1,2]	*NPS - 730*
Mojave mixed steppe	*N/A*	--	*3*[1,2]	*NPS - 3*

[1] Natural communities are within the 825 acres not protected by a Conservation Objective; all of these acres are protected as part of Joshua Tree National Park. They are included in the Conservation Area for reserve design purposes.

[2] These natural communities are not on the list of conserved natural communities in the Plan because they are already adequately conserved in the Plan Area.

Table A4-5a: Analysis of Other Conserved Habitat Covered by Other Conservation Objectives Dos Palmas Conservation Area

Species	*Total Acres of Habitat in Conservation Area*	*Acres Covered by Another Conservation Objective*	*Additional Acres Protected by Existing Conservation Lands*	*Total Acres Covered*	*Total Acres Not Covered by a Conservation Objective*	*Land Ownership of Acres Not Covered by a Conservation Objective*
Coachella Valley round-tailed ground squirrel	4,287	4,209	54	4,263	24	Private - 19 SLC - 5
Desert tortoise	334	199	135	334	0	N/A
Flat-tailed horned lizard	5,450	5,387	30	5,417	33	Private - 33
Least Bell's vireo (Breed./Migratory)	10,338 (181/10,157)	10,338	0	10,338	0	N/A
Orocopia sage	3,743	3,608	135	3,743	0	N/A

Table A4-5a (cont.)

Species	*Total Acres of Habitat in Conservation Area*	*Acres Covered by Another Conservation Objective*	*Additional Acres Protected by Existing Conservation Lands*	*Total Acres Covered*	*Total Acres Not Covered by a Conservation Objective*	*Land Ownership of Acres Not Covered by a Conservation Objective*
Palm Springs pocket mouse	7,832	7,733	65	7,798	34	Private - 29 SLC - 5
Southern yellow bat	126	126	0	126	0	N/A
Southwestern willow flycatcher (breed./migratory) [1]	10,338 (126/10,212)	10,338	0	10,338	0	N/A
Yellow-breasted chat	10,338 (403/9,935)	10,338	0	10,338	0	N/A

[1] The same statistics also apply for summer tanager and yellow warbler

Table A4-5b: Analysis of Certain Conserved Natural Communities Covered by Other Conservation Objectives Dos Palmas Conservation Area

Natural Community	*Total Acres of Natural Community in Conservation Area*	*Acres Covered by Another Conservation Objective*	*Additional Acres Protected by Existing Conservation Lands*	*Total Acres Covered*	*Total Acres Not Covered by a Conservation Objective*	*Total Acres of Natural Community Not Covered by a Conservation Objective*
Sonoran creosote bush scrub	11,854	11,712	142	11,854	0	N/A
Tamarisk scrub	2,700	357	937	1,294	1,406	Private - 1,385; SLC - 21

Table A4-6a: Analysis of Other Conserved Habitat for Covered Species Covered by Other Conservation Objectives Coachella Valley Stormwater Channel and Delta Conservation Area

Species	*Total Acres of Habitat in Conservation Area*	*Acres Covered by Another Conservation Objective*	*Additional Acres Protected by Existing Conservation Lands*	*Total Acres Covered*	*Total Acres Not Covered by a Conservation Objective*	*Land Ownership of Acres Not Covered by a Conservation Objective*
Least Bell's vireo[1] Breeding/ Migratory	2517 (82/2435)	2517	0	2517	0	N/A
Southwestern willow flycatcher[1] Breeding/ Migratory	2517	2517	0	2517	0	N/A
Summer tanager[1] Breeding/ Migratory	2517	2517	0	2517	0	N/A
Yellow warbler[1] Breeding/ Migratory	2517	2517	0	2517	0	N/A
Yellow-breasted chat[1] Breeding/ Migratory	2517	2517	0	2517	0	N/A
Le Conte's Thrasher	928	928	0	928	0	N/A
Palm Springs pocket mouse	172	172	0	172	0	N/A

[1] Total acres are the same; breeding and migratory habitat acres may differ

Table A4-6b: Analysis of Certain Conserved Natural Communities Covered by Other Conservation Objectives - Coachella Valley Stormwater Channel and Delta Conservation Area

Natural Community	*Total Acres of Natural Community in Conservation Area*	*Acres Covered by Another Conservation Objective*	*Additional Acres Protected by Existing Conservation Lands*	*Total Acres Covered*	*Total Acres Not Covered by a Conservation Objective*	*Land Ownership of Acres Not Covered by a Conservation Objective*
Tamarisk scrub	163	58	5	63	100	Private - 88; IID – 12

Table A4-7a: Analysis of Other Conserved Habitat for Covered Species Covered by Other Conservation Objectives Santa Rosa and San Jacinto Mountains Conservation Area

Species	*Total Acres of Habitat in Conservation Area*	*Acres Covered by Another Conservation Objective*	*Additional Acres Protected by Existing Conservation Lands*	*Total Acres Covered*	*Total Acres Not Covered by a Conservation Objective*	*Land Ownership of Acres Not Covered by a Conservation Objective*
Coachella Valley fringe-toed lizard	120	110	2	112	8	Private – 8
Coachella Valley giant sand-treader cricket	120	110	2	112	8	Private – 8
Coachella Valley Jerusalem cricket	200	183	3	186	14	Private – 14
Coachella Valley milkvetch	292	278	3	281	11	Private – 11
Coachella Valley round-tailed ground squirrel	1.330	1,230	34	1,264	66	Private - 52; DWA - 4; CVWD – 10
Flat-tailed horned lizard	81 (Pred - 66; Pot - 15)	67	0	67	14	Private – 14 (Pred - 11; Pot - 3)
Gray vireo	67,407	67,407	0	67,407	0	N/A
Least Bell's vireo (breed./migratory)	5,554 (1,597/3,957)	5,554	0	5,554	0	N/A
Palm Springs pocket mouse	5,562	4,357	363	4,720	842	Private - 823; DWA - 4; CVWD – 15
Peninsular bighorn sheep	169,479	169,479	0	169,479	0	N/A
Southern yellow bat	953	953	0	953	0	N/A
Southwestern willow flycatcher (breed./migratory)[1]	5,554 (1,597/3,957)	5,554	0	5,554	0	N/A
Yellow-breasted chat (breed./migratory)[1]	5,554 (1,597/3,957)	5,554	0	5,554	0	N/A

[1] The same statistics also apply for summer tanager and yellow warbler. The total modeled habitat for the riparian birds is the same; only breeding and migratory habitat differs.

Table A4-7b: Analysis of Certain Conserved Natural Communities Covered by Other Conservation Objectives Santa Rosa and San Jacinto Mountains Conservation Area

Natural Community	*Total Acres of Natural Community in Conservation Area*	*Acres Covered by Another Conservation Objective*	*Additional Acres Protected by Existing Conservation Lands*	*Total Acres Covered*	*Total Acres Not Covered by a Conservation Objective*	*Land Ownership of Acres Not Covered by a Conservation Objective*
Ephemeral desert sand fields	37	27	5	32	5	Private – 5
Sonoran creosote bush scrub	44,287	40,051	589	40,640	3,647	Private-3,075; DWA - 1; CVWD – 571
Stabilized sand fields	20	20	0	20	0	N/A
Mesquite hummocks	5	5	0	5	0	N/A
Sonoran mixed woody and succulent scrub	90,537	90,107	404	90,511	26	Private - 20; DWA - 3; Indian - 2; CPS – 1
Active desert dunes	56	56	0	56	0	N/A
Interior live oak chaparral	2,738	2,738	0	2,738	0	N/A
Northern mixed chaparral	3	3	0	3	0	N/A
Stabilized shielded sand fields	7	7	0	7	0	N/A

4.2 Acquisitions since the Planning Agreement

Acquisitions resulting on land in the Conservation Areas being conserved since the 1996 Planning Agreement are credited to Complementary Conservation, the state and federal contribution to Plan implementation, or the Permittees obligations. Table A4-8 shows the acquisitions since 1996 and how they have been credited.

Table A4-8: Acquisitions and Credit Since 1996

Agency/Entity	*Acres Acquired*	*Credit*		
		Complementary Conservation	*State/Federal*	*Local Permittees*
American Land Conservancy	496	496		
Bureau of Land Management[2]	9,763	8,721	1,042	
Center for Natural Lands Management[3]	2,679	812	1,355	512
Coachella Valley Mountains Conservancy[2]	1,752	1,103	649	
Department of Fish and Game (Wildlife Conservation Board)	3,158		3,158	
Friends of the Desert Mountains[4]	6,033	3,630	2,403	
Living Desert	641	641		
Local Permittees	1,988			1,988
National Park Service	918	918		
The Nature Conservancy	2,300	2,300		
U.S. Forest Service	927	927		
Wildlands Conservancy	21,592	21,592		
TOTAL	52,247	41,140	8,607	2,500

[1] .

[2] Acquisitions in the Santa Rosa and San Jacinto Mountains National Monument were considered Complementary Conservation. Othert acquisitions were credited to the state/federal commitment to Plan implementation.

[3] Acquisitions with grant funds from CVMC were credited to the state/federal commitment to Plan implementation. Acquisitions with CVFTL HCP fees were credited to the Local Permittees. Acquisitions with other funding sources were credited to Complementary Conservation.

[4] Acquisitions with grant funds from CVMC were credited to the state/federal commitment to Plan implementation. Acquisitions with other funding sources were credited to Complementary Conservation.

4.3 Model MOU

The Local Permittees will commit existing identified Local Permittee owned land to conservation in perpetuity in the MSHCP Reserve System. Local Permittee lands in the MSHCP Reserve System that are currently conserved and which will be managed for Plan purposes include identified lands owned by the Cities and CVWD. CVCC will enter into agreements to ensure the permanent conservation and management of the above identified lands pursuant to the Plan, including providing access to the property for biological monitoring and management purposes. The model MOU developed for this purpose is shown below.

MEMORANDUM OF UNDERSTANDING
REGARDING CONSERVATION MANAGEMENT
BY AND BETWEEN
COACHELLA VALLEY CONSERVATION COMMISSION
AND _____

This Memorandum of Understanding ("Memorandum") is made and entered into this ___ day of _____, 200__, by and between the Coachella Valley Conservation Commission and the _____
.

WHEREAS, the Coachella Valley Conservation Commission ("Commission"), was established to implement the Coachella Valley Multiple Species Habitat Conservation Plan ("MSHCP") and ensure the conservation of landing the MSHCP Reserve System to ensure the conservation of Covered Species and conserved natural communities; and

WHEREAS, the _____("_____") is a California nonprofit corporation whose mission includes acquisition and protection of natural open space areas; and

WHEREAS, the _____owns land within the MSHCP Reserve System; and

WHEREAS, the _____ desires to cooperate with the Commission in the conservation of these lands in perpetuity in a manner consistent with the Conservation Goals and Conservation Objectives of the MSHCP

NOW, THEREFORE, it is mutually agreed and understood that:

1. The _____will manage the Land in a manner consistent with the Conservation Goals and Conservation Objectives of the MSHCP.

2. The _____will, upon request, provide access to the Commission and its agents, the Biological Monitoring Administrator and the Administrator's designees, the Reserve Management Oversight Committee, the Reserve Unit Management Committee, the California Department of Fish and Game, and the U.S. Fish and Wildlife Service for purposes of biological monitoring.

3. The _____will cooperate with the Commission and its agents, the Land Manager and the Land Manager's designees, the Reserve Management Oversight Committee, the Reserve Unit Management Committee, the California Department of Fish and Game, and the U.S. Fish and Wildlife Service for purposes in management and adaptive management actions required to implement the MSHCP.

4. The Commission, its member entities, and/or the California Department of Fish and Game, and/or the U.S. Fish and Wildlife Service will fund the biological monitoring activities

and the management and adaptive management activities on the _____ land.

5. The Commission and the _____ mutually agree that the _____ may dispose of its land by sale or gift to any government agency cooperating in the implementation of the MSHCP to ensure conservation of the land in perpetuity, or to a nonprofit conservation organization that agrees to enter into a Memorandum for conservation management on the land with the Commission.

6. The Commission and the _____ further mutually agree that the _____ may dispose of its land by sale for other than a conservation purpose only after providing the Commission with the opportunity to acquire the land at market value as determined by appraisal.

7. (Name), (Title)_____, or his successor, is designated as the _____' official contact with the Commission for the purpose of this Memorandum. (Name), (Title)_____ of the Coachella Valley Conservation Commission, or his successor, is designated as the Commission's official contact with the _____ for the purposes of this Memorandum.

8. The Commission shall indemnify and hold _____ its directors, officials, officers, agents, consultants, employees and volunteers free and harmless from any and all claims, demands, causes of action, liabilities, obligations, judgments or damages, in law or in equity, to property or persons, in any manner arising out of or incident to alleged negligent acts or willful misconduct of the Commission, its officials, officers, employees, agents, consultants, and contractors arising out of or in connection with the performance of this MOU.

9. This Memorandum will commence on the date this Memorandum is last signed by the parties hereto and may be terminated only by written agreement of both parties.

10. This Memorandum may be executed in counterpart. The counterparts together shall constitute a single agreement.

_____	_____
_____	_____
Date	Date

Note: The Model Conservation Easement has been moved from Appendix I; it is now found as Exhibit H to the Final IA.

4.4 Dimensions of Culverts and Bridges that Function as Biological Corridors

4.4.1 Stubbe Canyon Wash Biological Corridor under I-10

The Biological Corridor centers on the Stubbe Canyon Wash bridges over the I-10 freeway in Section 8, T3S R3E. This Biological Corridor connects Stubbe/Cottonwood Canyons Conservation Area and the Snow Creek/Windy Point Conservation Area.

Two undercrossings exist side by side, separated by 0.06 miles. The Stubbe West undercrossing is 11.3 meters wide, 5.1 meters high, and the total distance from the north side of the freeway to the south side of the freeway is 70.0 meters. It is open across the center median of the freeway, such that it is well lit by natural light and there is direct line of sight from one side of the freeway to the other. It has a natural bottom of rocks and sandy soils. On the north side of the freeway, Stubbe West wash slopes gradually up to the frontage road approximately 35 meters to the north. The Stubbe East undercrossing is 16.7 meters wide, 4.5 meters high, and the total distance from the north side of the freeway to the south side of the freeway is 74.0 meters. It is open across the center median of the freeway, such that the it is well lit by natural light and there is direct line of sight from one side of the freeway to the other. It also has a natural bottom of rocks and sandy soils. On the north side, the undercrossing slopes up gradually to the two-lane frontage road, approximately 40 meters north of I-10. This road dead ends approximately one mile to the west and serves only a small rural residential area. The corridor north of the freeway then expands in width from the frontage road to the San Bernardino Mountains, where the corridor is over 1 1/2 miles wide at the mouths of Stubbe and Cottonwood Canyons. On the south side of the freeway is a railroad track approximately 20 meters south of the undercrossings. The track is elevated on trestles and affords no physical obstacle to wildlife movement. The toe of slope of the San Jacinto Mountains is approximately 0.5 miles from the freeway at this point.

4.4.2 Whitewater River and San Gorgonio River Biological Corridors under Highway 111

Portions of the Whitewater River Floodplain Conservation Area and the Highway 111/I-10 Conservation Area function as a Linkage south from the I-10 bridge to Highway 111, where a bridge over the San Gorgonio River just before it joins the Whitewater River completes the Biological Corridor. The Snow Creek bridge over Highway 111 is 148.5 meters wide, 4.5 meters high and 67.3 meters long. This bridge has seven divisions that are each 4.5 meters high and 11.8 meters long; the second through sixth divisions are each 23.0 meters wide while the first and seventh divisions are 17.0 and 16.5 meters wide, respectively. There is also a Whitewater River

undercrossing under Highway 111 approximately 0.5 miles west of the Snow Creek bridge. It provides an additional Biological Corridor. The Whitewater River bridge over Highway 111 is 63.0 meters wide, 2.6 meters high, and 37.2 meters long and links the Snow Creek/Windy Point Conservation Area with the Highway 111/I-10 Conservation Area. This bridge has seven divisions that are each 9.0 meters wide, 2.6 meters high and 12.9 meters long. It is sandy-bottomed and devoid of vegetation.

4.4.3 Whitewater River Biological Corridor under the I-10

Whitewater Canyon serves as part of a Linkage and Biological Corridor connecting the San Bernardino Mountains portion of the Transverse Ranges with the Peninsular Ranges (San Jacinto and Santa Rosa Mountains) through the Snow Creek/Windy Point Conservation Area. The corridor provides for movement along the Whitewater River, which crosses under the I-10 freeway beneath a high bridge, the approximate dimensions of which are 112.8 meters wide, 7.2 meters high, and 48.0 meters long. This bridge has six divisions or spans of equal dimensions. Each division is 18.8 meters wide, 7.2 meters high and 48.0 meters long. The bridge is divided into two sections to accommodate east and westbound lanes of I-10. It straddles a large wash with gravel, rocks, and large boulders. There is a frontage road approximately 0.3 miles to the north and wind turbines approximately 0.3 miles to the south.

4.4.4 Mission Creek Biological Corridors under Hwy 62

A Biological Corridor exists in the Upper Mission Creek/Big Morongo Canyon Conservation Area where two bridges span Highway 62 over Mission Creek. The Mission Creek south bridge is 8.6 meters wide, 3.4 meters high, and 11.3 meters long on the northbound two lanes of Highway 62. This bridge is 8.7 meters wide, 2.5 meters high, and 11.3 meters long on the southbound side of Highway 62. Mission Creek is not spanned for a distance of 21.0 meters between the northbound and southbound lanes.

The northern Mission Creek bridge is 9.5 meters wide, 6.2 meters high, and 11.4 meters long on the northbound side of Highway 62. It is 9.5 meters wide, 6.2 meters high, and 11.4 meters long on the southbound side of Highway 62. Mission Creek is not spanned for a distance of 21.0 meters between the north and southbound lanes.

4.4.5 Mission Creek and Willow Wash Biological Corridors under I-10

The Plan maintains two Biological Corridors between the Willow Hole Conservation Area and the Whitewater Floodplain Conservation Area via the Mission Creek culvert and the Willow Wash culvert which both cross under the I-10 Freeway. The Mission Creek culvert has a natural

bottom and measures 17.5 meters wide, 3.2 meters high, and 55.6 meters long. The Willow Wash culvert measures 20.7 meters wide, 1.9 meters high, and 50.0 meters long and also has a natural bottom.

4.4.6 Biological Corridors under the I-10 Freeway in the Desert Tortoise and Linkage Conservation Area

A bridge over and several culverts under I-10 in the Desert Tortoise and Linkage Conservation Area form Biological Corridors that are part of larger Linkages connecting the Joshua Tree National Park Conservation Area with the Mecca Hills/Orocopia Mountains Conservation Area. The dimensions of the bridge and the culverts are as follows:

a. Corridor 1, centered on Thermal Canyon: 8.7 meters high, 19.0 meters wide, and 83.8 meters long. There is a 55.3 meter gap between the eastbound and westbound lanes of the freeway.
b. Corridor 2 centered on the E. Cactus City Wash and Hazy Gulch culverts. The E. Cactus City Wash undercrossing is 15.0 meters long on the westbound side of I-10, 14.9 meters long on the eastbound side of I-10, with a 39.0 meter gap in between for a total of 68.9 meters. The corridor is 2.7 meters high and 19.6 meters wide. The Hazy Gulch undercrossing is 12.6 meters long on the westbound side of I-10 and 12.6 meters long on the eastbound side of I-10, with a 32.9 meter gap in between for a total of 58.1 meters. The corridor is 4.2 meters high and 12.8 meters wide. Both have a natural, sandy wash bottom.
c. Corridor 3 centered on the Happy Gulch culvert is 1.2 meters high, 11.0 meters wide. It is 12.7 meters long on the westbound side of I-10 and 12.7 meters long on the eastbound side of I-10, with a 32.8 meter gap in between for a total of 58.2 meters.
d. Corridor 4 centered on the Desperation Arroyo culvert is 2.8 meters high and 5.4 meters wide. It is 12.5 meters long on the westbound side of I-10 and 12.5 meters long on the eastbound side of I-10, with a 33.0 meter gap in between for a total of 58.0 meters.
e. Corridor 5 centered on the Desperation Arroyo, West Buried Mountain Wash, Buried Mountain Wash, Resurrection Wash, West Saddle Gulch, Saddle Gulch, West Cotton Gulch, Cotton Gulch, East Cotton Gulch, and Paul Gulch culverts, west of Cottonwood Canyon.

5.0Costs of and Funding for Plan Implementation

5.1 Land Costs

A copy of *A Market Study of Land Values, Related to Several Areas of Prospective Acquisition, Associated with the Coachella Valley Multiple Species Habitat Conservation Plan* (Scarcella, July 2005) is available for review at CVAG. This study was based on the author's review of current sales and listings of comparable properties Table A5-1 summarizes projected purchase price in the Conservation Areas based on the Market Study with the above-described modifications. The table includes the Permittees' share of private land in the Conservation Areas that could have to be acquired, except the fluvial sand transport processes Essential Ecological Processes in the Cabazon, Long Canyon, and West Deception Conservation Areas where the Plan provides that the Conservation Objectives can be met without land acquisition. The table assumes acquisition of all the non-conservation land shown in the table. In practice, this may not occur because planning tools such as density transfer, and dedication of land through conditions of approval for projects in the Conservation Areas may make it unnecessary to purchase all the land. The table may, therefore, overstate the amount of land that might need to be acquired.

Table A5-1 Projected Acquisition Costs in Conservation Areas[1]

MSHCP Designation	Low-Range Per Acre	Mid-Range Per Acre	High-Range Per Acre	Total Acres[2]	Low Range %	Mid Range %	High Range %	Low-Range Totals	Mid-Range Totals	High-Range Totals	Total Value Estimate	Avg. $ Per Acre
Cabazon[3]	$ 500	$ 7,000	$ 13,500	2,140	70%	20%	10%	$ 749,000	$ 2,996,000	$ 2,889,000	$ 6,634,000	$ 3,100
Stubbe & Cottonwood Canyons	$ 500	$ 6,950	$ 13,400	1,830	40%	45%	15%	$ 366,000	$ 5,723,325	$ 3,678,300	$ 9,767,625	$ 5,338
Whitewater Canyon	$ 400	$ 4,000	$ 6,500	740	20%	80%	0%	$ 59,200	$ 2,368,000	$ -	$ 2,427,200	$ 3,280
Snow Creek / Windy Point	$ 500	$ 1,850	$ 3,200	1,340	40%	20%	40%	$ 268,000	$ 495,800	$ 1,715,200	$ 2,479,000	$ 1,850
Highway 111 / I-10	$ 2,500	$ 10,625	$ 18,750	360	20%	60%	20%	$ 180,000	$ 2,295,000	$ 1,350,000	$ 3,825,000	$ 10,625
Upper Mission Creek / Big Morongo Cyn	$ 1,500	$ 25,750	$ 50,000	6,970	65%	30%	5%	$ 6,795,750	$ 53,843,250	$ 17,425,000	$ 78,064,000	$ 11,200
Whitewater Floodplain	$ 500	$ 5,250	$ 10,000	3,940	50%	30%	20%	$ 985,000	$ 6,205,500	$ 7,880,000	$ 15,070,500	$ 3,825
Willow Hole	$ 2,500	$ 21,250	$ 40,000	1,960	25%	55%	20%	$ 1,225,000	$ 22,907,500	$ 15,680,000	$ 39,812,500	$ 20,313
Thousand Palms	$ 5,000	$ 37,500	$ 70,000	5,480	40%	45%	15%	$ 10,960,000	$ 92,475,000	$ 57,540,000	$ 160,975,000	$ 29,375
Edom Hill	$ 5,000	$ 12,500	$ 20,000	1,860	85%	10%	5%	$ 7,905,000	$ 2,325,000	$ 1,860,000	$ 12,090,000	$ 6,500
Indio Hills / Joshua Tree NP Linkage	$ 1,000	$ 15,500	$ 30,000	1,830	75%	20%	5%	$ 1,372,500	$ 5,673,000	$ 2,745,000	$ 9,790,500	$ 5,350
Indio Hills Palms	$ 500	$ 1,000	$ 1,500	1,250	55%	30%	15%	$ 343,750	$ 375,000	$ 281,250	$ 1,000,000	$ 800
East Indio Hills	$ 1,000	$ 4,250	$ 7,500	2,690	30%	55%	15%	$ 807,000	$ 6,287,875	$ 3,026,250	$ 10,121,125	$ 3,763
Santa Rosa & San Jacinto Mtns	$ 350	$ 4,000	$ 50,000	31,390	50%	48%	2%	$ 5,493,250	$ 60,268,800	$ 31,390,000	$ 97,152,050	$ 3,095
Dos Palmas	$ 350	$ 1,425	$ 2,500	10,570	90%	5%	5%	$ 3,329,550	$ 753,113	$ 1,321,250	$ 5,403,913	$ 511
Desert Tortoise and Linkage	$ 225	$ 1,113	$ 2,000	45,250	65%	25%	10%	$ 6,617,813	$ 12,585,156	$ 9,050,000	$ 28,252,969	$ 624
Joshua Tree National Park	$ 150	$ 225	$ 300	26,400	25%	25%	50%	$ 990,000	$ 1,485,000	$ 3,960,000	$ 6,435,000	$ 244
Mecca Hills / Orocopia Mountains	$ 250	$ 1,125	$ 2,000	21,970	60%	30%	10%	$ 3,295,500	$ 7,414,875	$ 4,394,000	$ 15,104,375	$ 688
CV Stormwater Channel & Delta	$ 10,000	$ 20,000	$ 30,000	3,770	30%	30%	40%	$ 11,310,000	$ 22,620,000	$ 45,240,000	$ 79,170,000	$ 21,000
West Deception Canyon[3]	$ 300	$ 300	$ 300	400	100%	0%	0%	$ 120,000	$ -	$ -	$ 120,000	$ 300
				172,140.00				**$ 63,172,313**	**$ 309,097,194**	**$ 211,425,250**	**$ 583,694,756**	**$ 3,391**

[1] This table includes the estimated costs of the Local Permittees' share of acquisitions. Land values are based on *A Market Study of Land Values, Related to Areas of Prospective Acquisition, Associated with the Coachella Valley Multiple Species Habitat Conservation Plan* (Scarcella, September 2006).

[2] Indicates the maximum acres of private non-conservation land that could need to be acquired to achieve Conservation Objectives. The acreages are lower than in the Market Study because it included projected acquisitions through Complementary Conservation and Additional Conservation lands to be acquired by state and federal agencies.

[3] Acres for which the only Conservation Objective is conserving the fluvial sand transport Essential Ecological Process are not included as meeting this Conservation Objective does not require any acquisition.

5.2 Land Improvement Costs

Land improvement refers to capital costs that occur when land is acquired in the Conservation Areas in order to render the land usable for the intended conservation purposes. These costs include but are not limited to fencing as necessary (but not ongoing maintenance of fencing), signage, and removal of trash and exotic species. In the first year of the acquisition program, $182,000 is allocated to land improvement. This cost is subject to 3% annual inflation. Over the 30 year term of the acquisition program, the total projected for land improvement is $8,683,000.

In 2005 dollars, i.e., without taking inflation into account, the projected costs are:

Fencing	$ 1,427,884
Gates	30,000
Clean-up	53,000
Saharan mustard removal	$3,943,961
Signage	3,240
TOTAL	$ 5,458,085

5.3 CVCC Administrative Costs

Table A5-2 shows the cost projections for CVCC administrative costs.

Table A5-2: CVCC Administrative Cost Projections

Position	*% time CVCC*	*Annual Salary+Benefits*	*CVCC charge*
Exec Director	0.1	$166,254	$16,625
Director of Environmental Resources	0.8	$119,538	$95,630
Program Assistant II	0.8	$68,931	$55,145
Technician	0.75	$60,403	$45,302
IT Manager	0.25	$85,176	$21,294
Accounting Technician	0.5	$57,158	$28,579
Director Administrative Services	0.1	$152,485	$15,248
Acquisitions Manager (contract)			$100,000
Subtotal			$377,824
Overhead at 20%			$75,565
Total			$453,389

These costs are apportioned between administration of the acquisition program and general administration during the thirty years period of the acquisition program. In addition to the $120,000 for an Acquisition Manager and 20% overhead, CVAG will provide staff support to the acquisition program, including GIS analysis and mapping, funding disbursement, and staff support for the Acquisition and Funding Coordinating Committee and CVCC Executive Committee regarding decisions on acquisitions. In all, in addition to the $120,000 for an Acquisition Manager and 20% overhead, $291,000 of CVAG staff time is allocated to the acquisition program, for a total of $411,000 in the first year. That amount is projected to increase 3% annually during the 30 year acquisition program.

6.0 Plan Implementation

6.1 Conservation Areas Conservation Objectives for Use in Rough Step Analysis

The annual Rough Step analysis conducted by the Permittees for each Conservation Area will verify that sufficient progress is being made toward achieving the Conservation Objectives for Core Habitats, Essential Ecological Process areas, Biological Corridors and Linkage, and conserved natural communities for each Conservation Area.

Cabazon Conservation Area Conservation Objectives.

1. In total, 2,340 acres of the Cabazon Conservation Area shall be conserved. (This may be less than the sum of acres indicated in the following objectives because there can be overlap among areas covered by the objectives. For example, Core Habitat for two or more species may overlap, or Core Habitat and an Essential Ecological Process area may overlap. The individual acreage figures will be used in compliance monitoring.)
2. Conserve at least 1,629 acres of the sand source areas.
3. Conserve at least 12 acres of mesquite hummocks natural community and 9 acres of southern sycamore-alder riparian woodland natural community, which provide Habitat for riparian birds and other Covered Species.
4. Conserve at least 83 acres of Essential Habitat for the Peninsular bighorn sheep.
5. Maintain the current capacity for fluvial (water-borne) sand transport along 4,496 acres of the San Gorgonio River and its tributaries.
6. Maintain functional Biological Corridors under I-10 by conserving at least 631 acres in the Fornat Wash Biological Corridor to maintain ecosystem function for Covered Species. Aside from the freeway culvert, which is an unavoidably narrow segment, the Biological Corridor shall be one mile wide, except where Existing Uses or Indian reservation lands not subject to the Plan preclude this width, to minimize edge effects. It should also be noted that portions of the corridor cross Indian reservation land, which is not a part of the Plan and over which the Plan exerts no control.
7. Coordinate with the Western Riverside County MSHCP Regional Conservation Authority to ensure that fluvial sand transport along the San Gorgonio River west of the Cabazon Conservation Area and functionality of the San Gorgonio River as a Biological Corridor are maintained.

Stubbe and Cottonwood Canyons Conservation Area Conservation Objectives.

1. In total, 2,430 acres of the Stubbe and Cottonwood Canyons Conservation Area shall be conserved. (This may be less than the sum of acres indicated in the following objectives because there can be overlap among areas covered by the objectives. For example, Core Habitat for two or more species may overlap, or Core Habitat and an Essential Ecological Process area may overlap. The individual acreage figures will be used in compliance monitoring.)
2. Conserve at least 2,276 acres of Core Habitat for desert tortoise, allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused disturbance, and edge effects to Core Habitat by conserving contiguous Habitat and effective Linkages between patches of Core Habitat. Protect individual tortoises within the area when allowed Development does occur.
3. Conserve at least 1,111 acres of Other Conserved Habitat for Le Conte's thrasher. Conserve Le Conte's thrasher nesting sites as described in Section 4.4 for avoidance, minimization, and mitigation measures.
4. Conserve at least 1,241 acres of the sand source area in the San Bernardino Mountains to maintain the natural erosion processes that provide sediment for the blowsand ecosystem.
5. Conserve at least 1,129 acres in the fluvial (water-borne) sand transport area. Maintain the current capacity for fluvial sand transport in Stubbe Canyon Wash.
6. Conserve occupied burrowing owl burrows as described in Section 4.4 for burrowing owl avoidance, minimization, and mitigation measures.
7. Conserve at least 25 acres of Sonoran cottonwood-willow riparian forest and at least 229 acres of desert dry wash woodland natural communities, which provide Habitat for riparian birds and other Covered Species. For the remaining acreage of the Sonoran cottonwood-willow riparian forest natural community where disturbance is authorized by the Plan, ensure no net loss.
8. Maintain functional Biological Corridors under I-10 by conserving at least 1,058 acres in the Stubbe Canyon Wash Biological Corridor north of the freeway to maintain potential Habitat connectivity for desert tortoise, Coachella Valley round-tailed ground squirrel, and Palm Springs pocket mouse, and a wildlife movement corridor to maintain ecosystem function for Covered Species. Aside from the freeway culverts and any Existing Use areas, which are unavoidably narrow segments, the Biological Corridor shall expand to one mile wide to minimize edge effects.

Snow Creek/Windy Point Conservation Area Conservation Objectives.

1. In total, 2,340 acres of the Snow Creek/Windy Point Conservation Area shall be conserved. (This may be less than the sum of acres indicated in the following objectives because there can be overlap among areas covered by the objectives. For example, Core Habitat for two or more species may overlap, or Core Habitat and an Essential Ecological Process area may overlap. The individual acreage figures will be used in compliance monitoring.)
2. Conserve Core Habitat and associated Essential Ecological Processes (as set forth below) for Coachella Valley milkvetch, Coachella Valley giant sand-treader cricket, Coachella Valley Jerusalem cricket, Coachella Valley fringe-toed lizard, Coachella Valley round-tailed ground squirrel, and Palm Springs pocket mouse, allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused disturbance, and edge effects to Core Habitat by conserving contiguous Habitat and effective Linkages between patches of Core Habitat.
    a. Conserve at least 816 acres of Core Habitat for the Coachella Valley milkvetch in the City of Palm Springs portion of the area and at least 1,210 acres of Core Habitat in the unincorporated portion of the area.
    b. Conserve at least 672 acres of Core Habitat for the Coachella Valley giant sand-treader cricket in the City of Palm Springs portion of the area and at least 501 acres of Core Habitat in the unincorporated portion of the area.
    c. Conserve at least 815 acres of Core Habitat for the Coachella Valley Jerusalem cricket in the City of Palm Springs and at least 538 acres in the unincorporated portion of the area.
    d. Conserve at least 672 acres of Core Habitat for the Coachella Valley fringe-toed lizard in the City of Palm Springs portion of the area and at least 501 acres of Core Habitat in the unincorporated portion of the area.
    e. Conserve at least 838 acres of Core Habitat for the Coachella Valley round-tailed ground squirrel in the City of Palm Springs portion of the area and at least 1,371 acres of Core Habitat in the unincorporated portion of the area.
    f. Conserve at least 838 acres of Core Habitat for the Palm Springs pocket mouse in the City of Palm Springs portion of the area and at least 1,331 acres of Core Habitat in the unincorporated portion of the area.
    g. Conserve at least 838 acres of the fluvial and aeolian sand transport area in the City of Palm Springs portion of the area and at least 1,482 acres in the unincorporated portion of the area. Maintain the current capacity for fluvial sand transport in the San Gorgonio River floodplain
3. Conserve at least 775 acres of Other Conserved Habitat for Le Conte's thrasher in the City of Palm Springs portion of the area and at least 1,453 acres of Other Conserved Habitat in the unincorporated portion of the area. Conserve Le Conte's thrasher nesting

sites as described in Section 4.4 for avoidance, minimization, and mitigation measures.

4. Conserve at least 144 acres of Essential Habitat for the Peninsular bighorn sheep in the City of Palm Springs portion of the area, and at least 443 acres in the unincorporated portion of the area.
5. Conserve individual desert tortoises as described in Section 4.4 for desert tortoise avoidance, minimization, and mitigation measures.
6. Conserve occupied burrowing owl burrows as described in Section 4.4 for burrowing owl avoidance, minimization, and mitigation measures.
7. Conserve at least 62 acres of the active desert dunes and at least 610 acres of the ephemeral desert sand fields in the City of Palm Springs portion of the area, and at least 409 acres of the ephemeral desert sand fields and at least 93 acres of the stabilized and partially stabilized desert sand fields in the unincorporated portion of the area to provide for the conservation of these natural communities. As these conserved natural communities are all part of the Core Habitat areas identified in Conservation Objective 2 for this area, attainment of that objective will also achieve this objective.
8. Maintain functional Biological Corridors and Linkages under I-10 and Highway 111 by conserving at least 415 acres of identified Biological Corridor in the unincorporated portion of the Conservation Area and at least 247 acres identified Biological Corridor in the City of Palm Springs' portion, such that the functionality of each individual Biological Corridor listed below is not compromised:
    a. Conserve the Stubbe Canyon Wash Biological Corridor south of the I-10 to maintain potential Habitat connectivity for desert tortoise, Coachella Valley round-tailed ground squirrel, and Palm Springs pocket mouse, and to maintain ecosystem function for Covered Species. Aside from the freeway culverts and any Existing Use areas, which are unavoidably narrow segments, the Biological Corridor shall expand to one mile wide to minimize edge effects.
    b. Conserve the Whitewater Floodplain Biological Corridor south of Highway 111 to maintain potential Habitat connectivity for Coachella Valley Jerusalem cricket, Coachella Valley round-tailed ground squirrel, and Palm Springs pocket mouse, and to maintain ecosystem function for Covered Species. Aside from the highway culverts and any Existing Use areas, which are unavoidably narrow segments, the Biological Corridor shall expand to one mile wide to minimize edge effects.

Whitewater Canyon Conservation Area Conservation Objectives.

1. In total, 1,440 acres of the Whitewater Canyon Conservation Area shall be conserved. (This may be less than the sum of acres indicated in the following objectives because there can be overlap among areas covered by the objectives. For example, Core Habitat for two or more species may overlap, or Core Habitat and an Essential Ecological Process area may overlap. The individual acreage figures will be used in compliance monitoring.)

2. Conserve at least 1,084 acres of Core Habitat for desert tortoise in the unincorporated portion of the area, allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused disturbance, and edge effects to Core Habitat by conserving contiguous Habitat and effective Linkages between patches of Core Habitat. Protect individual tortoises within the area if allowed Development does occur.
3. Conserve at least 850 acres of the sand source area in the San Bernardino Mountains in the unincorporated portion of the area to maintain the natural erosion processes that provide sediment for the blowsand ecosystem.
4. Conserve at least 435 acres in the fluvial (water-borne) sand transport area in the Riverside County portion of the area. Maintain the current capacity for fluvial sand transport in the Whitewater River.
5. Conserve at least 348 acres of Other Conserved Habitat for the Little San Bernardino Mountains linanthus in the Riverside County portion of the area.
6. Conserve at least 368 acres of Core Habitat for the triple-ribbed milkvetch in the Riverside County portion of the area.
7. Conserve at least 706 acres of modeled Habitat for the arroyo toad in the Riverside County portion of the area.
8. In the Riverside County portion of the area, conserve at least 107 acres of existing Sonoran cottonwood-willow riparian forest natural community, which provides Habitat for riparian birds and other Covered Species. For the remaining acreage of this natural community where disturbance is authorized by the Plan, ensure no net loss.
9. In the Riverside County portion of the area, maintain functional Biological Corridors under I-10 by conserving at least 201 acres in the Whitewater River Biological Corridor north of the freeway to maintain potential Habitat connectivity for desert tortoise, Coachella Valley round-tailed ground squirrel, and Palm Springs pocket mouse, and to maintain ecosystem function for Covered Species. Aside from the freeway bridge and any Existing Use areas, which are unavoidably narrow segments, the Biological Corridor shall expand to one mile wide to minimize edge effects.

Highway 111/I-10 Conservation Area Conservation Objectives.

1. Conserve 350 acres in this Conservation Area. This will protect Other Conserved Habitat for the Coachella Valley milkvetch, Coachella Valley Jerusalem cricket, Coachella Valley round-tailed ground squirrel, Palm Springs pocket mouse, and Le Conte's thrasher, allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused disturbance, and edge effects to Habitat by conserving contiguous Habitat patches and effective Linkages between them.

<u>Whitewater Floodplain Conservation Area Conservation Objectives</u>.

1. In total, 4,140 acres of the Whitewater Floodplain Conservation Area shall be conserved. (This may be less than the sum of acres indicated in the following objectives because there can be overlap among areas covered by the objectives. For example, Core Habitat for two or more species may overlap, or Core Habitat and an Essential Ecological Process area may overlap. The individual acreage figures will be used in compliance monitoring.)
2. Conserve Core Habitat and associated ecological processes (as set forth below) for Coachella Valley milkvetch, Coachella Valley giant sand-treader cricket, Coachella Valley fringe-toed lizard, Coachella Valley round-tailed ground squirrel, and Palm Springs pocket mouse, allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused disturbance, and edge effects to Core Habitat by conserving contiguous Habitat and effective Linkages between patches of Core Habitat.
    a. Conserve at least 2,671 acres of Core Habitat for the Coachella Valley milkvetch in the Palm Springs portion of the area, at least 61 acres in the Cathedral City portion of the area, and at least 58 acres in the unincorporated Riverside County portion of the area.
    b. Conserve at least 2,659 acres of Core Habitat for the Coachella Valley giant sand-treader cricket in the Palm Springs portion of the area, at least 61 acres in the Cathedral City portion of the area, and at least 57 acres in the unincorporated Riverside County portion of the area.
    c. Conserve at least 2,659 acres of Core Habitat for the Coachella Valley fringe-toed lizard in the Palm Springs portion of the area, at least 61 acres in the Cathedral City portion of the area, and at least 57 acres in the unincorporated Riverside County portion of the area.
    d. Conserve at least 2,955 acres of Core Habitat for the Coachella Valley round-tailed ground squirrel in the Palm Springs portion of the area, at least 59 acres in the Cathedral City portion of the area, and at least 100 acres in the unincorporated Riverside County portion of the area.
    e. Conserve at least 3,122 acres of Core Habitat for the Palm Springs pocket mouse in the Palm Springs portion of the area, at least 61 acres in the Cathedral City portion of the area, and at least 477 acres in the unincorporated Riverside County portion of the area.
    f. Conserve at least 3,484 acres of the fluvial and aeolian sand transport area in the Palm Springs portion of the area, at least 61 acres in the Cathedral City portion of the area, and at least 481 acres in the unincorporated Riverside County portion of the area. Maintain the current capacity for fluvial sand transport in the Whitewater River floodplain.
3. Conserve occupied burrowing owl burrows as described in Section 4.4 for burrowing owl

avoidance, minimization, and mitigation measures.

4. Conserve at least 3,433 acres of Other Conserved Habitat for Le Conte's thrasher in the Palm Springs portion of the area, at least 61 acres in the Cathedral City portion of the area, and at least 480 acres in the unincorporated Riverside County portion of the area. Conserve Le Conte's thrasher nesting sites as described in Section 4.4 for avoidance, minimization, and mitigation measures.
5. Conserve at least 392 acres of the active desert sand fields in the Palm Springs portion of the area; at least 43 acres of the active desert sand fields in the Cathedral City portion of the area; at least 1,185 acres of the ephemeral desert sand fields in the Palm Springs portion of the area and at least 52 acres in the unincorporated Riverside County portion of the area for the conservation of these natural communities; at least 394 acres of the stabilized and partially stabilized desert sand fields in the Palm Springs portion of the area and at least 4 acres of the stabilized and partially stabilized desert sand fields in the unincorporated Riverside County portion of the area. As these conserved natural communities are all part of the Core Habitat areas identified in Conservation Objective 2 for this area, attainment of that objective will also achieve this objective.
6. Maintain functional Biological Corridors and Linkages by conserving at least 475 acres of identified Biological Corridor in the unincorporated portion of the Conservation Area, at least 809 acres of identified Biological Corridor in the City of Palm Springs' portion, and at least 18 acres of identified Biological Corridor in the City of Cathedral City portion, such that the functionality of each individual Biological Corridor listed below is not compromised:
    a. Conserve the Whitewater River Biological Corridor south of I-10 in the unincorporated area to maintain potential Habitat connectivity for desert tortoise, Coachella Valley round-tailed ground squirrel, and Palm Springs pocket mouse, and to maintain ecosystem function for Covered Species. Aside from the freeway bridge and any Existing Use areas, which are unavoidably narrow segments, the Biological Corridor shall expand to one mile wide to minimize edge effects.
    b. Conserve the Mission Creek Biological Corridor south of the freeway in the Palm Springs portion of the Conservation Area to maintain potential Habitat connectivity for Coachella Valley round-tailed ground squirrel, and Palm Springs pocket mouse, and to maintain ecosystem function for Covered Species. Aside from the freeway culvert and any Existing Use areas, which are unavoidably narrow segments, the Biological Corridor shall expand to one mile wide to minimize edge effects.
    c. Conserve the Willow wash area south of the I-10 in Palm Springs and in Cathedral City to maintain potential Habitat connectivity for Coachella Valley round-tailed ground squirrel, and Palm Springs pocket mouse, and to maintain ecosystem function for Covered Species. Aside from the freeway culverts and any Existing Use areas, which are unavoidably narrow segments, the Biological

Corridor shall expand to one mile wide to minimize edge effects.

d. Maintain the ability of wildlife to cross Indian Avenue and Gene Autry Trail by providing undercrossings for Coachella Valley fringe-toed lizard, flat-tailed horned lizard, Coachella Valley round-tailed ground squirrel, and Palm Springs pocket mouse if these roads are widened to six lanes or more.

Upper Mission Creek/Big Morongo Canyon Conservation Area Conservation Objectives.

1. In total, ~~11,037~~10,810 acres of the Upper Mission Creek/Big Morongo Canyon Conservation Area shall be conserved. (This may be less than the sum of acres indicated in the following objectives because there can be overlap among areas covered by the objectives. For example, Core Habitat for two or more species may overlap, or Core Habitat and an Essential Ecological Process area may overlap. The individual acreage figures will be used in compliance monitoring.) If through means not under the control of the Permittees this Conservation Objective cannot be achieved within the Desert Hot Springs or Riverside County portions of the Conservation Area, the acreage not conserved per this Conservation Objective shall be conserved in or adjacent to this Conservation Area or the Willow Hole, Whitewater Canyon, Desert Tortoise Linkage, Stubbe and Cottonwood Canyons, Indio Hills/Joshua Tree National Park Linkage, Joshua Tree National Park, Mecca Hills/Orocopia Mountains, or Snow Creek/Windy Point Conservation Areas as described below for the individual species. The Wildlife Agencies shall review impacts and conservation pursuant to the requirements above annually during the Rough Step review. If, as described below, the maximum impacts are exceeded or the minimum required conservation is not occurring, coverage for Palm Springs pocket mouse and/or Little San Bernardino Mountains linanthus shall automatically terminate and the CVCC and Permittees will be given written notice acknowledging the termination of coverage for the above-referenced species 30 days prior to coverage terminating.

2. Conserve Core Habitat and associated ecological processes (as set forth below) for Little San Bernardino Mountains linanthus, triple-ribbed milkvetch, desert tortoise, and Palm Springs pocket mouse, allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused disturbance, and edge effects to Core Habitat by conserving contiguous Habitat and effective Linkages between patches of Core Habitat.

   a. Conserve at least ~~967~~966 acres of Core Habitat for the Little San Bernardino Mountains linanthus in the Desert Hot Springs portion of the area ~~(including at least 891 acres in the Special Provisions Area)~~ and at least ~~1,100~~1,052 acres in the Riverside County portion ~~(including at least 65 acres in the Special Provisions Area)~~, including the hydrologic processes upon which the plant depends. ~~If, through means not under the control of the Permittees, this Conservation Objective cannot be achieved, for every acre less than 967 acres conserved in the Desert Hot Springs portion of the area (within the current Desert Hot Springs City limits), and for every acre less than 1,100 acres conserved in the Riverside County portion of the area, 2 acres of suitable habitat shall be conserved adjacent to or within this Conservation~~

~~Area, Willow Hole Conservation Area, or Whitewater Canyon Conservation Area. These acquisitions shall occur, at a minimum, incrementally with disturbance, so as to occur within 2 years of whenever the acres not conserved shown in Table 4-42a or acres of disturbance authorized in Table 4-42c are exceeded, at the same ratio (2:1 for losses beyond those anticipated in the tables). These substitute acquisitions within Conservation Areas pursuant to the requirements above would be beyond the minimum Conservation Objectives identified in the Plan. Proposed acquisitions shall be subject to Wildlife Agencies' review and approval.~~

b. Conserve at least 426 acres of Core Habitat for the triple-ribbed milkvetch in the Riverside County portion of the area.

c. Conserve at least ~~1,429~~2,271 acres of Core Habitat for desert tortoise in the Desert Hot Springs portion of the area ~~(including at least 1,324 acres in the Special Provisions Area)~~ and at least ~~7,984~~7,936 acres in the Riverside County portion ~~(including at least 192 acres in the Special Provisions Area)~~. Protect individual tortoises within the area when allowed Development does occur. ~~If, through means not under the control of the Permittees, this Conservation Objective cannot be achieved, for every acre less than 1,429 acres conserved in the Desert Hot Springs portion of the area, and for every acre less than 7,984 acres conserved in the Riverside County portion of the area, 2 acres of suitable habitat shall be conserved adjacent to or within this Conservation Area, the Desert Tortoise Linkage, Stubbe and Cottonwood Canyons, Whitewater Canyon, Indio Hills/Joshua Tree National Park Linkage, Joshua Tree National Park, or Mecca Hills/Orocopia Mountains Conservation Areas. These acquisitions shall occur incrementally with disturbance, so as to occur within 2 years of whenever the acres not conserved shown in Table 4-42a or the acres of disturbance authorized in Table 4-42c are exceeded, at the same 2:1 ratio. These substitute acquisitions within Conservation Areas pursuant to the requirements above would be beyond the minimum Conservation Objectives identified in the Plan. Proposed acquisitions shall be subject to Wildlife Agencies' review and approval.~~

d. Conserve at least ~~1,403~~1,865 acres of Core Habitat for the Palm Springs pocket mouse in the Desert Hot Springs portion of the area ~~(including at least 1,324 acres in the Special Provisions Area)~~, at least 22 acres of Other Conserved Habitat for the Palm Springs pocket mouse in the Palm Springs portion of the area and at least ~~1,363~~ 1,112 acres of Core Habitat in the Riverside County portion ~~(including at least 203 acres in the Special Provisions Area)~~. Maintain potential Habitat connectivity between Core Habitat in the Upper Mission Creek/Big Morongo Canyon Conservation Area and the Willow Hole Conservation Area. Minimize fragmentation and human-disturbance of, and edge effects to, the Habitat connectivity area along Morongo Wash from any Development allowed within the Conservation Area. ~~If, through means not under the control of the Permittees, this Conservation Objective cannot be achieved, for every acre less than 1,403 acres conserved in the Desert Hot Springs portion of the area, and for every acre less than 1,363 acres conserved in the Riverside County portion of the area, then 2 acres of suitable habitat shall be conserved adjacent to or within this Conservation Area or in the Willow Hole or Snow Creek/Windy Point Conservation Areas. These acquisitions shall occur~~

~~incrementally with disturbance, so as to occur within 2 years of whenever the acres not conserved shown in Table 4-42a or acres of disturbance authorized in Table 4-42c are exceeded, at the same 2:1 ratio. These substitute acquisitions within Conservation Areas pursuant to the requirements above would be beyond the minimum Conservation Objectives identified in the Plan. Conservation within or adjacent to the Snow Creek/Windy Point Conservation Area shall make up no more than 40 percent of the offsetting acreage. Proposed acquisitions shall be subject to Wildlife Agencies' review and approval.~~

e. Conserve at least ~~6~~141 acres of the sand source areas in the Desert Hot Springs portion of the area and at least 6,488 acres in the Riverside County portion subject to natural erosion processes.

f. Conserve at least ~~1,399~~1,949 acres of the fluvial sand transport areas in the Desert Hot Springs portion of the area ~~(including at least 1,319 acres in the Special Provisions Area)~~, at least 22 acres in the Palm Springs portion, and at least ~~1,509~~1,259 acres in the Riverside County portion. Maintain the current capacity for fluvial sand transport in Mission Creek and Morongo Wash.

3. Conserve at least ~~1,409~~1,931 acres of Other Conserved Habitat for Le Conte's thrasher in the Desert Hot Springs portion of the area ~~(including at least 1,326 acres in the Special Provisions Area)~~, at least 22 acres in the Palm Springs portion, and at least ~~1,323~~1,072 acres in the Riverside County portion of the area ~~(including at least 203 acres in the Special Provisions Area)~~. Conserve Le Conte's thrasher nesting sites as described in Section 4.4 for avoidance, minimization, and mitigation measures. ~~If, through means not under the control of the Permittees, this Conservation Objective cannot be achieved, for every acre less than 1,409 acres conserved in the Desert Hot Springs portion of the area, and for every acre less than 1,323 acres conserved in the Riverside County portion of the area, 2 acres of suitable habitat shall be conserved adjacent to or within this Conservation Area or within other appropriate Conservation Areas described in Table 9-23 of the Plan. These acquisitions shall occur incrementally with disturbance, so as to occur within 2 years of whenever the acres not conserved shown in Table 4-42a or acres of disturbance authorized in Table 4-42c are exceeded, at the same 2:1 ratio. These substitute acquisitions within Conservation Areas pursuant to the requirements above would be beyond the minimum Conservation Objectives identified in the Plan. Proposed acquisitions shall be subject to Wildlife Agencies' review and approval.~~

4. Conserve at least ~~460~~90 acres of Coachella Valley Jerusalem cricket Habitat in the Desert Hot Springs portion of the area, and at least 419 acres of Coachella Valley Jerusalem cricket Habitat in the Riverside County portion of the area ~~(including at least 41 acres in the Special Provisions Area)~~.

5. Conserve occupied burrowing owl burrows as described in Section 4.4 for burrowing owl avoidance, minimization, and mitigation measures.

6. Conserve at least 76 acres of Sonoran cottonwood-willow riparian forest and at least ~~52~~58 acres of Southern sycamore-alder riparian woodland in the Riverside County portion of the area; and at least ~~58~~76 acres of desert dry wash woodland natural

communities in the Desert Hot Springs portion ~~(including at least 57 acres in the Special Provisions Area)~~, and at least 76 acres in the Riverside County portion, which provide Habitat for riparian birds and other Covered Species. For the remaining acreage of these conserved natural communities where disturbance is authorized by the Plan, ensure no net loss. ~~If, through means not under the control of the Permittees, this Conservation Objective cannot be achieved, for every acre less than 58 acres conserved in the Desert Hot Springs portion of the area, and for every acre less than 76 acres in the Riverside County portion of the area, 2 acres of suitable habitat shall be conserved adjacent to or within this Conservation Area or within other appropriate Conservation Areas described in Table 10-26 of the Plan. These acquisitions shall occur incrementally with disturbance, so as to occur within 2 years of whenever the acres not conserved shown in Table 4-42a or the acres of disturbance authorized in Table 4-42c are exceeded, at the same 2:1 ratio. These substitute acquisitions within Conservation Areas pursuant to the requirements above would be beyond the minimum Conservation Objectives identified in the Plan. Proposed acquisitions shall be subject to Wildlife Agencies' review and approval.~~

7. Maintain the two bridges on Highway 62 over Mission Creek so as not to affect the existing sediment transport and Biological Corridor. Maintain functional Biological Corridors under Highway 62 by conserving at least 88 acres in the Desert Hot Springs portion and at least ~~715~~688 acres in the Riverside County portion to maintain potential Habitat connectivity for desert tortoise and Palm Springs pocket mouse, and to maintain ecosystem function for Covered Species. Aside from the highway bridges and any Existing Use areas, which are unavoidably narrow segments, the Biological Corridor shall expand to one mile wide to minimize edge effects.

8. Maintain the fluvial sand transport along the existing Mission Creek Channel.

Willow Hole Conservation Area Conservation Objectives.

1. In total, 4,920 acres of the Willow Hole Conservation Area shall be conserved. (This may be less than the sum of acres indicated in the following objectives because there can be overlap among areas covered by the objectives. For example, Core Habitat for two or more species may overlap, or Core Habitat and an Essential Ecological Process area may overlap. The individual acreage figures will be used in compliance monitoring.)

2. Conserve Core Habitat and associated ecological processes (as set forth below) for Coachella Valley milkvetch, Coachella Valley fringe-toed lizard, Coachella Valley round-tailed ground squirrel, and Palm Springs pocket mouse, allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused disturbance, and edge effects to Core Habitat by conserving contiguous Habitat patches and effective Linkages between patches of Core Habitat.

   a. Conserve at least 782 acres of Core Habitat for the Coachella Valley milkvetch in the Cathedral City portion of the area, at least 863 acres in the Desert Hot Springs portion of the area, and at least ~~1,751~~888 acres in the Riverside County portion.

b. Conserve at least 211 acres of Core Habitat for the Coachella Valley fringe-toed lizard in the Cathedral City portion of the area, at least 3 acres in the Desert Hot Springs portion of the area, and at least ~~454~~452 acres in the Riverside County portion.

c. Conserve at least 1,256 acres of Core Habitat for the Coachella Valley round-tailed ground squirrel in the Cathedral City portion of the area, at least 3 acres in the Desert Hot Springs portion of the area, and at least ~~1,081~~1,078 acres in the Riverside County portion.

d. Conserve at least 959 acres of Core Habitat for the Palm Springs pocket mouse in the Cathedral City portion of the area, at least 1,542 acres in the Desert Hot Springs portion of the area, and at least ~~2,684~~1,142 acres in the Riverside County portion of the area. Maintain potential Habitat connectivity between Core Habitat in the Willow Hole Conservation Area and Upper Mission Creek/Big Morongo Canyon Conservation Area. Minimize fragmentation and human-disturbance of, and edge effects to, the Habitat connectivity area along Morongo Wash from any Development allowed within the Conservation Area.

e. Conserve at least 710 acres of the sand source area in the Cathedral City portion of the area and at least 17 acres in the Riverside County portion to maintain the natural erosion processes that provide sediment for the blowsand ecosystem.

3. Conserve at least 798 acres in the fluvial (water-borne) and aeolian (air-borne) sand transport area in the Cathedral City portion of the area, at least 1,542 acres in the Desert Hot Springs portion of the area, and at least ~~2,734~~1,192 acres in the Riverside County portion. Maintain the current capacity for fluvial sand transport in Mission Creek and Morongo Wash for sand transport to the Willow Hole/Edom Hill Reserve.

4. Conserve at least 1,508 acres of Other Conserved Habitat for Le Conte's thrasher in the Cathedral City portion of the area, at least 1,499 acres in the Desert Hot Springs portion of the area, and at least ~~2,677~~1,178 acres in the Riverside County portion. Conserve Le Conte's thrasher nesting sites as described in See Section 4.4 avoidance, minimization, and mitigation measures.

5. Conserve at least ~~98~~71 acres of mesquite hummocks natural community in the Riverside County portion of the area, and at least 27 acres in the Desert Hot Springs portion of the area, which provides Habitat for riparian birds and other Covered Species.

6. Conserve at least ~~319~~194 acres of stabilized & partially stabilized desert dunes in the Riverside County portion and at least 125 acres in the Desert Hot Springs portion; at least 33 acres of active desert sand fields in the Cathedral City portion of the area; at least 178 acres of ephemeral desert sand fields in the Cathedral City portion of the area, at least 549 acres in the Desert Hot Springs portion, and at least ~~728~~179 acres in the Riverside County portion; at least 51 acres of stabilized and partially stabilized desert sand fields in the Cathedral City portion of the area, at least 49 acres in the Desert Hot Springs portion, and at least 79~~128~~ acres in the Riverside County portion; and at least 152 acres of desert saltbush scrub in the Riverside County portion of the area to conserve these natural communities.

7. Maintain functional Biological Corridors between this area and the Whitewater Floodplain Conservation Area by maintaining the culverts conveying Mission Creek and Willow Wash under I-10 at no less than their current size and character. Maintain functional Biological Corridors under I-10 by conserving at least ~~397~~120 acres in the Riverside County portion and at least 277 acres in the Desert Hot Springs portion ~~total~~, such that the functionality of each individual Biological Corridor listed below is not compromised:

   a. Conserve the Mission Creek Biological Corridor north of the freeway to maintain potential Habitat connectivity for Coachella Valley round-tailed ground squirrel, and Palm Springs pocket mouse, and to maintain ecosystem function for Covered Species. Aside from the freeway culvert and any Existing Use areas, which are unavoidably narrow segments, the Biological Corridor shall expand to one mile wide to minimize edge effects.

   b. Conserve the Willow Wash area north of the freeway in the City of Desert Hot Springs ~~unincorporated county portion~~ to maintain potential Habitat connectivity for Coachella Valley round-tailed ground squirrel, and Palm Springs pocket mouse, and to maintain ecosystem function for Covered Species. Aside from the freeway culverts and any Existing Use areas, which are unavoidably narrow segments, the Biological Corridor shall expand to one mile wide to minimize edge effects.

8. Maintain the ability of wildlife to cross Mountain View Road, Varner Road, 18th Avenue, and Dillon Road by providing culverts or undercrossings for Coachella Valley fringe-toed lizard, Coachella Valley giant sand-treader cricket, Coachella Valley round-tailed ground squirrel, Palm Springs pocket mouse, and other species if these roads are widened beyond two lanes.

9. Maintain the fluvial sand transport along the existing Mission Creek Channel.

10. Conserve occupied burrowing owl burrows as described in Section 4.4 for burrowing owl avoidance, minimization, and mitigation measures.

11. Remove tamarisk to improve water availability for mesquite hummocks.

Long Canyon Conservation Area Conservation Objectives.

1. Maintain the fluvial (water-borne) transport of sediment through the Long Canyon floodplain area. Maintain the current capacity for fluvial sand transport in Long Canyon wash.

Edom Hill Conservation Area Conservation Objectives.

1. In total, 3,060 acres of the Edom Hill Conservation Area shall be conserved. (This may be less than the sum of acres indicated in the following objectives because there can be overlap among areas covered by the objectives. For example, Core Habitat for two or more species may overlap, or Core Habitat and an Essential Ecological Process area may overlap. The individual acreage figures will be used in compliance monitoring.)

2. To maintain connectivity, conserve the Other Conserved Habitat patches for the Coachella Valley milkvetch, Coachella Valley giant sand-treader cricket, Coachella Valley fringe-toed lizard, Coachella Valley round-tailed ground squirrel, and Palm Springs pocket mouse between the Thousand Palms Conservation Area and the Willow Hole Conservation Area. Maintain the Other Conserved Habitat patches, allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused disturbance, and edge effects to the Habitat by conserving effective Linkages between patches of Core Habitat.
3. Conserve ecological processes (as set forth below) for the Willow Hole Conservation Area and the Thousand Palms Conservation Area.
    a. Conserve at least 310 acres of the sand source area for the Willow Hole Conservation Area in the Cathedral City portion of the area and at least 1,770 acres in the Riverside County portion to maintain the natural erosion processes that provide sediment for the blowsand ecosystem.
    b. Conserve at least 565 acres in the fluvial sand transport area in the Riverside County portion of the area for the Willow Hole Conservation Area. Maintain the current capacity for fluvial sand transport in the washes emanating from the Indio Hills that carry sand to the Willow Hole Conservation Area.
    c. Conserve that portion of the sand source area for the Thousand Palms Conservation Area in the Riverside County portion of the Conservation Area to maintain the natural erosion processes that provide sediment for the blowsand ecosystem.
4. Conserve occupied burrowing owl burrows as described in Section 4.4 avoidance, minimization, and mitigation measures.
5. Conserve at least 310 acres of Other Conserved Habitat for Le Conte's thrasher in the Cathedral City portion of the area and at least 1,745 acres in the Riverside County portion. Conserve individual Le Conte's thrasher nesting sites as described in Section 4.4 avoidance, minimization, and mitigation measures.
6. Conserve at least 3 acres of the stabilized and partially stabilized desert sand fields, and at least 37 acres of active desert sand fields in the Riverside County portion of the area to ensure the conservation of these conserved natural communities.

Thousand Palms Conservation Area Conservation Objectives.

1. In total, 8,040 additional acres of the Thousand Palms Conservation Area shall be conserved. (This may be less than the sum of acres indicated in the following objectives because there can be overlap among areas covered by the objectives. For example, Core Habitat for two or more species may overlap, or Core Habitat and an Essential Ecological Process area may overlap. The individual acreage figures will be used in compliance monitoring.)
2. Conserve Core Habitat and associated ecological processes (as set forth below) for

Coachella Valley milkvetch, Mecca aster, Coachella Valley giant sand-treader cricket, Coachella Valley fringe-toed lizard, flat-tailed horned lizard, Coachella Valley round-tailed ground squirrel, and Palm Springs pocket mouse, allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused disturbance, and edge effects to Core Habitat by conserving contiguous Habitat patches and effective Linkages between patches of Core Habitat. This will also help maintain connectivity with Habitat at Willow Hole through the Edom Hill Conservation Area.

a. Conserve at least 985 acres of Core Habitat for the Coachella Valley milkvetch.

b. Conserve at least 2,676 acres of Core Habitat for the Mecca aster.

c. Conserve at least 818 acres of Core Habitat for the Coachella Valley giant sand-treader cricket.

d. Conserve at least 818 acres of Core Habitat for the Coachella Valley fringe-toed lizard.

e. Conserve at least 860 acres of Core Habitat for the flat-tailed horned lizard. Conserve individual flat-tailed horned lizards as described in Section 4.4 avoidance, minimization, and mitigation measures.

f. Conserve at least 3,082 acres of Core Habitat for the Coachella Valley round-tailed ground squirrel.

g. Conserve at least 3,679 acres of Core Habitat for the Palm Springs pocket mouse.

h. Conserve at least 3,712 acres of the sand source area to maintain the natural erosion processes that provide sediment for the blowsand ecosystem. This also maintains Linkages for wildlife to the Edom Hill Conservation Area.

i. Conserve at least 4,206 acres in the fluvial and aeolian sand transport area to maintain the sand transport system. Maintain the current capacity for fluvial sand transport in the washes emanating from the Indio Hills that provide sand for the Thousand Palms Conservation Area. This also maintains Linkages for wildlife to the Edom Hill Conservation Area.

3. Conserve occupied burrowing owl burrows as described in Section 4.4 burrowing owl avoidance, minimization, and mitigation measures.

4. Conserve the refugia locations for the desert pupfish in accordance with the Desert Pupfish Recovery Plan.

5. Conserve at least 3,972 acres of Other Conserved Habitat for Le Conte's thrasher. Conserve Le Conte's thrasher nesting sites as described in Section 4.4 avoidance, minimization, and mitigation measures.

6. Conserve at least 34 acres of the desert dry wash woodland natural community, which provides Habitat for riparian birds and other Covered Species. For the remaining acreage of this natural community where disturbance is authorized by the Plan, ensure no net loss.

7. Conserve at least 14 acres of active desert dunes and at least 804 acres of active desert sand fields to provide for the Conservation of these conserved natural communities. This goal will be attained through attaining Goal 2 for the species that inhabit these conserved

natural communities.

8. Maintain the hydrologic groundwater regime necessary to maintain the pupfish refugium and the mesquite hummocks, Sonoran cottonwood-willow riparian woodland, desert dry wash woodland, and desert fan palm oasis woodland natural communities in this Conservation Area.

9. Maintain the ability of wildlife to cross Ramon Road, Washington Street, and Thousand Palms Canyon Road by providing undercrossings for Coachella Valley fringe-toed lizard, flat-tailed horned lizard, Coachella Valley round-tailed ground squirrel, and Palm Springs pocket mouse if these roads are widened. These undercrossings should also provide for seed dispersal.

West Deception Canyon Conservation Area Conservation Objectives.

1. Conserve at least 1,063 acres of the sand source area to maintain the natural erosion processes that provide sediment for the blowsand ecosystem.

2. Maintain the current capacity for fluvial sand transport in the West Deception Canyon fluvial sand transport system.

Indio Hills/Joshua Tree National Park Linkage Conservation Area Conservation Objectives.

1. In total, 10,530 acres of the Indio Hills/Joshua Tree National Park Linkage Conservation Area shall be conserved. (This may be less than the sum of acres indicated in the following objectives because there can be overlap among areas covered by the objectives. For example, Core Habitat for two or more species may overlap, or Core Habitat and an Essential Ecological Process area may overlap. The individual acreage figures will be used in compliance monitoring.)

2. Conserve ecological processes for the Thousand Palms Conservation Area that occur in the Indio Hills/Joshua Tree National Park Linkage Conservation Area and Core Habitat for the desert tortoise as set forth below:

   a. Conserve at least 7,735 acres of Core Habitat for desert tortoise, allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused disturbance, and edge effects to Core Habitat by conserving contiguous Habitat and effective Linkages between patches of Core Habitat. Protect individual tortoises within the area when allowed Development does occur.

   b. Conserve at least 4,135 acres of the sand source area to maintain the natural erosion processes that provide sediment for the blowsand ecosystem.

   c. Conserve at least 6,132 acres in the fluvial sand transport area. Maintain the current capacity for fluvial sand transport in the washes emanating from the Little San Bernardino Mountains that flow into Thousand Palms Canyon.

3. Maintain functional Biological Corridors and Linkages as set forth below.
   a. Conserve at least 10,267 acres in the Indio Hills/Joshua Tree National Park Biological Corridor to maintain Habitat connectivity and ecosystem function between the Thousand Palms Conservation Area and the Joshua Tree National Park Conservation Area for Covered Species. The corridor shall be wide enough to minimize edge effects.
4. Conserve at least 5,457 acres of Other Conserved Habitat for Le Conte's thrasher. Conserve Le Conte's thrasher nesting sites as described in Section 4.4 avoidance, minimization, and mitigation measures.
5. Maintain the ability of wildlife to cross Dillon Road by providing undercrossings to maintain ecosystem function for Covered Species, if this road is widened.

Indio Hills Palms Conservation Area Conservation Objectives.

1. In total, 2,290 acres of the Indio Hills Palms Conservation Area shall be conserved. (This may be less than the sum of acres indicated in the following objectives because there can be overlap among areas covered by the objectives. For example, Core Habitat for two or more species may overlap, or Core Habitat and an Essential Ecological Process area may overlap. The individual acreage figures will be used in compliance monitoring.)
2. Conserve at least 2,290 acres of Core Habitat for Mecca aster, allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused disturbance, and edge effects to Core Habitat by conserving contiguous Habitat patches and effective linkages between patches of Core Habitat.
3. Conserve at least 7 acres of Other Conserved Habitat for Le Conte's thrasher. Conserve Le Conte's thrasher nesting sites as described in Section 4.4 avoidance, minimization, and mitigation measures.
4. Conserve at least 33 acres of desert dry wash woodland natural community, which provides Habitat for riparian birds and other Covered Species.
5. Conserve at least 1 acre of the mesquite hummocks natural community, which provides Habitat for riparian birds and other Covered Species.
6. Conserve at least 42 acres of desert fan palm oasis woodland natural community, which provides Habitat for southern yellow bat.

East Indio Hills Conservation Area Conservation Objectives.

1. In total, 2,790 acres of the East Indio Hills Conservation Area shall be conserved. (This may be less than the sum of acres indicated in the following objectives because there can be overlap among areas covered by the objectives. For example, Core Habitat for two or more species may overlap, or Core Habitat and an Essential Ecological Process area may overlap. The individual acreage figures will be used in compliance monitoring.)

2. Conserve Habitat, as set forth below, for Mecca aster, flat-tailed horned lizard, Coachella Valley round-tailed ground squirrel, and Palm Springs pocket mouse, allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused disturbance, and edge effects by conserving contiguous Habitat patches and effective Linkages.

    a. Conserve at least 1,045 acres of Other Conserved Habitat for the Mecca aster in the Riverside County portion of the area.

    b. Conserve at least 415 acres of Other Conserved Habitat for the flat-tailed horned lizard in the Riverside County portion of the area, at least 5 acres in the City of Coachella portion, and at least 100 acres in the City of Indio portion. Conservation of species Habitat in the City of Indio is subject to the conditions in measure 1 of the Required Measures for the Conservation Area section below.

    c. Conserve at least 1,253 acres of Other Conserved Habitat for Le Conte's thrasher in the Riverside County portion of the area, at least 56 acres in the City of Coachella portion, and at least 105 acres in the City of Indio portion. Conserve Le Conte's thrasher nesting sites in the area as described in Section 4.4 for avoidance, minimization, and mitigation measures. Conservation of species Habitat in the City of Indio is subject to the conditions in measure 1 of the Required Measures for the Conservation Area section below.

    d. Conserve at least 896 acres of Other Conserved Habitat for the Coachella Valley round-tailed ground squirrel in the Riverside County portion of the area, at least 5 acres in the City of Coachella portion, and at least 103 acres in the City of Indio portion. Conservation of species Habitat in the City of Indio is subject to the conditions in measure 1 of the Required Measures for the Conservation Area section below.

    e. Conserve at least 944 acres of Other Conserved Habitat for the Palm Springs pocket mouse in the Riverside County portion of the area, at least 7 acres in the City of Coachella portion, and at least 103 acres in the City of Indio portion. Conservation of species Habitat in the City of Indio is subject to the conditions in measure 1 of the Required Measures for the Conservation Area section below.

3. Conserve at least 4 acres of active desert dunes in the Riverside County portion; at least 295 acres of stabilized and partially stabilized desert sand fields in the Riverside County portion of the area; at least 100 acres of stabilized shielded desert sand fields in the City of Indio portion of the area and at least 256 acres in the Riverside County portion; at least 2 acres of mesquite hummocks in the City of Indio portion of the area and at least 39 acres in the Riverside County portion; and at least 7 acres of desert saltbush scrub in the Riverside County portion of the area to conserve these natural communities. Conservation of natural communities in the City of Indio is subject to the conditions in measure 1 of the Required Measures for the Conservation Area section below.

4. Consistent with the research program described in Section 8.4.1.2, restore 80 acres of mesquite hummocks if 80% of the mesquite hummocks natural community in the south half of Section 17, T5S, R8E, is not conserved under the Plan. If the 80% is conserved, the Conservation Objective shall be to restore 40 acres of mesquite hummocks.

Joshua Tree National Park Conservation Area Conservation Objectives.

1. In total, 35,600 acres of the Joshua Tree National Park Conservation Area shall be conserved. (This may be less than the sum of acres indicated in the following objectives because there can be overlap among areas covered by the objectives. For example, Core Habitat for two or more species may overlap, or Core Habitat and an Essential Ecological Process area may overlap. The individual acreage figures will be used in compliance monitoring.)
2. Conserve Core Habitat for desert tortoise, potential Habitat for gray vireo, and ecological processes for the Joshua Tree National Park Conservation Area (as set forth below), allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused disturbance, and edge effects to Core Habitat by conserving contiguous Habitat patches and effective Linkages between patches of Core Habitat.
    a. Conserve at least 15,367 acres of Core Habitat for desert tortoise. Protect individual tortoises within the area when allowed Development does occur.
    b. Conserve at least 1,208 acres of Other Conserved Habitat for the gray vireo.
    c. Conserve at least 222 acres of Other Conserved Habitat for Le Conte's thrasher. Conserve Le Conte's thrasher nesting sites as described in Section 4.4 avoidance, minimization, and mitigation measures.
    d. Maintain the current capacity for fluvial sand transport in the washes emanating from the Little San Bernardino Mountains that provide sand for the Thousand Palms Conservation Area.
3. Conserve at least 7,195 acres of the Mojave mixed woody scrub and at least 1,208 acres of the Mojavean pinyon and juniper woodland natural communities
4. Conserve at least 119 acres of the desert dry wash woodland natural community, which provides Habitat for riparian birds and other Covered Species.

Desert Tortoise and Linkage Conservation Area Conservation Objectives.

1. In total, 46,350 acres of the Desert Tortoise Linkage Conservation Area shall be conserved. (This may be less than the sum of acres indicated in the following objectives because there can be overlap among areas covered by the objectives. For example, Core Habitat for two or more species may overlap, or Core Habitat and an Essential Ecological Process area may overlap. The individual acreage figures will be used in compliance monitoring.)

2. Conserve Core Habitat as set forth below for desert tortoise, allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused disturbance, and edge effects to Core Habitat by conserving contiguous Habitat and effective Linkages between patches of Core Habitat. In addition, conserve Habitat for the Mecca aster and Orocopia sage, for which this area provides Core Habitat in conjunction with that in the Mecca Hills/Orocopia Mountains Conservation Area.

    a. Conserve at least 44,977 acres of Core Habitat for the desert tortoise in the Riverside County portion of the area, and at least 270 acres in the City of Coachella portion. Protect individual tortoises within the area when allowed Development does occur. Priority will be given to conserving Core Habitat in the Desert Wildlife Management Area for desert tortoise delineated in the NECO Plan.

    b. Conserve at least 1,855 acres of Core Habitat for the Mecca aster in the Riverside County portion of the Conservation Area.

    c. Conserve at least 398 acres of Core Habitat for the Orocopia sage in the Riverside County portion of the Conservation Area.

3. Conserve at least 25,319 acres of Other Conserved Habitat for Le Conte's thrasher in the Riverside County portion of the area, and at least 270 acres in the City of Coachella portion. Conserve Le Conte's thrasher nesting sites as described in Section 4.4 avoidance, minimization, and mitigation measures.

4. Conserve at least 6,771 acres of the desert dry wash woodland natural community in the Riverside County portion of the area, and at least 109 acres in the City of Coachella portion. Maintain the current capacity for flows in the washes that maintain desert dry wash woodland. This natural community provides Habitat for riparian birds and other Covered Species.

5. Conserve at least 14,143 acres, such that the functionality of each individual Biological Corridor listed below is not compromised, to maintain Linkages between the Joshua Tree National Park Conservation Area and the Mecca Hills/Orocopia Mountains Conservation Area and Biological Corridors under I-10 for desert tortoise, and to maintain ecosystem function for Covered Species.

    a. Conserve Corridor 1, centered on Thermal Canyon.

    b. Conserve Corridor 2 centered on the E. Cactus City Wash and Hazy Gulch culverts.

    c. Conserve Corridor 3 centered on the Happy Gulch culvert.

    d. Conserve Corridor 4 centered on the Desperation Arroyo culvert.

e. Conserve Corridor 5 centered on the Desperation Arroyo, West Buried Mountain Wash, Buried Mountain Wash, Resurrection Wash, West Saddle Gulch, Saddle Gulch, West Cotton Gulch, Cotton Gulch, East Cotton Gulch, and Paul Gulch culverts.

Aside from the freeway bridges and culverts and any Existing Use areas, which are unavoidably narrow segments, the Biological Corridors shall expand to one mile wide to minimize edge effects.

6. Maintain the bridges on I-10 and the culverts under I-10 associated with the aforementioned corridors so as not to affect the existing hydrological regime and Biological Corridors.

Mecca Hills/Orocopia Mountains Conservation Area Conservation Objectives.

1. In total, 23,670 acres of the Mecca Hills/Orocopia Mountains Conservation Area shall be conserved. (This may be less than the sum of acres indicated in the following objectives because there can be overlap among areas covered by the objectives. For example, Core Habitat for two or more species may overlap, or Core Habitat and an Essential Ecological Process area may overlap. The individual acreage figures will be used in compliance monitoring.)
2. Conserve Core Habitat for Mecca aster, Orocopia sage, and desert tortoise (as set forth below), allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused disturbance, and edge effects to Core Habitat by conserving contiguous Habitat patches and effective Linkages between patches of Core Habitat.
   a. Conserve at least 4,181 acres of Core Habitat for the Mecca aster.
   b. Conserve at least 16,227 acres of Core Habitat for the Orocopia sage.
   c. Conserve at least 23,617 acres of Core Habitat for the desert tortoise. Protect individual tortoises within the area when allowed Development does occur.
3. Conserve at least 5,866 acres of Other Conserved Habitat for Le Conte's thrasher. Conserve Le Conte's thrasher nesting sites as described in Section 4.4 avoidance, minimization, and mitigation measures.
4. Conserve at least 2,861 acres of the desert dry wash woodland natural community, which provides Habitat for the riparian birds and other Covered Species.

Dos Palmas Conservation Area Conservation Objectives.

1. In total, 12,870 acres of the Dos Palmas Conservation Area shall be conserved. (This may be less than the sum of acres indicated in the following objectives because there can be overlap among areas covered by the objectives. For example, Core Habitat for two or more species may overlap, or Core Habitat and an Essential Ecological Process area may overlap. The individual acreage figures will be used in compliance monitoring.)
2. Conserve Core Habitat for crissal thrasher; and Habitat for the California black rail and Yuma clapper rail as set forth below, allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused disturbance, and edge effects to Core Habitat by conserving contiguous Habitat patches and effective Linkages between patches of Core Habitat.
    a. Conserve at least 343 acres of Core Habitat for the crissal thrasher.
    b. Conserve at least 334 acres of Other Conserved Habitat for the California black rail.
    c. Conserve at least 374 acres of Other Conserved Habitat for the Yuma clapper rail.
    d. Conserve at least 6,689 acres of Other Conserved Habitat for Le Conte's thrasher. Conserve Le Conte's thrasher nesting sites as described in Section 4.4 avoidance, minimization, and mitigation measures.

4. Conserve at least 3,631 acres of Other Conserved Habitat for the flat-tailed horned lizard.
5. Conserve all known locations for the desert pupfish. Conserve newly found locations of this species in the area.
6. Maintain the refugium populations of the desert pupfish in accordance with the Desert Pupfish Recovery Plan.
7. Conserve at least 23 acres of the mesquite hummocks, at least 205 acres of the cismontane alkali marsh, at least 746 acres of the desert dry wash woodland, at least 134 acres of the arrowweed scrub, and at least 320 acres of the mesquite bosque natural communities, which provide Habitat for the riparian birds and other Covered Species. Where disturbance is authorized for cismontane alkali marsh and arrowweed scrub, ensure no net loss.
8. Conserve at least 50 acres of the desert fan palm oasis woodland for the conservation of the southern yellow bat.
9. Conserve at least 4,381 acres of the desert sink scrub natural community.
10. Remove tamarisk to improve Habitat values.

Coachella Valley Stormwater Channel and Delta Conservation Area Conservation Objectives.

1. In total, 3,870 acres of the Coachella Valley Stormwater Channel and Delta Conservation Area shall be conserved. (This may be less than the sum of acres indicated in the following objectives because there can be overlap among areas covered by the objectives. For example, Core Habitat for two or more species may overlap, or Core Habitat and an Essential Ecological Process area may overlap. The individual acreage figures will be used in compliance monitoring.)
2. Conserve at least 781 acres of Core Habitat for crissal thrasher, allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused disturbance, and edge effects to Core Habitat by conserving contiguous Habitat patches and effective Linkages between patches of Core Habitat.
3. Conserve at least 706 acres of Other Conserved Habitat for Le Conte's thrasher.
4. Establish 66 acres of permanent Habitat for California black rail and Yuma clapper rail in this area to replace the Habitat that is periodically altered by flood control and drain maintenance activities.
5. Establish permanent riparian Habitat including at least 44 acres of Sonoran cotton-wood-willow riparian forest in this area to replace the Habitat that is periodically altered by flood control maintenance activities.
6. Restore and enhance wetlands Habitat as Feasible.
7. Conserve occupied burrowing owl burrows as described in Section 4.4 burrowing owl avoidance, minimization, and mitigation measures.
8. Establish 25 acres of permanent replacement Habitat for pupfish and maintain a desert pupfish population in the agricultural drains.
9. Conserve at least 67 acres of mesquite hummocks, at least 713 acres of the desert saltbush scrub, at least 1,026 acres of desert sink scrub, and at least 51 acres of coastal and valley freshwater marsh natural communities, which provide Habitat for riparian birds and other Covered Species. For the remaining acreage of the coastal and valley freshwater marsh natural community where disturbance is authorized by the Plan, ensure no net loss.
10. Remove tamarisk to improve Habitat values.

Santa Rosa and San Jacinto Mountains Conservation Area Conservation Objectives.

1. In total, 55,890 acres of Santa Rosa and San Jacinto Mountains Conservation Area shall be conserved. (This may be less than the sum of acres indicated in the following objectives because there can be overlap among areas covered by the objectives. For example, Core Habitat for two or more species may overlap, or Core Habitat and an Essential Ecological Process area may overlap. The individual acreage figures will be used in compliance monitoring.)
2. As of June 2003, conserve at least 19,205 acres of Essential Habitat for Peninsular bighorn sheep in the Riverside County portion of the Conservation Area, at least 97 acres in the City of Cathedral City portion, at least 1,158 acres in the City of Indian Wells portion, at least 2,545 acres in the City of La Quinta portion, at least 130 acres in the City of Palm Desert portion, at least 7,211 acres in the City of Palm Springs portion, and at least 450 acres in the City of Rancho Mirage portion. Ensure that any Development allowed does not fragment Core Habitat, and that edge effects from such Development are minimized.
3. As of June 2003, conserve at least 7,930 acres of known and potential gray vireo Habitat in the unincorporated portion of the Conservation Area, and at least 3,883 acres in the City of Palm Springs portion. Minimize fragmentation, human-caused disturbance, and edge effects to Core Habitat by conserving contiguous Habitat patches and effective Linkages between them.
4. As of June 2003, conserve at least 5,508 acres of Other Conserved Habitat for Le Conte's thrasher in the unincorporated portion of this Conservation Area, at least 11 acres in the City of Cathedral City portion, at least 206 acres in the City of Indian Wells portion, at least 387 acres in the City of La Quinta portion, at least 33 acres in the City of Palm Desert portion, at least 560 acres in the City of Palm Springs portion, and at least 17 acres in the City of Rancho Mirage portion.
5. As of June 2003, conserve at least 23,856 acres of Other Conserved Habitat for desert tortoise in the unincorporated portion of this Conservation Area, at least 95 acres in the City of Cathedral City portion, at least 999 acres in the City of Indian Wells portion, at least 1,409 acres in the City of La Quinta portion, at least 436 acres in the City of Palm Desert portion, at least 8,856 acres in the City of Palm Springs portion, and at least 1,326 acres in the City of Rancho Mirage portion.
6. Conserve occupied burrowing owl burrows as described in Section 4.4 burrowing owl avoidance, minimization, and mitigation measures.

7. As of June 2003, conserve at least 15 acres of southern arroyo willow riparian forest in the unincorporated portion of the Conservation Area; for the remaining acreage of this natural community where disturbance is authorized by the Plan, ensure no net loss. Conserve at least 117 acres of southern sycamore-alder riparian woodland in the unincorporated portion of the Conservation Area and at least 24 acres of southern sycamore-alder riparian woodland in the City of Palm Springs portion of this Conservation Area; for the remaining acreage of this natural community where disturbance is authorized by the Plan, ensure no net loss. Conserve at least 58 acres of Sonoran cottonwood-willow riparian forest in the City of Palm Springs portion of the Conservation Area; for the remaining acreage of this natural community where disturbance is authorized by the Plan, ensure no net loss. Conserve at least 1,244 acres of the desert dry wash woodland natural community in the unincorporated portion of the Conservation Area, at least 18 acres in the City of Cathedral City portion, at least 66 acres in the City of Indian Wells portion, at least 76 acres in the City of La Quinta portion, at least 29 acres in the City of Palm Desert portion, at least 36 acres in the City of Palm Springs portion, and at least 9 acres in the City of Rancho Mirage portion.
8. As of June 2003, conserve at least 404 acres of the known desert fan palm oasis woodland natural community, which provides Habitat for the southern yellow bat, in the unincorporated portion of the Conservation Area; and at least 76 acres in the City of Palm Springs portion.
9. As of June 2003, conserve at least 2,093 acres of semi-desert chaparral in the unincorporated portion of the Conservation Area and at least 571 acres in the City of Palm Springs portion. Conserve at least 2,274 acres of red shank chaparral in the unincorporated portion of the Conservation Area. Conserve at least 2,899 acres of peninsular juniper woodland and scrub natural community in the unincorporated portion of this Conservation Area and at least 3,177 acres in the City of Palm Springs portion. Attainment of Goal 2 will also achieve this goal.

6.2 Mitigation Matrix for I-10 Interchange and Related Arterial Projects

To mitigate the impacts of the interchange and related arterial projects identified in Section 7.2.1 of the Plan, Caltrans, CVAG, and CVCC will acquire 1,795 acres in Conservation Areas in accordance with the mitigation matrix shown in Table A6-1.

Table A6-1: Mitigation Matrix for Interchange and Associated Arterials Projects

CDFG and USFWS agree that mitigation land may be purchased for I-10 interchange projects and associated arterials in the CV MSHCP proposed Conservation Areas as indicated in the matrix below. All parties recognize that the location of a parcel need not be reviewed and approved by CDFG or USFWS if the parcel is located in any of the Conservation Areas indicated in the matrix for the given interchange and associated arterial project. All parties recognize, however, that parcels must conform to CDFG and USFWS standards regarding clear title and land condition, e.g., parcels with liens or hazardous materials on site would not be acceptable to CDFG and USFWS.

	Conservation Area Where Mitigation May be Accomplished									
Interchange Project	Snow Creek/ Windy Point[1]	Highway 111/I10	Upper Mission Creek[2]	Mission Creek/ Morongo Wash	Whitewater Floodplain	Willow Hole	Edom Hill	Thousand Palms[1]	Indio Hills/Joshua Tree National Park Linkage[1]	East Indio Hills[1]
Indian Ave.	X	X	X	X	X	X				
Palm/Gene Autry			X	X	X	X			X	
Date Palm					X	X	X	X	X	
Ramon/Bob Hope						X	X	X	X	X
Jefferson								X	X	X

[1] Non mountainous portions only.
[2] Non mountainous portion of the Conservation Area east of Highway 62 only.

7.0Take Authorization for Covered Activities and Term of Permit

7.1 Information on IID's Overhead Power Line "N50" Circuit Relocation in the Thousand Palms Conservation Area

N50 CIRCUIT RELOCATION

Scope of Work

Scope: Re-routing of distribution line along Thousand Palms Canyon Rd. (approx. 2 mi.) Job above described to be done on the N-50 circuit out of Sky Valley Sub.

Removal of approx. 2 mi of existing distribution line.

Location: Along Thousand Palms Canyon Rd and between Ave 28 and Ave 24.

Justification: This project was brought to IID's attention by the Bureau of Land Management (BLM) to relocate a portion of the existing N-50 circuit. This circuit is in conflict with Palm Oasis within Thousand Palms conservation area. Relocation of existing facilities will preserve existing habitat and will create easy access for IID's maintenance and operation personnel

1. Installation of new pole line

Description of Work	Equipment to be used
A. Delivering material to job site. - Approx. 28 wood poles with a length of 40' each.	Low bed truck w/crane.
B. Framing poles - Pre-assembling of wood pole structures, installing crossarms, braces, pin & dead end insulators. Quantity: approx. 28 poles	Line truck, foreman's truck

C. Excavation for pole installation - Trenching approx. 18" to 24" wide x 6' deep Quantity: approx. 28 units	Backhoe, line truck w/auger
D. Installing down guys - Installing steel screw anchors (10" x 5' in ground) - Installing steel galvanized wire to support poles at pole line dead ends and deflections. Quantity: approx. 4 units	Backhoe, line truck w/auger
E. Stringing conductor - Installing 4-3/0 AAC conductors on top of crossarms, attach them to insulators. Length: approx. 2 mi Quantity: approx 28 poles	Line truck, boom truck

2. Removal of existing pole line section in conflict

Description of Work	**Equipment to be used**
A. Removing conductor - De-energize conductors at both ends - Remove conductors from insulators - Pull & roll up existing conductor. Quantity: approx. 2 mi	Line truck, boom truck, Foreman's truck
B. Removing down guys - Remove steel screw anchors and galvanized wire Quantity: approx. 4 units	Line truck
C. Removal of existing equipment attached to poles Quantity: 3 units	Line truck, boom truck
D. Wood poles removal - Digging around wood poles - Pulling wood poles out Quantity: approx. 32 poles	Line truck, backhoe
E. De-assembling of wood pole structures - Remove crossarms, braces, insulators etc.	Line truck
F. Loading of all equipment and material removed	Low bed truck w/crane

8.0 MSHCP Reserve System Management & Monitoring Program

8.1 Background Information on Development of Niche Models

This process involves developing GIS-based models of habitat associations of the target species (see papers in Scott et al. 2002 for numerous examples). The variables available are those generated directly or calculated from existing area-wide GIS layers. This limitation is imposed by the desire to use these models to predict the likelihood of a species' occurrence (i.e., estimate "habitat quality") for any point within the Plan area. This can only be done for points for which there are values for all variables in any particular model and these variables need to be available as GIS-layers. For a variety of reasons, this is not likely to be a serious limitation. Most significantly, it means that the models will be based more on landscape-level rather than species-level (local-level) attributes.

The dependent variable for most of these models will be a GIS-layer that contains the geographical coordinate location of each observation of the target species (or species group). These points will come from museum specimen collection records, historical observations, personal observations from reliable sources, and surveys performed during the baseline phase or surveys by others. A layer of points at which the target was surveyed for, but at which it was not observed will also be developed. Because of detectability issues noted above, these "negatives" are considered less informative than "positives;" nevertheless, they can be used in certain types of modeling.

Potential independent ("predictor") variables for this habitat modeling are still being determined. It is likely that many will take the form of "percent of area within X meters of the point that consists of vegetation type Y." These sorts of variables are generated by placing a buffer of X-m radius around a point and recording the proportion of area within the resulting circle that consists of each vegetation type, including type Y. Others may summarize the structural configuration of vegetation types within the buffered area (e.g., number of different types, interspersion of different types, amount of edge or ecotone between different types). Yet others may take the form of "distance from the point to the nearest attribute Z," where Z might be a road, an urban boundary, a particular vegetation type, or any other GIS attribute that might be important.

Interpretation of high-resolution satellite images will likely yield attributes that may be important indicators of environmental quality for numerous species. In addition to trying to use

"positive" variables (i.e., variables most likely to promote the presence of a species at a point), the models will attempt to use "negative" variables as well, especially those that are related to previously identified potential threats to the target species or vegetation type. Insofar as possible, models will use variables that quantify or capture variation associated with attributes that are potentially under management control.

During the next several years several modeling techniques will be applied and tested. Other potential modeling techniques will be used as they become available or appear suitable such that the following list is not comprehensive. Insofar as possible, we want to use variables that quantify or capture variation associated with attributes that are potentially under management control.

The modeling approaches initially identified for evaluation include:

1. *Mahalanobis D^2* – we construct a multivariate vector of means (and their associated variances) for all of the variables in use for a target species based on their values over all points at which the species was observed. We can generate for every point in the study area its observed value for each of the variables, then calculate the "distance" between a point and the mean vector based on the variable-by-variable difference between them. The smaller the difference the smaller the distance, and the more the habitat at a point resembles the habitat at points where the species was seen. These distances can be rescaled such that they follow a Chi-squared distribution, and the values converted to a "probability of similarity" ranging from near zero to near one. A new GIS-layer can be generated showing the P-value for the entire study area. Examples include Clark et al. 1993 and Knick and Dyer 1997.

2. *Pearson's Planes* – While conceptually appealing and relatively easy to implement, under certain conditions D^2 fails to predict species' occurrences accurately, especially in a landscape that may be undergoing change (including change undertaken as part of desirable management activities; Knick and Rotenberry 1998). The Pearson's Planes technique is a method for partitioning D^2, with resulting partitioned distances being rankable from most to least relevant to a species' distribution (Rotenberry et al. 2002). The technique is based on a conceptual model of the ecological niche, one that assumes that an occupied point represents at least some minimally suitable configuration of habitat. As with D^2, every point on a map can be scored for its value on each plane, with smaller values (closer distances) associated with greater likelihood of a species' presence. Pearson's Planes will always be equal or superior to an unpartitioned D^2 in predicting distributions. A drawback is that interpretation of the planes in the context of the original measured variables is currently problematic; however, on the positive side the technique appears to be robust to the inclusion of irrelevant variables.

3. *Genetic Algorithm for Rule-set Prediction* – As does Pearson's Planes, GARP modeling places primacy on point occurrence data, and is based on a concept of the ecological niche (Peterson et al. 2002). GARP tries, interactively, to find non-random correlations between the presence and absence of the species and the values of the environmental parameters, using several types of rules. Each rule type implements a different method for building species prediction models. Currently there are four types of rules implemented: atomic (simple presence/absence), logistic regression, bioclimatic envelope, and negated bioclimatic envelope rules (Stockwell and Peters 1999).

For a smaller set of points we will also have known "negatives," points that were surveyed but at which the target species was not observed. There are two forms of regression-type modeling that can be used for these data; each yields a regression equation that one may use to predict the value of a dependent variable for an observation (e.g., point on the map) based on the observation's scores on the original variables and a set of generated coefficients.

1. *Discriminant Function Analysis* – DFA is a linear technique similar to the familiar multiple regression, only the dependent variable is a class variable that takes on the values of "present" or "absent." The DF is a composite variable constructed so that the two classes are maximally separated along it. Each point has a score on the DF that is a linear combination of its values of the original variables, and one may also calculate the score of any other point (i.e., the rest of the map) for which one has measurements for the original variables. Using the DF scores and Bayes' Theorem one can estimate the probability that any point belongs to one class or the other. These classification probabilities can be plotted on a map of the project area.

2. *Multiple Logistic Regression* – Logistic regression is also similar to ordinary (linear) multiple regression, only the dependent variable is a class variable (usually given the values 0 or 1 denoting absence and presence of the target species), and a logistic (logit-transformed variables) rather than a linear model is fit. Output is the probability of class membership for any particular combination of original variables, which can be plotted on a map of the project area.

3. *Classification and Regression Tree* – CART analysis repeatedly partitions a dataset into homogeneous subsets (Breiman et al. 1984). In this case, subsets are points where the species was detected vs. where it was not. At each partition a value of one of the independent variables is found such that the variance between subsets is maximized and the variance within subsets is minimized. Under some, but not all circumstances CART can outperform logistic regression, discriminant function, and Mahalanobis D^2 in predicting species distributions (Dettmers et al. 2002).

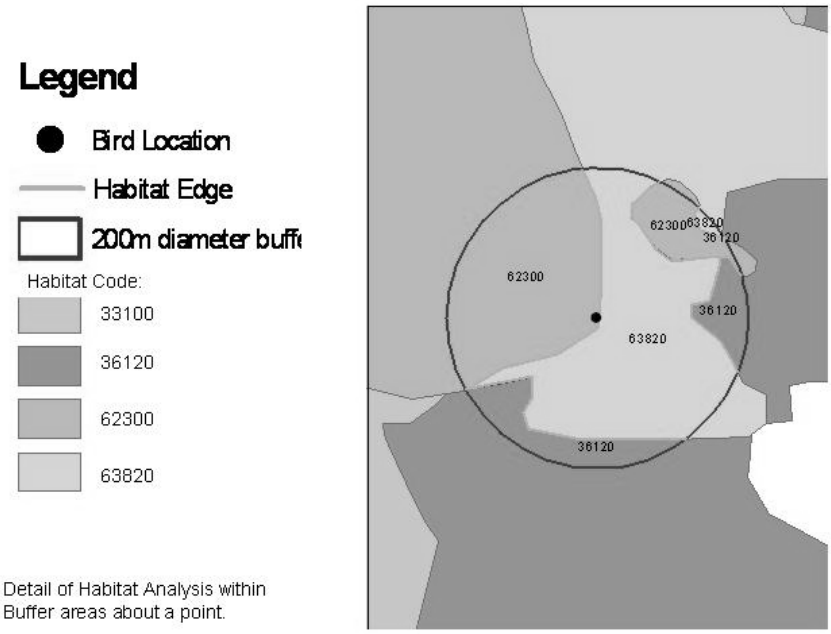
From Example Habitat Model: Riparian bird Species

Number of Sampling Points: This issue will be addressed initially using preliminary analysis of 2002 and 2003 survey data. At least for riparian birds there will be an upper limit to the number of points that can be sampled due to the limited amount of riparian vegetation type throughout the study region. For all species there will be a relatively small number of points associated with pre-existing observations (e.g., museum records). Some non regression-type modeling techniques, such as D^2, Pearson's planes, and GARP, appear to function fairly well even with relatively small numbers of observations, although this is true only so long as there is still a reasonable observations-to-variables ratio (Rotenberry et al. 2002, Peterson et al. 2002).

Distribution of Sampling Points: As noted above, an issue to be resolved is the distribution of sampling points. Randomly distributing points throughout the project area is not likely to be effective; with respect to riparian birds the sampling has been confined to riparian vegetation types. Within riparian corridors, however, the location of points was basically random with respect to locations of birds. Actual locations of points were constrained to a degree by local configuration of vegetation; some areas were not accessible simply because the understory was impenetrable. Such problems are likely to arise as well when sampling points need to be sited in newly targeted but previously unvisited areas. Truly random location of points will undoubtedly result in some placed in difficult-to-access areas, with the tradeoff that fewer points can be sampled for a given level of effort (time + number of observers).

GIS Analysis. A sample GIS analysis for creating a predictive species occurrence map is given below. Using ArcGIS software, a 200 m diameter circular buffer was drawn around each riparian bird observation location collected by UCR biologists during spring/summer 2002 (Figure 9.5). Within each buffered area, vegetation variables were summarized, and included: total area of each vegetation type (indicated by the different colored polygons in Figure 9.5), the total length of edge of each vegetation type (indicated by orange line segments in Figure 9.5), and the total number of vegetation types.

Figure A8-1: Detail of Habitat Analysis with Buffer Areas around a Point



Once these vegetation variables were calculated for the bird location points, they were calculated for a grid of points within Conservation Areas across the entire Plan area.

Figure A8-2a: Sample of Grid Points across the Plan Area

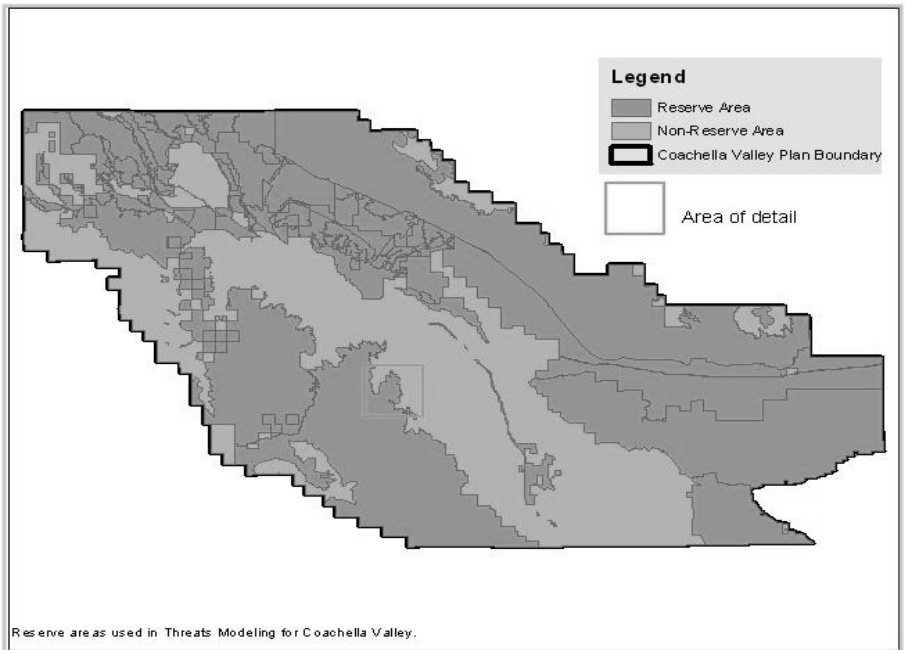
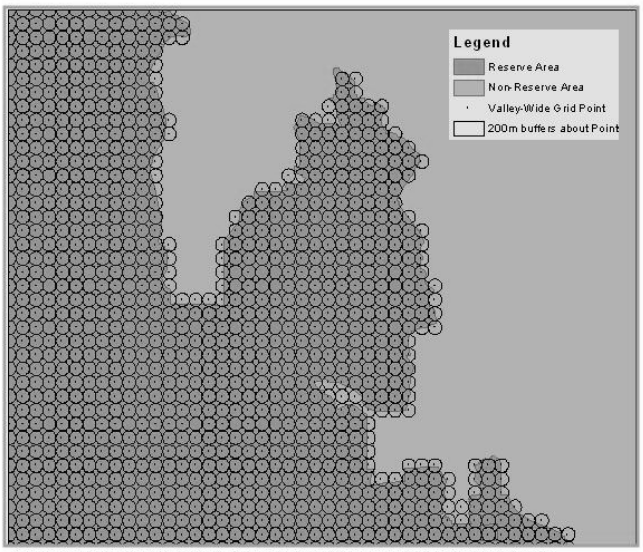


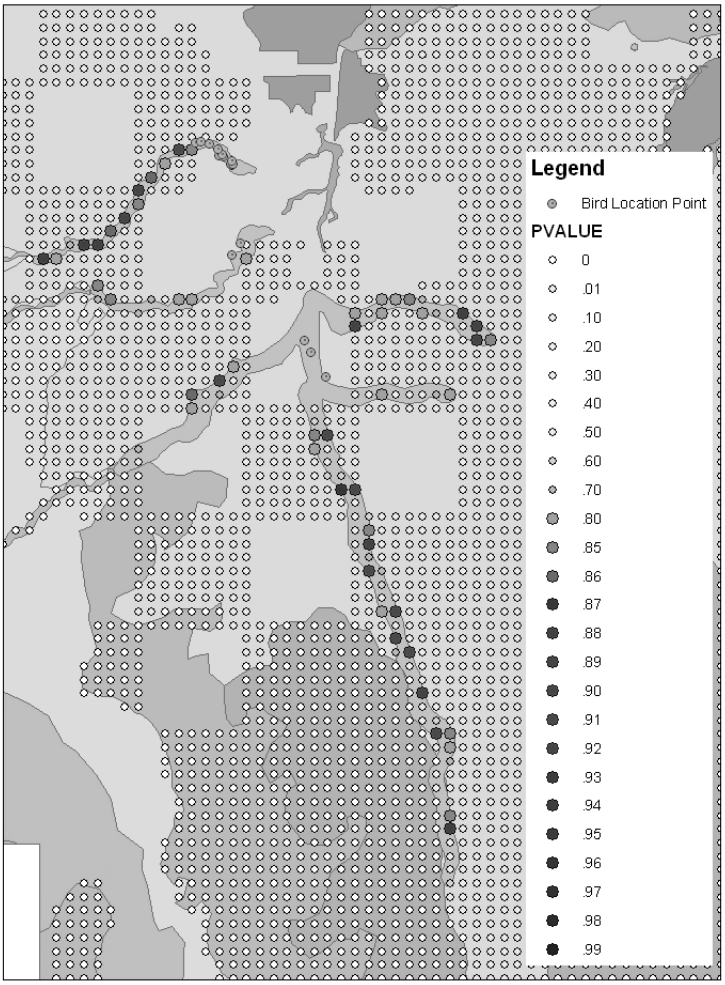
Figure A8-2b: Smaller Area of Detail with Grid of Points for Modeling



Area of Detail: Valley-Wide grid of points and buffer areas for Threats Modeling.

Once the vegetation variables were generated for the bird location points, and the valley-wide points, a statistical comparison was made to identify valley-wide points that showed similarity to bird location points. Those valley-wide points with the greater similarity to bird location points had higher p-values, and are indicated by the orange and pink dots in Figure A8-3.

Figure A8-3: Predictive Occurrence Map for Riparian Bird Species, Coachella Valley, Based on Vegetation GIS Layers and Bird Location Points Collected by UCR Bird Surveys



Predictive Occurence Map (in part) for Riparian Bird Species, Coachella Valley, based on vegetation GIS information and UCR bird surveys.

8.2 Various Approaches to Sampling

8.2.1 Community Classification Index

A subset of points identified in the predictive modeling of species distributions, and additional sites determined to be key contributing ecosystems to Coachella Valley Biodiversity will be visited and sampled to create an index to classify plant and animal communities. Our objectives are to obtain quantitative characterizations of communities that will be sensitive to detection of both natural dynamic and anthropogenic changes in community structure in time and space. Since species endangerment is most often a direct result of degraded community integrity, monitoring the health of communities must be one of our priorities. Populations of priority species are ideally monitored within the context of their relevant species assemblages so that real threats can be differentiated from natural processes, and so threats can be identified and managed before priority species are negatively affected.

1. *Plant Community Classification*: This will be a quantitative augmentation of the vegetation mapping data with an additional element of assessing levels of invasion by exotic species. Re-sampling and gathering more data on the same sites used in the vegetation mapping effort will enable greater accuracy in determining how communities change over time, and will establish confidence intervals for the vegetation mapping data.

2. *Invertebrate Community Classification*: In terrestrial sites, we anticipate that the primary focus will be Hymenoptera. This is because they play crucial roles in the food webs of the vertebrates in the plan, and some constitute a critical threat to many of the species in the plan. We are developing a rapid baited sampling of the dominant species of terrestrial ants and a longer-term pitfall sampling of terrestrial invertebrates, mainly ants and spiders. Other sampling strategies are being explored as needed. The main focus is on ants because they require little training or expertise for identification and are key species for community diversity. Healthy, diverse ant communities are resistant to invasion by the exotic ants (fire ants, argentine ants) identified as serious threats to priority species and community integrity.

3. *Vertebrate Community Classification*: Different assessment groupings (birds, amphibians, reptiles, large mammals, small mammals) have been identified and protocols are being developed for each. The desert pupfish and the desert bighorn sheep are being managed by CDFG independently of our effort.

4. *Remote Monitoring*: We are working through three projects funded by other entities to develop technologies for monitoring bird vocalizations. These systems will be deployed

simultaneously with the organism assessments to determine if these approaches are appropriate and can be utilized in future analyses.

Initially, we envision two teams of two people conducting simultaneous Assessments of Vegetation, Vertebrate, and Invertebrate Communities. Each team will sample two sites per morning for one hour per site. After each morning Rapid Assessment period, teams will create and maintain sampling arrays that require longer term investments (i.e. pitfall arrays, microphones, automated cameras) and monitor spatial and temporal variation at a subset of sites to be determined (mainly highly seasonal ecosystems where precise timing of sampling will be critical). Climatic factors and seasonal probability of detection of priority species will determine where and when teams will be assigned to sample sites. Field sampling protocols will be simple and well defined to minimize variation in data quality between personnel.

8.2.2 Conceptual Framework for Sampling by Species

The second approach for determining sampling locations will be based on habitat modeling. The original plan was based on habitat modeling based on visual differentiation of several characteristics such as sand types, vegetation, and other features. We will expand on this initial effort. We propose to link surveys designed to monitor the distribution and/or abundance of target species with our efforts to model habitat associations for those same species. On the one hand, monitoring data provide observations that can be incorporated into habitat association models; on the other hand, habitat association models can be used to indicate areas where monitoring activities should be located, due to the actual or expected presence of the target species (the latter of which can serve as tests of the models), or in anticipation of expected changes in habitat quality due to management or other activities. As noted above, there are different "types of rarity" associated with the species to be covered under the HCP, and the techniques discussed here pertain primarily to those that, at least in principle, could be distributed over a relatively large spatial extent (whether in a variety of different habitat types, or in only one habitat type, but one that is broadly distributed). In essence, we describe a *regional* (as opposed to local) monitoring/modeling effort (see, for example, Larsen et al. 2001, Yoccoz et al. 2001, Busch and Trexler 2003). For species that occur at only a few well-defined points, regional surveys as we describe them are not effective; instead, such taxa are better monitored by more focused surveys.

REGIONAL MONITORING SURVEYS. We assume that regional monitoring surveys for any target taxon or taxon group will consist of a network of "points" scattered throughout the plan area. An issue to be resolved is the distribution of these points, whether random throughout the entire area, random stratified by habitat/vegetation type, or placed according to the expectation of a taxon's presence at a point. We further assume that the precise methodology for assessing the presence of a target species (or species group) at a sampling point will be specific for that

species. Such techniques are generally well-known to ornithologists, herpetologists, mammalogists, botanists, etc., and will be provided by them. Thus, "points" may consist of auditory/visual counts, small grids of traps, short transects, etc., and may differ in size. For longer transects we assume that the precise location of each detection of a target species will be recorded; these become "points" themselves.

We expect that for most points we will have a datum that indicates whether a target species was detected at that point during a specific sampling effort. (For habitat modeling we will also have an additional set of points at which the target species was observed independently from any formal surveys – see below). This implies that most points will be relatively small, that most of our data will be presence/absence, and that we are primarily concerned with a target's distributional extent rather than absolute abundance in any spatially-restricted area (although in practice the two are usually highly correlated over large spatial scales). For a variety of well-documented reasons, the number seen at points in a survey area invariably underestimates the number of individuals actually present; thus, it is necessary to also estimate "detectability," the probability that the target species will be observed at a point if it is, in fact, present. Because not all individuals are detected in any sample,

$$C = Np$$

where C = number counted, N = number actually present (our primary variable of interest), and p = probability of detection.

Obviously, $N = C / p$, which is why we are interested in estimating p.

Several statistical techniques have been developed to enable estimation of detectability under a variety of sampling schemes, which we illustrate using our on-going monitoring of sensitive riparian bird species.

Example - Riparian Bird Species

The basic sampling unit is a "point count," where an observer stands immobile at a particular spot and for a fixed period of time (15 min) records all target species seen and/or heard. Because several of these species are relatively inconspicuous and hence may have low probability of detection even when present, our counts at riparian points will focus only on the target species, generally ignoring other species (which represent a distraction to observers) that may also be present. The target species are Least Bell's Vireo, Southwestern Willow Flycatcher, Yellow Warbler, Yellow-breasted Chat, and Summer Tanager. We will also track Brown-headed Cowbirds, as they are considered a potential threat to several of the target species due to brood parasitism.

Avian point count data are recorded in such a way as to allow us to estimate a species' presence, detectability, and distribution using four different techniques.

1. *Distance-based method* – requires that we partition sightings of a target species during a count period among distance-from-the-point classes. In our case we use 0-25 m, 25-50 m, and > 50 m. Distance-based methods have a long history of use in estimating species abundances and densities, especially when coupled with line-transect sampling (e.g., Burnham et al. 1980). In current terminology, our points are considered to be transects of zero length, but the analytical technique remains the same (Rosenstock et al. 2002). (For other taxa, non zero-length transects may be more appropriate; they can easily be integrated into this analytical framework).

2. *Temporal-based removal method* – requires that we partition sightings of a target species during a count period among time intervals. We divide the 15-minute count period into four intervals, recording whether species are detected in the first (0-3:00), second (3:00-5:00) third (5:00-10:00), or fourth (10:00-15:00) interval. Removal models assume that once an individual is detected, it may no longer be counted at a subsequent time during the survey; thus, as individuals are detected, fewer are available to be detected in subsequent time intervals. This decline in numbers detected though time can be used to estimate the initial number of individuals present. Farnsworth et al. (2002) provide guidelines for using Program SURVIV (White 1983) to estimate detection probabilities.

3. *Double- or multiple-counting method* – requires multiple counts at points, usually using different observers. After making certain assumptions, observations made on multiple visits can be analyzed using mark-recapture techniques (e.g., Program MARK; White and Burnham 1999; MacKenzie et al. in press) or logistic regression (Manly et al. 1996). An appeal of this method is that the analytical techniques permit the use of covariates as well.

4. *Dual-frame sampling* – requires that we sample from a "list frame" (points at which the target species has been observed in the past) and an "area frame" (points at which the target species might occur) (Haines and Pollock 1998). If the target species is observed at an area frame point during a general sampling period, that point is moved to the list frame for the next sampling period; if the target is not observed at a list frame point, that point is moved to the area frame. This sampling technique dove-tails with our habitat modeling effort, as we will use the habitat model developed for a target species to develop the area frame.

It is not clear at this time which of these approaches will be most suitable for achieving our specific monitoring objectives. It is certainly possible that our explorations of these techniques

will suggest that different ones may be more appropriate for different taxa. One major concern will be sufficiency of observations; some of the target taxa may be so uncommon as to generate an insufficient number of detections to apply some of these techniques successfully. Our best guess at the moment is that some combination of multiple-counting (e.g., MacKenzie et al. in press) and dual frame sampling (Haines and Pollock 1998) will best meet our needs.

HABITAT MODELING. We are developing GIS-based models of habitat associations of the target species (see papers in Scott et al. 2002 for numerous examples). This means that the variables we can use are those (and only those) that can be generated directly or calculated from existing area-wide GIS layers. This limitation is imposed by the fact that we wish to predict the likelihood of a species' occurrence (i.e., estimate "habitat quality") for any point within the study or plan area; we can only do so for points for which we have values for all variables in any particular model, and the only area-wide variables currently available are those in the GIS-layers. For a variety of reasons, we do not think this is likely to be a serious limitation. Most significantly, it means that our models will be based more on landscape-level rather than local-level attributes.

The dependent variable for most of our models will be a GIS-layer that contains the geographical coordinate location of each observation of the target species (or species group). These points will come from museum specimen collection records, historical observations, personal observations from reliable sources, and surveys performed by us and others. Secondarily, we will also develop a layer of points at which we know the target was surveyed for, but at which it was not observed. Because of detectability issues noted above, we consider these "negatives" less informative than "positives;" nevertheless, they can be used in certain types of modeling.

We are still developing candidate independent ("predictor") variables for our modeling. We imagine that many will take the form of "percent of area within X meters of the point that consists of vegetation type Y." These sorts of variables are generated by placing a buffer of X-m radius around a point and recording the proportion of area within the resulting circle that consists of each vegetation type, including type Y. Others may summarize the structural configuration of vegetation types within the buffered area (e.g., number of different types, interspersion of different types, amount of edge or ecotone between different types). Yet others may take the form of "distance from the point to the nearest attribute Z," where Z might be a road, an urban boundary, a particular vegetation type, or any other GIS attribute we guess might be important. Finally, we expect that interpretation of high-resolution satellite images will yield a wealth of yet-to-be-determined attributes that may be important indicators of environmental quality for numerous species. In addition to trying to use "positive" variables (i.e., variables we think likely promote the presence of a species at a point), we also wish to use "negative" ones, especially those that are related to previously identified potential threats to the target species or vegetation type.

INITIAL TEST CASE - RIPARIAN BIRD SPECIES IN COACHELLA VALLEY. Because no single target riparian bird species is likely to be very abundant or occur at many different points, and because most are broadly overlapping in general, if not specific, habitat affinities (mainly confined to riparian vegetation types, which occur in mostly discrete patches that are distinctly different from the surrounding matrix of desert vegetation), we will initially lump them together for habitat modeling purposes. In a trial run using data from the Coachella Valley, the model located potential sites that have not been surveyed but likely contain the birds of interest. These will be further explored this next growing season. All organisms will be surveyed using this approach.

One additional point that was generated was the sensitivity to the vegetation mapping. If this mapping is not accurate, the model suffers. For this reason, we stress the need for accurate, high-resolution vegetation maps. The CCB is participating in collaboration with CDFG and CNPS to develop such maps, and to increase the data associated with the maps to increase resolution (see habitat monitoring discussion).

1. *Number of Sampling Points*: This issue is yet to be addressed, but should become somewhat clearer once we undertake preliminary analyses of our riparian data. Unfortunately, at least for riparian birds there will be an upper limit to the number of points we can sample due to the limited amount of riparian vegetation type throughout the study region. For all species there will be a relatively small number of points associated with pre-existing observations (e.g., museum records). Some non regression-type modeling techniques, such as D^2, Pearson's planes, and GARP, appear to function fairly well even with relatively small numbers of observations, although this is true only so long as there is still a reasonable observations-to-variables ratio (Rotenberry et al. 2002, Peterson et al. 2002).

2. Distribution of Sampling Points: As noted above, an issue to be resolved is the distribution of sampling points. We do not think that randomly distributing them throughout the project area is effective; indeed, we have already acknowledged this with respect to riparian birds simply by the fact that we have confined our sampling to riparian vegetation types. Within riparian corridors, however, our location of points was basically random with respect to locations of birds. Actual locations of points were constrained to a degree by local configuration of vegetation; some areas were not accessible to us simply because the understory was impenetrable. Such problems are likely to arise as well when sampling points need to be sited in newly targeted but previously unvisited areas. Truly random location of points will undoubtedly result in some placed in difficult-to-access areas, with the tradeoff that fewer points can be sampled for a given level of effort (time + number of observers).

8.2.3 Conceptual Framework for Habitat Monitoring

VEGETATION ANALYSIS—BEYOND THE MAP. California wildlands are being subject to increasing exotic invasive plant invasion and experiencing fire, an ecological perturbation virtually unknown in the recent past. Coastal sage scrub (CSS) has experienced massive vegetation change to exotic annual grassland over the past 40 years, especially near urban areas where deposition is highest. Deserts have only recently been subject to such perturbation. Because of indirect effects on the environment (CO_2, precipitation, NO_x deposition), suburban humans can leave a footprint hundreds of km. Therefore, the conservation reserves will continue to be impacted by the changing environments. A critical biomass of 0.5 to 1T/ha dry biomass, stimulated by N deposition and produced during wet years, triggered fires and may initiate large-scale vegetation conversion (Fenn et al. 2003). These thresholds are characterized by rapid upward increase in % exotic species that is promoted by increased fire frequency. Our goals are to explore the relationships between areas occupied by exotic grasses and historical fire sites.

Standard techniques employing double sampling for percent cover and biomass of herbs, line transects for shrubs can be used (Mueller-Dombois & Ellenberg 1974) to assess vegetation change, particularly when coupled with vegetation mapping activities. Power analyses are used to determine adequate sample size. Richness can be measured by using a releve approach to detect infrequent species. Regression analysis, principle components analysis, and canonical correspondence analysis will be used to analyze vegetation data. Biomass of herbaceous vegetation will also be sampled to detect yearly variation and fuel load that might promote fire.

ANALYSIS. During the 2003 growing season, we will develop individual locations in collaboration with the resource agencies and incorporate a range of techniques at varying resolution going down to individual line transects. These analyses will allow us to determine areas where threshold values in exotic grass invasions threaten the sustainability of the particular reserve.

METHODS FOR REMOTE SENSING. Ultimately, there will be a need for assessing habitat conditions over larger areas than can be surveyed with regularity. A remote sensing approach is needed. Initially, leaf area index (LAI) can be assessed using 30-m resolution multispectral Thematic Mapper (TM) data. To assess small features crucial to particular species, greater detail can be gained using 4-m resolution multispectral images from the Ikonos satellite. The TM satellite data can be coupled to a bi-directional reflectance distribution function (BRDF) model by Nikolov (1999). This model has been successfully applied to AVHRR data to derive seasonal LAI over the western USA at 1-km resolution and may provide additional means of distinguishing native vegetation from exotic grasses in the remotely sensed images.

Satellite imagery data is improving in resolution and quality rapidly. Current methods include the new IKONOS imagery which can generate a pixel sizes down to $4m^2$, with features (such as shrubs) being identifiable at a 1m resolution. Specific features, such as sand dune edges, can be resolved at sample intervals limited only by the numbers of images acquired.

By linking satellite imagery and field sampling data, a scaling analysis can be used to integrate the habitat structure into a single framework for scaling-up/down. Such matrices can be mathematically linked to stability measures to detect ecological phase transitions or thresholds and relaxation time (Li, 2002).

SYNCHRONIZATION AND VARIATION OF POPULATIONS AND COMMUNITIES. Variation through both time and space is the dominant feature of the biota in Riverside County. Variation in space is addressed through metapopulation modeling and sampling of habitat types. However, variation through time is just as crucial. Although temperature is relatively predictable, precipitation can vary by almost an order of magnitude. This variation exists in the desert and includes the El Nino-Southern Oscillation (ENSO) phenomena and is also subject to the Pacific Decadal Oscillation (PDO). ENSO events have been occurring with a 3-5 year periodicity whereas the PDO occurs in decadal time scales. Although these appear to be independent, if both ENSO and PDO -negative or both positive anomalies occur simultaneously, they may feed back into each other. Double positives include the strong and wet El Ninos of the 1990s, and double negatives include the severe droughts of the 1950s 1890s, and 1680s (the year of the Pueblo Revolts in New Mexico). Projections are that we are entering a period of negative PDO when drought may begin to predominate.

Alternatively, some climatologists have modeled global change phenomena particularly focusing on the warming effect of elevated CO_2. Their projections use a warming ocean model similar to the El Nino phenomena and project increasing precipitation, particularly during the summer, for southern California (e.g., Bachelet et al. 2001).

In either case, populations of both plants and animals are synchronized with these large-scale climate drivers (e.g., Post and Forchhammer 2002). Plant responses are both direct and indirect. Direct, in that many of the sensitive species are water-limited annuals requiring average or above average precipitation to set seed. However, with high precipitation, exotic annual grasses also are highly productive, often out-competing native species (Eliason and Allen 1997) and providing fuel for fires in lowland areas (Fenn et al. 2003). Drought has some advantages in that grass competition can be curtailed, but seed production and annual plant germination can also be reduced. Animal populations are also tightly coupled with food resources.

Clearly, surveys cannot be undertaken on an arbitrary 5, 7, 8 or 10-year periodicity if trends are to be determined. Understanding the relationships between climate and biota, and between

sensitive plants, exotic invaders, and animals of concern is going to be crucial for developing accurate monitoring protocols. Our goals are to begin working on relationships between climactic variables, NDVI, and metapopulation dynamics to generate an appropriate sampling periodicity.

8.3 Background on Monitoring: Aeolian Sand Community

Rainfall appears related to fringe-toed lizard reproductive patterns as well (Barrows and Fisher, in prep., Muth and Fisher, in prep., Figure 4). Even though fringe-toed lizard numbers have at times over the past 15 years dropped to nearly non-detectable levels (Figure 4), those declines have been associated with droughts; their numbers have always rebounded during average to above average rainfall years. Sounding alarms and calls for management actions during those drought-related natural declines would have been misguided and a waste of limited human resources. These weather data need to be related to habitat and species level monitoring data that are collected. Only through a thorough understanding of regional weather conditions and patterns, can large spatial scale conclusions be drawn regarding the relative importance of either anthropogenic or natural causes of changes in abundance of target species.

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Figure A8-4: Annual Fluctuation of Fringe-Toed Lizards at the Thousand Palms Preserve

Areal Extent of Habitat

In addition to using weather data to distinguish between human and natural caused changes, monitoring of the areal extent of the habitat is required. This monitoring becomes exceedingly important to 1) determine and quantify the ebb and flow of the extent of this dynamic sand dune habitat and the effects on target species, 2) assess future changes in landscape connectivity, and 3) evaluate the effects of changing proximity to human activities. Digital satellite imagery (Ikonos with four meter resolution, false-color infrared, Space Imaging Corporation, Boulder, CO) is now available and can be used to assess these changes (See example in Figure 5). These images are extremely useful in distinguishing and quantifying different levels of stabilization within the dune and hummock habitat matrix. The digital images are analyzed using ARCVIEW© 3.2 Geographic Information System (GIS, ESRI, Redlands, CA) with the Image Analysis extension. Using satellite imagery of the Coachella Valley Preserve area, the program was tasked to divide the habitat into 10 categories based on reflectance values. Four of the created categories dealt specifically with aeolian habitat (Figure 5) and appeared to make separations consistent with both particle size and compaction (Barrows, pers. obs.); the other six were upland habitats or areas of dense vegetation. Both of these variables have bearing on the relative abundances of the dune-associated species. Additionally, by having the GIS program "choose" the categories, the choices are without observer biases and are more likely to be repeatable and comparable to future images.

Due to the dynamics of this habitat, new digital images should be acquired and analyzed every two years. In this way, change analyses can be performed, directly indicating the extent of habitat gains and losses through time. Of highest priority is the quantity and distribution of the active aeolian habitat, a type clearly and accurately discerned by this kind of analysis. When active aeolian habitat is in decline, the images can be used to help develop hypothesis for that decline, and to evaluate the success of remedial management action that may be taken.

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Glossary

areas of high biological diversity—Although the term conservation site is often used to describe areas chosen through the process of reserve design and site identification, in actuality these are areas of biodiversity significance and different from sites as defined in site conservation planning. Although the planning effort may delineate rough or preliminary site boundaries or use other systematic units such as watersheds or hexagons as site selection units, the boundaries and the target occurrences contained within these areas are first approximations that will be dealt with in more specificity and accuracy in the site conservation planning process.

association—The finest level of biological community organization in the US National Vegetation Classification, defined as a plant community with a definite floristic composition, uniform habitat conditions, and uniform physiognomy. This is the system used in the California Native Plant Society's *Manual of California Vegetation* (Sawyer and Keeler-Wolf 1995). With the exception of a few associations that are restricted to specific and unusual environmental conditions, associations generally repeat across the landscape. They also occur at variable spatial scales depending on the steepness of environmental gradients and the patterns of distribution.

biological diversity—The variety of living organisms considered at all levels of organization including the genetic, species, and higher taxonomic levels. Biological diversity also includes the variety of habitats, ecosystems, and natural processes occurring therein.

biodiversity hot spot—Typically, a geographic location under a high degree of threat and characterized by unusually high species richness and large numbers of endemic species.

bioreserve—A landscape, large in size with naturally functioning ecological processes and containing outstanding examples of ecosystems (ecological systems), communities, and species which are endangered or inadequately protected.

coarse filter-fine filter approach—A working hypothesis that assumes that conservation of multiple, viable examples of all coarse-filter targets (communities and ecological systems) will also conserve the majority of species (fine-filter targets). The term coarse filter refers to targets at the community or system level of biological organization whereas coarse-scale refers to spatial scale of, for example, terrestrial targets that roughly cover 20,000–1,000,000 acres.

coarse-scale approach—Ecological systems or matrix communities are spatially large terrestrial targets referred to as coarse-scale. The coarse-scale approach is the first step in the portfolio assembly process where all coarse-scale targets are represented or "captured" in the ecoregion (including those that are feasibly restorable).

community—Natural or plant communities (also called terrestrial communities) are community types of definite floristic composition, uniform habitat conditions, and uniform physiognomy. Natural communities are defined by the finest level of classification, the "plant association" level of the National Vegetation Classification. Like ecological systems, terrestrial communities are characterized by both a biotic and abiotic component. Even though they are classified based upon dominant vegetation, we use them as inclusive conservation units that include all component species (plant and animal) and the ecological processes that support them.

connectivity—Conservation sites or reserves have permeable boundaries and thus are subject to inflows and outflows from the surrounding landscapes. Connectivity in the selection and design of nature reserves relates to the ability of species to move across the landscape to meet basic habitat requirements. Natural connecting features within the ecoregion may include river channels, riparian corridors, ridgelines, or migratory pathways.

conservation focus—Those targets that are being protected and the scale at which they are protected (e.g. local scale species and small patch communities; intermediate scale species and large patch communities; coarse scale species and matrix communities; and regional scale species).

conservation goal—In ecoregional planning, the number and spatial distribution of on-the-ground occurrences of targeted species, communities, and ecological systems that are needed to adequately conserve the target in an ecoregion.

conservation site—A site which maintains targets and their supporting ecological processes within their natural ranges of variability. A functional conservation site will conserve a small number of ecological systems, communities, or species at one or two scales below regional and targets tend to be relatively few, often sharing similar ecological processes.

conservation status—Usually refers to the category assigned to a conservation target such as threatened, endangered, imperiled, vulnerable, and so on.

conservation target (see target)

conservation value—A criterion in the site selection process that is based upon the number, diversity (scale, aquatic/terrestrial), and health of conservation targets.

Core Habitat—As defined by the SAC, Core Habitat for a given species is a habitat patch or aggregation of habitat patches that 1) is of sufficient size to support a viable population of that species; 2) is not fragmented by roads or unsuitable habitat; 3) has intact ecological processes;

and 4) has effective corridors and connections to other habitats, where applicable, to allow gene flow among populations and to promote movement of large predators.

corridor—A route that allows movement of individuals or taxa from one region or place to another. In ecoregional planning, it is important to establish corridors among sites for conservation targets that require such areas for dispersal and movement. Focal species may help in designing corridors and linkages.

data dictionary - A data dictionary is a list that maintains, for each coverage, the names of the attributes and a description of the attribute values (including a description of each code, if necessary). Having a data dictionary for your database is invaluable as a reference during the project as well as for transferring information to others.

data layer (see GIS coverage)

decline/declining - For conservation targets, the historical or recent decline through all or part of its range. Declining species exhibit significant, long-term declines in habitat/and or numbers, are subject to a high degree of threat, or may have unique habitat or behavioral requirements that expose them to great risk.

Disjunct - Disjunct species have populations that are geographically isolated from other populations.

distribution pattern—The overall pattern of occurrence for a particular conservation target. In conservation projects, often referred to as the relative proportion of the target's natural range occurring within a given area (i.e. endemic, widespread, limited, disjunct, peripheral).

ecological communities (see community)

ecological drainage units (EDU)—Aggregates of watersheds that share ecological and biological characteristics. Ecological drainage units contain sets of aquatic systems with similar patterns of hydrologic regime, gradient, drainage density, & species distribution. Used to spatially stratify ecoregions according to environmental variables that determine regional patterns of aquatic biodiversity and ecological system characteristics.

ecological integrity—The probability of an ecological community or ecological system to persist at a given site is partially a function of its integrity. The ecological integrity or viability of a community is governed primarily by three factors: demography of component species populations; internal processes and structures among these components; and intactness of landscape-level processes which sustain the community or system.

ecological system (see terrestrial ecological systems or aquatic ecological system).

ecoregion—A relatively large area of land and water that contains geographically distinct assemblages of natural communities. These communities (1) share a large majority of their species, dynamics, and environmental conditions, and (2) function together effectively as a conservation unit at global and continental scales." Ecoregions were defined by Robert Bailey as major ecosystems resulting from large-scale predictable patterns of solar radiation and moisture, which in turn affect the kinds of local ecosystems and animals and plant found within.

edge effect—The influence of a habitat edge on interior conditions of a habitat or on species that use interior habitat. Greater amounts of edge habitat can often lead to deleterious effects on "interior" target species.

efficiency—A principle in which occurrences of coarse-scale ecological systems that contain multiple targets at other scales are given priority. This is accomplished through identification of functional sites and landscapes. In more academic literature, efficiency refers to conserving the greatest amount of biological diversity in the least amount of land area.

element—A term originating from the methodology of the Natural Heritage Network that refers to species, communities, and other entities (e.g., migratory bird stopovers) of biodiversity that serve as both conservation targets and as units for organizing and tracking information.

element occurrence (EO)—A term originating from the methodology of the Natural Heritage Network, including the California Natural Diversity Data Base, that refers to a unit of land or water on which a population of a species or example of an ecological community occurs. For communities, these EOs represent a defined area that contains a characteristic species composition and structure. In this Plan, element occurrences are referred to as known locations.

endangered species—A species that is federally listed or proposed for listing as Endangered by the U.S. Fish and Wildlife Service under the Endangered Species Act.

endemic—Species that are restricted to an ecoregion (or a small geographic area within an ecoregion), depend entirely on a single area for survival, and therefore, are often more vulnerable.

essential conservation area - Conservation areas that are required for the long-term viability of one or more target species or natural communities. Includes corridors for natural processes as part of essential area. Because a given conservation area was deemed essential does not mean that it, by itself, is sufficient to provide viability for a species.

feasibility—A principle used in this conservation planning process to include Core Habitat, ecosystem process, or linkage areas in the reserve design if they are suitable and contribute to conservation plan goals. Factors contributing to feasibility may include management considerations, the probability of success, and implementation strategies.

fine filter—To ensure that the coarse-fine filter strategy adequately captures all viable, native species and ecological communities, conservation planning also targets species that cannot be reliably conserved through the coarse-filter approach and may require individual attention through the fine filter approach. Wide-ranging, very rare, extremely localized, narrowly endemic, or keystone species are all likely to need fine-filter strategies.

Flagship species—Charismatic species, used to draw attention to an issue or to build support for reserve selection.

focal species—Focal species have spatial, compositional and functional requirements that may encompass those of other species in the region and may help address the functionality of ecological systems. Focal species may not always be captured in the portfolio through the coarse filter. This planning effort used The Nature Conservancy's approach, which defines wide-ranging and keystone as examples of focal species.

fragmentation—Process by which habitats are increasingly subdivided into smaller units, resulting in their increased insularity as well as losses of total habitat area. Fragmentation may be caused by humans (such as development of a road) or by natural processes (such as a tornado).

functionality—A principle to ensure all sites in a conservation area are functional or feasibly restorable to a functional condition. Functional sites maintain the size, condition, and landscape context within the natural range of variability of the respective conservation targets.

GAP (National Gap Analysis Program)—Gap analysis is a scientific method for identifying the degree to which native animal species and natural communities are represented in our present-day mix of conservation lands. Those species and communities not adequately represented in the existing network of conservation lands constitute conservation "gaps." The purpose of the Gap Analysis Program (GAP) is to provide broad geographic information on the status of ordinary species (those not threatened with extinction or naturally rare) and their habitats in order to provide land managers, planners, scientists, and policy makers with the information they need to make better-informed decisions.

georeference—Georeferencing establishes the relationship between objects on a planar map and known real-world coordinates, such as section corners.

GIS (Geographic Information System) - An organized system of computer hardware, software, and geographic data designed to efficiently capture, store, update, manipulate, analyze, and display all forms of spatial (geographically referenced) information.

GIS coverage—1. A digital version of a map forming the basic unit of vector data storage in ARC/INFO. A coverage stores map features as primary features (such as arcs, nodes, polygons, and label points) and secondary features (such as tics, map extent, links, and annotation). Associated feature attribute tables describe and store attributes of the map features. 2. a set of thematically associated data considered as a unit. A coverage usually represents a single theme, or layer, such as soils, streams, or roads.

habitat—The place or type of site where species and species assemblages are typically found and/or successfully reproducing. In addition, marine communities and systems are referred to as habitats. They are named according to the features that provide the underlying structural basis for the community.

habitat enhancement -- any manipulation of habitat that improves its value and ability to meet specified requirements of one or more Covered Species, including actions to reverse the effects of previous disturbance, control exotic species, and retain natural diversity.
indicator species—A species used as a gauge for the condition of a particular habitat, community, or ecosystem. A characteristic or surrogate species for a community or ecosystem.

indigenous—A species that is naturally occurring in a given area and elsewhere.

irreplaceable—The single most outstanding example of a target species, community, or system, or a population that is critical to a species remaining extant and not going extinct.

keystone species—A species whose impacts on its community or ecosystem are large; much larger than would be expected from its abundance. (e.g. beaver or prairie dogs)

landscape—A heterogeneous land area composed of a cluster of interacting ecosystems that are repeated in similar form throughout.

landscape level or landscape scale—Landscape level actions (conservation planning, monitoring) focus on geographically large areas with functional ecosystem processes and coarse-scale conservation targets

large patch—Communities that form large areas of interrupted cover. Individual occurrences of this community patch type typically range in size from 50 to 2,000 hectares. Large patch communities are associated with environmental conditions that are more specific than those of

matrix communities, and that are less common or less extensive in the landscape. Like matrix communities, large-patch communities are also influenced by large-scale processes, but these tend to be modified by specific site features that influence the community.

linear communities—Communities that occur as linear strips are often, but not always, ecotonal between terrestrial and aquatic systems. Examples include coastal beach strands, bedrock lakeshores, and narrow riparian communities. Similar to small patch communities, linear communities occur in very specific ecological settings, and the aggregate of all linear communities covers, or historically covered, only a small percentage of the natural vegetation of an ecoregion. They also tend to support a specific and restricted set of associated flora and fauna. Linear communities differ from small patch communities in that both local-scale processes and large-scale processes strongly influence community structure and function.

linkage – A planned connection between habitat "islands" to provide protected movement opportunities and increased range for various species, thereby helping to maintain healthy populations and genetic diversity. *See corridors*

map units - The coordinate units in which a geographic data set (e.g., a coverage) is stored in ARC/INFO or ARCView. Map units can be inches, centimeters, feet, meters, or decimal degrees.

mapping precision - the accuracy with which a location of an observation or occurrence of a species or natural community has been mapped, dependent upon the original source of information.

matrix-forming or matrix communities—Communities that form extensive and contiguous cover may be categorized as matrix (or matrix-forming) community types. Matrix communities occur on the most extensive landforms and typically have wide ecological tolerances. They may be characterized by a complex mosaic of successional stages resulting from characteristic disturbance processes (e.g. New England northern hardwood-conifer forests). Individual occurrences of the matrix type typically range in size from 2,000 to 500,000 hectares. In a typical ecoregion, the aggregate of all matrix communities covers, or historically covered, as much as 75-80% of the natural vegetation of the ecoregion. Matrix community types are often influenced by large-scale processes (e.g. climate patterns, fire) and are important habitat for wide-ranging or large area-dependent fauna, such as large herbivores or birds.

maximum extent practicable—The biological standards as proposed by the SAC focus on maximizing conservation by incorporating natural features, artificial buffers (e.g. roads) and other features to the greatest extent possible.

metadata—Metadata documents the content, source, reliability, and other characteristics of data. Metadata are particularly important in the iterative conservation planning process because this documentation will expedite the review of existing tabular and geospatial data sets when a conservation plan is revisited and will minimize the likelihood of "lost" data.

metapopulation—A network of semi-isolated populations with some level of regular or intermittent migration and gene flow among them, in which individual populations may go extinct but can then be recolonized from other source populations (this is referred to as rescue effect).

minimum mapping unit—The minimum sizes or dimensions for features to be mapped as lines or areas for a given map scale. For example, long narrow features such as streams and rivers will be represented as lines if their width is less than 0.10 inch. If a polygon is smaller than .125 inch on aside, it will be represented as a point.

minimum dynamic area—The area needed to insure survival or re-colonization of a site following disturbance that removes most or all individuals. This is determined by the ability of some number of individuals or patches to survive and the size and severity of stochastic events.

mosaic—An interconnected patchwork of distinct vegetation types.

native—Those species and communities that were not introduced accidentally or purposefully by people but that are found naturally in an area. Native communities are those characterized by native species and maintained by natural processes. Native includes both endemic and indigenous species.

natural community — The array of native plants and animals, many of which are interdependent, in a given ecosystem. Often named for the principal type of vegetation in the community, for example, "desert dry wash woodland" and "active sand dunes." This assemblage of plants and animals interacts with one another, the abiotic environment around them, and is subject to primarily natural disturbance regimes. Those assemblages that are repeated across a landscape in an observable pattern constitute a natural community type.

network of conservation sites—A reserve system connecting multiple nodes and corridors into a landscape that allows material and energy to flow among the various components.

nonhabitat matrix — A natural habitat that is unsuitable for the survival of the target species, usually adjacent to, interconnected with, or surrounding suitable habitat.

occurrence—Spatially referenced examples of species, communities, or ecological systems. May be equivalent to CNDDB Element Occurrences, or may be more loosely defined locations delineated through 1) the definition and mapping of other spatial data, or 2) the identification of areas by experts.

partnership—Collaborative relationship with a diverse array of public and private organizations, agencies, and individuals.

patch community—Communities nested within matrix communities and maintained primarily by specific environmental features rather than disturbance processes.

photo interpretation —A systematic examination of aerial photos, and frequently, other supporting materials such as maps and reports of field observations. Based on this study, an interpretation is made as to the physical nature of objects and phenomena appearing in the photographs. Interpretations may take place at a number of levels of complexity, from the simple recognition of objects on the earth's surface to the derivation of detailed information regarding the complex interactions among earth surface and subsurface features.

population viability analysis (PVA)—A collection of quantitative tools and methods for predicting the likely future status (e.g., likelihood of extinction or persistence) of a population or collection of populations of conservation concern. A PVA estimates the likelihood of population viability over a determinate time period, based on life history variables.

rangewide—Referring to the entire distribution of a species, community, or ecological system.

rapid ecological assessment (REA)—Technique for using remote sensing information combined with on-the-ground selected biological surveys to relatively quickly assess the presence and quality of conservation targets, especially at the community and ecosystem level.

representation—A principle of reserve selection and design referring to the capture of the full spectrum of biological and environmental variation within a network of reserves or conservation sites, including all genotypes, species, communities, ecosystems, habitats, and landscapes.

representativeness—Captures multiple examples of all conservation targets across the diversity of environmental gradients appropriate to the conservation Plan Area (e.g., temperature/moisture gradient, or some other physical gradient).

resolution—Resolution is the accuracy at which a given map scale can depict the location and shape of map features. For example, at a map scale of 1:63,360 (1 inch = 1 mile), features smaller than .10-mile long or wide only measure .10-inch wide or long on the map. The larger

the map scale, the higher the possible resolution. As map scale decreases, resolution diminishes and feature boundaries must be smoothed, simplified, or not shown at all. For example, small areas may have to be represented as points.

satellite imagery—An image, which is a graphic representation or description of an object, that is typically produced by an optical or electronic device. Other common examples include scanned data and photographs. An image is stored as a raster data set of binary or integer values that represent the intensity of reflected light, heat, or another range of values on the electromagnetic spectrum. Remotely sensed images (such as satellite imagery) are digital representations of the Earth. Landsat and SPOT are two types of satellite imagery used in this Plan.

section—Areas of similar physiography within an ecoregional province; a hierarchical level with the U.S. Forest Service ECOMAP framework for mapping and classifying ecosystems at multiple geographic scales.

site (or conservation site)—Areas that are defined by the presence of conservation targets, are the focus of conservation action, and are the locus for measuring conservation success. Conservation planning identifies and selects conservation targets and locates occurrences of these targets. Based on geographic proximity, these target occurrences are grouped together into sites.

SITES—Software consisting of computerized algorithms designed specifically for The Nature Conservancy users in ecoregional planning to aid in selecting conservation sites.

small patch—Communities that form small, discrete areas of vegetation cover. Individual occurrences of this community type typically range in size from 1 to 50 hectares. Small patch communities occur in very specific ecological settings, such as on specialized landform types or in unusual microhabitats. The specialized conditions of small patch communities, however, are often dependent on the maintenance of ecological processes in the surrounding matrix and large patch communities. In many ecoregions, small patch communities contain a disproportionately large percentage of the total flora, and also support a specific and restricted set of associated fauna (e.g. invertebrates or herptofauna) dependent on specialized conditions.

source (of stress)—An extraneous factor, either human (i.e. activities, policies, land uses) or biological (e.g. non-native species), that infringes upon a conservation target in a way that results in stress.

spatial pattern—Within an ecoregion, natural terrestrial communities may be categorized into four functional groups on the basis of their current or historical patterns of occurrence, as

correlated with the distribution and extent of landscape features and ecological processes. These groups are identified as matrix communities, large-patch communities, small-patch communities, and linear communities.

stakeholder—In a particular project or area, someone who: 1) would benefit if TNC achieved its project goals, 2) would be hurt, or believe they could be hurt by TNC's goals, 3) could shape public opinion about TNC's project even if it might not directly affect them, and 4) has the authority to make decisions affecting TNC's goals.

stratification—A hierarchical division of an ecoregion into nested, progressively smaller geographic units. Spatial stratification is used to represent each conservation target across its range of variation (in internal composition and landscape setting) within the ecoregion, to ensure long-term viability of the type by buffering against degradation in one portion of its range, and to allow for possible geographic variation.

stress—Something that impairs or degrades the size, condition, or landscape context of a conservation target, resulting in reduced viability.

sufficient conservation area—A conservation area that includes enough habitat to contain a viable population size of one or more target species. The inclusion of one or more additional conservation areas may be sufficient, but not essential, to the protection of a species.

target—Also called conservation target. An element of biodiversity selected as a focus for conservation planning or action. The three principle types of targets in this habitat conservation planning program are species, ecological communities, and ecological systems.

terrestrial ecological community—Plant community types of definite floristic composition, uniform habitat conditions, and uniform physiognomy. Terrestrial ecological communities are defined by the finest level of classification, the "plant association" level of the National Vegetation Classification.

terrestrial ecological systems—Dynamic spatial assemblages of ecological communities that 1) occur together on the landscape; 2) are tied together by similar ecological processes (e.g., fire, hydrology), underlying environmental features (e.g., soils, geology), or environmental gradients (e.g., elevation, hydrologically-related zones); and 3) form a robust, cohesive, and distinguishable unit on the ground. Ecological systems are characterized by both biotic and abiotic (environmental) components and can be terrestrial, aquatic, marine, or a combination of these.

threat—The combined concept of ecological stresses to a target and the sources of that stress to the target.

threatened species—Species federally listed or proposed for listing as Threatened by the U.S. Fish and Wildlife Service under the Endangered Species Act.

umbrella species—Typically wide-ranging species that require large blocks of relatively natural or unaltered habitat to maintain viable populations. Protection of the habitats of these species may protect the habitat and populations of many other more restricted or less wide ranging species.

urgency—A qualitative measure referring to the immediacy of severe threats—taking into account how severe the threat is and how likely it is to destroy or seriously degrade the targets.

viable/viability—The ability of a species to persist for many generations or an ecological community or system to persist over some time period. An assessment of viability will often focus on the minimum area and number of occurrences necessary for persistence. However, conservation goals should not be restricted to the minimum but rather should extend to the size, distribution, and number of occurrences necessary for a community to support its full complement of native species.

viable population—A population is considered viable if it contains an estimated 5,000 to 10,000 individuals for vertebrates, 10,000 to 20,000 individuals for invertebrates. These numbers imply a population of sufficient size to persist through fluctuations caused by environmental variation and to have a realistic potential for genetic interactions.

vulnerable—Vulnerable species are usually abundant, may or may not be declining, but some aspect of their life history makes them especially vulnerable (e.g., migratory concentration or rare/endemic habitat). For example, sandhill cranes are a vulnerable species because a large percentage of the entire population aggregates during migration along a portion of the Platte River in Nebraska.

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Appendix III

SAMPLE
Memorandum of Understanding (MOU)

between
Bureau of Land Management, California Department of Fish and Game, Coachella Valley Conservation Commission, and U.S. Fish and Wildlife Service

for
Interim Management of Reserve Management Units
and
Implementation of the Trails Management Plan for the Santa Rosa and San Jacinto Mountains Conservation Area

I. Purpose

The MSCHP calls for the development of a management plan for each of the Reserve Units in the Plan Area. These Reserve Management Unit Plans (RMUPs) will be developed within three years of Permit issuance by the Reserve Management Unit Committees (RMUCs), Reserve Managers, and the Land Manager. The elements of the RMUPs are described in Section 6.2 of the MSHCP. The RMUPs will include ongoing management measures and Adaptive Management actions, schedules, and responsibilities for implementation. The RMUPs will include recommendations for public access and uses based on assessment of compatibility with resource protection objectives.

This Sample MOU (hereinafter "MOU") has been developed to provide guidelines to address management needs that are known or may arise in years one through three of MSHCP implementation, prior to completion of the RMUPs. Upon Permit issuance for the MSHCP, the management entities will work together to finalize an MOU. [While this current MOU references only the Bureau of Land Management (BLM), California Department of Fish and Game (CDFG), Coachella Valley Conservation Commission (CVCC, for Permittee lands), and U.S. Fish and Wildlife Service (USFWS), the Final MOU is intended include California State Parks (State Parks), National Park Service (NPS), and U.S. Forest Service (USFS). The CVCC will use its best efforts to include State Parks, NPS, and USFS in the Final MOU so the MOU will facilitate coordination and integrated management of lands owned by agencies not signatory to the Plan (BLM, NPS, and USFS).] This MOU will serve as the basis for establishing and clarifying the roles and responsibilities of the cooperating parties in the management and operation of the Reserve System and implementation of the Conservation provisions of the Coachella Valley Multiple Species Habitat Conservation Plan/Natural Community Conservation Plan (MSHCP). However, this MOU notwithstanding, the parties recognize that management of

their lands is guided by different authorities and policies and that final management decisions rest with each individual party.

This MOU is neither a fiscal nor a funds obligation document for the parties. The MOU shall not obligate the parties to expend appropriations or to enter into any contract or other obligation with the other parties or another entity.

In carrying out this MOU, there shall be no discrimination against any person because of race, color, national origin, sex, age, religion, or disability.

II. Authorities

This MOU is entered into under the following authorities:

A. BLM:
- Section 307 of the Federal Land Policy and Management Act (Public Law 94-579, 90 Stat. 2766)
- Sikes Act (Public Law 93-452, 88 Stat. 1369)
- Endangered Species Act (Public Law 93-205, 87 Stat. 884) as amended
- BLM and CDFG Master Memorandum of Understanding (June 1983)
- California Desert Conservation Area (CDCA) Plan, as amended

B. CDFG:
- California Code of Regulations (need citation)
- Sikes Act (Public Law 93-452, 88 Stat. 1369)
- BLM and CDFG Master Memorandum of Understanding (June 1983)
- California Endangered Species Act, as Amended September 1984

C. CVCC:
- Implementing Agreement for MSHCP

D. USFWS:
- Endangered Species Act (16USC 1531 et seq.), as amended
- Fish and Wildlife Coordination Act
- National Wildlife Refuge Administration Act (16USC 668 dd)

III. Goals and Objectives

The parties agree that the overriding goal of this MOU is to ensure the Conservation of the Covered Species and natural communities and implement the MSHCP through maintenance and enhancement of biological diversity and ecosystem processes within the Plan Area (*See Section 1.2, Purpose, of the MSHCP*). The Reserve System is established as part of the MSHCP. The acquisition and maintenance of the Reserve System is the basis for issuance of Permits. The term "Permits" refers, collectively, to the Section 10(a)(1)(B) Permit and the NCCP Permit issued by USFWS and CDFG, respectively, to Permittees for Take of Covered Species pursuant to FESA and the NCCP Act (*See Section 1.2 of the MSHCP).* The management of the Reserve Lands will coordinate management of Existing Conservation Lands with Additional Conservation Lands acquired through the Plan.

The Plan establishes Reserve Management Units (RMUs) to ensure the coordinated management necessary to achieve the Conservation Goals and Objectives. RMUs encompass one or more Conservation Areas, based on Habitat/natural community patterns, land ownership, and similar management needs. Within the RMUs, management obligations under the Plan may vary depending on land ownership or administrating agency. Either a single agency (e.g. the National Park Service for Joshua Tree National Park Conservation Area) or a group of agencies will oversee these RMUs, working together as a Reserve Management Unit Committee (RMUC). The CVCC will have a Land Manager and a Monitoring Program Administrator (MPA) to work on behalf of the Permittees. The Land Manager and MPA will coordinate with the RMUCs, Trails Management Subcommittee, and Reserve Management Oversight Committee (RMOC) to facilitate the exchange of information regarding completed and proposed management/Adaptive Management actions and Monitoring Program data, respectively (*Section 8.2.2, Management Program Organizational Structure).*

The goal of the Management Program is to implement management actions and prescriptions that ensure Conservation of the Covered Species and Natural Communities within the Plan Area. As described in Section 8.4.6.2, the Management Program involves the implementation of Adaptive Management of trails and public use in the Santa Rosa and San Jacinto Mountains Conservation Area. The goals and objectives are provided below under Item A for the overall Management Program and Item B for the Trails Management Program.

A. Goals and Objectives: Reserve System Management Program (*from Section 8.1.2*)

The Management Program will incorporate Adaptive Management, which includes an integrated multidisciplinary approach to addressing management practices, evaluating management actions, and assessing threats using appropriate experimental approaches at species, community, and landscape levels. The Management Program will be integrated in a feedback loop with the Monitoring Program, which, in addition to tracking the status of Covered Species and conserved natural communities, will provide scientifically reliable data for the Management Program. The Management Program will:

- Develop a reserve management plan within 3 years of permit issuance and evaluate existing management activities. This plan will delineate cost estimates, staffing needs, and schedules for implementation.

- Use available data to structure a range of alternative response models to address a given threat or stressor affecting a Covered Species or natural community and evaluate these models.
- Incorporate a research component that will be funded and implemented by this Plan. Research needs will evolve over time. Research needs will be revealed by the same process used to evaluate monitoring and management protocols and results, incorporating empirical data and recognition of knowledge gaps.
- Provide a process for implementing Adaptive Management actions, and a means to evaluate the efficacy of these actions.
- Establish an evaluation subcommittee composed at least in part of managers and scientists.

B. Goals and Objectives of the Trails Management Plan for the Santa Rosa and San Jacinto Mountains Conservation Area

The Trails Management Plan for the Santa Rosa and San Jacinto Mountains is designed to meet two primary goals. These goals and the related objectives are as follows:

Goal 1: Minimize the risk of potential adverse impacts to bighorn sheep from recreational activities.

Objective 1: Design trail management measures to support predictable use patterns by trail users.
Objective 2: Manage trails to preserve the opportunity for bighorn sheep to access water sources during the summer months.
Objective 3: Manage trails to preserve the opportunity for bighorn sheep to move across the landscape.
Objective 4: Implement a biological monitoring program to track trail use and bighorn sheep distribution and demography
Objective 5: Provide a mechanism to evaluate effectiveness of the trails program and recommend modifications to management actions if necessary.

Goal 2: Provide recreational opportunities throughout the Santa Rosa and San Jacinto Mountains for hikers, equestrians, and mountain bikers that are consistent with recovery of bighorn sheep.

Objective 6: Provide some opportunities for recreational trail use on a year-round basis.
Objective 7: Provide at least seasonal opportunities for recreational trail use.
Objective 8: Provide opportunities for recreation by developing new trails that avoid sensitive bighorn sheep habitat.
Objective 9: Provide consistent management of the trails system across jurisdictional boundaries.

IV. Program Coordination and Responsibilities

A. Reserve System Management Program

To implement this MOU and ensure the coordinated management of the Reserve System, the parties hereby designate the following as their representatives to the RMOC. The representatives to each RMUC will also need to be identified.

BLM (designated by BLM)
CDFG (designated by CDFG)
California State Parks (designated by State Parks)
CVCC (designated by CVCC)
National Park Service (designated by NPS), *ex officio*
USFWS (designated by USFWS)
USFS (designated by USFS), *ex officio*
Other public or private entities that hold reserve lands as appointed by CVCC

To delineate management responsibilities among the agencies for the Reserve Management Program:

1. BLM agrees to:

   a. Provide ranger support as time and staffing permit for the patrol of the Reserve System and enforcement of appropriate State and Federal laws and regulations.

   b. Participate in habitat protection activities such as road closures, signing, fencing, patrols and other enforcement activities, consistent with the California Desert Conservation Area Plan, as amended.

   c. Participate in habitat restoration and enhancement projects such as invasive species control, erosion control, restoration of illegal or decommissioned trails, and restoration from OHV impacts.

   d. Participate in the development and installation of interpretive signs, kiosks, markers and other interpretive information.

   e. Provide a representative to the RMUCs of which BLM is a designated member, (Unit 1, Unit 3, Unit 4, Unit 5, Unit 6), the Trails Management Subcommittee, and the RMOC.

   f. Provide staff support covering archaeology, botany, geology, recreation, and wildlife issues for environmental assessment of actions taken within the Reserve System.

   g. Provide funding, as available, to manage BLM lands within the Reserve System.

2. CDFG agrees to:

    a. Provide additional patrols and enforcement personnel as time and staffing permit in coordination with CVCC, BLM, and USFWS patrols.

    b. Coordinate with USFWS and BLM concerning the review and permitting of all research needs within the Reserve System. This includes scientific collecting permits required by CDFG.

    c. Provide funding, as available, for CDFG lands within the Reserve System.

    d. Participate in habitat protection activities such as road closures, signing, fencing, patrols and other enforcement activities.

    e. Participate in habitat restoration and enhancement projects such as invasive species control, erosion control, restoration of illegal or decommissioned trails, and restoration from OHV impacts.

    f. Participate in the development and installation of interpretive signs, kiosks, markers and other interpretive information.

    g. Provide a representative to the RMUCs of which CDFG is a designated member (Unit 1, Unit 4, Unit 6), the Trails Management Subcommittee, and the RMOC.

    h. Provide staff support for biology and wildlife issues for environmental assessment of actions taken within the Reserve System.

3. CVCC agrees to:

    a. Provide ranger/warden positions as identified in the Management Program budget, for patrol and enforcement on Permittee owned lands within the Reserve System, in coordination with BLM, CDFG, and USFWS enforcement personnel.

    b. Implement the Management Program for the Reserve System as described in Section 8.0 of the MSHCP, in coordination with BLM, CDFG, USFWS, and other land management agencies and Permittees.

    c. Implement the Monitoring Program for the Reserve System as described in Section 8.0 of the MSHCP, in coordination with BLM, CDFG, USFWS, and other land management agencies and Permittees.

    d. Coordinate with USFWS, BLM and CDFG concerning the review and permitting of all research needs within the Reserve System.

e. Provide funding for the Local Permittee lands within the Reserve System, according to the budget and funding identified Sections 5 and 8 of the MSHCP.

f. Coordinate the development and installation of interpretive signs, kiosks, markers and other interpretive information.

g. Provide a representative to the RMOC and the RMUCs in which Permittees own land.

h. CVCC may retain or contract with a person or entity to manage Local Permittee RMU lands and coordinate through the RMUCs with the entities managing Conservation land in the RMUs. As set forth in Section 6.1.5 of the MSHCP, the duties of the Land Manager include:

   i. Manage the Local Permittees' RMU lands pursuant to the Plan.
   ii. Coordinate construction of fencing and barriers designed to control and manage public use of the Conservation Areas and maintain/replace those structures as needed over time.
   iii. Provide liaison between the RMUCs and appropriate law enforcement entities to keep trespass and illegal dumping activities under control.
   iv. Coordinate, in cooperation with state and federal land management agencies, the construction and maintenance of public access trails and kiosks in appropriate locations approved by the RMOC, and provide current informational literature to the public.
   v. Organize and coordinate a docent/volunteer corps to help with public access, interpretation, and construction of public trails and kiosk facilities.
   vi. Respond to public inquiries in coordination with appropriate land management agencies and Permittees.
   vii. In coordination with the agencies on whose land the control activities would occur, carry out and coordinate exotic species control activities, focusing on those invasive exotic species with the greatest impacts on the Covered Species, conserved natural communities, and the functioning of natural processes within the Conservation Areas.
   viii. In coordination with the agencies on whose land the activities would occur, carry out, coordinate and/or contract for any additional management activity called for in the MSHCP Reserve System Management Program.
   ix. Facilitate the exchange of information regarding all completed and proposed management and Adaptive Management actions.
   x. Prepare an annual work plan, in coordination with the RMUCs, to be reviewed and commented on by the RMOC, and then submitted to the CVCC for budget approval. The elements of the annual work plan are described in Section 8.7.
   xi. Provide annual reporting to CVCC and the RMOC on all completed and proposed land management and adaptive management actions.
   xii. Coordinate with the MPA regarding the Monitoring Program.

4. USFWS agrees to:

    a. Provide additional patrols and enforcement personnel as time and staffing permit in coordination with CVCC, BLM, and CDFG patrols.

    b. Coordinate with CDFG and BLM concerning the review and permitting of all research needs within the Reserve System.

    c. Provide funding for USFWS lands within the Reserve System.

    d. Participate in habitat protection activities such as road closures, signing, fencing, patrols and other enforcement activities on Refuge lands within the Reserve System.

    e. Participate in habitat restoration and enhancement projects such as invasive species control, erosion control, and restoration from OHV impacts.

    f. Participate in the development and installation of interpretive signs, kiosks, markers and other interpretive information.

    g. Provide a representative to the RMUCs in which USFWS owns land (Unit 1), the Trails Management Subcommittee, and the RMOC.

    h. Provide staff support for biology and wildlife issues for environmental assessment of actions taken within the Reserve System.

5. All parties agree:

    a. To identify a process for adoption of, and provide for enforcement of, rules and regulations for the Reserve System, consistent with applicable authorities regarding enforcement activities.

    b. To cooperate in regulation, management, control, or elimination of activities which may be adverse to the Conservation of the Covered Species and covered natural communities within the Reserve System, as described in Section 8, 9, and 10 of the MSHCP and consistent with applicable plans, policies, regulations, and laws governing non-signatories to the Plan.

    c. To cooperate in monitoring and Adaptive Management of the Covered Species and covered natural communities within the Reserve System, as described in Section 8 of the MSHCP and consistent with applicable plans, policies, regulations, and laws governing non-signatories to the Plan.

    d. To promote, develop, screen, review, and approve research projects within the Reserve System in coordination with the other members of the RMOC and consistent with applicable plans, policies, regulations, and laws.

e. To promote public awareness of the resource values within the Reserve System through interpretive programs, public education, and community outreach.

f. To ensure any action proposed by any of the parties within the Reserve System is promptly reviewed by all parties prior to approval of that action, including other members of the RMOC. This shall not convey the right to any party to veto a proposed use or action on the land of another party but is intended to affirm a spirit of negotiation and cooperation. Potentially conflicting land uses shall be discussed among the parties. The parties with, where necessary, the assistance of the Land Manager and the MPA, shall ensure that any action taken is consistent with the MSHCP and Conservation of the Covered Species and natural communities, as well as other applicable plans, policies, regulations, and laws.

g. To review the annual budget and annual work plan for the Reserve System, in coordination with the RMOC. The Land Manager and the RMUCs will coordinate in the preparation of an annual work plan for each RMU. The annual work plan will describe the conserved lands, the potential threats and proposed management prescriptions, a work schedule for management actions, and a budget.

h. To coordinate management responsibilities among the parties, including other land management agencies within the Reserve System. Any party may be responsible for implementing any of the activities; however, one party may be designated in the work plan to be responsible for coordinating, promoting, and overseeing projects under its assigned responsibility. Project-specific agreements may be required for one party to implement an activity on another party's land.

i. That each provision of this MOU is subject to the bylaws of CVCC, the laws of the State of California, and the laws of the United States.

j. That nothing herein shall be construed as obligating any of the cooperating parties to expend or be involved in any contract or other obligation for the future payment of money in excess of the appropriations authorized by law and administratively allocated for these projects.

k. That all improvements shall be and will remain the property of the entity owning the land on which such improvements occur unless otherwise provided for through another instrument.

l. That each party agrees that it will be responsible for its own acts and the results thereof and shall not be responsible for the acts of the other parties and the results thereof. Each party therefore agrees that it will assume all risk and liability to itself, its agents or employees, for any injury to persons or property resulting in any manner from the conduct of its own operations, and the operations of its agents or employees, under this MOU, from any and all causes due to any act or acts, negligence, or the failure to exercise proper precautions, of or by itself or its own agents or its own employees, while occupying or visiting the premises under

and pursuant to the MOU. The Government's liability shall be covered by the provisions of the Federal Tort Claims Act (28 U.S.C. 2671-80 (1976)).

B. Implementation of the Trails Management Plan for the Santa Rosa and San Jacinto Mountains Conservation Area

The following statements delineate management responsibilities among the agencies for Trails Management Program. State Parks, NPS, and USFS do not have lands affected by or involved in the Trails Plan:

1. BLM agrees to:

   a. Provide ranger support as time and staffing permit for the enforcement of trails management program (e.g. mandatory self-issue permit on some trails), consistent with enforcement of appropriate State and Federal laws and regulations.

   b. Provide at least one seasonal aide (or equivalent), as funding is available, to implement the human use monitoring on selected trails in conjunction with other seasonal aides provided by the CVCC as described in Section 8 of the Plan.

   c. Provide support as time and staffing permit, including personnel, materials, and equipment for the bighorn sheep and trails research program. This may include but is not limited to in-kind commitments of staff, equipment, etc.

   d. Cooperate with CVCC, CDFG, USFWS, and other partners on the funding and implementation of the bighorn sheep-monitoring program, including funding as available.

   e. Participate in trail management activities such as installation of trail signage and barriers, installation of trailheads, patrols and other enforcement activities, consistent with the California Desert Conservation Area Plan, as amended.

   f. Participate in the development and installation of interpretive signs, kiosks, markers and other interpretive information regarding trails and resource issues.

   g. Provide a representative to the Trails Management Subcommittee.

   h. Provide staff support covering archaeology, cultural resources, botany, geology, recreation, and wildlife issues for the Trails Management Program.

   i. Provide funding, as available, for trails management projects on BLM lands within the Santa Rosa and San Jacinto Mountains Conservation Area.

2. CDFG agrees to:

    a. Provide personnel as time and staffing permit for the enforcement of trails management program (e.g. mandatory self-issue permit on some trails), consistent with enforcement of appropriate State and Federal laws and regulations.

    b. Coordinate with USFWS and BLM concerning the review and permitting of all research needs for the Trails Management Program.

    c. Provide staff support for the design and implementation of the human use monitoring on selected trails.

    d. Provide personnel as time and staffing permit for the bighorn sheep and trails research program.

    e. Cooperate with BLM, CVCC, USFWS, and other partners on the funding and implementation of the bighorn sheep-monitoring program.

    f. Participate in trail management activities such as installation of trail signage and barriers, installation of trailheads, and patrols and other enforcement activities.

    g. Participate in the development and installation of interpretive signs, kiosks, markers and other interpretive information regarding trails and resource issues.

    h. Provide a representative to the Trails Management Subcommittee.

    i. Provide staff support for biology and wildlife issues for environmental assessment of actions taken for the Trails Management Program.

3. CVCC agrees to:

    a. Provide personnel for the enforcement of trails management program (e.g. mandatory self-issue permit on some trails), consistent with enforcement of appropriate State and Federal laws and regulations.

    b. Coordinate with USFWS, CDFG, and BLM concerning the review and permitting of all research needs for the Trails Management Program.

    c. Provide three seasonal aides for the implementation of the human use monitoring on selected trails in conjunction with another seasonal aide provided by the BLM as described in Section 8 of the Plan.

    d. Provide funding for personnel, materials, and equipment for the bighorn sheep and trails research program. The CVCC share has been apportioned, based on the land ownership of areas where existing and future trails occur, as approximately

40% of the total cost. This share may include but is not limited to in-kind commitments of staff, equipment, etc.

e. Cooperate with BLM, CDFG, USFWS, and other partners on the funding and implementation of the bighorn sheep-monitoring program.

f. Participate in trail management activities such as installation of trail signage and barriers, installation of trailheads, and patrols and other enforcement activities.

g. Participate in the development and installation of interpretive signs, kiosks, markers and other interpretive information regarding trails and resource issues.

h. Provide a representative to the Trails Management Subcommittee.

4. USFWS agrees to:

a. Coordinate with CDFG and BLM concerning the review and permitting of all research needs for the Trails Management Program.

b. Cooperate with BLM, CDFG, CVCC, and other partners on the funding and implementation of the bighorn sheep-monitoring program.

c. Provide staff support for the design and implementation of the human use monitoring on selected trails.

d. Provide staff support for the design and implementation of the bighorn sheep and trails research program and the bighorn sheep-monitoring program.

e. Provide a representative to the Trails Management Subcommittee.

f. Provide staff support for biology and wildlife issues related to the Trails Management Program.

Table A2-1 provides a summary of the tasks, roles and responsibilities for initial implementation of the Trails Plan beginning with Permit issuance in Plan year one.

VI. Execution, Modification, and Duration of MOU

This MOU will become effective upon the date subscribed by the last signatory, and shall continue in force until the completion of the management plans for each of the Reserve Units in the Plan Area. These RMUPs will be developed within three years of Permit issuance. This MOU may be terminated by any party upon 30 days written notice.

Amendment to this MOU may be proposed by any party and shall become effective upon approval by all parties.

_____	_____
BLM	Date
_____	_____
CDFG	Date
_____	_____
CVCC	Date
_____	_____
USFWS	Date

Table A2-1: Summary of the Roles and Responsibilities of Agencies and Organizations for Implementation of the Trails Management Plan for the Santa Rosa and San Jacinto Mountains Conservation Area[1]

MANAGEMENT ACTION/TASK	IMPLEMENTATION	RESPONSIBLE ENTITY
TRAILS AND BIGHORN SHEEP RESEARCH PROGRAM		
➢ Determine Funding Needs and Identify Funding Sources for Years 1-5	Year 1	❖ CDFG ❖ CVCC ❖ BLM ❖ USFWS
➢ Develop Request for Proposals (includes selection of Outside Reviewers)	Year 1	❖ CVCC ❖ CDFG ❖ BLM ❖ USFWS ❖ Outside Objective Reviewers
➢ Release Request for Proposals	Year 1	❖ CVCC
➢ Select Researchers	Year 1	❖ CVCC ❖ CDFG ❖ BLM ❖ USFWS ❖ Outside Objective Reviewers
➢ Finalize Research Study Design ➢ Coordinate Trail Use Levels under Research Program	Year 2	❖ Research Scientists ❖ CVCC ❖ BLM ❖ CDFG ❖ USFWS
➢ Conduct Field Research	Years 2 through 6	❖ Research Scientists
➢ Provide Annual Progress Report and Data Summaries	Years 2 through 7	❖ Research Scientists ❖ Monitoring Program Coord.
➢ Review Annual Progress Report and Data Summaries	Years 2 through 7	❖ RMOC ❖ RMUC ❖ Trails Management Subcommittee
➢ Research Results/Data Analyzed	Year 6	❖ Research Scientists

MANAGEMENT ACTION/TASK	IMPLEMENTATION	RESPONSIBLE ENTITY
TRAILS AND BIGHORN SHEEP RESEARCH PROGRAM (CONT.)		
➢ Research Report Completed	Year 7 (or by Year 9)	❖ Research Scientists
➢ Revise Trails Management Program as needed	pending completion of relevant research (by Year 10)	❖ CVCC ❖ CDFG ❖ BLM ❖ USFWS ❖ Trails Management Subcommittee
HUMAN TRAIL USE MONITORING PROGRAM		
➢ Determine Funding Needs and Identify Funding Sources for Years 1-7	Year 1	❖ CDFG ❖ CVCC ❖ BLM ❖ USFWS
➢ Finalize Study Design for Field Monitoring	Year 1	❖ CDFG ❖ CVCC ❖ BLM ❖ USFWS
➢ Implement Self-issue permit System ➢ Self issue permit data should be calibrated with results of monitoring	Year 1	❖ CVCC ❖ BLM ❖ Trails Management Subcommittee
➢ Implement Trail Use Monitoring	Year 1	❖ CVCC ❖ BLM ❖ CDFG
➢ Monitor Compliance with Hot Season Closures	Years 1 through 7	❖ CVCC ❖ BLM ❖ CDFG
➢ Provide Annual Progress Report and Data Summaries	Years 1 through 7	❖ Monitoring Program Coord. ❖ BLM ❖ CDFG
➢ Review Annual Progress Report and Data Summaries	Years 1 through 7	❖ RMOC, RMUC ❖ CVCC ❖ Trails Management Subcommittee

MANAGEMENT ACTION/TASK	IMPLEMENTATION	RESPONSIBLE ENTITY
PENINSULAR BIGHORN SHEEP POPULATION MONITORING		
➢ Determine Funding Needs and Identify Funding Sources for Years 1-5	Year 1	❖ CDFG ❖ CVCC ❖ BLM ❖ USFWS
➢ Determine Elements of Monitoring Program	Year 1	❖ CDFG ❖ CVCC ❖ BLM ❖ USFWS
➢ Develop Request for Proposals (includes selection of Outside Reviewers)	Year 1	❖ CVCC ❖ CDFG ❖ BLM ❖ USFWS ❖ Outside Objective Reviewers ❖ Trails Management Subcommittee
➢ Release Request for Proposals	Year 1	❖ CVCC
➢ Select Monitoring Program Scientists	Year 1	❖ CVCC ❖ CDFG ❖ BLM ❖ USFWS ❖ Outside Objective Reviewers (subject to approval by other committee members)
➢ Finalize Monitoring Design	Year 1	❖ Research Scientists ❖ CVCC ❖ CDFG ❖ BLM ❖ USFWS

MANAGEMENT ACTION/TASK	IMPLEMENTATION	RESPONSIBLE ENTITY
PENINSULAR BIGHORN SHEEP POPULATION MONITORING (CONT.)		
➢ Implement PBS Monitoring Program	Year 1-2	❖ CVCC ❖ CDFG ❖ BLM ❖ USFWS ❖ OTHER PARTNERS
➢ Provide Annual Progress Report and Data Summaries	Years 2 through 6	❖ Research Scientists ❖ Monitoring Program Coordinator
➢ Review Annual Progress Report and Data Summaries	Years 1 through 9	❖ RMOC ❖ RMUC ❖ Trails Management Subcommittee
TRAILS EDUCATION PROGRAM		
➢ Implement Trails education program ➢ Involve/coordinate with Trails Management Committee ➢ Determine funding sources for kiosks at trailheads ➢ Install kiosks by Year 2 ➢ Informational articles in trail user group newsletters	Year 1 – Year 7	❖ CVCC ❖ CDFG ❖ BLM ❖ SRSJ National Monument ❖ Trails Management Subcommittee ❖ OTHER PARTNERS
➢ Coordinate with National Monument and Monument Advisory Committee	Ongoing	❖ CVCC ❖ BLM

MANAGEMENT ACTION/TASK	IMPLEMENTATION	RESPONSIBLE ENTITY
TRAILS ENFORCEMENT PROGRAM		
➢ Develop Joint Enforcement MOU ➢ Determine enforcement program for self-issue permits	Year 1	❖ BLM ❖ CDFG ❖ CVCC
➢ Implement Trails Enforcement Program ➢ Install signage, barriers	Year 1 and Year 2	❖ BLM ❖ CDFG ❖ CVCC
➢ Coordinate with Trails Management Subcommittee and Trail User Groups on volunteer enforcement	Year 1 – Year 7	❖ CVCC ❖ BLM ❖ Trails Management Subcommittee ❖ Trail User Groups
ANNUAL REVIEW OF TRAILS MANAGEMENT PROGRAM		
➢ Implement Annual Review of Trails Management Program including PBS monitoring data, research data, compliance with hot season closures, self-issue permit results, human use of trails	Year 1	❖ Trails Management Subcommittee ❖ RMUC ❖ RMOC
		❖

[1] *Timelines in Table A2-1 are advisory only and failure to meet these timelines does not render this MOU invalid. Additionally the Management Actions/Tasks may change after the formation of the RMOC and input is subsequently received from that Committee.*

[2] *Year 1 begins at permit issuance.*

Definitions

Acceptable Biologist	A biologist whose name is on a list maintained by CVCC of biologists who are acceptable to CVCC, CDFG, and USFWS for purposes of conducting surveys of Covered Species.
Acquisition and Funding Coordinating Committee	A committee formed by the CVCC that provides input on local funding priorities and Additional Conservation Land acquisitions.
Adaptive Management	To use the results of new information gathered through the monitoring program of the Plan and from other sources to adjust management strategies and practices to assist in providing for the Conservation of Covered Species.
Additional Conservation Lands	Conserved Habitat that will contribute to Reserve System Assembly, as described in Section 4.2.2 of the MSHCP.
Allowable Uses	Uses allowed within the MSHCP Reserve System, as defined in Section 7.3.2 of the MSHCP.
Annual Report (s)	The report(s) prepared pursuant to the requirements of Section 6.4 of the MSHCP.
Area Plan	A community planning area defined in the County of Riverside General Plan. Four County of Riverside Area Plans are located within the MSHCP Plan Area.
Biological Corridor	Wildlife movement area that is constrained by existing development, freeways, or other impediments. *[See also "Linkage."]*
California Department of Fish and Game ("CDFG")	A department of the California Resources Agency.
California Department of Parks and Recreation ("State Parks")	A department of the California Resources Agency.
California Department of Transportation ("Caltrans")	A department of the California Business, Transportation, and Housing Agency.
California Endangered Species Act ("CESA")	California Fish and Game Code, Section 2050 et seq. and all rules, regulations and guidelines promulgated thereunder, as amended.
California Environmental Quality Act (CEQA)	California Public Resources Code, Section 21000 et seq. and all guidelines promulgated thereunder, as amended. For the MSHCP, CVAG shall be the Lead Agency under CEQA, as defined under state CEQA Guidelines Section 15367.

Candidate Species	"Candidate Species" means both (1) a species formally noticed by the California Fish and Game Commission as under review for listing as threatened or endangered, or a species for which the Fish and Game Commission has published a notice of proposed regulation to add a species as threatened or endangered, and (2) a species which USFWS has identified as being a candidate for listing, but for which development of a listing regulation is precluded by other higher priority listing activities.
Certificate of Inclusion	The document attached as Exhibit "H" to the IA that would be required to be executed prior to a Participating Special Entity receiving Take Authorization pursuant to Section 11.7 of the IA or for other Covered Activities, as appropriate.
Changed Circumstances	Changes in circumstances affecting a Covered Species or geographic area covered by the MSHCP, that can reasonably be anticipated by the Parties and that can reasonably be planned for in the MSHCP. Changed Circumstances and the planned responses to those circumstances are more particularly described in Section 6.8.3 of the MSHCP. Changed Circumstances do not include Unforeseen Circumstances.
Cities	The cities of Cathedral City, Coachella, Desert Hot Springs, Indian Wells, Indio, La Quinta, Palm Desert, Palm Springs, and Rancho Mirage, collectively.
Coachella Valley Association of Governments ("CVAG")	A joint powers authority that functioned as Lead Agency for the preparation of the MSHCP.
Coachella Valley Conservation Commission ("CVCC")	A joint powers authority formed by the Local Permittees to provide primary policy direction for implementation of the MSHCP, as set forth in Section 6.1.1 of the MSHCP, and Section 11.2.2 of the IA.
Coachella Valley Fringe-toed Lizard Habitat Conservation Plan ("CVFTL HCP")	The CVFTL HCP in the Plan area, dated April 21, 1986, more particularly described in Section 16.2 of the IA.
Coachella Valley Mountains Conservancy ("CVMC")	A state agency within the California Resources Agency.
Complementary Conservation	The land projected to be acquired in the Conservation Areas for Conservation purposes independent of, but compatible with, the MSHCP, as described in Section 4.2.1 of the MSHCP.

Conservation	To use, and the use of, methods and procedures within the MSHCP Reserve System and within the Plan Area as set forth in the MSHCP Plan, that are necessary to bring any species to the point at which the measures provided pursuant to FESA and the California Fish and Game Code are no longer necessary. However, Permittees will have no duty to enhance, restore or revegetate MSHCP Reserve System lands unless required by the MSHCP, the IA, or agreed to through implementation of the Plan.
Conservation Areas	A system of lands described in Section 4.3 of the MSHCP that provides Core Habitat and Other Conserved Habitat for the Covered Species, conserves natural communities, conserves Essential Ecological Processes, and secures Biological Corridors and Linkages between major Habitat areas. There are 21 Conservation Areas from which the MSHCP Reserve System will be assembled.
Conservation Goal(s)	A broad statement of intent that describes how the Plan will accomplish the protection of Core Habitat, Essential Ecological Processes, Biological Corridors, and Linkages in the MSHCP Reserve System to ensure that the Covered Species are adequately conserved. Conservation Goals are also designed to ensure the persistence of natural communities.
Conservation Level	A numerical designation, as described in Section 2.4 of the MSHCP, assigned to all land within the Plan Area.
Conservation Objective(s)	Measurable statements of actions or measures that will lead to attainment of the Conservation Goals.
Conservation Strategy	The overall approach to assure Conservation of Covered Species within the Plan Area.
Conserved Habitat	Land that is permanently protected and managed for the benefit of the Covered Species under the institutional arrangements that provide for its ongoing management, and under the legal arrangements that prevent its conversion to other uses.
Core Habitat	The areas identified in the Plan for a given species that are composed of a Habitat patch or aggregation of Habitat patches that (1) are of sufficient size to support a self-sustaining population of that species, (2) are not fragmented in a way to cause separation into isolated populations, (3) have functional Essential Ecological Processes, and (4) have effective Biological Corridors and/or Linkages to other Habitats, where feasible, to allow gene flow among populations and to promote movement of large predators.
County	County of Riverside
County Flood Control	Riverside County Flood Control and Water Conservation District
County Parks	Riverside County Regional Park and Open Space District

County Waste	Riverside County Waste Resources Management District
Covered Activities	Certain activities carried out or conducted by Permittees, Participating Special Entities, Third Parties Granted Take Authorization and others within the MSHCP Plan Area, as described in Section 7 of the MSHCP, that will receive Take Authorization under the Section 10(a) Permit and the NCCP Permit, provided these activities are otherwise lawful.
Covered Species	The species for which Take Authorization is provided through the Permits issued in conjunction with the IA. These species are discussed in Section 9 of the MSHCP, and listed in Exhibit C of the IA.
Critical Habitat	Habitat for species listed under FESA that has been designated pursuant to Section 4 of FESA and identified in 50 C.F.R., Sections 17.95 and 17.96.
Development	The uses to which land shall be put, including construction of buildings, structures, infrastructure, and all associated alterations of the land.
Discretionary Project	A proposed project requiring discretionary action by a Permittee, as that term is used in CEQA and defined in state CEQA Guidelines, Section 15357, including issuance of a grading permit for County projects.
Effective Date	Date on which the IA takes effect, as set forth in Section 19.1 of the IA.
Emergency	A sudden, unexpected occurrence, involving a clear and imminent danger, demanding immediate action to prevent or mitigate the loss of, or damage to, life, health, property, or essential public services. Emergency includes such occurrences as fire, flood, earthquake, or other soils or geologic movements, as well as such occurrences as riot, accident, or sabotage.
Endangered Species	Those species listed as endangered under FESA and/or CESA.
Essential Ecological Processes	Processes that maintain specific Habitat types and are necessary to sustain the Habitat (in a state usable by Covered Species). Essential Ecological Processes may include abiotic hydrological processes (both subsurface and surface), erosion, deposition, blowsand movement, substrate development and soil formation, and disturbance regimes such as flooding and fire; and biotic processes such as reproduction, pollination, dispersal, and migration.
Essential Habitat	Certain lands delineated in the Recovery Plan for Bighorn Sheep in the Peninsular Ranges, California (USFWS 2000).
Existing Conservation Lands	Subset of MSHCP Reserve System lands consisting of lands in public or private ownership and managed for Conservation and/or open space values that contribute to the Conservation of Covered Species, as generally depicted in Figure 4-2 of the MSHCP.
Existing Uses	An existing use, public or private, which is the primary use on the property.

Feasible	Capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors.
Federal Endangered Species Act (FESA)	16 U.S.C., Section 1531 et seq. and all rules and regulations promulgated thereunder, as amended.
Habitat	The combination of environmental conditions of a specific place providing for the needs of a species or a population of such species.
HabiTrak	A GIS application to provide data on Habitat loss and Conservation, which occurs under the Permits.
Implementing Agreement (IA)	The executed agreement that implements the terms and conditions of the MSHCP.
Independent Science Advisors (ISA)	The qualified biologists, Conservation experts and others that provide scientific input to assist in the planning and implementation of the MSHCP for the benefit of the Covered Species, as set forth in Section 3.1.2 of the MSHCP.
Joint Project Review Process	The review process described in Section 6.6.1.1 of the MSHCP for Development proposed in Conservation Areas.
Land Manager	The entity, or entities, which has the responsibility to manage land acquired by the Permittees as set forth in Section 6.1.5 of the MSHCP.
Land Use Adjacency Guidelines	Standards delineated in Section 4.5 of the MSHCP for land uses adjacent to or within the Conservation Areas that are necessary to avoid or minimize edge effects. "Adjacent" means that a parcel shares a common boundary with a parcel in a Conservation Area.
Legal Instrument	The term "Legal Instrument," as used within the Plan and/or IA, shall refer to recorded legal instruments acceptable to the Wildlife Agencies, which provides legal protection in perpetuity to conservation lands; this legal protection may consist of a conservation easement consistent with California Civil Code Section 815 et seq. or a perpetual deed restriction that meets the requirements of a conservation easement under this statute.
Linkage	Habitat that provides for the occupancy of Covered Species and their movement between larger blocks of Habitat over time, potentially over a period of generations. In general, Linkages are large enough to include adequate Habitat to support small populations of the species and, thus, do not require that an individual of the species transit the entire Linkage to maintain gene flow between populations. What functions as a Linkage for one species may provide only a Biological Corridor or no value for other species. *[See also "Biological Corridor."]*
Listed Species	A species that is listed under FESA and/or CESA.
Local Development Mitigation	The fee imposed by applicable Local Permittees on new Development

Fee	pursuant to Government Code, Section 66000 et seq.
Local Permittees	CVCC, CVAG, County, County Flood Control, County Parks, County Waste, CVWD, IID, MSWD, and the Cities.
Major Amendments	Those proposed amendments to the MSHCP and the IA, as described in Section 20.5 of the IA and Section 6.12.4 of the MSHCP.
Management Program	MSHCP management actions, as described in Section 8 of the MSHCP.
Migratory Bird Treaty Act (MBTA)	50 C.F.R., Section 21 et seq. and all rules and regulations promulgated thereunder, as amended.
Migratory Bird Treaty Act (MBTA) Special Purpose Permit	A permit issued by the USFWS under 50 Code of Federal Regulations section 21.27, authorizing Take, in connection with Covered Activities, under the MBTA of the Covered Species listed in 50 Code of Federal Regulations Section 10.13 that are also listed as endangered or threatened under FESA.
Minor Amendments	Minor changes to the MSHCP and the IA, as defined in Section 20.4 of the IA and Section 6.12.3 of the MSHCP.
Mitigation Lands	A subset of Additional Conservation Lands as described in Sections 4.1 and 4.2.2.2 of the MSHCP.
Monitoring Program	The monitoring programs and activities set forth in Section 8 of the MSHCP.
Monitoring Program Administrator (MPA)	The individual or entity responsible for administering the monitoring program, as described in Section 6.1.6 of the MSHCP.
Monitoring Reports	Report(s) prepared pursuant to the requirements of Section 8.7 of the MSHCP.
MSHCP	Synonym for Plan, used in the text where needed for clarity.
MSHCP Reserve System	A reserve that will total approximately 745,900 acres. The MSHCP Reserve System will provide for the Conservation of the Covered Species.
NCCP Act	California Natural Community Conservation Planning Act of 2002 (California Fish and Game Code § 2800 et seq.) including all regulations promulgated thereunder, as amended.
NCCP Permit	The Permit issued under the NCCP Act for the MSHCP to permit the Take of identified species listed under CESA as threatened or endangered, a species that is a candidate for listing, and Non-listed Species.

NEPA	National Environmental Policy Act, (42 U.S.C., Section 4321-4335) and all rules, regulations promulgated thereunder, as amended. For the purposes of the MSHCP, USFWS is the Lead Agency under NEPA, as defined in 40 C.F.R., Section 1508.16.
Non-Listed Species	A species that is not listed under FESA and/or CESA.
No Surprises Assurance	The guarantee that, provided Permittees are properly implementing the terms and conditions of the MSHCP, the IA, and the Permit(s), the USFWS can only require additional mitigation for Covered Species beyond that provided for in the MSHCP as a result of Unforeseen Circumstances in accordance with the "No Surprises" regulations at 50 C.F.R., Sections 17.22(b)(5) and 17.32(b)(5) and as discussed in Section 6.8 of the MSHCP.
Operation and Maintenance Activities (O&M)	Those Covered Activities that include the ongoing operation and maintenance of public facilities, as described in Section 7.3.1.1 of the MSHCP.
Other Conserved Habitat	Part of a Conservation Area that does not contain Core Habitat for a given species, but which still has Conservation value. These values may include Essential Ecological Processes, Biological Corridors, Linkages, buffering from edge effects, enhanced species persistence probability in proximate Core Habitat, genetic diversity, recolonization potential, and flexibility in the event of long-term Habitat change.
Participating Special Entity	Any regional public service provider, such as a utility company or a public district or agency, that operates and/or owns land within the MSHCP Plan Area and that applies for Take Authorization pursuant to Section 11.7 of the IA.
Party and Parties	The signatories to the IA, namely CVAG, CVCC, County, County Flood Control, County Parks, County Waste, the Cities, CVWD, IID, MSWD, Caltrans, CVMC, State Parks, USFWS, and CDFG and any other city within the Plan Area that incorporates after the Effective Date and complies with Section 11.5 of the IA.
Permit(s)	Collectively, the Section 10(a)(1) Permit and NCCP Permit issued by the Wildlife Agencies to Permittees for Take of Covered Species pursuant to FESA and the NCCP Act and in conformance with the MSHCP and the IA.
Permittees	CVAG, CVCC, County, County Flood Control, County Parks, County Waste, the Cities, CVWD, IID, MSWD, Caltrans, CVMC, and State Parks.
Plan	Coachella Valley Multiple Species Habitat Conservation Plan, a comprehensive multiple species habitat conservation planning program that addresses multiple species' needs, including Habitat and the preservation of natural communities in the Coachella Valley area of Riverside County, California, as depicted in Figure 4-1 in Section 4.1 of the MSHCP and Exhibit "A" of the IA.

Plan Area	The boundaries of the MSHCP, consisting of approximately 1.2 million acres in the Coachella Valley area of Riverside County, as depicted in Figure 2-2 of the MSHCP Plan, and Exhibit B of the IA.
Planning Agreement	The Memorandum of Understanding prepared consistent with the NCCP Act to guide development of the MSHCP that is contained in Appendix II of the MSHCP.
Plan Participants	CVAG, CVCC, County, County Flood Control, County Parks, County Waste, the Cities, CVWD, IID, MSWD, Caltrans, CVMC, State Parks, and others receiving Take Authorization under the Permits.
Private Conservation Land	Land owned by a non-governmental entity committed to Conservation in perpetuity through deed restriction, conservation easement, or other binding agreement satisfactory to CDFG and USFWS.
Reserve Lands	Existing Conservation Lands, Additional Conservation Lands, and Complementary Conservation.
Reserve Management Oversight Committee (RMOC)	The committee established by the CVCC to provide biological, technical and operational expertise for implementation of the MSHCP, including oversight of the MSHCP Reserve System, as described in Section 6.1.3 of the MSHCP.
Reserve Management Unit (RMU)	The units identified in Section 6.1.4 of the MSHCP.
Reserve Management Unit Plan (RMUP)	The plan setting forth management practices for identified portions of the MSHCP Reserve System Area, prepared and adopted as described in Section 6.2 of the MSHCP.
Reserve System	A synonym for MSHCP Reserve System.
Reserve System Assembly	The process of conserving lands within the Conservation Areas through acquisition or other means to assemble the MSHCP Reserve System.
Rough Step	A Conservation Area assembly accounting process to monitor Conservation and loss of specified Habitats within the Plan Area.
Rough Step Analysis Unit	A geographic unit within which Rough Step is tracked. The Conservation Areas are the Rough Step Analysis Units.
Scientific Advisory Committee (SAC)	The committee of scientists that provided scientific input into the development of the Plan, as described in Section 3.1.1.
Section 10(a) Permit	The permit issued by the USFWS to Permittees pursuant to 16 U.S.C., Section 1539(a), authorizing Take of Covered Species.

Special Provisions Area	Provisions that apply to a given location or area, identified by a location description or in a figure, which address specific conditions necessary to achieve Conservation in that location or area.
Species Conservation Goal(s)	Goals for the Conservation of each Covered Species described in Section 9 of the MSHCP.
State Assurances	Except as provided in Section 15.5 of the IA, provided Permittees are implementing the terms and conditions of the MSHCP, the IA, and the Permits, if there are Unforeseen Circumstances, CDFG shall not require additional land, water or financial compensation, or additional restrictions on the use of land, water, or other natural resources for the life of the NCCP Permit without the consent of the Permittees, unless CDFG determines that continued implementation of the IA, the MSHCP, and/or the Permits would jeopardize the continued existence of a Covered Species, or as required by law and would therefore lead to NCCP Permit revocation or suspension.
State Permittees	Caltrans, CVMC, and State Parks.
Take	The definition of such term in FESA and the California Fish and Game Code. Section 9 of FESA does not prohibit Take of Federally Listed plants.
Take Authorization	The ability to incidentally Take species pursuant to the Section 10(a)(1)(B) Permit and/or the NCCP Permit.
Third Party Take Authorization	Take Authorization received by a landowner, developer, or other public or private entity from the Permittees pursuant to Section 17 of the IA, thereby receiving Take Authorization for Covered Species pursuant to the Permits.
Threatened Species	Those species listed as threatened under FESA and/or CESA.
Unforeseen Circumstances	Changes in circumstances affecting a Covered Species or geographic area covered by the MSHCP that could not reasonably have been anticipated by the Parties at the time of the MSHCP's negotiation and development, and that result in a substantial and adverse change in the status of the Covered Species. As defined, the term is intended to have the same meaning as it is used: (1) to define the limit of the Permittees' obligation on the "No Surprises" regulations set forth in 50 C.F.R., Sections 17.22 (b)(5) and 17.32 (b)(5); and (2) in California Fish and Game Code, Section 2805(k).
United States Fish and Wildlife Service ("USFWS")	An agency of the United States Department of the Interior.
Wildlife Agencies	USFWS and CDFG, collectively.

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IMPLEMENTING AGREEMENT

for the

COACHELLA VALLEY
MULTIPLE SPECIES HABITAT CONSERVATION PLAN/
NATURAL COMMUNITY CONSERVATION PLAN

by and between

COACHELLA VALLEY ASSOCIATION OF GOVERNMENTS, COACHELLA VALLEY CONSERVATION COMMISSION, COUNTY OF RIVERSIDE, RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT, RIVERSIDE COUNTY WASTE RESOURCES MANAGEMENT DISTRICT, RIVERSIDE COUNTY REGIONAL PARKS AND OPEN SPACE DISTRICT, CITY OF CATHEDRAL CITY, CITY OF COACHELLA, CITY OF DESERT HOT SPRINGS, CITY OF INDIAN WELLS, CITY OF INDIO, CITY OF LA QUINTA, CITY OF PALM DESERT, CITY OF PALM SPRINGS, CITY OF RANCHO MIRAGE, COACHELLA VALLEY WATER DISTRICT, IMPERIAL IRRIGATION DISTRICT, MISSION SPRINGS WATER DISTRICT, COACHELLA VALLEY MOUNTAINS CONSERVANCY, CALIFORNIA DEPARTMENT OF ~~FISH AND GAME~~FISH AND WILDLIFE, CALIFORNIA DEPARTMENT OF TRANSPORTATION, CALIFORNIA DEPARTMENT OF PARKS AND RECREATION, AND UNITED STATES FISH AND WILDLIFE SERVICE

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1. PARTIES

This Implementing Agreement ("Agreement"), made and entered into as of this ___ day of _____, 2007, by and among the Coachella Valley Association of Governments, Coachella Valley Conservation Commission, County of Riverside, Riverside County Flood Control and Water Conservation District, Riverside County Regional Parks and Open Space District, Riverside County Waste Resources Management District, City of Cathedral City, City of Coachella, City of Desert Hot Springs, City of Indian Wells, City of Indio, City of La Quinta, City of Palm Desert, City of Palm Springs, City of Rancho Mirage, Coachella Valley Water District, Imperial Irrigation District, Mission Springs Water District, Coachella Valley Mountains Conservancy, California Department of Transportation, California Department of Parks and Recreation (together with their successors and assigns collectively, the "Permittees"), California Department of Fish and ~~Game~~Wildlife and United States Fish and Wildlife Service (collectively, the "Parties"), defines the Parties' roles and responsibilities and provides a common understanding of the actions that will be undertaken to implement the Coachella Valley Multiple Species Habitat Conservation Plan/Natural Community Conservation Plan ("MSHCP" or "Plan"). The United States Fish and Wildlife Service and the California Department of Fish and ~~Game~~Wildlife may be referred to collectively herein as the "Wildlife Agencies."

2. DEFINED TERMS

Terms used in this Agreement and specifically defined in the Federal Endangered Species Act, California Endangered Species Act, the California Natural Community Conservation Planning Act or the MSHCP shall have the same meaning when utilized in this Agreement, unless this Agreement expressly provides otherwise.

The following terms used in this Agreement shall have the meanings set forth below:

2.1 "Acceptable Biologist" means a biologist whose name is on a list maintained by CVCC of biologists who are acceptable to CVCC, CDFG, and USFWS for purposes of conducting surveys of Covered Species.

2.2 "Acquisition and Funding Coordinating Committee" means a committee formed by the CVCC that provides input on local funding priorities and Additional Conservation Land acquisitions.

2.3 "Adaptive Management" means to use the results of new information gathered through the monitoring program of the Plan and from other sources to adjust management strategies and practices to assist in providing for the Conservation of Covered Species.

2.4 "Additional Conservation Lands" means Conserved Habitat that will contribute to Reserve System Assembly as described in Section 4.2.2 of the MSHCP.

2.5 "Allowable Uses" means uses allowed within the MSHCP Reserve System, as defined in Section 7.3.2 of the MSHCP.

2.6 "Annual Report(s)" means the report(s) prepared pursuant to the requirements of Section -6.4 of the MSHCP.

2.7 "Area Plan" means a community planning area defined in the County of Riverside General Plan. Four County of Riverside Area Plans are located within the MSHCP Plan Area.

2.8 "Biological Corridor" means the wildlife movement area that is constrained by existing development, freeways, or other impediments. [See also "Linkage"]

2.9 “California Department of Fish and ~~Game~~Wildlife (“CDFG”) means a department of the California Resources Agency.

2.10 “California Department of Parks and Recreation (“State Parks”)” means a department of the California Resource Agency.

2.11 "California Department of Transportation (“Caltrans”)" means a department of the California Business, Transportation, and Housing Agency.

2.12 “California Endangered Species Act (“CESA”) means California Fish and Game Code, Section 2050 et seq. and all rules, regulations and guidelines promulgated there under, as amended.

2.13 “California Environmental Quality Act ("CEQA")” means the California Public Resources Code, Section 21000 et seq. and all guidelines promulgated there under, as amended. For the MSHCP, CVAG shall be the Lead Agency under CEQA, as defined under state CEQA Guidelines Section 15367.

2.14 "Candidate Species" means both (1) a species formally noticed by the California Fish and Game Commission as under review for listing as threatened or endangered, or a species for which the Fish and Game Commission has published a notice of proposed regulation to add a species as threatened or endangered, and (2) a species which the USFWS has identified as being a candidate for listing, but for which development of a listing regulation is precluded by other higher priority listing activities.

2.15 "Certificate of Inclusion" means the document attached as Exhibit “H” to this Agreement that would be required to be executed prior to a Participating Special Entity receiving Take Authorization pursuant to Section 11.7 of this Agreement or for other Covered Activities, as appropriate.

2.16 "Changed Circumstances" means changes in circumstances affecting a Covered Species or geographic area covered by the MSHCP that can reasonably be anticipated by the Parties and that can reasonably be planned for in the MSHCP. Changed Circumstances and the planned responses to those circumstances are more particularly described in Section 6.8.3 of the MSHCP. Changed Circumstances do not include Unforeseen Circumstances.

2.17 "Cities" means the cities of Cathedral City, Coachella, Desert Hot Springs, Indian Wells, Indio, La Quinta, Palm Desert, Palm Springs and Rancho Mirage, collectively.

2.18 “Coachella Valley Association of Governments (“CVAG”)” means a joint powers authority that functioned as Lead Agency for the preparation of the MSHCP.

2.19 “Coachella Valley Conservation Commission (“CVCC”)” means a joint powers authority formed by the Local Permittees to provide primary policy direction for implementation of the MSHCP, as set forth in Section 6.1.1 of the MSHCP, and Section 11.2.2 of this Agreement.

2.20 "Coachella Valley Fringe-toed Lizard Habitat Conservation Plan (“CVFTL HCP”)” means the CVFTL HCP in the Plan area, dated April 21, 1986, more particularly described in Section 16.2 of this Agreement.

2.21 “Coachella Valley Mountains Conservancy (“CVMC”)” means a state agency within the California Resources Agency.

2.22 "Complementary Conservation" means the land projected to be acquired in the Conservation Areas for Conservation purposes independent of, but compatible with, the MSHCP as described in Section 4.2.1 of the MSHCP.

2.23 "Conservation" means to use, and the use of, methods and procedures within the MSHCP Reserve System and within the Plan Area as set forth in the MSHCP Plan, that are necessary to bring any species to the point at which the measures provided pursuant to FESA and the California Fish and Game

Code are no longer necessary. However, Permittees will have no duty to enhance, restore, or revegetate MSHCP Reserve System lands unless required by the MSHCP, this Agreement, or agreed to through implementation of the Plan.

2.24 "Conservation Areas" means a system of lands described in Section 4.3 of the MSHCP that provides Core Habitat and Other Conserved Habitat for the Covered Species, conserves natural communities, conserves Essential Ecological Processes, and secures Biological Corridors and Linkages between major Habitat areas. There are 21 Conservation Areas from which the MSHCP Reserve System will be assembled.

2.25 "Conservation Goal(s)" means a broad statement of intent that describes how the Plan will accomplish the protection of Core Habitat, Essential Ecological Processes, Biological Corridors, and Linkages in the MSHCP Reserve System to ensure that the Covered Species are adequately conserved. Conservation Goals are also designed to ensure the persistence of natural communities.

2.26 "Conservation Level" means a numerical designation, as described in Section 2.4 of the MSHCP, assigned to all land within the Plan Area.

2.27 "Conservation Objective(s)" means measurable statements of actions or measures that will lead to attainment of the Conservation Goals.

2.28 "Conservation Strategy" means the overall approach to assure Conservation of Covered Species within the Plan Area.

2.29 "Conserved Habitat" means land that is permanently protected and ─managed for the benefit of the Covered Species under the institutional arrangements that provide for its ongoing management, and under the legal arrangements that prevent its conversion to other uses.

2.30 "Core Habitat" means the areas identified in the Plan for a given species that are composed of a Habitat patch or aggregation of Habitat patches that (1) are of sufficient size to support a self-sustaining population of that species, (2) are not fragmented in a way to cause separation into isolated populations, (3) have functional Essential Ecological Processes, and (4) have effective Biological Corridors and/or Linkages to other Habitats,

where feasible, to allow gene flow among populations and to promote movement of large predators.

2.31 "County" means the County of Riverside.

2.32 "County Flood Control" means the Riverside County Flood Control and Water Conservation District.

2.33 "County Parks" means the Riverside County Regional Parks and Open Space District.

2.34 "County Waste" means the Riverside County Waste Resources Management District.

2.35 "Covered Activities" means certain activities carried out or conducted by Permittees, Participating Special Entities, Third Parties Granted Take Authorization and others within the MSHCP Plan Area, as described in Section 7 of the MSHCP, that will receive Take Authorization under the Section 10(a) Permit and the NCCP Permit, provided these activities are otherwise lawful.

2.36 "Covered Species" means the species for which Take Authorization is provided through the Permits issued in conjunction with this Agreement. These species are discussed in Section 9 of the MSHCP, and listed in Exhibit "C" to this Agreement.

2.37 "Critical Habitat" means Habitat for species listed under FESA that has been designated pursuant to Section 4 of FESA and identified in 50 C.F.R., Sections 17.95 and 17.96.

2.38 "Development" means the uses to which land shall be put, including construction of buildings, structures, infrastructure and all associated alterations of the land.

2.39 "Discretionary Project" means a proposed project requiring discretionary action by a Permittee, as that term is used in CEQA and defined in state CEQA Guidelines Section 15357, including issuance of a grading permit for County projects.

2.40 "Effective Date" means the date on which this Agreement takes effect, as set forth in Section 19.1 of this Agreement.

2.41 "Emergency" means a sudden, unexpected occurrence, involving a clear and imminent danger, demanding immediate action to prevent or mitigate the loss of, or damage to,

life, health, property, or essential public services. Emergency includes such occurrences as fire, flood, earthquake, or other soils or geologic movements, as well as such occurrences as riot, accident, or sabotage.

2.42 "Endangered Species" means those species listed as endangered under FESA and/or CESA.

2.43 "Essential Ecological Processes" means processes that maintain specific Habitat types and are necessary to sustain the Habitat (in a state usable by Covered Species). Essential Ecological Processes may include abiotic hydrological processes (both subsurface and surface), erosion, deposition, blowsand movement, substrate development and soil formation, disturbance regimes such as flooding and fire, and biotic processes such as reproduction, pollination, dispersal, and migration.

2.44 "Essential Habitat" means certain lands delineated in the Recovery Plan for Bighorn Sheep in the Peninsular Ranges, California (USFWS 2000).

2.45 "Existing Conservation Lands" means a subset of the MSHCP Reserve System lands consisting of lands in public or private ownership and managed for Conservation and/or open space values that contribute to the Conservation of Covered Species, as generally depicted in Figure 4-2 of the MSHCP.

2.46 "Existing Uses" means an existing use, public or private, which is the primary use on the property.

2.47 "Feasible" means capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors.

2.48 “Federal Endangered Species Act (“FESA”)” means 16 U.S.C., Section 1531 et seq. and all rules and regulations promulgated there under, as amended.

2.49 "Habitat" means the combination of environmental conditions of a specific place providing for the needs of a species or a population of such species.

2.50 "HabiTrak" means a GIS application to provide data on Habitat loss and Conservation–, which occurs under the Permits.

2.51 "Implementing Agreement (“IA”)" means the executed agreement that implements the terms and conditions of the MSHCP.

2.52 "Independent Science Advisors (“ISA”)" means the qualified biologists, Conservation experts and others that provide scientific input to assist in the planning and implementation of the MSHCP for the benefit of the Covered Species, as set forth in Section 3.1.2 of the MSHCP.

2.53 "Joint Project Review Process" means the review process described in Section 6.6.1.1 of the MSHCP for Development proposed in Conservation Areas.

2.54 "Land Manager" means the entity, or entities, which has the responsibility to manage land acquired by the Permittees as set forth in Section 6.1.5 of the MSHCP.

2.55 "Land Use Adjacency Guidelines" means standards delineated in Section 4.5 of the MSHCP for land uses adjacent to or within Conservation Areas that are necessary to avoid or minimize edge effects. “Adjacent” means that a parcel shares a common boundary with a parcel in a Conservation Area.

2.56 “Legal Instrument” as used within the Plan and/or IA, shall refer to recorded legal instruments acceptable to the Wildlife Agencies, which provides legal protection in perpetuity to conservation lands; this legal protection may consist of a conservation easement consistent with California Civil Code Section 815 et seq. or a perpetual deed restriction that meets the requirements of a conservation easement under this statute.

2.57 "Linkage" means Habitat that provides for the occupancy of Covered Species and their movement between larger blocks of Habitat over time, potentially over a period of generations. In general, Linkages are large enough to include adequate Habitat to support small populations of the species and, thus, do not require that an individual of the species transit the entire Linkage to maintain gene flow between populations. What functions as a Linkage for one species may provide only a Biological Corridor or no value for other species. [See also "Biological Corridor."]

2.58 "Listed Species" means a species that is listed under FESA and/or CESA.

2.59 "Local Development Mitigation Fee" means the fee imposed by applicable Local Permittees on new Development pursuant to Government Code, Sections 66000 et seq.

2.60 "Local Permittees" means CVAG, CVCC, County, County Flood Control, County Parks, County Waste, CVWD, IID, MSWD, and the Cities.

2.61 "Major Amendments" means those proposed amendments to the MSHCP and this Agreement, as described in Section 20.5 of this Agreement and Section 6.12.4 of the MSHCP.

2.62 "Management Program" means the MSHCP management actions, as described in Section 8 of the MSHCP.

2.63 "Migratory Bird Treaty Act ("MBTA")" means 50 C.F.R., Section –21 et seq. and all rules and regulations promulgated there under, as amended.

2.64 "Migratory Bird Treaty Act ("MBTA") Special Purpose Permit" means a permit issued by the USFWS under 50 Code of Federal Regulations, section 21.27, authorizing Take, in connection with Covered Activities, under the MBTA of the Covered Species listed in 50 Code of Federal Regulations Section 10.13 that are also listed as endangered or threatened under FESA.

2.65 "Minor Amendments" means minor changes to the MSHCP and this Agreement, as defined in Section 20.4 of this Agreement and Section 6.12.3 of the MSHCP.

2.66 "Mitigation Lands" means a subset of Additional Conservation Lands as described in Section and 4.2.2 of the MSHCP.

2.67 "Monitoring Program" means the monitoring programs and activities set forth in Section 8 of the MSHCP.

2.68 "Monitoring Program Administrator ("MPA")" means the individual or entity responsible for administering the monitoring program, as described in Section 6.1.6 of the MSHCP.

2.69 "Monitoring Report(s)" means the report(s) prepared pursuant to the requirements of Section 8.7 of the MSHCP.

2.70 "MSHCP" means a synonym for Plan, used in the text where needed for clarity.

2.71 "MSHCP Reserve System" means a reserve that will total approximately 745,900 acres. The MSHCP Reserve System will provide for the Conservation of the Covered Species.

2.72 "NCCP Act" means the California Natural Community Conservation Planning Act of 2002 (California Fish and Game Code § 2800 et seq.), including all regulations promulgated thereunder, as amended.

2.73 "NCCP Permit" means the Permit issued under the NCCP Act for the MSHCP to permit the Take of identified species listed under CESA as threatened or endangered, a species that is a candidate for listing, and Non-listed Species.

2.74 "NEPA" means the National Environmental Policy Act (42 U.S.C., Section 4321 - 4335) and all rules and regulations promulgated thereunder, as amended. For the purposes of the MSHCP, USFWS is the Lead Agency under NEPA, as defined in 40 C.F.R., Section 1508.16.

2.75 “Non-Listed Species” means a species that is not listed under FESA and/or CESA.

2.76 "No Surprises Assurances" means the guarantee that, provided Permittees are properly implementing the terms and conditions of the MSHCP, this Agreement, and the Permit(s), the USFWS can only require additional mitigation for Covered Species beyond that provided for in the MSHCP as a result of Unforeseen Circumstances in accordance with the "No Surprises" regulations at 50 C.F.R., Sections 17.22(b)(5) and 17.32(b)(5) and as discussed in Section 6.8 of the MSHCP.

2.77 "Operation and Maintenance Activities (“O&M”)" means those Covered Activities that include the ongoing operation and maintenance of public facilities, as described in Section 7.3.1.1 of the MSHCP.

2.78 "Other Conserved Habitat" means part of a Conservation Area that does not contain Core Habitat for a given species, but which still has Conservation value. These values may include Essential Ecological Processes, Biological Corridors, Linkages, buffering from edge effects, enhanced species persistence probability in proximate Core Habitat, genetic diversity, recolonization potential, and flexibility in the event of long-term Habitat change.

2.79 "Participating Special Entity" means any regional public service provider, such as a utility company or a public

district or agency, that operates and/or owns land within the Plan Area and that applies for Take Authorization pursuant to Section 11.7 of this Agreement.

2.80 "Party" and "Parties" mean the signatories to this Agreement, namely CVCC, CVAG, County, County Flood Control, County Parks, County Waste, the Cities, CVWD, IID, MSWD, Caltrans, State Parks, CVMC, CDFG, USFWS and any other city within the Plan Area that incorporates after the Effective Date and complies with Section 11.5 of this Agreement.

2.81 "Permit(s)" means, collectively, the Section 10(a)(1) Permit and NCCP Permit issued by the Wildlife Agencies to Permittees for Take of Covered Species pursuant to FESA and the NCCP Act and in conformance with the MSHCP and this Agreement.

2.82 "Permittees" means CVAG, CVCC, County, County Flood Control, County Parks, County Waste, the Cities, CVWD, IID, MSWD, Caltrans, State Parks and CVMC.

2.83 "Plan" means the Coachella Valley Multiple Species Habitat Conservation Plan, a comprehensive multiple species habitat conservation planning program that addresses multiple species' needs, including Habitat and the preservation of natural communities in the Coachella Valley area of Riverside County, California, as depicted in Figure 4-1 in Section 4 of the MSHCP and Exhibit "A" of this Agreement.

2.84 "Plan Area" means the boundaries of the MSHCP, consisting of –approximately 1.1 million acres in the Coachella Valley area of Riverside County, California, as depicted in Figure 1-2 of the MSHCP Plan, and Exhibit "B" to this Agreement.

2.85 “Planning Agreement” means the Memorandum of Understanding prepared consistent with the NCCP Act to guide development of the MSHCP that is contained in Appendix II of the MSHCP.

2.86 "Plan Participants" means CVAG, CVCC, County, County Flood Control, County Parks, County Waste, the Cities, CVWD, IID, MSWD, CVMC, Caltrans, State Parks and others receiving Take Authorization under the Permits.

2.87 "Private Conservation Land" means land owned by a non-governmental entity committed to Conservation in perpetuity through deed restriction, conservation easement, or other binding agreement satisfactory to CDFG and USFWS.

2.88 "Reserve Lands" means Existing Conservation Lands, Additional Conservation Lands, and Complementary Conservation.

2.89 "Reserve Management Oversight Committee (“RMOC”)" means the committee established by the CVCC to provide biological, technical, and operational expertise for implementation of the MSHCP, including oversight of the MSHCP Reserve System, as described in Section 6.1.3 of the MSHCP.

2.90 "Reserve Management Unit (“RMU”)" means the unit identified in Section 6.1.4 of the MSHCP.

2.91 "Reserve Management Unit Plan (“RMUP”)" means the plan setting forth management practices for identified portions of the MSHCP Reserve System Area, prepared and adopted as described in Section 6.2 of the MSHCP.

2.92 “Reserve System” means a synonym for MSHCP Reserve System.

2.93 "Reserve System Assembly" means the process of conserving lands within the Conservation Areas through acquisition or other means to assemble the MSHCP Reserve System.

2.94 "Rough Step" means a Conservation Area assembly accounting process to monitor Conservation and loss of specified Habitats within the Plan Area.

2.95 "Rough Step Analysis Unit" means a geographic unit within which Rough Step is tracked. The Conservation Areas are the Rough Step Analysis Units.

2.96 "Scientific Advisory Committee (“SAC”)" means the committee of scientists that provided scientific input into the development of the Plan, as described in Section 3.1.1.

2.97 "Section 10(a) Permit" means the permit issued by the USFWS to Permittees- pursuant to 16 U.S.C., Section 1539(a), authorizing Take of Covered Species.

2.98 “Special Provisions Area” means provisions that apply to a given location or area, identified by a location description or in a figure, which address specific conditions necessary to achieve Conservation in that location or area.

2.99 “Species Conservation Goal(s)” means the Goals for the Conservation of each Covered Species described in Section 9 of the MSHCP.

2.100 "State Assurances" means, except as provided in Section 15.5 of this Agreement, provided Permittees are implementing the terms and conditions of the MSHCP, the Agreement, and the Permits, if there are Unforeseen Circumstances, CDFG shall not require additional land, water or financial compensation or additional restrictions on the use of land, water or other natural resources for the life of the NCCP Permit without the consent of the Permittees, unless CDFG determines that continued implementation of this Agreement, the MSHCP, and/or the Permits would jeopardize the continued existence of a Covered Species, or as required by law and would therefore lead to NCCP Permit revocation or suspension.

2.101 "State Permittees" means Caltrans, State Parks, and CVMC.

2.102 "Take" means the definition of such term in FESA and the California Fish and Game Code. Section 9 of FESA does not prohibit Take of Federally Listed plants.

2.103 "Take Authorization" means the ability to incidentally Take species pursuant to the Section 10(a)(1)(B) Permit and/or the NCCP Permit.

2.104 "Third Party Take Authorization" means Take Authorization received by a landowner, developer, or other public or private entity from the Permittees pursuant to Section 17 of this Agreement, thereby receiving Take Authorization for Covered Species pursuant to the Permits.

2.105 "Threatened Species" means those species listed as threatened under FESA and/or CESA.

2.106 "Unforeseen Circumstances" means changes in circumstances affecting a Covered Species or geographic area covered by the MSHCP that could not reasonably have been anticipated by the Parties at the time of the MSHCP’s negotiation and development, and that result in a substantial and adverse change in the status of the Covered Species. As defined, the term is intended to have the same meaning as it is used: (1) to define the limit of the Permittees' obligation on the "No Surprises" regulations set forth in 50 C.F.R., Sections 17.22(b)(5) and

17.32(b)(5); and (2) in California Fish and Game Code, Section 2805(k).

2.107 "United States Fish and Wildlife Service (“USFWS”)" means an agency of the United States Department of the Interior.

2.108 "Wildlife Agencies" means USFWS and CDFG, collectively.

3. RECITALS

This Agreement is entered into with regard to the following facts:

WHEREAS, CVAG is a joint powers authority, created pursuant to the provisions of Government Code section 6500; and

WHEREAS, CVCC is a joint powers authority, created pursuant to the provisions of Government Code section 6500; and

WHEREAS, CVWD is a governmental agency, created pursuant to the provisions of California Water Code section 30000; and

WHEREAS, IID is a governmental agency, created pursuant to the provisions of California Water Code section 20500; and

WHEREAS, MSWD is a County Water District, created pursuant to the provisions of California Water Code section 3000 et seq; and

WHEREAS, the County is a governmental agency, created pursuant to the provisions of the California Government Code, Title 3, Div. 1, Chapter 3, Article 1, section 23300; and

WHEREAS, County Flood Control is a governmental agency, created pursuant to the provisions of the California Water Appendix, Chapter 48-1; and

WHEREAS, County Parks is a governmental agency, created pursuant to the provisions of Public Resources Code section 5506.7; and

WHEREAS, County Waste is a governmental agency, created pursuant to the provisions of the Health and Safety Code sections 4700 et seq.; and

WHEREAS, the Cities are California municipal corporations located within the Coachella Valley of Riverside County, California; and

WHEREAS, Caltrans is a department of the California Business, Transportation and Housing Agency, created pursuant to the provisions of the California Government Code sections

14000 et seq.; and

WHEREAS, State Parks is a department of the California Resources Agency, created pursuant to the provisions of the California Government Code sections 14000 et seq.; and

WHEREAS, CVMC is a state agency within the California Resources Agency, created pursuant to the provisions of Public Resources Code sections 33500 et seq.; and

WHEREAS, CDFG is a department of the California Resources Agency with jurisdiction over the conservation, protection, restoration, enhancement and management of fish, wildlife, native plants and habitat necessary for biologically sustainable populations of those species under the California Endangered Species Act (California Fish and Game Code sections 2050 et seq.), the California Native Plant Protection Act (California Fish and Game Code sections 1900 et seq.), the California Natural Community Conservation Planning Act (California Fish and Game Code sections 2800 et seq.) and other relevant state laws; and

WHEREAS, USFWS is an agency of the United States Department of the Interior and has jurisdiction over the conservation, protection, restoration, enhancement and management of fish, wildlife, native plants and habitat necessary for biologically sustainable populations of those species to the extent set forth in FESA and other relevant federal laws; and

WHEREAS, the MSHCP is a multi-jurisdictional habitat conservation plan focusing on the conservation of both sensitive species and associated habitats to address biological and ecological diversity conservation needs in the Coachella Valley and surrounding mountains located in Central Riverside County, setting aside significant areas of undisturbed land for the conservation of sensitive habitat while preserving open space and recreational opportunities; and

WHEREAS, the MSHCP's external boundaries encompass approximately 1.2 million acres, which extend to include the Coachella Valley watershed; and

WHEREAS, certain plant and animal species and habitat have been identified that exist, or may exist, within the Coachella Valley and surrounding mountains, and which have been: 1) state or federally listed as threatened or endangered; 2) proposed for listing as threatened or endangered; or 3) identified as a CDFG Species of Special Concern, a California Fully Protected Species, a California Specially Protected Species, a sensitive plant species as determined by the California Native Plant Society or other unlisted wildlife considered sensitive within the Plan Area; and

WHEREAS, future growth and land development within the Plan Area, including both public and private projects, may result in the "taking" of such species as defined in state and federal law, thus requiring Take Authorization prior to the carrying out of otherwise lawful activities; and

WHEREAS, the MSHCP will give the County, the Cities and other Permittees the ability to control local land use decisions and maintain economic development flexibility while providing a coordinated reserve system and implementation program that will facilitate the preservation of biological diversity, as well as enhancing the region's quality of life. Such planning is an effective tool in protecting the region's biodiversity while reducing conflicts

between protection of wildlife and plants and the reasonable use of natural resources for economic development; and

WHEREAS, the MSHCP addresses the potential impacts of urban growth, natural habitat loss and species endangerment, and creates a plan to mitigate for the potential loss of Covered Species and their habitats due to the direct and indirect impacts of future development of both private and public lands within the Plan Area; and

WHEREAS, the MSHCP, this Agreement and the Permits establish the conditions under which the Permittees will receive from the USFWS and CDFG certain long-term Take Authorizations and other assurances that will allow the taking of Covered Species incidental to lawful uses authorized by the Permittees; and

WHEREAS, Permittees will, for the benefit of public and private property owners and other project proponents within the MSHCP boundaries, transfer Take Authorization received from the Wildlife Agencies through the land use entitlement process, issuance of Certificate of Inclusion or other appropriate mechanism as set forth in the MSHCP and this Agreement; and

WHEREAS, Permittees, with technical assistance from the USFWS and CDFG, have prepared the MSHCP as part of their application for Take Authorization for Covered Species, as defined below, to the Wildlife Agencies under FESA and the NCCP Act, which describes the biological impacts of the MSHCP on the Covered Species and their habitats, and defines the comprehensive avoidance, minimization, conservation and mitigation measures required to avoid and mitigate effects of Take of Covered Species from Permittees' Covered Activities; and

WHEREAS, the MSHCP has been developed through a cooperative effort involving USFWS, CDFG, local governmental agencies, property owners, development interests, environmental interest groups and other members of the public.

AGREEMENT

THEREFORE, the Parties do hereby understand and agree as follows:

4. PURPOSES

The purposes of this Agreement are:

4.1 To ensure implementation of each of the terms of the MSHCP and this Agreement for the benefit of the Covered Species and Natural Communities, while allowing well managed and planned future economic growth;

4.2 To describe remedies and recourse should any Party fail to perform its obligations, responsibilities and tasks as set forth in the MSHCP, the Permits and this Agreement; and

4.3 To provide assurances to Permittees and others participating in the MSHCP that:

A. With respect to Covered Species, compliance with the terms of the MSHCP, the Permits and this Agreement constitutes compliance with the provisions of FESA, CESA and the NCCP Act;

B. Implementation of this Agreement and the MSHCP will adequately provide for the Conservation and protection of the Covered Species and their Habitats in the Plan Area; and

C. Pursuant to the federal "No Surprises" provisions of 50 Code of Federal Regulations, section 17.22(b)(5) and 17.32(b)(5) and State Assurances pursuant to Fish and Game Code section 2820(f) and Sections 14.11 and 15.3 of this Agreement, respectively, as long as the terms of the MSHCP, this Agreement and the Permits are properly implemented, the Wildlife Agencies will not require additional mitigation from Permittees, with respect to Covered Species, except as provided for in this Agreement or as required by law.

5. INCORPORATION OF THE MSHCP

The MSHCP and each of its provisions are intended to be, and by this reference are, incorporated herein. In the event of any direct contradiction between the terms of this Agreement and the MSHCP, the terms of this Agreement will control. In all other cases, the terms of this Agreement and the terms of the MSHCP will be interpreted to be supplementary to each other.

6. CONSERVATION STRATEGY

6.1 The MSHCP is intended to conserve adequate habitat in an unfragmented manner to provide for the protection and security of long-term viable populations of the species that are either currently listed as threatened or endangered, are proposed for listing, or are believed to have a high probability of being proposed for listing in the future if not protected by the Plan. The MSHCP is intended to preserve biological diversity as well as maintain the quality of life within the Coachella Valley and surrounding mountains by conserving species and their associated habitats and coordinating, streamlining and planning Development. By adopting this regional approach, the MSHCP will result in much greater and more biologically effective Habitat and species Conservation than a project-by-project approach could produce. The MSHCP is intended to proactively address requirements of the state and federal ESAs to avoid disruption of economic development activities in the Plan Area.

6.2 The MSHCP provides a broad Conservation Strategy, which will be implemented generally through the following:

A. As set forth in Section 4.0 of the MSHCP, the MSHCP Reserve System shall be approximately 745,900 acres and will consist of Existing Conservation Lands, lands conserved through Complementary Conservation and Additional Conservation Lands. The MSHCP Reserve System is divided into 21 Conservation Areas that provide Core and other Conserved Habitat for Covered Species, conserve the natural communities

included in the Plan and Essential Ecological Processes essential to sustain the Core Habitat and secure Biological Corridors and Linkages between major Habitat areas.

B. For each of the Conservation Areas, Conservation Objectives and required measures shall be implemented as set forth in Section 4.3 of the MSHCP.

C. New land uses adjacent to or within the MSHCP Conservation Areas shall implement the Land Use Adjacency Guidelines set forth in Section 4.5 of the MSHCP, as applicable.

D. The Avoidance, Minimization and Mitigation Measures set forth in Section 4.4 of the MSHCP shall be implemented.

E. Monitoring and management activities will be undertaken for each of the MSHCP Covered Species. Monitoring and management activities are described in Section 8 of the MSHCP.

F. Species-specific Conservation Goals and Objectives shall be implemented for each of the Covered Species in the MSHCP and are set forth in Section 9 of the MSHCP.

G. Natural Communities Conservation Goals and Objectives have been developed and shall be implemented for each of the Covered Natural Communities in the MSHCP and are set forth in Section 10 of the MSHCP.

7. MSHCP RESERVE SYSTEM ASSEMBLY

7.1 **Overview**. As set forth in Section 4 of the MSHCP, the MSHCP Reserve System will consist of approximately 745,900 acres and will consist of Existing Conservation Lands, lands conserved through Complementary Conservation and Additional Conservation Lands. The MSHCP Reserve System is divided into 21 Conservation Areas that provide Core and other Conserved Habitat for Covered Species, conserve the natural communities included in the Plan and Essential Ecological Processes essential to sustain the Core Habitat and secure Biological Corridors and Linkages between major habitat areas.

7.2 **Contribution of Existing Conservation Lands**. As described in Section 4.1 of the MSHCP, the MSHCP Reserve System will include Existing Conservation Lands. As of 1996, these lands were comprised of approximately 496,400 acres. Because of acquisitions, the acreage had increased to 557,100 by 2006. Of this acreage, 491,500 acres (as of 1996), or 529,200 acres (as of 2006) are federal and state Existing Conservation

Lands. Approximately 900 acres (as of 1996), or 19,100 acres (as of 2006) are non-profit organization Existing Conservation Lands. Approximately 4,000 acres (as of 1996) or 8,800 acres (as of 2006) are Local Permittee Existing Conservation Lands.

7.3 **Complementary Conservation**. As described in Section 4.2.1 of the MSHCP, the MSHCP Reserve System will include approximately 69,290 acres (as of 1996), or 29,990 acres (as of 2006) through Complementary Conservation efforts. Such efforts include BLM and United States Forest Service acquisition programs in the Santa Rosa and San Jacinto Mountains National Monument, BLM Wilderness in-holding acquisitions, including Mecca Hills and Orocopia Mountains Wilderness Areas, and Joshua Tree National Park.

7.4 **Contribution of Additional Conservation Lands**. As described in Table 4-1 and Sections 4.2.2 and 5.1.1 of the MSHCP, the MSHCP Reserve System will include Additional Conservation Lands comprised of approximately 129,690 acres as of 2006, that will be acquired or otherwise conserved. Of this acreage, approximately 96,400 acres (as of 2006) will be acquired or otherwise conserved as the Local Permittees' share of Plan implementation. Approximately 39,850 acres (as of 1996) or 21,390 acres (as of 2006) will be acquired or otherwise conserved as the state and federal contribution to Plan implementation. Approximately 10,800 acres of public and quasi-public lands are also projected to be conserved. In addition, as described in Section 4.2.2.2.4 of the MSHCP, the Local Permittees will protect the fluvial sand transport Essential Ecological Process in the Cabazon, Long Canyon, and West Deception Canyon Conservation Areas to ensure no net reduction in fluvial sand transport in these areas, which comprise approximately 7,800 acres.

7.5 **Review of Development Proposals in Conservation Areas**. As set forth in Section 4.3 of the MSHCP, Development in Conservation Areas will be limited to uses that are compatible with the Conservation Objectives for the specific Conservation Area. Discretionary Projects in Conservation Areas, other than second units on parcels with an existing residence, shall be required to assess the project's ability to meet the Conservation Objectives in the Conservation Area. Additionally, the Permittees will participate in the Joint Project Review Process set forth in Section 6.6.1.1 of the MSHCP.

7.6 **Reserve Assembly Accounting**. In order to ensure that the MSHCP Reserve System is established, all

Permittees will be required to maintain a record of total acres and location of Development within their jurisdiction within the Plan boundaries and submit this information to the CVCC on a monthly basis. However, Caltrans must submit such information on a bi-annual basis. As set forth in Section 6.4 of the MSHCP, annual reports will be prepared in order to account for Habitat losses and gains associated with public and private Development projects. The annual reports will be used to demonstrate that Conservation is occurring in rough proportionality with Development, reflect that the MSHCP Reserve System is being assembled as contemplated in the MSHCP and ensure that Habitat Conservation Goals and Objectives and required measures are being implemented.

8. MSHCP RESERVE SYSTEM MANAGEMENT REQUIREMENTS

8.1 **Overview**. The MSHCP Reserve System will be managed pursuant to Section 8 of the MSHCP. The Plan establishes RMUs to ensure coordinated management in order to achieve the Conservation Goals and Objectives. Additionally, within three (3) years of Permit issuance, the RMUCs and the Land Manager will develop a Reserve System Management Plan. The elements of this plan are described in Section 6.2 of the MSHCP and will include ongoing management measures and Adaptive Management actions.

8.2 **Management Activities**. Management activities pursuant to the MSHCP are set forth in Section 8 of the MSHCP. As set forth in Sections 6.1.3 and 8.2.2 of the MSHCP, such activities will be overseen by the RMOC and implemented by the RMUCs, in coordination with the Land Manager and Monitoring Program Administrator.

8.3 **Management Program**. Section 8 of the MSHCP sets forth the Management Program, allowing flexibility to ensure protection of species for which current scientific data is currently lacking. Consistent with an Adaptive Management approach, the Parties agree that the methods and means of implementing the Management Program shall be changed as necessary to respond to species' needs and new scientific data as these items may change over time.

9. MSHCP RESERVE SYSTEM MONITORING REQUIREMENTS

9.1 **Monitoring Program**. Monitoring of the MSHCP Reserve System will be instituted pursuant to Section 8.3 of the MSHCP. Implementation of the long-term Monitoring Program includes an initial inventory and assessment period.

9.2 **Monitoring Program Administrator**. A Monitoring Program Administrator shall be selected by the CVCC and shall be responsible for implementing the Monitoring Program with oversight from the RMOC. The Monitoring Program Administrator's duties are set forth in Section 6.1.6 of the MSHCP.

9.3 **Monitoring Reporting Requirements**. Pursuant to Section 8.7 of the MSHCP, the Monitoring Program Administrator shall prepare annual monitoring reports that provide an analysis of the monitoring results and any implications for the Management Program and Reserve System Assembly. These reports will be submitted to the RMOC, the RMUCs and the Land Manager and will include, at a minimum, the items listed in Section 8.7 of the MSHCP.

10. REPORTING REQUIREMENTS

10.1 **Annual Reporting**. As described in Section 6.4 of the MSHCP, the CVCC will prepare an annual report that will be submitted to the Wildlife Agencies and Permittees. The annual report for the preceding calendar year shall be submitted by March 30. The annual report shall be presented at a CVCC public workshop and copies made available to the public. The annual report shall include, at a minimum, the following information:

A. An overview of the status of the Conservation Areas.

B. Results of monitoring as described in Section 8.7 of the MSHCP. Identification of Adaptive Management actions indicated and whether or not such actions were implemented.

C. A description of Reserve Management activities for the previous year.

D. An accounting of the number of acres acquired, conserved through cooperative management agreements or otherwise protected during the previous year to quantify the progress achieved towards identified Conservation Objectives.

E. An accounting of the number of acres of Core Habitat, Essential Ecological Processes, Biological Corridors and Linkages and natural

communities conserved within each Conservation Area developed or impacted by Covered Activities during the previous year.

F. An accounting of the number of acres of habitat for the species and natural communities outside the MSHCP Conservation Areas in the Plan Area developed during the previous year.

G. An accounting of the status of each Covered Species with respect to the Species Conservation Goals and Objectives in Sections 4 and 9.

H. An evaluation of any significant issues encountered in Plan implementation during the previous year and proposed resolution.

I. Expenditures for acquisition and MSHCP Reserve System management over the previous year and applicable budgets for the upcoming fiscal year.

J. Summary of compliance activities required of Permittees.

K. A copy of the audit of CVCC finances for the most recent fiscal year.

L. Summary of all unauthorized/unpermitted activities detected and enforcement actions taken during the previous year

M. Additional technical, commercial, and scientific information and/or data that are reasonably available and necessary to evaluate performance and compliance with the commitments and objectives of the Plan shall be provided to the Wildlife Agencies upon written request.

10.2 **Certification of Reports**. All reports shall include the following certification from the responsible entity official that supervised or directed preparation of the report:

I certify that, to the best of my knowledge, after appropriate inquiries of those involved in the preparation of the report, the information submitted is appropriate and complete.

11. MSHCP IMPLEMENTATION STRUCTURE

11.1 **Permittee Implementation Mechanisms**. As set forth below, the Permittees have selected legal mechanisms to ensure implementation of the terms of the MSHCP and this Agreement ("Implementation Mechanism"). The Permits shall be effective upon issuance. If, however, within six (6) months of execution of this Agreement, the County and Cities have not adopted an appropriate Implementation Mechanism, the Wildlife Agencies may initiate suspension or revocation proceedings

pursuant to Section 23.5 of this Agreement. The Permittees' obligations to fully implement the terms and conditions of the MSHCP and this Agreement commence upon execution of this Agreement. After adoption of an Implementation Mechanism, the Local Permittees shall submit a copy of the appropriate documents to the CVCC and the Wildlife Agencies substantially in the form addressed below, or take such other actions that will ensure effective MSHCP implementation.

11.1.1 **The Cities**

A. The Cities shall adopt an ordinance imposing the Local Development Mitigation Fee as analyzed in the Nexus Fee Report. A model ordinance imposing such fees is attached to this Agreement as Exhibit "D." The Cities shall adopt ordinances in substantially the same form or at a minimum, containing the same requirements as the model ordinance.

B. The Cities shall adopt a resolution that adopts the MSHCP and establishes procedures and requirements for the implementation of its terms and conditions. A model resolution is attached to this Agreement as Exhibit "E." The Cities shall adopt a resolution in substantially the same form or at a minimum, containing the same requirements as the model resolution. The resolution shall contain at least the following conditions:

1. Commitment to ensure compliance with the Conservation Area requirements and measures set forth in Section 4 of the MSHCP, including but not limited to the Property Owner Initiated Habitat Evaluation and Acquisition Negotiation Strategy (HANS), if HANS is applicable.

2. Imposition of all other terms of the MSHCP, this Agreement and the Permits including but not limited to participation in the Joint Project Review Process set forth in Section 6.6.1.1 of the MSHCP, and compliance with the applicable Land Use Adjacency Guidelines set forth in Section 4.5 of the MSHCP.

3. Agreement to enforce all terms and conditions of the MSHCP, this Agreement and the Permits.

11.1.2 **The County.**

A. The County shall establish a development mitigation fee for the unincorporated area of the County to specifically provide for habitat acquisition pursuant to the MSHCP.

B. The County shall implement the MSHCP through incorporation of the relevant terms and requirements into its General Plan, including but not limited to the following:

1. Commitment to ensure compliance with the Conservation Area requirements and measures set forth in Section 4.0 of the MSHCP, including but not limited to the Property Owner Initiated Habitat Evaluation and Acquisition Negotiation Strategy, if applicable.

2. Imposition of all other terms of the MSHCP, this Agreement and the Permits including but not limited to participation in the Joint Project Review Process set forth in Section 6.6.1.1 of the MSHCP, and compliance with the applicable Land Use Adjacency Guidelines set forth in Section 4.5 of the MSHCP.

3. Agreement to enforce all other terms and conditions of the MSHCP, this Agreement and the Permits.

11.1.3 **County Flood Control.** County Flood Control shall implement the MSHCP and this Agreement through execution of this Agreement.

11.1.4 **County Parks**. County Parks shall implement the MSHCP and this Agreement through execution of this Agreement.

11.1.5 **County Waste**. County Waste shall implement the MSHCP and this Agreement through execution of this Agreement.

11.1.6 **CVCC.** CVCC shall implement the MSHCP and this Agreement through approval of a resolution that adopts the MSHCP and establishes procedures and requirements for the implementation of its terms and conditions for any Covered Activities. The CVCC shall adopt a resolution in substantially the same form as the Model Resolution attached as Exhibit "E."

11.1.7 **CVAG**. CVAG shall implement the MSHCP and this Agreement through execution of this Agreement.

11.1.8 **CVMC.** CVMC shall implement the MSHCP and this Agreement through execution of this Agreement.

11.1.9 **Caltrans.** Caltrans shall implement the MSHCP and this Agreement through execution of this Agreement.

11.1.10 **State Parks**. State Parks shall implement the MSHCP and this Agreement through execution of this Agreement.

11.1.11 **CVWD.** CVWD shall implement the MSHCP and this Agreement through execution of this Agreement.

11.1.12 **IID.** IID shall implement the MSHCP and this Agreement through execution of this Agreement.

11.1.13 **MSWD**. MSWD shall implement the MSHCP and this Agreement through execution of this Agreement.

11.2 Organizational Structure

11.2.1 **Overview**. Successful implementation of the MSHCP requires both a local administrative structure and effective coordination with state and federal partners. The Parties have therefore established an Organizational Structure for implementation and management of the MSHCP described in Section 6.1 of the MSHCP.

11.2.2 **CVCC Organization**

A. Overview. As set forth in Section 6.1 of the MSHCP, implementation of the MSHCP will be overseen and administered by the CVCC, a joint regional authority formed by the County, the Cities, CVWD, ~~and~~ IID, and MSWD. The CVCC shall sign this Agreement and shall be a Permittee under the Permits. However, the CVCC shall not limit County or City local land use authority or prevent a Permittee from approving a Discretionary Project. As set forth in Section 6.1.1 of the Plan, the CVCC shall be formed prior to issuance of the Permits, as a separate and independent joint powers authority.

B. Duties and Responsibilities. The CVCC shall provide the primary policy direction for the implementation of the MSHCP and will provide opportunities for public participation in the decision-making process. The CVCC shall have, at a minimum, the powers and duties as set forth in Section 6.1.1.2 of the MSHCP.

11.2.3 **Acquisition and Funding Coordinating Committee**. To assist in implementing its duties under the MSHCP, the CVCC shall form the Acquisition and Funding Coordinating Committee to provide input on local funding priorities and Additional Conservation Lands acquisition priorities. As set forth in Section 6.1.2 of the MSHCP, the Acquisition

and Funding Coordinating Committee shall be formed within one hundred twenty (120) days of the issuance of the Permits. Permittee representatives on the Acquisition and Funding Coordinating Committee shall be appointed by the CVCC and shall include any Permittee requesting membership. The Wildlife Agencies shall be ex officio members of the Acquisition and Funding Coordinating Committee. The Acquisition and Funding Coordinating Committee shall advise the CVCC on local funding priorities and Additional Conservation Lands acquisitions as set forth in Section 6.1.2 of the MSHCP. However, the CVCC will have final decision making authority in establishing and implementing these local priorities.

11.2.4 **Joint Project Review Process**. To ensure that the requirements of the Permits, the MSHCP and this Agreement are properly met, a Joint Project Review Process for projects within the Conservation Areas shall be instituted by the CVCC. The process for the Joint Project Review Process is set forth in Section 6.6.1.1 of the MSHCP.

11.2.5 **CVCC Executive Director**.

A. Selection. An appropriate individual shall be selected as the CVCC Executive Director by the CVCC to administer the Plan. The Executive Director shall implement the duties and responsibilities of the CVCC. During the first five (5) years, the CVCC shall initially contract with CVAG for the Executive Director within thirty (30) days of the formation of the CVCC.

B. Duties and Responsibilities. The Executive Director shall have the powers and duties as set forth in Section 6.1.1.3 of the MSHCP.

11.2.6 **Reserve Management Oversight Committee**.

A. Formation and Representation. As described in Section 6.1.3 of the MSHCP, the RMOC is the primary interagency group that will coordinate implementation of the Plan. The CVCC Executive Director shall appoint the chair of the RMOC from those entities identified below. The RMOC shall be assembled within one hundred twenty (120) days of Permit issuance and shall report to the CVCC. The RMOC shall be composed of one representative from USFWS, CDFG, BLM, State Parks, CVCC, the County and up to five other representatives, as appointed by the CVCC, of private and public agencies or entities that hold land dedicated to Conservation within the MSHCP Reserve System. National Park Service (designated by NPS) and U.S. Forest Service (designated by USFS) will be *ex officio* members.

B. Duties and Responsibilities. The RMOC shall have the duties and responsibilities as set forth in Section 6.1.3 of the MSHCP.

11.2.7 **Reserve Management Unit Committees**. To coordinate management of lands owned by different entities in the MSHCP Reserve System, RMUCs will be established for each of the six Reserve Management Units ("RMU"). The RMUs are described in Section 6.1.4 of the MSHCP. The RMUCs shall be established within one hundred twenty (120) days of Permit issuance. RMUC composition and duties and responsibilities are set forth in Section 6.1.4 of the MSHCP.

11.2.8 **Land Manager**. As described in Section 6.1.5 of the MSHCP, the CVCC may retain or contract with a person or entity to manage Local Permittee RMU lands and coordinate through the RMUCs with the entities managing Conservation land in the RMUs. The required qualifications, duties and responsibilities of the Land Manager are set forth in Section 6.1.5 of the MSHCP.

11.2.9 **Monitoring Program Administrator**. A Monitoring Program Administrator selected by the CVCC shall be responsible for implementing the Monitoring Program contained in Section 8 of the MSHCP. The duties of the Monitoring Program Administrator are set forth in Section 6.1.6 of the MSHCP.

11.2.10 **MSHCP Reserve Management Unit Plan**. As described in Section 6.2 of the MSHCP, the CVCC shall work with each RMUC to develop a Reserve Management Unit Plan ("RMUP"). The RMUPs will define specific management actions, schedules and responsibilities for Plan implementation. The RMUPs shall be prepared within three (3) years of Permit issuance and revised as necessary as lands are added to the MSHCP Reserve System. The RMUPs shall contain, at a minimum, the elements set forth in Section 6.2 of the MSHCP.

11.3 **Changed Circumstances**.

11.3.1 **General Terms.** Consistent with USFWS regulations regarding Habitat Conservation Plan assurances, Section 6.8.3 of the MSHCP identifies changes in the circumstances affecting the MSHCP Reserve System and/or Covered Species which can be reasonably anticipated and planned for in the MSHCP and describes the responses to such changes that will be carried out by the Parties. Since the MSHCP includes an Adaptive Management approach to reserve management, changes over time and adaptive responses are already contemplated and do not therefore require amendments to the MSHCP or the Permits. The Parties agree that this Section and Section 6.8.3 of the MSHCP address all reasonably foreseeable Changed Circumstances and describe specific responses for them; other changes not identified

as Changed Circumstances will be treated as Unforeseen Circumstances.

11.3.2 **Permittee-Initiated Response to Changed Circumstances**. Permittee(s) will give notice to the Wildlife Agencies within sixty (60) calendar days after learning that any of the Changed Circumstances listed in Section 6.8.3 of the MSHCP have occurred. As soon as practicable thereafter, but no later than sixty (60) days after learning of the Changed Circumstances, Permittee(s) will modify its/their activities in the manner described in Section 6.8.3 of the MSHCP, to the extent necessary to address the effects of the Changed Circumstances on the Covered Species, and will report to the Wildlife Agencies on its/their actions. Permittee(s) will undertake such modifications without awaiting notice from the Wildlife Agencies.

11.3.3 **Wildlife Agency-Initiated Response to Changed Circumstances**. If the Wildlife Agencies determine that Changed Circumstances have occurred, they shall notify Permittee(s) in writing within sixty (60) calendar days. Within sixty (60) days after receiving such notice, Permittee(s) will begin implementation of the required changes and report to the Wildlife Agencies on its/their actions. If the USFWS and/or CDFG determine that Changed Circumstances have occurred and that a Permittee has not responded in accordance with Section 6.8.3 of the MSHCP, the Wildlife Agency or Agencies will so notify the affected Permittee and the CVCC and will direct Permittee to make the required changes.

11.3.4 **Condemnation of Lands Providing Conservation Benefits**. In the event that an authority with eminent domain powers condemns part of the lands to which the MSHCP's Conservation and mitigation measures apply, the applicable Permittee shall seek full reimbursement for fragmentation, and increased management and monitoring costs. The applicable Permittee shall use all funds provided to the Permittee through the condemnation proceedings to provide additional Conservation and mitigation measures that will replace the Conservation benefits that would have been provided by the condemned lands.

11.3.5 **New Listings of Species Not Covered by the MSHCP**. The USFWS or CDFG may list additional species under FESA and/or CESA as threatened or endangered, delist species that are currently listed, or declare listed species as extinct. In the event of a new listing of one or more species not covered by the MSHCP, the following steps will be taken.

If a species not covered by the MSHCP is listed as threatened or endangered under FESA and/or CESA during the Permit application

process or during the life of the Permits, the USFWS and/or CDFG and the Permittee(s) will identify actions that may cause Take, jeopardy or adverse modification of Critical Habitat, and the Permittee(s) will avoid such actions in the implementation of their Covered Activities until approval of an amendment to the MSHCP to address the newly listed species in accordance with the Modifications and Amendments Procedures described in Section 6.12 of the MSHCP. Such avoidance measures will include the following: 1) evaluation of applications for proposed Covered Activities with respect to potential effects on the newly listed species; such evaluations will include assessment of the presence of suitable habitat for the newly listed species within the areas potentially affected by the proposed Covered Activity and surveys for the newly listed species, as appropriate, using accepted protocols; and 2) implementation of measures to avoid impacts to the newly listed species based on the results of the data collected in item 1) above and the evaluation of those data in the context of the design of the proposed Covered Activity. Alternatively, a Plan amendment may not be pursued and Take Authorization may be sought separately.

11.4 **Annexation and Deannexation of Lands**. Each of the Permittees shall enforce the terms of the Plan, the Permits and this Agreement as to all individuals or entities subject to its jurisdiction, including lands in the Plan Area annexed into the Permittees' jurisdictions after the Effective Date of this Agreement, provided the Minor Amendment requirements of Section 6.12.3 of the MSHCP and Section 20.4 of this Agreement have been met. If the Minor Amendment requirements cannot be met, a Major Amendment will be required.

In the event of the annexation or deannexation of any land within the Plan Area to another jurisdiction that is not a Permittee, the Parties shall seek to enter into an agreement between the Permittees, the Local Agency Formation Commission ("LAFCO"), the annexing or deannexing jurisdiction and the Wildlife Agencies as part of the annexation process to ensure that any Development of the annexed lands proceeds in accordance with the Conservation Goals and Objectives of the MSHCP. If an agreement can be reached, that jurisdiction shall become a Permittee after executing an addendum to this Agreement. If an agreement cannot be reached, or if the MSHCP requirements are not imposed as a condition of annexation by LAFCO, then the annexed or deannexed land will not receive Take Authorization pursuant to the Permits. Additionally, such annexation or deannexation may result in the revocation or suspension of the Permits pursuant to Section 23.5 of this Agreement. Parties within such annexed or deannexed land that qualify as Participating Special Entities may receive Take Authorization as set forth in Section 11.7 of this Agreement.

11.5 **Incorporation of New Cities within MSHCP Boundaries**. The Parties anticipate that during the term of the MSHCP, and after the Effective Date, one or more new cities may

be incorporated within the Plan Area. Such newly incorporated cities, upon adoption of an appropriate Implementation Mechanism and execution of an Implementing Agreement with the Wildlife Agencies substantially similar in form to this Agreement, shall receive Take Authorization pursuant to the Permits and all other rights and obligations granted by the Permits, the MSHCP and this Agreement. Incorporation of a new city within the Plan Area shall constitute a Minor Amendment and shall be processed as such pursuant to Section 20.4 of this Agreement and Section 6.12.3 of the MSHCP. In the event a newly incorporated city fails to participate in the MSHCP, the Permits may be revoked or suspended as set forth in Section 23.5 of this Agreement.

11.6 **Growth-Inducing Effects**. Once mitigation has been imposed upon the Permittees, Participating Special Entity, or Third Party Granted Take Authorization for a proposed project in conformance with the requirements of the MSHCP and the Permits, Permittees shall not be required to provide or impose any additional mitigation for any growth-inducing effects that such project may have on a Covered Species and/or its Habitat within the Plan Area.

11.7 **Participating Special Entity**.

11.7.1 **Take Authorization for Participating Special Entities**. Any public service provider, such as a utility company or a public district, including, but not limited to, a school, water, or irrigation district, that operates facilities and/or owns land within the Plan Area may request Take Authorization for its activities pursuant to the Permits as a Participating Special Entity. As set forth below, such activities must comply with all of the terms and requirements of the Permits, the MSHCP and this Agreement.

11.7.2 **Grant of Take Authorization to Participating Special Entity**. The CVCC may grant Take Authorization to a Participating Special Entity for its activities upon compliance with this Section. The Participating Special Entity shall submit a complete application for the proposed activity to the CVCC containing a detailed description of the proposed activity, a map indicating the location of the proposed activity and an analysis of its potential impacts to Covered Species and their Habitats and to the MSHCP Reserve System.

Within thirty (30) days of receipt of the complete application, CVCC and Wildlife Agency staff shall review the application. If CVCC staff, with the concurrence of the Wildlife Agencies, finds that the proposed activity complies with all terms and requirements of the MSHCP, the

Permits and this Agreement and does not compromise the viability of the Permits or the MSHCP Reserve System, the CVCC shall issue a Certificate of Inclusion upon completion or fulfillment in full of all appropriate requirements as set forth below and the proposed activity shall be deemed a Covered Activity. In the event the proposed activity crosses the MSHCP Reserve System, CVCC staff must make a finding supported by adequate evidence that the activity will result in a biologically equivalent or superior alternative to the MSHCP Reserve System prior to execution of a Certificate of Inclusion. The Certificate of Inclusion shall depict on an attached map the lands by parcel number, acreage and owner to which the proposed Take Authorization(s) would apply. In the event that the proposed activity does not comply with the terms and requirements of the Permits, the MSHCP and this Agreement, and/or compromises the viability of the MSHCP Reserve System, CVCC and Wildlife Agency staff shall meet with the proposed Participating Special Entity representatives to attempt to reach a mutually agreeable solution.

11.7.3 **Requirements for Participating Special Entities**. In addition to complying with applicable sections of the MSHCP, Participating Special Entities shall also contribute to Plan implementation through payment of a fee based upon the type of proposed activity, which shall be applicable to all activities in the Plan Area. For regional utility projects that will be constructed to serve Development, such as major truck lines, Participating Special Entities shall pay a fee in the amount of 5% of total capital costs or make other contributions to the Plan as may be agreed to by the CVCC and the Wildlife Agencies. For such activities that will result in only temporary impacts (impacts that generally last for less than five years) and disturbance, Participating Special Entities shall pay a fee in the amount of 3% of total capital costs or other appropriate measures as may be agreed to by the CVCC and the Wildlife Agencies. Additionally, the Participating Special Entities will be charged appropriate administration fees to process the application. Public district or agency projects that will be constructed to serve Development, such as new schools and treatment plants, inside the Conservation Areas shall be designed and implemented pursuant to the requirements of Section 4.0 of the MSHCP and all other requirements of the MSHCP, including payment of Local Development Mitigation Fees as adopted for commercial and industrial Development. For such activities outside of the Conservation Areas, contribution will consist of payment of Local Development Mitigation Fees as adopted for commercial and industrial Development and any other applicable requirements. All fees shall be collected by, or submitted to, the CVCC. All obligations must be satisfied prior to impacts to Covered Species and their Habitats.

12. FUNDING OF THE MSHCP

The funding of the MSHCP, including financing of Reserve System Assembly, and management and monitoring will occur pursuant to Section 5.0 of the MSHCP.

12.1 **Local Obligations.**

12.1.1 **Local Permittee Additional Conservation Lands Obligations**. As described in Sections 4.2 and 5.1.1 of the MSHCP, Local Permittees are responsible for the Conservation of 96,400 acres of Additional Conservation Lands (as of 2006). Approximately 88,900 acres will be conserved through acquisition or other means. The projected cost in 2006 dollars for this acreage is approximately $301.5 million. The related transaction costs for appraisals, escrow fees, etc. are estimated to be approximately $15.1 million.

12.1.2 **Administration Costs**. The Local Permittees will be responsible for certain Plan administration costs necessary to implement the terms and conditions of the Plan, including staffing for the CVCC. As described in Sections 5.1.2.3 and 5.1.3 of the MSHCP, the Local Permittee obligation for Plan administration costs for the acquisition program is approximately $493,000 in the first year, increasing by 3.29% annually to offset inflation. Non-acquisition program administration costs are estimated to be approximately $56,000 in the first year and $115,414,000 over the life of the Plan.

12.1.3 **Local Permittee Monitoring and Management Obligations**. As described in Sections 5 and 8 of the MSHCP, Local Permittees are responsible under the Plan for monitoring, land management and Adaptive Management costs on lands managed by the Local Permittees. In addition, an endowment would be established to fund monitoring, land management and Adaptive Management.

12.2 **Local Funding Sources**. The local funding program will fund the Local Permittees' obligations under the MSHCP as set forth in Section 5.2 of the Plan. The primary components are as follows:

12.2.1 **Local Development Mitigation Fees**. As further described in Section 5.2.1.1 of the MSHCP, the County and the Cities shall adopt fee ordinances establishing a Local Development Mitigation Fee to partially fund Plan implementation. The projected revenues from the Local Development Mitigation Fees are anticipated to be approximately $517 million over the first fifty (50) years of Plan implementation. The County and the Cities shall transmit all collected Local Development Mitigation Fees to the CVCC, at least quarterly, to be expended to fulfill the terms of the MSHCP.

12.2.2 **Transportation and Other Regional Infrastructure Project Contribution**. Permittees' transportation and other regional infrastructure projects will contribute to Plan implementation. For transportation infrastructure, the local funding program will provide approximately $30 million in contribution from Measure A funds. Additionally, CVWD will acquire 550 acres in the Thousand Palms Conservation Area to mitigate for the Whitewater Flood Control project. CVWD, ~~and~~ IID, and MSWD will also make contributions to the management and monitoring endowment. —These total contributions are estimated at approximately $4,108,400. Other regional utility and local public capital construction projects will mitigate their impacts, in whole or in part, under the MSHCP through payment of a per-acre mitigation fee or other appropriate method. As described in Section 6.6.2 of the Plan, Caltrans will acquire or fund the acquisition of 5,791 acres. Caltrans will also contribute $7.6 million to CVCC for monitoring, management and Adaptive Management. Caltrans and CVAG will also acquire 1,795 acres as mitigation for freeway interchanges and associated arterials and contribute $1,077,000 towards monitoring, management and Adaptive Management endowment fund.

12.2.3 **Landfill Tipping Fees**. Landfill tipping fees in the Plan Area are estimated to generate approximately $575,000 in 2006 from County landfills, with a projected rate increase of 4% annually thereafter.

12.2.4 **Eagle Mountain Landfill Environmental Mitigation Trust Fund**. Eagle Mountain Landfill tipping fees are estimated to generate $228 million dollars over the next seventy-five (75) years. Should the availability of this funding source become unreliable, Section 5.2.2.4 of the MSHCP provides potential alternative funding sources.

12.2.5 **Additional Funding**. As further described in Section 5.2.1.6 of the MSHCP, the Parties shall seek additional funding from private, local, state and federal sources including grants. Additionally, funds may be received from Participating Special Entities. In addition, should certain funding sources become unreliable, Section 5.2.2.4 of the MSHCP provides potential alternative funding sources.

12.3 **Annual Evaluation of Funding**. On an annual basis, the Permittees and the Wildlife Agencies will evaluate the performance of the funding mechanisms and develop any necessary modifications to address possible shortfalls. Additionally, this annual evaluation will include an assessment of the funding plan and anticipate funding needs over the next eighteen (18) months for the purpose of identifying any potential deficiencies in cash flow. If deficiencies are identified through this evaluation, the Permittees and the Wildlife Agencies will

develop strategies to address any additional funding needs consistent with the terms and conditions of the Plan. Additional funding needs will be addressed as set forth in Section 5.2.2 of the MSHCP.

13. PERMITTEES' TAKE AUTHORIZATION AND OBLIGATIONS

13.1 **Permittees' Take Authorization**. Each Permittee may engage in, and receive Take Authorization for, Covered Activities as set forth in Section 7 of the MSHCP. The County and Cities may also confer Take Authorization and approve projects proposed within their respective jurisdictions, as set forth in Sections 7.1 and 7.2 of the MSHCP. The County, Cities and the CVCC may also confer Take Authorization through the issuance of a Certificate of Inclusion or other written mechanism or instrument as set forth in Section 11.7 of this Agreement.

13.2 **County and Cities Obligations**. The County and the Cities have the following obligations under the MSHCP and this Agreement:

A. Adopt and maintain ordinances or resolutions as necessary, and amend their general plans as appropriate, to implement the requirements and to fulfill the purposes of the Permits, the MSHCP and this Agreement for private and public projects. Such requirements and policies include: 1) compliance with relevant processes to ensure application of the Conservation Area requirements set forth in Section 4.0 of the MSHCP and thus, satisfaction of the local acquisition obligation; 2) require compliance with the applicable Land Use Adjacency Guidelines set forth in Section 4.5 of the MSHCP; 3) maintain a record of total acres developed and their location within its jurisdiction and transmit such information monthly to the CVCC; 4) convey any changes in County or city boundaries or general plan land use designations to CVCC at the end of each calendar year; 5) ensure compliance with the Avoidance, Minimization and Mitigation Measures in Section 4.4 of the MSHCP; 6) ensure implementation consistent with the Species Conservation Goals and Objectives in Section 9 of the MSHCP; and 7) permanently protect and manage Mitigation Land within the reserve system legally owned and/or controlled by the entity unless conveyed to the CVCC.

B. Transmit any collected Local Development Mitigation Fees, other appropriate fees and associated interest as described in Section 5.2.1.1 of the MSHCP to the CVCC at least quarterly.

C. Contribute appropriate mitigation as determined by the affected Permittee for County and City public projects, including, but not limited to, any one or any combination of the following: 1) acquisition of replacement habitat

at a 1:1 ratio that is biologically equivalent or superior to the property being disturbed; or 2) payment of the Local Development Mitigation Fees as established for commercial and industrial Development. Such contributions shall occur prior to impacts to Covered Species and their Habitats.

D. Participate as a member agency in the CVCC as set forth in Section 6.1.1 of the MSHCP.

E. Participate as a member of the RMOC as set forth in Section 6.1.3 of the MSHCP, as appropriate.

F. Participate in the Joint Project Review Process set forth in Section 6.6.1.1 of the MSHCP for projects in the Conservation Areas.

G. Take all necessary and appropriate actions, following applicable land use permit enforcement procedures and practices, to enforce the terms of project approvals for public and private projects, including compliance with the MSHCP, the Permits and this Agreement.

H. Manage MSHCP Reserve System lands or conservation easements owned or leased by the County or respective City pursuant to Sections 8 and 9 of the MSHCP.

I. Carry out all other applicable requirements of the MSHCP, this Agreement and the Permits. Notwithstanding the foregoing, nothing within this Agreement shall be construed to require the County or the Cities to provide funding, or any other form of compensation, beyond the fees collected or dedicated lands required pursuant to the Permits, this Agreement and the MSHCP or other mitigation agreed to by the appropriate Parties.

13.3 **CVCC Obligations**. CVCC has the following obligations under the MSHCP and this Agreement:

A. Implement the necessary requirements to fulfill the purposes of the Permits, the MSHCP and this Agreement, for projects for which it issues Take Authorization such as for Participating Special Entities. Such requirements include: 1) ensuring compliance with relevant processes to ensure application of the Conservation Area requirements set forth in Section 4 of the MSHCP; 2) ensuring compliance with the applicable Land Use Adjacency Guidelines as set forth in Section 4.5 of the MSHCP; 3) compliance with the Avoidance, Minimization and Mitigation Measures in Section 4.4 of the MSHCP; 4) ensure implementation consistent with the Species Conservation Goals and Objectives in Section 9 of the MSHCP; and 5) permanently protect and manage Mitigation Land within the reserve system legally owned and/or controlled by the entity unless conveyed to the CVCC.

B. Administer and oversee implementation of the MSHCP as set forth in Section 6.1 of the MSHCP.

C. Collect and expend Local Development Mitigation Fees and other applicable funds as described in Section 5 of the MSHCP.

D. Transfer Take Authorization to Participating Special Entities pursuant to Section 11.7 of this Agreement.

E. Accept and manage MSHCP Reserve System property including conservation easements that have been conveyed to it by the County, Cities or other entity, agency or individual, pursuant to Section 6.1.1.2 of the MSHCP.

F. Ensure compliance with the Conservation Objectives set forth in Section 4.3.7 of the MSHCP.

G. Carry out all other applicable requirements of the MSHCP, this Agreement, and the Permits. Notwithstanding the foregoing, nothing within this Agreement shall be construed to require the CVCC to provide funding, or any other form of compensation, beyond the fees collected or dedicated lands required pursuant to the Permits, this Agreement and the MSHCP.

13.4 **CVAG Obligations**. CVAG has the following obligations under the MSHCP and this Agreement:

A. Implement the necessary requirements to fulfill the purposes of the Permits, the MSHCP and this Agreement for its Covered Activities.

B. Contribute $30 million from Measure A or other funds as set forth in Section 6.6.1 of the Plan.

C. Carry out all other applicable requirements of the MSHCP, this Agreement and the Permits. Notwithstanding the foregoing, nothing within this Agreement shall be construed to require CVAG to provide funding, or any other form of compensation, beyond the fees collected or dedicated lands required pursuant to the Permits, this Agreement and the MSHCP or other funding mechanisms identified in the Plan.

13.5 **County Flood Control Obligations**. County Flood Control has the following obligations under the MSHCP and this Agreement:

A. Implement the necessary requirements to fulfill the purposes of the Permits, the MSHCP and this Agreement for its Covered Activities. Such requirements include: 1) compliance with relevant processes and measures to ensure application of the Conservation Area requirements set forth in

Section 4 of the MSHCP; 2) compliance with the applicable Land Use Adjacency Guidelines as set forth in Section 4.5 of the MSHCP; 3) compliance with the Avoidance, Minimization and Mitigation Measures in Section 4.4 of the MSHCP; 4) ensure implementation consistent with the Species Conservation Goals and Objectives in Section 9 of the MSHCP; and 5) permanently protect and manage Mitigation Land within the reserve system legally owned and/or controlled by the entity unless conveyed to the CVCC.

B. Contribute mitigation through payment of 3% of total capital costs for its Covered Activities. Such payment may be offset through acquisition of replacement Habitat or creation of new Habitat for the benefit of Covered Species, as appropriate. Such mitigation shall be implemented prior to impacts to Covered Species and their Habitats. This provision does not apply to O&M activities.

C. Manage land owned or leased within the MSHCP Reserve System that has been set aside for Conservation purposes in accordance with Sections 8 and 9 of the MSHCP.

D. Participate in the Joint Project Review Process for its projects within the Conservation Areas as described in Section 6.6.1.1 of the Plan.

E. Carry out all other applicable requirements of the MSHCP, this Agreement and the Permits. Notwithstanding the foregoing, nothing in this Agreement shall be construed to require County Flood Control to provide funding, or any other form of compensation, beyond the fees collected, mitigation payments of 3% of capital costs pursuant to Section 13.5 above, dedicated lands required pursuant to the Permits or other MSHCP requirements, this Agreement and the MSHCP.

13.6 **County Parks Obligations**. County Parks has the following obligations under the MSHCP and this Agreement:

A. Implement the necessary requirements to fulfill the purposes of the Permits, the MSHCP and this Agreement for its Covered Activities. Such requirements include: 1) compliance with relevant processes and measures to ensure application of the Conservation Area requirements set forth in Section 4.0 of the MSHCP; 2) compliance with the applicable Land Use Adjacency Guidelines as set forth in Section 4.5 of the MSHCP; 3) compliance with the Avoidance, Minimization and Mitigation Measures in Section 4.4 of the MSHCP; 4) ensure implementation consistent with the Species Conservation Goals and Objectives in Section 9 of the MSHCP; and 5) permanently protect and manage Mitigation Land within the reserve system legally owned and/or controlled by the entity unless conveyed to the CVCC.

B. Contribute appropriate mitigation as determined by County Parks for its projects, including, but not limited to, any one or any combination of the following: 1) acquisition of replacement habitat at a 1:1 ratio that is biologically equivalent or superior to the property being disturbed; or 2) payment of the Local Development Mitigation Fees as established for commercial and industrial Development. Such contribution shall occur prior to impacts to Covered Species and their Habitats.

C. Manage and monitor land owned or leased within the MSHCP Reserve System that has been set aside for Conservation purposes in accordance with Sections 8 and 9 of the MSHCP.

D. Participate in the Joint Project Review Process for its projects, if any, within the Conservation Areas as described in Section 6.6.1.1 of the Plan.

E. Carry out all other applicable requirements of the MSHCP, this Agreement and the Permits. Notwithstanding the foregoing, nothing in this Agreement shall be construed to require County Parks to provide funding, or any other form of compensation, beyond the fees collected or dedicated lands required pursuant to the Permits or other MSHCP requirements, this Agreement and the MSHCP.

13.7 **County Waste Obligations**. County Waste has the following obligations under the MSHCP and this Agreement:

A. Implement the necessary requirements to fulfill the purposes of the Permits, the MSHCP and this Agreement for its Covered Activities. Such requirements include: 1) compliance with relevant processes and measures to ensure application of the Conservation Area requirements set forth in Section 4.0 of the MSHCP; 2) compliance with the applicable Land Use Adjacency Guidelines as set forth in Section 4.5 of the MSHCP; 3) compliance with the Avoidance, Minimization and Mitigation Measures in Section 4.4 of the MSHCP; 4) ensure implementation consistent with the Species Conservation Goals and Objectives in Section 9 of the MSHCP; and 5) permanently protect and manage Mitigation Land within the reserve system legally owned and/or controlled by the entity unless conveyed to the CVCC.

B. Manage and monitor land owned within the MSHCP Reserve System that has been set aside for Conservation purposes in accordance with Sections 8 and 9 of the MSHCP.

C. Participate in the Joint Project Review Process for its projects, if any, within the Conservation Areas as described in Section 6.6.1.1 of the Plan.

D. Carry out all other applicable requirements of the MSHCP, this Agreement, and the Permits. Notwithstanding the foregoing, nothing within this Agreement shall be construed to require County Waste to

provide funding, or any other form of compensation, beyond the requirements of the Permits, this Agreement and the MSHCP.

13.8 **CVWD Obligations**. CVWD has the following obligations under the MSHCP and this Agreement:

A. Implement the necessary requirements to fulfill the purposes of the Permits, the MSHCP and this Agreement, for its Covered Activities. Such requirements include: 1) compliance with relevant processes and measures to ensure application of the Conservation Area requirements set forth in Section 4.0 of the MSHCP; 2) compliance with the applicable Land Use Adjacency Guidelines as set forth in Section 4.5 of the MSHCP; 3) compliance with the Avoidance, Minimization and Mitigation Measures in Section 4.4 of the MSHCP; 4) ensure implementation consistent with the Species Conservation Goals and Objectives in Section 9 of the MSHCP; and 5) permanently protect and manage Mitigation Land within the reserve system legally owned and/or controlled by the entity unless conveyed to the CVCC.

B. As set forth in Section 6.6.1 of the Plan, cooperate with CVCC towards Conservation of a portion of the 7,000 acres CVWD owns in the Conservation Area.

C. Contribute $3,583,400 towards the Endowment Fund for the Monitoring Program, the Management Program and Adaptive Management.

D. Additional contributions as set forth in the Plan.

E. Participate as a member of the CVCC as set forth in Section 6.1.1 of the MSHCP.

F. Participate in the Joint Project Review Process for its projects within the Conservation Areas as described in Section 6.6.1.1 of the Plan.

G. Carry out all other applicable requirements of the MSHCP, this Agreement, and the Permits. Notwithstanding the foregoing, nothing within this Agreement shall be construed to require CVWD to provide funding, or any other form of compensation, beyond the requirements of the Permits, this Agreement and the MSHCP.

13.9 **IID Obligations**. IID has the following obligations under the MSHCP and this Agreement:

A. Implement the necessary requirements to fulfill the purposes of the Permits, the MSHCP and this Agreement for its Covered Activities. Such requirements include: 1) compliance with relevant processes and measures to ensure application of the Conservation Area requirements set forth in Section 4 of the MSHCP; 2) compliance with the applicable Land Use

Adjacency Guidelines as set forth in Section 4.5 of the MSHCP; 3) compliance with the Avoidance, Minimization and Mitigation Measures in Section 4.4 of the MSHCP; 4) ensure implementation consistent with the Species Conservation Goals and Objectives in Section 9 of the MSHCP; and 5) permanently protect and manage Mitigation Land within the reserve system legally owned and/or controlled by the entity unless conveyed to the CVCC.

B. As set forth in Section 6.6.1 of the Plan, cooperate with CVCC towards the Conservation of a portion of the land it owns in the Conservation Areas.

C. Contribute $525,000 towards the Endowment Fund for the Monitoring Program, the Management Program and Adaptive Management.

D. Participate as a member of the CVCC as set forth in Section 6.1.1.1 of the MSHCP.

E. Participate in the Joint Project Review Process for its projects within the Conservation Areas as described in Section 6.6.1.1 of the Plan.

F. Carry out all other applicable requirements of the MSHCP, this Agreement, and the Permits. Notwithstanding the foregoing, nothing within this Agreement shall be construed to require IID to provide funding, or any other form of compensation, beyond the requirements of the Permits, this Agreement and the MSHCP.

13.10 **Caltrans Obligations**. Caltrans has the following obligations under the MSHCP and this Agreement:

A. Implement the necessary requirements to fulfill the purposes of the Permits, the MSHCP and this Agreement for its Covered Activities. Such requirements include: 1) compliance with relevant processes and measures to ensure application of the Conservation Area requirements set forth in Section 4 of the MSHCP; 2) compliance with the applicable Land Use Adjacency Guidelines as set forth in Section 4.5 of the MSHCP; 3) compliance with the Avoidance, Minimization and Mitigation Measures in Section 4.4 of the MSHCP; 4) ensure implementation consistent with the Species Conservation Goals and Objectives in Section 9 of the MSHCP; and 5) permanently protect and manage Mitigation Land within the reserve system legally owned and/or controlled by the entity unless conveyed to the CVCC.

B. As set forth in Section 6.6.2 of the Plan, acquire and convey to CVCC or provide funding to the CVCC sufficient to acquire 5,791 acres of Additional Conservation Lands in the Conservation Areas as a contribution to Plan implementation for the Covered Activities described in Section 7.2.2 of the Plan. Within five (5) years of Permit issuance,

Caltrans will provide $7.6 million to CVCC for the monitoring, management, and Adaptive Management of the 5,791 acres.

C. Within one year of Permit issuance, CVCC and Caltrans shall prepare an agreement that specifies that if the MSHCP Permits are ever revoked, a conservation bank shall be established whereby the contributed lands are conveyed to CDFG with an endowment sufficient to provide for the permanent monitoring, land management, and Adaptive Management of the land. CVCC, the Wildlife Agencies, and Caltrans will enter into a Conservation Bank Agreement once a portion or all of the 5,791 acres are acquired.

D. As described in Section 6.6.1 of the Plan, cooperate with CVAG and CVCC in the acquisition of 1,795 acres to mitigate the interchange and associated arterial projects, and the contribution of $1,077,000 to the endowment for the Monitoring Program, Management Program, and Adaptive Management of those lands.

E. Carry out all other applicable requirements of the MSHCP, this Agreement, and the Permits.

13.11 **State Parks Obligations**. State Parks has the following obligations under the MSHCP and this Agreement:

A. Implement the necessary requirements to fulfill the purposes of the Permits, the MSHCP and this Agreement for its Covered Activities. Such requirements include: 1) compliance with relevant processes and measures to ensure application of the Conservation Area requirements set forth in Section 4 of the MSHCP; 2) compliance with the applicable Land Use Adjacency Guidelines as set forth in Section 4.5 of the MSHCP; 3) compliance with the Avoidance, Minimization and Mitigation Measures in Section 4.4 of the MSHCP; 4) ensure implementation consistent with the Species Conservation Goals and Objectives in Section 9 of the MSHCP; and 5) permanently protect and manage Mitigation Land within the reserve system legally owned and/or controlled by the entity unless conveyed to the CVCC.

B. As set forth in Section 6.6.2 of the Plan, prior to construction of camping, trailhead, and trail facilities as a Covered Activity in the Indio Hills/Joshua Tree National Park Linkage Conservation Area, acquire a minimum of 640 acres in the Conservation Area, of which a maximum of 100 acres may be developed as a Covered Activity. Development of the camping and trailhead facility must be consistent with the Conservation Objectives for the Conservation Area.

C. Carry out all other applicable requirements of the MSHCP, this Agreement, and the Permits.

13.12 **CVMC Obligations**. CVMC has the following obligations under the MSHCP and this Agreement:

A. Implement the necessary requirements to fulfill the purposes of the Permits, the MSHCP and this Agreement for its Covered Activities, if any. Such requirements include: 1) compliance with relevant processes and measures to ensure application of the Conservation Area requirements set forth in Section 4 of the MSHCP; 2) compliance with the applicable Land Use Adjacency Guidelines as set forth in Section 4.5 of the MSHCP; 3) compliance with the Avoidance, Minimization and Mitigation Measures in Section 4.4 of the MSHCP; 4) ensure implementation consistent with the Species Conservation Goals and Objectives in Section 9 of the MSHCP; and 5) permanently protect and manage Mitigation Land within the reserve system legally owned and/or controlled by the entity unless conveyed to the CVCC.

B. Manage easements and land owned or leased within the MSHCP Reserve System that have been set aside for Conservation purposes in accordance with Sections 8 and 9 of the MSHCP.

C. Carry out all other applicable requirements of the MSHCP, this Agreement, and the Permits. Notwithstanding the foregoing, nothing within this Agreement shall be construed to require CVMC to provide funding, or any other form of compensation, beyond the fees collected or dedicated lands required pursuant to the Permits, this Agreement and the MSHCP.

13.13 **MSWD Obligations**. MSWD has the following obligations under the MSHCP and this Agreement:

A. Implement the necessary requirements to fulfill the purposes of the Permits, the MSHCP and this Agreement for its Covered Activities, if any. Such requirements include: 1) compliance with relevant processes and measures to ensure application of the Conservation Area requirements set forth in Section 4 of the MSHCP; 2) compliance with the applicable Land Use Adjacency Guidelines as set forth in Section 4.5 of the MSHCP; 3) compliance with the Avoidance, Minimization and Mitigation Measures in Section 4.4 of the MSHCP; 4) ensure implementation consistent with the Species Conservation Goals and Objectives in Section 9 of the MSHCP; and 5) permanently protect and manage Mitigation Land within the reserve system legally owned and/or controlled by the entity unless conveyed to the CVCC.

B. As set forth in Section 6.6.1 of the MSHCP, cooperate with CVCC towards Conservation of a portion of the 61 acres MSWD owns in the Conservation Area.

C. Contribute $350,000 towards the Endowment Fund for the Monitoring Program, the Management Program and Adaptive Management.

D. Additional non-monetary contributions as set forth in the MSHCP.

E. Participate as a member of the CVCC as set forth in Section 6.1.1 of the MSHCP.

F. Participate in the Joint Project Review Process for its projects within the Conservation Areas as described in Section 6.6.1.1 of the Plan.

G. Carry out all other applicable requirements of the MSHCP, this Agreement, and the Permits. Notwithstanding the foregoing, nothing within this Agreement shall be construed to require MSWD to provide funding, or any other form of compensation, beyond the requirements of the Permits, this Agreement and the MSHCP.

14. USFWS OBLIGATIONS AND ASSURANCES

14.1 **Take Authorization for Covered Activities**. Upon execution of this Agreement by all Parties, and satisfaction of all other applicable legal requirements, the USFWS will issue Permittees a permit under section 10(a)(1)(B) of FESA authorizing incidental Take by Permittees of the Covered wildlife Species resulting from Covered Activities within the Plan Area, subject to and in accordance with, the MSHCP, the Permits and this Agreement.

14.2 **USFWS Findings - Covered Species**. The USFWS has found, following opportunity for public comment, that: 1) the taking of Covered Species within the Plan Area in accordance with the MSHCP as implemented will be incidental to the carrying out of otherwise lawful activities; 2) the MSHCP as implemented will, to the maximum extent practicable, minimize and mitigate the impacts of such incidental taking; 3) the funding sources identified and provided for herein will ensure that adequate funding for the MSHCP will be provided; 4) the requested taking of Covered wildlife Species will not appreciably reduce the likelihood of survival and recovery of such species in the wild; and 5) the MSHCP, as implemented, will satisfy and fulfill all measures agreed upon by the Parties for the purposes of the MSHCP (including procedures determined by the USFWS to be necessary to address Unforeseen Circumstances).

14.3 **Section 10(a) Permit Coverage**. The Section 10(a) Permit will identify all Covered Species. The Permit will

take effect for FESA listed Covered Species at the time that the Section 10(a) Permit is issued. For currently Unlisted Species, the Permit will take effect when such species are Listed.

14.4 **Implementation Assistance**. Subject to Section 27.10 of this Agreement, USFWS shall provide staff to serve on all appropriate committees and shall ensure, to the extent possible, staff participation in discussions and meetings with the other Parties to ensure that the implementation of this Agreement is consistent with any findings upon which the Section 10(a) Permit is based. In the event that other habitat conservation plans are proposed within the boundaries of the MSHCP, the USFWS will require the proponents to consult with the CVCC during the development of the habitat conservation plan or prior to completion of the Section 7 consultation process. The USFWS shall, to the extent appropriate, cooperate with the Permittees in obtaining additional funding from sources including, but not limited to, existing and future state and federal grant programs and existing and future bond issues.

14.5 **Assurances Regarding MSHCP**. After opportunity for public review and comment, based on the best available current scientific and commercial data, the USFWS has found that the MSHCP, as implemented by this Agreement: 1) is consistent with and will complement other applicable Conservation planning and regulatory programs and efforts addressing wildlife within the region, 2) minimizes and mitigates the potential significant adverse impacts of the Covered Activities on the Covered Species, 3) will ensure that the measures agreed upon by the Permittees and the USFWS will be met, and 4) will be implemented. The USFWS shall not take a position inconsistent with the acknowledgments set forth in this Section, including, without limitation, in the form of comments offered by the USFWS in the context of any CEQA or NEPA process associated with approvals for Covered Activities, with regard to effects on Covered Species.

14.6 **Take Authorization for Newly Regulated Covered Species; Savings Provision**. Subject to compliance with all other terms of this Agreement, the Section 10(a) Permit will automatically become effective for each Unlisted Covered Species upon the listing of such species as endangered or threatened under FESA. If it is judicially determined that the USFWS was not authorized to cause the Section 10(a) Permit to become effective automatically as to Covered Species as they become listed pursuant to FESA, the USFWS shall accept the minimization and mitigation measures in the MSHCP and this

Agreement as the basis for an application for a section 10(a) amendment or separate Section 10(a) Permits, MBTA Permits, and/or other Take Authorizations. The USFWS shall use reasonable efforts to review and process the application expeditiously so as to ensure, provided the Permit amendment or application meets the requirements of FESA and other applicable federal laws, that the Take Authorization is effective concurrently with the listing of the Covered Species under FESA. In issuing such Permits, amendments and/or Take Authorizations, and to the extent that such judicial determination creating the circumstances requiring such additional review and processing allows, the USFWS shall not request, impose, recommend or require further mitigation, Conservation, compensation, enhancement or other protection for such Covered Species except as expressly provided in this Agreement.

14.7 **Changes in the Environmental Laws**. It is acknowledged and agreed by the USFWS that the Permittees are agreeing to perform substantial avoidance, minimization, mitigation, Conservation and management measures as set forth in this Agreement. If a change in, or an addition to, any federal law governing or regulating the impacts of Development on land, water or biological resources as they relate to Covered Species, including, but not limited to, FESA and NEPA, the USFWS shall give due consideration to the measures required under the MSHCP in applying the new laws and regulations to the Permittees.

14.8 **Section 7 Consultations**. The USFWS will evaluate the direct, indirect, and cumulative effects of the Covered Activities in its internal FESA biological opinion issued in connection with the MSHCP and issuance of the Section 10(a) Permit. As a result, and to the maximum extent allowable, in any consultation under section 7 of FESA subsequent to the Effective Date involving the Permittee(s) or entity with Third Party Take Authorization with regard to Covered Species and Covered Activities, the USFWS shall ensure that the FESA biological opinion issued in connection with the proposed project that is the subject of the consultation is consistent with the internal FESA biological opinion. Such projects must be consistent with the terms and conditions of the MSHCP and this Agreement. Any terms and conditions included under the reasonable and prudent measures of a FESA biological opinion issued subsequent to the Effective Date with regard to the Covered Species and Covered Activities shall, to the maximum extent appropriate, be consistent with the implementation measures of the MSHCP and this Agreement. The USFWS shall not impose measures in excess of

those that have been or will be required by the Permittee(s) or entity with Third Party Take Authorization pursuant to the MSHCP and this Agreement. The USFWS shall process subsequent FESA consultations for Covered Activities in accordance with the process and time periods set forth in 50 Code of Federal Regulations, section 402.14. The Parties agree that this section does not create an independent cause of action.

14.9 **Critical Habitat Designation for Covered Species**. The USFWS acknowledges and agrees that the MSHCP and this Agreement provide a comprehensive, habitat-based approach to the protection of Covered Species by focusing on the lands essential for the long-term Conservation of the Covered Species and appropriate management for those lands. This approach is consistent with the overall purposes of FESA to provide a means whereby the ecosystems upon which endangered and threatened species depend may be conserved. FESA regulations specify that the criteria to be used in designating critical habitat include "those physical and biological features that are essential to the Conservation of a given species and that may require special management considerations or protection." (50 C.F.R. § 424.12(b).)

The MSHCP and this Agreement provide for the protection of those physical and biological features essential to the Conservation of the Covered Species in a manner consistent with USFWS regulations concerning the designation of Critical Habitat. The USFWS agrees that, to the maximum extent allowable after public review and comment, in the event that a Critical Habitat determination is made for any Covered Species, and unless the USFWS finds that the MSHCP is not being implemented, lands within the boundaries of the MSHCP will not be designated as Critical Habitat. In addition, if Critical Habitat is designated within the MSHCP boundaries, pursuant to Section 14.11 of this Agreement and except as expressly provided in Section 14.11 of this Agreement and Section 6.8 of the MSHCP regarding Unforeseen Circumstances, no subsequent evaluation of the Covered Species, nor any mitigation, compensation, Conservation enhancement or other protective measures other than those set forth in the MSHCP will be required. Moreover, to the maximum extent allowable after public review and comment, the USFWS agrees to reassess and revise the boundaries of existing designated and proposed Critical Habitat of Covered Species within the MSHCP boundaries after its approval, although the Parties recognize that funding constraints may influence the timing of such regulatory action.

14.10 **Future Recovery Plans**. Recovery plans under FESA delineate actions necessary to recover and protect federally Listed Species. These plans frequently include information, or may lead to the development of information, that can contribute to the development of an adaptive management program. However, recovery plans do not obligate any Permittee, individual or entity to undertake specific tasks.

The Parties acknowledge that FESA recovery plans have no effect on the implementation of this MSHCP, except to the extent that they may contribute information to, or assist in achieving the goals of, the Management Program. Any recovery plan applicable to any Covered Species found in the Plan Area that is developed after the Effective Date shall:

A. Not require any additional land or financial compensation by Permittees;

B. Be finalized only after the USFWS has consulted with and requested input from the CVCC and made reasonable attempts to give notice to Plan Participants of the preparation of the recovery plan; and

C. Not in any way diminish the Take Authorization for Covered Species granted to Permittees pursuant to the MSHCP, this Agreement, or the Section 10(a) Permit.

14.11 **No Surprises Assurances and Unforeseen Circumstances**.

14.11.1 **No Surprises Assurances**. The USFWS has promulgated the Habitat Conservation Plan Assurances Rule, published in the Federal Register on February 23, 1998 (63 Federal Register 8859), and codified at 50 Code of Federal Regulations, sections 17.3, 17.22(b) and 17.32(b) ("No Surprises Rule").

14.11.2 Pursuant to the No Surprise Rule, the assurances by the USFWS in this Section shall apply so long as the commitments and provisions of the MSHCP, this Agreement and the Section 10(a) Permit are properly implemented.

14.11.3 As set forth in Section 6.8.1 of the MSHCP, pursuant to the No Surprises Rule, as long as the MSHCP is being properly implemented, the USFWS will not require from Permittees, Third Parties Granted Take Authorization, Participating Special Entities or other individuals or entities receiving Take Authorization under the Permits the commitment of additional land, or financial compensation or additional restrictions on the use of land or other natural resources with regard to Covered Activities and their impact on the Covered Species beyond the level and/or amounts specified in the MSHCP, the Permits and this Agreement.

14.11.4 As set forth in Section 6.8.1 of the MSHCP, pursuant to the No Surprises Rule, the USFWS has the burden of making a finding that Unforeseen Circumstances exist with regard to any Covered Species, using the best scientific and commercial data available. The findings must be clearly documented and based upon reliable technical information regarding the status and habitat requirements of the affected species. In deciding whether any Unforeseen Circumstances

exist, the USFWS shall consider, but not be limited to the following factors:

A. The extent of the current range of the Covered Species;

B. The percentage of the range of Covered Species and Habitat that has been adversely affected by the Covered Activities;

C. The percentage of the range of the Covered Species and Habitat that has been conserved by the MSHCP;

D. The ecological significance of that portion of the range or Habitat of the Covered Species;

E. The level of knowledge about the Covered Species and Habitat and the degree of specificity of the species Conservation program under the MSHCP; and

F. Whether failure to adopt additional Conservation measures would appreciably reduce the likelihood of survival and recovery of the Covered Species in the wild.

14.11.5 In the event the USFWS makes a finding of Unforeseen Circumstances and such Unforeseen Circumstances warrant the requirement of additional mitigation, enhancement or compensation measures, any such additional measures shall be restricted to modification of the management of the MSHCP Reserve System, and shall be the least burdensome measures available to address the Unforeseen Circumstances.

14.11.6 Changed Circumstances, as described in 50 Code of Federal Regulations section 17.22(b)(5)(i), are adequately addressed in Section 6.8.3 of the MSHCP, and Permittees shall implement any measures for such circumstances as called for in the MSHCP, as described in Section 11.3 of this Agreement.

14.12 **Migratory Bird Treaty Act**. The Section 10(a) Permit shall constitute a Special Purpose Permit under 50 Code of Federal Regulations section 21.27, for the Take of Covered Species listed under FESA and which are also listed under the MBTA (16 U.S.C. §§ 703-712), in the amount and/or number specified in the MSHCP, subject to the terms and conditions specified in the Section 10(a) Permit. Any such Take will not be in violation of the MBTA. The MBTA Special Purpose Permit will extend to Covered Species listed under FESA and also under the MBTA after the Effective Date of the Section 10(a) Permit. This Special Purpose Permit shall be valid for a period of three (3) years from its Effective Date, provided the Section 10(a) Permit

remains in effect for such period. The Special Purpose Permit shall be renewed pursuant to the requirements of the MBTA, provided the Permittees remain in compliance with the terms of this Agreement and the Section 10(a) Permit. Each such renewal shall be valid for a period of three (3) years, provided that the Section 10(a) Permit remains in effect for such period.

14.13 **Management of Land**. USFWS agrees to manage its land within the MSHCP Reserve System pursuant to the provisions of the Plan.

15. CDFG OBLIGATIONS AND ASSURANCES

15.1 **Issuance of NCCP Permit**.

15.1.1 Concurrent with the execution of this Agreement, CDFG has issued an NCCP Permit to the Permittees authorizing the Take of Covered Species, subject to and in accordance with the MSHCP and this Agreement.

15.1.2 Except as set forth in Section 15.5 of this Agreement, as to each Covered Species, including both Listed and Unlisted Species, that Take Authorization shall become effective upon issuance of the NCCP Permit.

15.2 **NCCP Permit Findings**. In separate findings, CDFG has found, following opportunity for public comment, that the MSHCP and this Agreement: 1) adequately provide for the Conservation and management of the Covered Species and their Habitat within the MSHCP and 2) satisfy all legal requirements under the NCCP Act necessary for CDFG to issue an NCCP Permit for such species. CDFG has found that the MSHCP meets the requirements of the NCCP Act for an NCCP Plan, and has approved the MSHCP as an NCCP Plan. In separate findings, CDFG has further found that the MSHCP and this Agreement adequately provide for the mitigation of potential "significant effects on the environment" (as defined in California Public Resources Code section 21068) which may result to Covered Species and their Habitat from the Covered Activities in the Plan Area.

15.3 **State Assurances**. Except for the provisions in Section 15.5, provided Permittees are implementing the terms and conditions of the MSHCP, this Agreement and the Permits, if there are Unforeseen Circumstances, CDFG shall not require additional land, water or financial compensation or additional restrictions on the use of land, water or other natural resources for

the life of the NCCP Permit without the consent of the Permittees, unless CDFG determines that continued implementation of this Agreement, the MSHCP, and/or the Permits would jeopardize the continued existence of a Covered Species, or as required by law and would therefore lead to NCCP Permit revocation or suspension.

The Parties acknowledge that, notwithstanding the assurances provided by this Section, future modifications to mitigation that are specifically contemplated under the MSHCP and this Agreement may require adjustments in the mitigation set forth in the MSHCP as of the Effective Date, including, but not limited to, Take minimization measures and MSHCP Reserve System management. Such changes are part of the MSHCP's operating Conservation program and are not precluded by the assurances provided in this Section. In particular, this Section shall not be construed to diminish the obligation of the Permittees, Third Parties Granted Take Authorization or Participating Special Entities to undertake mitigation actions in response to Changed Circumstances and to revise mitigation measures under the Management Program. However, CDFG acknowledges that neither the Management Program, nor the MSHCP's provisions concerning Changed Circumstances, are intended to require modifications to the MSHCP's mitigation program that would require additional funding nor to impose significant additional burdens on Permittees, discretionary approvals issued by Permittees, or on Participating Special Entities with respect to Take minimization measures.

15.4 **Implementation Assistance**. Subject to Section 27.10 of this Agreement, CDFG shall provide staff to serve on appropriate committees and shall ensure the availability of staff for informal discussions and meetings with the other Parties to ensure that the implementation of this Agreement is consistent with, and will not render invalid, any findings upon which the NCCP Permit is based. To the extent consistent with its legal authorities, CDFG shall cooperate with the Permittees in obtaining additional funding from sources including, but not limited to, existing and future state and federal grant programs and existing and future bond issues.

15.5 **Fully Protected Species**. The following Covered Species listed in the MSHCP are fully protected under California Fish and Game Code sections 3511 and 4700: 1) Peninsular bighorn sheep; 2) Yuma clapper rail; and 3) California black rail. Take of these species is prohibited under the California Fish and Game Code except as specifically provided in section 2081.7 of that Code. Under the NCCP permit, only CVWD is authorized to Take fully protected species, as described in that permit. Under Fish and Game Code section 2081.7, CDFG may authorize CVWD to take Yuma clapper rail and California black rail, if the requirements of that section are met. CDFG acknowledges and agrees that if the measures set forth in the MSHCP are fully complied with, the Covered Activities are not likely to result in

Take of fully protected species, except by CVWD. If CDFG determines that such measures are not adequate to prevent Take of one of the Fully Protected Species, CDFG shall notify the CVCC, USFWS and other affected Permittees in writing of such discovery and propose new, additional, or different Conservation measures that it believes are necessary to avoid Take of these species. The affected Permittees shall implement measures proposed by CDFG or such other measures agreed to by the Parties as adequate to avoid Take of Fully Protected Species.

If at any time there is a change in state law such that CDFG may issue a section 2081(b) Permit or Take Authorization under Fish and Game Code section 2835, other permit, or authorization allowing the Take of any species subject to California Fish and Game Code sections 3511, 4700, 4800, 5050 or 5515, the Permittees may apply for an amendment of the MSHCP and NCCP Permit or for a new permit for such species. In processing any such application, CDFG shall give good faith consideration to Take avoidance and mitigation measures already provided in the MSHCP and shall issue the amendment or Permit under the same terms and conditions as the existing NCCP Permit, to the extent permitted by law.

15.6 **Changes in the Environmental Laws**. It is acknowledged and agreed by CDFG that the Permittees are agreeing to perform substantial avoidance, minimization, mitigation, Conservation and management measures set forth in this Agreement and the MSHCP. If a change in, or addition to, the Environmental Laws takes place, CDFG shall give good faith consideration to the measures required under the MSHCP in applying the new laws and regulations to the Permittees.

15.7 **Consultations by CDFG**. Except as otherwise required by law, CDFG shall not recommend or otherwise seek to impose through consultation with other public agencies any mitigation, compensation or habitat enhancement requirements regarding impacts to Covered Species that exceed the requirements prescribed in and pursuant to the MSHCP and this Agreement, including, without limitation, in the form of comments offered by CDFG in the context of any CEQA process associated with approvals for Covered Activities with regard to effects on Covered Species.

15.8 **Management of Land**. CDFG agrees to manage its land within the MSHCP Reserve System consistent with the MSHCP, along with other legal mandates and management objectives.

16. RELATIONSHIP TO OTHER EXISTING HABITAT CONSERVATION PLANS, NCCP PERMITS AND SECTION 2081 PERMITS

16.1 **General**. The Parties acknowledge that there are Habitat Conservation Plans, biological opinions issued pursuant to section 7 and section 2081 Permits, currently in existence for projects in the Coachella Valley and surrounding mountains within Riverside County. The Parties agree that the MSHCP is not incompatible with nor does it negate these existing plans and Permits. Upon request, the Parties may consider consolidation of these Permits and plans into the MSHCP.

16.2 **Coachella Valley Fringe-Toed Lizard Take Authorization**. The Permitees will relinquish the Coachella Valley Fringe-Toed Lizard ("CVFTL") Section 10(a) Permit pursuant to 50 CFR 13.26 within six months of issuance of the MSHCP Section 10(a) Permit, which will allow for final accounting and completion of other administrative activities under the CVFTL HCP. Upon relinquishment of the CVFTL permit, Take Authorization for the CVFTL for Covered Activities will be provided pursuant to the MSHCP Section 10(a) Permit. Because the CVFTL Section 10(a) Permit will no longer exist, the consistency determination (under Fish and Game Code section 2080.1) which was based on such permit will also terminate. Upon issuance of the MSHCP Section 10(a) Permit, the current fees required under the CVFTL HCP will no longer be imposed.

17. THIRD PARTY TAKE AUTHORIZATION

17.1 **Authorization**. Upon execution of this Agreement by the Parties and the issuance of the Permits by the Wildlife Agencies, the Permittees may allow the Take of Covered Species by landowners, developers, and other private and public entities undertaking Covered Activities. Such Covered Activities must be under the direct control of the Permittees in conformance with approvals granted by the Permittees, or carried out in conformity with a Certificate of Inclusion or other written mechanism or instrument, and in compliance with this Agreement, the Permits and the MSHCP. As set forth in Section 11.1.1 of this Agreement, Permittees shall include as a part of any discretionary or certain City ministerial approvals, a Certificate of Inclusion or other written mechanism, a condition requiring compliance with the Permits, the MSHCP and this Agreement, that describes the Take Authorization to be granted pursuant to Section 17.2 of this Agreement. Such property owners, developers, and private and public entities shall receive Take Authorization provided they are in full compliance with all requirements of this Agreement, the

MSHCP, the Permits, the Implementation Mechanism adopted by Permittees, issued entitlements and all other applicable requirements.

17.2 **Timing of Take Authorization**. Authorization of Take for Third Parties shall occur upon issuance of a grading permit by a Local Permittee or issuance of a Certificate of Inclusion by the CVCC or other Local Permittee. Alternatively, as an incentive to convey property needed for inclusion in the MSHCP Reserve System and for which monetary compensation will not be provided, Third Party Take Authorization may be granted upon project approval and property conveyance. In order to obtain this early Take Authorization, the conveyance must occur within forty-five (45) days of project approval. Any subsequent suspension or revocation of Permits terminating Third Party Take Authorization will not be applicable to the Take Authorization granted upon the project's approval, provided the property has been conveyed and all other mitigation obligations have been satisfied, except where such Take Authorization will jeopardize a Covered Species listed under FESA and/or CESA. In this event, the provisions of Section 17.4 of this Agreement would be triggered. No grading permit or Certificate of Inclusion shall be issued by a Local Permittee until all mitigation requirements imposed by the Permittees through the Implementation Mechanism have been fully satisfied or are guaranteed to occur within a set time frame as approved by the Permittee. In the event that such mitigation requirements have not been satisfied prior to issuance of grading permit or Certificate of Inclusion, the applicant and the Permittee shall enter into an agreement setting forth the terms and conditions of MSHCP compliance and appropriate remedies for non-compliance. The Take Authorization conferred by the Permittees to the Third Parties shall be for the length of time, and run concurrently with, the specific land development approval or other entitlement or approval granted by the Permittees and the term of the Permits.

17.3 **Effect of MSHCP Amendments on Third Parties**. Amendments or other revisions to the MSHCP, subsequent to the granting of Take to a Third Party by a Permittee, shall not affect the Take conferred upon a Third Party or the level of compensation required unless the Third Party, the Wildlife Agencies and the affected Permittee all agree to such amendments or revisions.

17.4 **Effect of Revocation or Suspension of Permits on Third Parties**. In the event that one or both of the Wildlife

Agencies revoke or suspend all or a portion of the Take Authorization allowed under the Permits, and provided the affected Permittee continues to carry out its obligations under the MSHCP, this Agreement and the Permits, the Take Authorization and other assurances granted to Third Parties Granted Take Authorization by the Permittees will remain in effect as to each individual Third Party project that received Take Authorization prior to the revocation or suspension unless USFWS or CDFG determines that continuation of the Permits with regard to Take by Third Parties Granted Take Authorization would likely jeopardize a species listed under FESA and/or CESA. In this event, the CVCC, applicable Permittee(s), Third Parties Granted Take Authorization and Wildlife Agencies, shall meet and confer pursuant to the provisions in Section 23.6 of this Agreement. If these Parties cannot reach a mutually satisfactory resolution, the Wildlife Agencies may revoke or suspend all Take Authorization under the MSHCP for that listed species. In this event, all Local Permittees, Third Parties Granted Take Authorization and Participating Special Entities would be eligible for full or partial refund from the CVCC or other appropriate Permittees of any mitigation contribution, as appropriate, except to the extent that Take had already occurred. The CVCC or other applicable Permittee will issue a notice to all potentially affected property owners that Take Authorization for that listed species is no longer valid under the Plan.

17.5 **Effect of No Surprises Assurances on Third Parties**. Pursuant to the No Surprises Rule, the Wildlife Agencies shall not require the commitment of additional land or financial compensation or other mitigation from the Permittees, and the Permittees will not require such commitments from a Third Party pursuant to the Permits, the MSHCP or this Agreement beyond those measures imposed on the Third Party by the Local Permittee in accordance with the Permit, the MSHCP and this Agreement, unless agreed to by the Third Party. The Parties acknowledge that additional measures may be required for a species that is not a Covered Species, as described in Section 11.3.5 of this Agreement.

17.6 **Retention of Enforcement Authority Over Third Parties**. The Parties reserve the right to enforce all applicable federal, state, or local laws against persons or entities which engage in unlawful land development activity without obtaining proper permits and approvals. The Parties further reserve the right to enforce all applicable federal, state, or local laws against Third Parties conducting land development activities within the Plan Area not in compliance with project approvals

pursuant to the MSHCP. Local Permittees have the obligation to enforce conditions of project approval as described in Section 13.0 of this Agreement.

18. COOPERATIVE EFFORT

In order to ensure that the legal requirements set forth in this Agreement are fulfilled, each of the Parties to this Agreement must perform certain specified tasks as set forth in this Agreement and the MSHCP. The MSHCP and this Agreement thus describe a cooperative effort by federal, state and local agencies to implement a program of Conservation for the Covered Species.

Additionally, the Parties shall work cooperatively to enter into appropriate Memoranda of Understanding or other appropriate agreements with any non-Party managing land within the MSHCP Reserve System to manage lands in conformance and compliance with the MSHCP. A draft Model Memorandum of Understanding is attached hereto as Exhibit "F."

19. TERM

19.1 **Effective Date**. This Agreement shall be effective upon issuance of the Permits. Any Permittee executing this Agreement after the Effective Date shall, upon execution, become a Party to this Agreement, with all the rights and obligations of Parties defined herein, and this Agreement shall be enforceable between each later executing Permittee and all prior signing Parties.

19.2 **Term of the Agreement**. This Agreement shall run for a term of seventy-five (75) years from the Effective Date, unless terminated in accordance with Section 21 of this Agreement or unless extended by agreement of all of the Parties hereto.

19.3 **Term of the Permits**. The Permits shall run for a term of seventy-five (75) years from the Effective Date unless terminated as provided in this Agreement, provided the requirements of Section 11.1 of this Agreement have been met. This term was selected as reasonable due to the scope and breadth of the Plan, the need to establish an adequate endowment to manage and monitor the MSHCP Reserve System and the projected growth and planned infrastructure within the Plan Area.

19.4 **Extension of the Permit**. Upon agreement of the Parties and in compliance with all applicable laws, the Wildlife Agencies may, with respect to the Permits under their respective jurisdiction, extend the Permits beyond their initial terms under the applicable regulations in force on the date of such extension. If Permittees desire to extend the Permits, they will so notify the

Wildlife Agencies at least twelve (12) months before the then-current term is scheduled to expire and submit an application to renew the Permits. Extension of the Permits constitutes extension of the MSHCP and this Agreement for the same amount of time, subject to any modifications agreed to by the Parties at the time of extension.

19.5 **Permanent Preservation**. Notwithstanding the stated term as herein set forth, the Parties agree and recognize that once Take of a Covered Species and/or their habitat modified within the Plan Area, such Take and habitat modification will be permanent. The Parties therefore agree that obligations regarding the preservation and maintenance of the habitat provided for under the Permits, the MSHCP and this Agreement is likewise intended to be permanent and to extend beyond the term of this Agreement.

20. MODIFICATIONS AND AMENDMENTS TO THE MSHCP

20.1 **Clerical Changes**. Clerical changes to the MSHCP shall be made by the CVCC on its own initiative or in response to a written request submitted by any Permittee or Wildlife Agency, which includes documentation supporting the proposed clerical change. Clerical changes shall not require any amendment to the MSHCP, the Permits or this Agreement. Clerical changes include corrections of typographical, grammatical, and similar editing errors that do not change the intended meaning as well as corrections of any maps or exhibits to correct insignificant errors in mapping. The Parties anticipate that most clerical changes to the MSHCP will occur during the first ten (10) years of the Permits. Annual reports shall include a summary of clerical changes made to the MSHCP in the preceding calendar year.

20.2 **Land Use Changes**. The Parties agree that the adoption and amendment of general plans, specific plans, community plans, zoning ordinances and similar land use ordinances, and the granting of implementing land use entitlements by the County and the Cities are matters within the sole discretion of the County and Cities and shall not require amendments to this Agreement or the approval of other Parties to this Agreement. However, the Parties agree that: 1) no such action by the County or the Cities shall in any way alter or diminish their obligations under this Agreement, the MSHCP, or the Permits, and 2) approval of certain projects may lead to revocation or suspension of the Permits pursuant to Section 23.5 of this Agreement.

20.3 **Adaptive Management Changes**. Except as otherwise provided, changes to avoidance measures, minimization, mitigation, compensation and MSHCP Reserve System management strategies developed through and consistent with the Management Program described in Section 8.0 of the MSHCP shall not require any amendment to the MSHCP, this Agreement or the Permits.

20.4 **Minor Amendments**. Minor Amendments are amendments to the MSHCP of a minor or technical nature where the effect on Covered Species, levels of Take and Permittees' ability to implement the MSHCP are not significantly different than those described in the MSHCP as originally adopted. Minor Amendments to the MSHCP shall not require amendments to this Agreement or the Permits.

20.4.1 **List of Minor Amendments**. As set forth in Section 6.12.3 of the MSHCP, the following are contemplated as Minor Amendments to the MSHCP and therefore, will be administratively implemented pursuant to the procedures below. Minor Amendments processed pursuant to this subsection are limited to those listed in Sections 20.4.2 and 20.4.3 of this Agreement.

20.4.2 **Minor Amendments not Requiring Wildlife Agencies Concurrence**.

A. Minor corrections to land ownership;

B. Adjustment of land ownership and Conservation acreages in the Santa Rosa and San Jacinto Mountains Conservation Area upon completion of a land exchange between the Agua Caliente Band of Cahuilla Indians and BLM, as discussed in Section 4.2.1.1 of the Final MSHCP;

C. Minor revisions to survey, monitoring, reporting and/or management protocols that clearly do not affect Covered Species or overall MSHCP Reserve System functions and values;

D. Application of Take Authorization to Development within cities incorporated within the MSHCP boundaries after the Effective Date of this Agreement, pursuant to Section 11.5 of this Agreement, provided such inclusion does not preclude Reserve Assembly, significantly increase the cost of MSHCP Reserve System Assembly or management or preclude achieving Conservation Area Conservation Objectives or Species Conservation Goals;

E. Annexation or deannexation of property within the Plan Area pursuant to Section 11.4 of this Agreement, provided such

inclusion does not preclude Reserve Assembly, significantly increase the cost of MSHCP Additional Conservation Lands management or assembly, or preclude achieving Conservation Area Conservation Objectives or Species Conservation Goals;

F. Updates/corrections to the natural communities map and/or species occurrence data; and

G. Changes to the RMU boundaries.

20.4.3 **Minor Amendments Requiring Wildlife Agencies Concurrence**.

A. Conservation Area boundary adjustments as set forth in Section 6.12.2 of the MSHCP.

B. Construction and operation of CVWD water recharge and storage and other water related facilities as set forth in Section 7.3 of the MSHCP.

C. Modifications of the alignment of the Palm Desert to La Quinta Connector Trail from the alignment in the Trails Plan in the Final MSHCP.

D. Transfer of Conservation Objectives for conserved natural communities and/or identified Covered Species between Conservation Areas or between Recovery Zones in the Santa Rosa and San Jacinto Mountains Conservation Area may occur if the following is demonstrated:

1. The transfer does not reduce the number of acres anticipated by the Plan of the natural community or the species' habitat conserved.

2. The transfer does not reduce the Conservation value of the lands that will be conserved based on natural community patch size, configuration, and juxtaposition within the matrix of Conserved Habitat and is of greater or equal habitat value.

3. There is no reduction in Conservation and no increase in Take.

4. Transfers must be within kind (for a Covered Species or natural community). Any shifts must be species-specific and meet the above criteria.

E. Changes to the list of exotic species in Table 4-112 of the MSHCP.

F. Future proposals for new trails on Reserve Lands in the Santa Rosa and San Jacinto Mountains Conservation Area, other than the identified new trails (including perimeter trails).

G. Construction of the Morongo Wash Flood Control Facility as described in Section 7.3.1.

20.4.4 **Procedure**. Any Party may propose Minor Amendments to the MSHCP or this Agreement by providing written notice to all other affected Parties. Such notice shall include a description of the proposed Minor Amendment, an explanation of the reason for the proposed Minor Amendment, an analysis of its environmental effects including any impacts to the Conservation of Covered Species and a description of why that Party believes the effects of the proposed Minor Amendment: 1) are not significantly different from, and are biologically equivalent to, the terms in the MSHCP as originally adopted; 2) substantially conform to the terms in the MSHCP as originally adopted; and 3) will not significantly reduce the ability to acquire the Additional Conservation Lands. The Wildlife Agencies and affected parties shall submit any comments on the proposed Minor Amendment in writing within sixty (60) days of receipt of such notice. Any Party can institute the informal meet and confer process set forth in Section 23.6 of this Agreement to resolve disagreements concerning Minor Amendments.

For the minor amendments requiring Wildlife Agencies' concurrence, any non-concurrence must occur within sixty (60) days of receipt of the written notice as referenced above. If the Wildlife Agencies concur or if they fail to respond within the sixty (60) days period, the Minor Amendment may be approved. If the Wildlife Agencies do not concur with the analysis supporting the Minor Amendment in writing within the 60-day period, the project will be subject to a Major Amendment.

20.5 **Major Amendments**. Major Amendments are those proposed changes to the MSHCP and the Permits that are not clerical or Minor Amendments. Major Amendments to the MSHCP shall require a subsequent amendment to this Agreement and the Permits, and public notice as required by applicable laws and regulations. The CVCC shall submit any proposed Major Amendments to the Wildlife Agencies.

20.5.1 **List of Major Amendments**. Major Amendments include, but are not limited to, any of the following:

A. All amendments not contemplated in this Agreement as clerical or Minor Amendments to the MSHCP, except subsequent minor changes which are not specifically listed as a Minor Amendment in this Agreement that the Wildlife Agencies have determined to

be insubstantial and appropriate for implementation as a Minor Amendment;

B. Changes to the boundary of the Plan Area;

C. Addition of species to the Covered Species list; and

D. Changes in anticipated Reserve Assembly or funding strategies and schedules that would have substantial adverse effects on the Covered Species.

20.5.2 **Procedure**. Major Amendments shall be processed as set forth in Section 6.12.4 of the MSHCP and require the same process followed for the original MSHCP approval. A Major Amendment will require an amendment to the MSHCP and this Agreement addressing the new circumstances, subsequent publication and public notification, CEQA/NEPA compliance and intra-Service section 7 Consultation, if one is deemed necessary. Major Amendments shall be subject to review and approval by the CVCC and other Permittees as appropriate, at a noticed public hearing. The Wildlife Agencies will use reasonable efforts to process proposed Major Amendments within one hundred twenty (120) days after publication in the Federal Register of the proposed Major Amendment.

20.6 **Like Exchanges in Conservation Areas**. Like exchanges in Conservation Areas may be implemented pursuant to Section 6.12.2 of the MSHCP.

21. TERMINATION OF PERMITS

21.1 **Termination in General**. The Permittees may unanimously elect to terminate the MSHCP and the Permits. In order to terminate, the CVCC shall make written findings at a noticed public hearing that further compliance with this Agreement, and implementation of the MSHCP, are either not feasible or no longer in the best interest of the County, the Cities and the other Permittees. Termination by the Permittees shall not be effective until sixty (60) days after the CVCC has provided written notice to the Wildlife Agencies of the adoption of termination findings.

21.2 **Continuing Obligations**. In the event of termination, consistent with the requirements of 50 Code of Federal Regulations sections 17.32(b)(7) and 17.22(b)(7), the Permittees will remain obligated to fulfill any existing and outstanding minimization and mitigation measures required under the terms of the Permits for Take that occurs prior to such termination and such minimization and mitigation measures as

may be required pursuant to the terms of this Agreement and the MSHCP. With the consent of the Wildlife Agencies, the CVCC may transfer its obligations to a professional land manager approved by the Wildlife Agencies or to the Wildlife Agencies directly, or to another appropriate entity and/or entities acceptable to the Wildlife Agencies.

All Local Development Mitigation Fees that have been collected and held by the CVCC, the County and the Cities shall be placed in an interest bearing account governed by the CVCC, and shall be transferred to a professional land manager, the Wildlife Agencies directly, or other appropriate entity and/or entities acceptable to the Wildlife Agencies.

21.3 **Final Accounting**. At the time of termination, the CVCC shall provide to the Wildlife Agencies a final accounting of management activities and monitoring information. Such final accounting shall include, at a minimum, all of the information contained in the Annual Report described in Section 6.4 of the MSHCP and all outstanding obligations for future actions regarding implementation of the MSHCP. The final accounting shall specify the Permittees' specific responsibilities and time frames for carrying out such obligations to ensure Rough Step requirements are met by the Permittees.

21.4 **Dissolution of the CVCC**. In the event the CVCC disbands or is otherwise dissolved at the time of termination, the CVCC's obligations under this Agreement shall be carried out by the County or other appropriate entity and/or entities acceptable to the Wildlife Agencies.

22. WITHDRAWAL OF PERMITTEE(S)

22.1 **Withdrawal in General**. A Permittee may terminate its participation in the MSHCP and abandon its Take Authorization set forth in the Permits by notifying the Parties hereto in writing of its intent to terminate its participation. Any Permittee that elects to terminate participation in the MSHCP shall provide at least ninety (90) days written notice to all Parties. Prior to any such termination, the Permittee shall provide to the CVCC a final accounting of any information gathered by the Permittee with respect to implementation of the MSHCP, and shall transfer to the CVCC any Local Development Mitigation Fees or other funds related to the MSHCP that have been collected.

22.2 **Mitigation Responsibilities**. Consistent with the requirements of 50 Code of Federal Regulations sections 17.32(b)(7) and 17.22(b)(7), the withdrawing Permittee remains

responsible for any existing and outstanding minimization and mitigation measures required under the terms of the Permits for Take that occurs prior to such withdrawal, and such minimization and mitigation measures as may be required pursuant to the terms of this Agreement and the MSHCP.

22.3 **Termination of Permittee Take Authorization**. Termination of participation by any Permittee will automatically terminate Take Authorization for Covered Activities within that Permittee's jurisdiction. However, for those Covered Activities within that Permittee's jurisdiction that have been issued a grading permit or, if a grading permit is not required, have commenced grading activities or have been issued a Certificate of Inclusion prior to the notification or the Permittee's formal decision to terminate, Take Authorization shall continue under the remaining Permits provided all relevant obligations have been met pursuant to the MSHCP, this Agreement and the Permittee's land use entitlements. In this event, the withdrawing Permittee may elect to continue enforcement of the Plan for the Covered Activities. Otherwise, the CVCC or other appropriate remaining Permittee shall enter into a Certificate of Inclusion or other written mechanism or instrument with the Third Party Granted Take Authorization or Participating Special Entity. The Certificate of Inclusion or other written mechanism shall be automatically issued provided the applicable Parties are in compliance with the MSHCP, this Agreement and the Permits.

22.4 **Evaluation of Remaining Permits**. In the event of termination by any Permittee, the CVCC shall meet and confer with the Wildlife Agencies to determine to what extent, if any, Take Authorization may continue to be provided to the remaining Permittees. In making this determination, the Wildlife Agencies shall evaluate the benefits to Covered Species resulting from the participation of the remaining Permittees, the extent to which the withdrawing Permittee has outstanding obligations for compliance with Take minimization and mitigation measures, an evaluation of whether the Permits continue to meet issuance criteria pursuant to FESA and the NCCP Act, and any other relevant information. Such evaluation shall include an analysis of the viability of the MSHCP Reserve System without the participation of the Permittee, including whether adequate funding will be available to implement the terms of the MSHCP.

23. REMEDIES AND ENFORCEMENT

23.1 **Remedies in General**. Except as set forth below, each Party shall have all remedies otherwise available to enforce

the terms of the MSHCP, this Agreement and the Permits, and to seek remedies for any breach hereof, subject to the following limitations:

23.1.1 **No Monetary Damages**. No Party shall be liable in money damages to any other Party or any other person for any breach of this Agreement, any performance or failure to perform a mandatory or discretionary obligation imposed by this Agreement or any other cause of action arising from this Agreement. Notwithstanding the foregoing:

A. All Parties shall retain whatever liability they would possess for their present and future acts, or failure to act, without existence of this Agreement.

B. All Parties shall retain whatever liability they possess as an owner of interests in land.

C. Nothing contained in this Agreement is intended to limit the authority of the United States government or the government of the State of California to seek civil or criminal penalties or otherwise fulfill its/their enforcement responsibilities under FESA, CESA, the NCCP Act, or other applicable law.

23.2 **Default**. Any material breach or violation of this Agreement, the MSHCP, or the Permits shall be deemed a default under this Agreement.

23.2.1 **Notice and Opportunity to Cure Default**. If any Party determines that one of the other Parties is in violation of the terms of this Agreement, or that a violation is threatened, that Party shall give written notice to the violating Party of such violation and demand in writing the cure of such violation. If the violating Party fails to cure the violation within forty-five (45) days after receipt of said written notice and demand from the notifying Party, or said cure reasonably requires more than forty-five (45) days to complete and the violating Party fails to begin the cure within the forty-five (45) day period or fails to continue diligently to complete the cure, the notifying Party may bring an action at law or in equity in a court of competent jurisdiction to: 1) enforce compliance by the defaulting Party with the terms of this Agreement, 2) recover actual damages to which the notifying Party may be entitled for violation by the defaulting Party of the terms of this Agreement subject to the limitations stated in Section 23.1 above, and/or 3) enjoin the violation, ex parte as necessary, by temporary or permanent injunction without the necessity of proving either actual damages or the inadequacy of otherwise available legal remedies, or for other equitable relief. The notifying Party may apply

any damages recovered to the cost of undertaking any corrective action.

23.3 **Injunctive and Temporary Relief**. The Parties acknowledge that the Covered Species are unique and that their loss as species would result in irreparable damage to the environment and therefore injunctive and temporary relief may be appropriate to ensure compliance with the terms of this Agreement.

23.4 **Limitation and Extent of Enforceability**. Except as otherwise specifically provided herein, nothing in this Agreement shall be deemed to restrict the rights of the Permittees to the use of those lands, or interest in lands, constituting the Plan Area, provided that nothing in this Agreement shall absolve the Permittees from such other limitations as may apply to such lands, or interest in lands, under other laws or regulations of the United States, the State of California, or any local agency with jurisdiction over those lands.

23.5 **Revocation or Suspension of the Permits**. The Wildlife Agencies shall have the right to revoke or suspend all or portions of the Permits, in accordance with the laws and regulations in force at the time of such revocation or suspension. Such action may also be triggered by: 1) failure of a Permittee to implement the Implementation Mechanisms adopted by that agency; 2) approval of a proposed Development or public project that significantly compromises the viability of the MSHCP Reserve System; 3) failure to comply with Rough Step requirements set forth in Section 6.5 of the MSHCP; and/or 4) withdrawal of a Permittee. Such suspension or revocation may apply to the entire applicable Permit, or only to a portion such as specified Conservation Area, specified Covered Species, or specified Covered Activities. Such action may also be triggered if the Wildlife Agencies determine that land within the Conservation Areas is annexed to a non-participating public agency and thus, development of such land could significantly compromise the viability of the MSHCP Reserve System.

Except as otherwise required by law, prior to taking action to revoke or suspend the Permits, the Wildlife Agencies, as applicable, shall: 1) provide thirty (30) day prior written notification to the relevant Permittee(s) and the CVCC of the proposed revocation or suspension, and 2) meet and confer with the relevant Permittee(s) and the CVCC to attempt to avoid the need to revoke or suspend all or a portion of the Permits. The Parties may rely upon the informal meet and confer process set forth in Section 23.6 of this Agreement for disputes concerning potential Permit revocation or suspension.

If the Permits are suspended or revoked, Permittees shall not have the authority to rely upon the Permits to approve or carry out any actions which would violate FESA or CESA in the absence of such Permits. In the event of suspension or revocation of the Permits, Permittees' obligations under this Agreement and the MSHCP to carry out all of their responsibilities under the MSHCP, the Permits and this Agreement arising from any Covered Activity approved, authorized or carried out by the Permittees between the Effective Date of the Agreement and the date the Permits are revoked or suspended will continue until the USFWS and/or the CDFG determines that all Take of Covered Species that occurred under the Permits has been addressed pursuant to the terms of the Permits. Provided the suspension or revocation is not the result of the Permittee(s)' failure to properly implement the MSHCP, no additional mitigation beyond that contemplated in the MSHCP and this Agreement will be required. As to any Covered Activity of a Third Party that is approved or authorized by a Local Permittee and for which Take is authorized prior to the suspension or revocation or for Caltrans Covered Activities for which mitigation has already been contributed, so long as the Local Permittee and Third Party continue to fulfill their obligations under the Permits, the Take Authorization shall continue in effect for that project until completion pursuant to Section 23.7 of this Agreement, except where such Take Authorization will jeopardize a Species listed under FESA or CESA.

23.6 **Informal Meet and Confer Process for Disputes Concerning Covered Activities, State Streambed Alteration Agreements, Federal 404 Permits, and ESA Section 7 Consistency Consultation**. Concerning Covered Activities, state streambed alteration agreements, federal 404 permits, and section 7 consistency consultations, the Parties agree to work together in good faith to resolve disagreements using the informal dispute resolution procedures set forth in this Section, or such other procedures upon which the Parties may later agree. However, if at any time a Party determines that circumstances so warrant, such Party may seek any available remedy without waiting to complete this informal meet and confer process.

Unless the Parties agree upon another dispute resolution process, or unless the CDFG or the USFWS has initiated administrative proceedings or litigation in federal or state court, the Parties may use the following process to attempt to resolve disputes concerning Covered Activities, state streambed alteration agreements, federal 404 permits, and ESA section 7 consistency consultations:

A. The CDFG and/or the USFWS will notify the CVCC in writing of:

1. disagreements they may have with the impact of a proposed Covered Activity on a covered species,

2. the basis for CDFG's and/or USFWS's contention that the MSHCP lacks certain identified measures necessary to the continued existence of the identified species, or that the MSHCP contains measures that may be detrimental to the continued existence of the impacted Covered Species.

3. the basis for contending that the proposed Covered Activity is not consistent with the MSHCP and the Permits.

4. concerns they may have regarding the issuance of a state streambed alteration agreement, a federal 404 permit, or a section 7 consistency determination.

B. The CVCC, in coordination with the project applicant(s), will have sixty (60) days, or such other time as may be agreed upon, to respond. During this time, the CVCC, in coordination with the project applicant(s), may seek clarification of the information provided in the initial notice. The CDFG and/or the USFWS will use reasonable efforts to provide all information available to them that may be responsive to such inquiries.

C. Within sixty (60) days after such response was provided or was due, representatives of the Parties (and the project applicant(s) if the project applicant(s) so chooses) having authority to resolve the dispute will meet and negotiate in good faith toward a mutually satisfactory solution.

D. If any disagreement cannot be resolved through such negotiations, the Parties will consider other alternative dispute resolution processes and, if a dispute resolution process is agreed upon, will make good faith efforts to resolve those remaining disagreements through that process.

23.7 **Continuation Of Take Authorization after Revocation, Suspension or Permittee Withdrawal**. In the event of revocation or suspension of the Permits pursuant to Section 23.5 of this Agreement or withdrawal of a Permittee pursuant to Section 22 of this Agreement, any Third Party Granted Take Authorization or Participating Special Entity who is in compliance with the terms and conditions of the MSHCP, this Agreement and the Permits can automatically continue to receive Take Authorization from the CVCC or other remaining Permittee upon execution of a Certificate of Inclusion or other written mechanism or instrument issued by the CVCC or other remaining Permittee, except as otherwise required by law.

24. FORCE MAJEURE

In the event that the Permittees are wholly or partially prevented from performing obligations under this Agreement because of unforeseeable causes beyond the reasonable control of and without the fault or negligence of the Permittees ("Force Majeure"), including, but not limited to, acts of God, labor disputes, sudden actions of the elements, or actions of non-participating federal or state agencies or local jurisdictions, the Permittees shall be excused from whatever performance is affected by such unforeseeable cause to the extent so affected, and such failure to perform shall not be considered a material violation or breach, provided that nothing in this Section shall be deemed to authorize any Party to violate FESA, CESA or the NCCP Act,

and provided further that:

A. The suspension of performance is of no greater scope and no longer duration than is required by the Force Majeure;

B. Within fifteen (15) days after the occurrence of the Force Majeure, affected Permittees shall give the Wildlife Agencies written notice describing the particulars of the occurrence;

C. Permittees shall use their best efforts to remedy their inability to perform (however, this paragraph shall not require the settlement of any strike, walk-out, lock-out or other labor dispute on terms which in the sole judgment of the Permittees are contrary to their interest); and

D. When Permittees are able to resume performance of their obligations, the affected Permittees shall give the Wildlife Agencies written notice to that effect.

25. LEGAL AUTHORITY OF THE USFWS

The USFWS enters into this Agreement pursuant to FESA, the Fish and Wildlife Coordination Act (16 U.S.C. sections 661-666(c)), and the Fish and Wildlife Act of 1956 (16 U.S.C. sections 742(b) et seq.). Section 10(a)(1)(B) of FESA expressly authorizes the USFWS to issue a Section 10(a) Permit to allow the Incidental Take of animal species listed as threatened or endangered under FESA. The legislative history of section 10(a)(1)(B) clearly indicates that Congress also contemplated that the USFWS would approve a habitat conservation plan that protects Unlisted Species as if they were listed under FESA, and that in doing so, the USFWS would provide assurances for such Unlisted Species. The USFWS routinely approves habitat conservation plans that address both listed and unlisted Species.

26. LEGAL AUTHORITY OF THE CDFG

CDFG enters into this Agreement pursuant to its separate and independent authority under the NCCP Act (California Fish and Game Code sections 2800 et seq.). CDFG may authorize the Take of Covered Species, other than fully protected species, pursuant to California Fish and Game Code section 2835.

27. MISCELLANEOUS PROVISIONS

27.1 **Response Times**. The Parties agree that time is of the essence in performance of the obligations of this Agreement. Except as otherwise set forth herein or as statutorily required by CEQA, NEPA, CESA, FESA, the NCCP Act or any other laws or regulations, the Wildlife Agencies and the Permittees shall use reasonable efforts to respond to written requests within a forty-five (45) day time period.

27.2 **No Partnership**. Except as otherwise expressly set forth herein, neither this Agreement nor the MSHCP shall make, or be deemed to make, any Party to this Agreement the agent for, or the partner or joint venturer of, any other Party.

27.3 **Nullification of Agreement**. In the event that the Permits are not issued, this Agreement shall be null and void and no Party shall be bound by its terms.

27.4 **Notices**. Any notice permitted or required by this Agreement shall be in writing, delivered personally, by overnight mail, or by United States mail, certified and postage prepaid, return receipt requested to the persons listed below and addressed as follows, or at such other address as any Party may from time to time specify to the other Parties in writing. Notices may be delivered by facsimile or other electronic means, provided that they are also delivered personally or by overnight or certified mail. Notices shall be transmitted so that they are received within the specified deadlines. Notice delivered via certified mail, return receipt requested, shall be deemed given five (5) days after deposit in the United States mail. Notices delivered personally shall be deemed given on the date they are delivered. Notices delivered via overnight delivery shall be deemed given on the next business day after deposit with the overnight mail delivery service. The CVCC shall maintain a list of individuals responsible for ensuring Plan compliance for each of the Parties which may change. The following are the individuals currently responsible for ensuring Plan compliance:

Executive Director
Coachella Valley Conservation Commission
73-710 Fred Waring Drive, Suite 200
Palm Desert, California 92260
Telephone: 760-346-1127
Telefax: 760-340-5949

Executive Director
Coachella Valley Association of Governments
73-710 Fred Waring Drive, Suite 200
Palm Desert, California 92260
Telephone: 760-346-1127
Telefax: 760-340-5949

Executive Director
Coachella Valley Mountains Conservancy
73-710 Fred Waring Drive, Suite 205
Palm Desert, CA 92260
Telephone: 909-790-3405
Telefax: 909-790-7596

District Director
District 8
California Department of Transportation
464 West 4th Street
San Bernardino, California 92401-1400
Telephone: 909-383-4561
Telefax: 909-383-6899

Deputy Director
Habitat Conservation Division
California Department of ~~Fish and Game~~Fish and Wildlife
1416 Ninth Street, 13th Floor
Sacramento, California 95814
Telephone: 916-653-1070
Telefax: 916-653-3673

Regional Manager
Eastern Sierra and Inland Deserts Region
California Department of ~~Fish and Game~~Fish and Wildlife
4665 Lampson Ave. Suite J
Los Alamitos, California 90720
Telephone: 562-430-7212
Telefax: 562-799-8427

City Manager
City of Cathedral City
68-700 Avenida Lalo Guerrero
Cathedral City, California 92234
Telephone: 760-770-0340
Telefax: 760-770-0399

City Manager
City of Coachella
1515 6th Street
Coachella, California 92236
Telephone: 760-398-3502
Telefax: 760-398-8117

City Manager
City of Desert Hot Springs
65-950 Pierson Blvd
Desert Hot Springs, Califonia 92240
Telephone: 760-329-6411
Telefax: 760-288-3129

City Manager
City of Indian Wells
44-950 Eldorado Drive
Indian Wells, California 92210
Telephone: 760-346-2489
Telefax: 760-346-0407

City Manager
City of Indio
100 Civic Center Mall
Indio, California 92201
Telephone: 760-342-6500
Telefax: 760-342-6556

City Manager
City of La Quinta
78-495 Calle Tampico
La Quinta, California 92253
Telephone: 760-777-7025
Telefax: 760-777-7107

City Manager
City of Palm Desert
73-510 Fred Waring Drive
Palm Desert, California 92260
Telephone: 760-346-0611
Telefax: 760-340-0574

City Manager
City of Palm Springs
3200 E. Tahquitz Canyon Way
Palm Springs, California 92263
Telephone: 760-323-8201
Telefax: 760-323-8207

City Manager
City of Rancho Mirage
69-825 Highway 111
Rancho Mirage, California 92270
Telephone: 760-324-4511
Telefax: 760-324-8830

General Manager
Coachella Valley Water District
85995 Avenue 52
Coachella, California 92236
Telephone: 760-398-2651
Telefax: 760-398-3711

General Manager
Imperial Irrigation District
333 East Barioni Boulevard
Imperial, California 92251
Telephone: 760-339-9219
Telefax: 760-339-9392

General Manager
Mission Springs Water District
66575 Second Street
Desert Hot Springs, CA 92240
Telephone: 760-329-6448
Telefax: 760-339-9392

Chief Executive Officer
County of Riverside
County Administrative Center
P.O. Box 1605
Riverside, California 92502-1605
Telephone: 951-955-1100
Telefax: 951-955-1105

General Manager/Chief Engineer
Riverside County Flood Control
and Water Conservation District
1995 Market Street
Riverside, California 92501
Telephone: 951-955-1200
Telefax: 951-788-9965

General Manager
Riverside County Regional Park and Open Space District
4600 Crestmore Road
Riverside, California 92519-3507
Telephone: 951-955-4310
Telefax: 951-955-4305

Chief Executive Officer
Riverside County Waste Resources Management District
14310 Frederick Street
Moreno Valley, California 92553
Telephone: 951-486-3200
Telefax: 951-486-3205

Deputy Operations Manager
United States Fish and Wildlife Service
California/Nevada Operations Office
2800 Cottage Way, Room W-2606
Sacramento, California 95825-1846
Telephone: 916-414-6464
Telefax: 916-414-6486

In addition to the above list, the following individuals will also be provided all notices as set forth in this Section:

Chair
Coachella Valley Conservation Commission
73-710 Fred Waring Drive, Suite 200
Palm Desert, California 92260
Telephone: 760-346-1127
Telefax: 760-340-5949

Chair
Coachella Valley Association of Governments
73-710 Fred Waring Drive, Suite 200
Palm Desert, California 92260
Telephone: 760-346-1127
Telefax: 760-340-5949

Director
California Department of Parks
and Recreation
1416 Ninth Street, Room 1405
Sacramento, CA 95814
Telephone: 916-653-8380
Telefax: 916-657-3909

Board of Supervisors
County of Riverside
P.O. Box 1605
4080 Lemon Street, 5th Floor
Riverside, California 92502-1605
Telephone: 951-955-1050
Telefax: 951-955-1071

Mayor
City of Cathedral City
68-700 Avenida Lalo Guerrero
Cathedral City, California 92234
Telephone: 760-770-0340
Telefax: 760-202-1470

Mayor
City of Coachella
1515 6th Street
Coachella, California 92236
Telephone: 760-398-3502
Telefax: 760-398-8117

Mayor
City of Desert Hot Springs
65-950 Pierson Blvd
Desert Hot Springs, California 92240
Telephone: 760-329-6411
Telefax: 760-288-3129

Mayor
City of Indian Wells
44-950 Eldorado Drive
Indian Wells, California 92210
Telephone: 760-346-2489
Telefax: 760-346-0407

Mayor
City of Indio
100 Civic Center Mall
Indio, California 92201
Telephone: 760-863-5437
Telefax: 760-342-6597

Mayor
City of La Quinta
78-495 Calle Tampico
La Quinta, California
Telephone: 760-777-7025
Telefax: 760-777-7107

Mayor
City of Palm Desert
73-510 Fred Waring Drive
Palm Desert, California 92260
Telephone: 760-346-0611
Telefax: 760-340-0574

Mayor
City of Palm Springs
3200 E. Tahquitz Canyon Way
Palm Springs, California 92263
Telephone: 760-323-8204
Telefax: 760-323-8332

Mayor
City of Rancho Mirage
69-825 Highway 111
Rancho Mirage, California 92270
Telephone: 760-324-4511
Telefax: 760-324-8830

Field Supervisor
United States Fish and Wildlife Service
6010 Hidden Valley Road
Carlsbad, California 92009
Telephone: 760-431-9440
Telefax: 760- 431-9618

County Counsel
County of Riverside
3535 10th Street
Riverside, California 92501-3624
Telephone: 951-955-6301
Telefax: 951-955-6363

General Counsel
Office of the General Counsel
California Department of Fish and Wildlife
1416 Ninth Street, 12th Floor
Sacramento, California 95814
Telephone: 916-654-3821
Telefax: 916-654-3805

~~27.4~~27.5 **Entire Agreement**. This Agreement, together with the MSHCP and the Permits, constitutes the entire Agreement among the Parties. This Agreement supersedes any and all other agreements, either oral or in writing, among the Parties with respect to the subject matter hereof and contains all of the covenants and agreements among them with respect to said matters, and each Party acknowledges that no representation, inducement, promise of agreement, oral or otherwise, has been made by any other Party or anyone acting on behalf of any other Party that is not embodied herein. This Agreement shall not be construed as if it had been prepared by any one Party, but rather as if all Parties had prepared the Agreement.

~~27.5~~27.6 **Assignment or Transfer**. This Agreement and each of its covenants and conditions shall be binding on and inure to the benefit of the Parties and their respective successors and assigns. Assignment or other transfer of the Permits shall be governed by the Wildlife Agencies regulations in force at the time.

~~27.6~~27.7 **Defense**. Upon request, the CDFG will, to the extent authorized by California law, provide appropriate support to the Permittees in defending, consistent with the terms of the MSHCP, lawsuits arising out of the Permittees' adoption of the MSHCP and/or this Agreement.

~~27.7~~27.8 **Attorneys' Fees**. If any action at law or equity, including any action for declaratory relief is brought to enforce or interpret the provisions of this Agreement, each Party to the litigation shall bear its own attorneys' fees and costs, provided that attorneys' fees and costs recoverable against the United States shall be governed by applicable federal law.

~~27.8~~27.9 **Elected Officials Not to Benefit**. No member of, or delegate to, the California State Legislature, the United States Congress, the Riverside County Board of Supervisors, or City Council of the Permittees shall be entitled to any share or part of this Agreement or to any benefit that may arise from it.

~~27.9~~27.10 **Availability of Funds**. Implementation of this Agreement and the MSHCP by the USFWS is subject to the requirements of the Anti-Deficiency Act and the availability of appropriated funds. Nothing in this Agreement will be construed by the Parties to require the obligation, appropriation, or expenditure of any money from the United States Treasury. The Parties acknowledge and agree that the USFWS will not be required under this Agreement to expend any federal agency's appropriated funds unless and until an authorized official of that agency affirmatively acts to commit to such expenditures as evidenced in writing.

Implementation of this Agreement and the MSHCP by the CDFG is subject to the availability of appropriated funds. Nothing in this Agreement shall be construed by the Parties to require the obligation, appropriation, or expenditure of any money from the Treasury of the State of California. The Parties acknowledge and agree that the CDFG shall not be required under this Agreement to expend any State appropriated funds unless and until an authorized official of that agency affirmatively acts to commit such expenditure as evidenced in writing.

Implementation of this Agreement and the MSHCP by the CVCC, the County and the Cities is subject to the availability of appropriated funds. Nothing in this Agreement will be construed by the Parties to require the obligation, appropriation, or expenditure of any money from the general funds of the County or Cities unless expressly authorized by the County Board of Supervisors and/or appropriate City Councils. The obligations of the County, County Parks, County Waste, County Flood Control, CVWD, ~~and~~ IID, and MSWD are limited to those specifically set forth in the MSHCP, the Permits and this Agreement.

Implementation of this Agreement and the MSHCP by Caltrans is subject to the availability of appropriated funds. Nothing in this Agreement shall be construed by the Parties to require the obligation, appropriation, or expenditure of any money from the Treasury of the State of California. The Parties acknowledge and agree that Caltrans shall not be required under this Agreement to expend any State appropriated funds unless and until an authorized official of that agency affirmatively acts to commit such expenditure as evidenced in writing.

~~27.10~~27.11 **Governing Law**. This Agreement shall be governed by and construed in accordance with the laws of the United States and the State of California, as applicable.

~~27.11~~27.12 **Duplicate Originals**. This Agreement may be executed in any number of duplicate originals. A complete original of this Agreement shall be maintained in the official records of each of the Parties hereto.

~~27.12~~27.13 **Relationship to the FESA, CESA, NCCP Act and Other Authorities**. The terms of this Agreement are consistent with and shall be governed by and construed in accordance with FESA, CESA, the NCCP Act and other

applicable state and federal law. In particular, nothing in this Agreement is intended to limit the authority of the USFWS and CDFG to seek penalties or otherwise fulfill its responsibilities under FESA, CESA and the NCCP Act. Moreover, nothing in this Agreement is intended to limit or diminish the legal obligations and responsibilities of the USFWS as an agency of the federal government or CDFG as an agency of the State of California.

~~27.13~~27.14 **No Third Party Beneficiaries**. Without limiting the applicability of rights granted to the public pursuant to FESA, CESA, the NCCP Act or other applicable law, this Agreement shall not create any right or interest in the public, or any member thereof, as a third party beneficiary hereof, nor shall it authorize anyone not a Party to this Agreement to maintain a suit for personal injuries or property damages under the provisions of this Agreement. The duties, obligations, and responsibilities of the Parties to this Agreement with respect to third party beneficiaries shall remain as imposed under existing state and federal law.

~~27.14~~27.15 **References to Regulations**. Any reference in this Agreement, the MSHCP, or the Permits to any regulation or rule of the Wildlife Agencies shall be deemed to be a reference to such regulation or rule in existence at the time an action is taken.

~~27.15~~27.16 **Applicable Laws**. All activities undertaken pursuant to this Agreement, the MSHCP or Permits must be in compliance with all applicable state and federal laws and regulations.

~~27.16~~27.17 **Severability**. In the event one or more of the provisions contained in this Agreement is held invalid, illegal or unenforceable by any court of competent jurisdiction, such portion shall be deemed severed from this Agreement and the remaining parts of this Agreement shall remain in full force and effect as though such invalid, illegal, or unenforceable portion had never been a part of this Agreement. The Permits are severable such that revocation of one does not automatically cause revocation of the other.

~~27.17~~27.18 **Headings**. The paragraph headings used in this Agreement are for the convenience of the Parties and are not intended to be used as an aid to interpretation.

~~27.18~~27.19 **Due Authorization**. The USFWS and CDFG each represent and warrant for the benefit of the Permittees and their successors and assign that: 1) the execution and delivery of this Agreement has been duly authorized and approved by all requisite action; 2) no other authorization or approval, whether of governmental bodies or otherwise, will be necessary in order to enable the USFWS and CDFG to enter into and comply with the terms of this Agreement; and 3) the person executing this Agreement on behalf of the USFWS and CDFG has the authority to bind the USFWS and CDFG respectively.

~~27.19~~27.20 **Faxed Signatures**. Any Party may deliver its signed duplicate of this Agreement to any other Party by facsimile transmission, and such delivery shall be deemed made and completed upon receipt of such facsimile transmission by such other Party. Any Party delivering a signed duplicate by facsimile transmission shall promptly send the duplicate original bearing its original signature to such other Party, provided that a delay or failure to do so shall not negate the effectiveness of the delivery made by the facsimile transmission.

~~27.20~~27.21 **Calculation of Dates and Dates of Performance**. Where periods of time of forty-five (45) days or more are used in this Agreement, calculation of dates of performance shall be by calendar days, (e.g., where the text reads sixty (60) days, it shall be read to mean sixty (60) calendar days). Where periods of time are used in this Agreement of less than forty-five (45) days, calculation of date or performance shall be by business or working days. In the event that the date of performance is not a business day, due to falling on a Saturday, Sunday, or observed state or federal holiday, the date of performance shall be construed to be the next business day subsequent to the calculated date of performance.

~~27.21~~27.22 **Further Instruments**. Each of the Parties shall, promptly upon the request of the others, execute, acknowledge, and deliver to the others any and all further instruments and shall give such further assurances as are reasonably requested or appropriate to evidence or give effect to the provisions of this Agreement.

IN WITNESS WHEREOF, THE PARTIES HERETO have executed this Implementing Agreement to be in effect as of the date last signed below.

UNITED STATES FISH AND WILDLIFE SERVICE

_____ Date:_____

Deputy Manager
United States Fish and Wildlife Service
California/Nevada Operations Office
Sacramento, California

CALIFORNIA DEPARTMENT OF ~~FISH AND GAME~~FISH AND WILDLIFE

_____ Date:_____

Deputy Director
Habitat Conservation Division
California Department of Fish and ~~Game~~Wildlife
Sacramento, California

CALIFORNIA DEPARTMENT OF ~~FISH AND GAME~~FISH AND WILDLIFE

_____ Date:_____

Regional Manager
Eastern Sierra and Inland Deserts Region
California Department of ~~Fish and Game~~Fish and WildlifeWildlife
Los Alamitos, California

CALIFORNIA DEPARTMENT OF ~~FISH AND GAME~~FISH AND WILDLIFE

_____ Date:_____

General Counsel (approval as to form)
California Department of Fish and ~~Game~~Wildlife
Sacramento, California

COACHELLA VALLEY ASSOCIATION
OF GOVERNMENTS

_____ Date:_____

Chair of the Executive Committee
Coachella Valley Association of Governments
Palm Desert, California

COACHELLA VALLEY CONSERVATION COMMISSION

_____ Date:_____

Chair
Coachella Valley Conservation Commission
Palm Desert, California

COACHELLA VALLEY MOUNTAINS CONSERVANCY

_____ Date:_____

Chair
Coachella Valley Mountains Conservancy
Palm Desert, California

RIVERSIDE COUNTY BOARD OF SUPERVISORS

_____ Date:_____

Chair of the Board of Supervisors
Riverside County Board of Supervisors
Riverside, California

RIVERSIDE COUNTY FLOOD CONTROL
AND WATER CONSERVATION DISTRICT

_____ Date:_____

Chair
Riverside County Flood Control
and Water Conservation District
Riverside, California

CALIFORNIA DEPARTMENT OF PARKS AND RECREATION

_____ Date:_____

Director of State Parks
California Department of Parks and Recreation
Sacramento, California

RIVERSIDE COUNTY REGIONAL PARK
AND OPEN SPACE DISTRICT

_____ Date:_____

Chair
Riverside County Regional Park and Open Space District
Riverside, California

RIVERSIDE COUNTY WASTE RESOURCES MANAGEMENT DISTRICT

_____ Date:_____

Chair
Riverside County Waste Resources Management District
Riverside, California

CALIFORNIA DEPARTMENT OF TRANSPORTATION

_____ Date:_____

Director
California Department of Transportation
Sacramento, California

CITY OF CATHEDRAL CITY

_____ Date:_____

Mayor
City of Cathedral City
Cathedral City, California

CITY OF COACHELLA

_____ Date:_____

Mayor
City of Coachella
Coachella, California

CITY OF DESERT HOT SPRINGS

_____ Date:_____

Mayor
City of Desert Hot Springs
Desert Hot Springs, California

CITY OF INDIAN WELLS

_____ Date:_____

Mayor
City of Indian Wells
Indian Wells, California

CITY OF INDIO

_____ Date:_____

Mayor
City of Indio
Indio, California

CITY OF LA QUINTA

_____ Date:_____

Mayor
City of La Quinta
La Quinta, California

CITY OF PALM DESERT

_____ Date:_____

Mayor
City of Palm Desert
Palm Desert, California

CITY OF PALM SPRINGS

_____ Date:_____

Mayor
City of Palm Springs
Palm Springs, California

CITY OF RANCHO MIRAGE

_____ Date:_____

Mayor
City of Rancho Mirage
Rancho Mirage, California

IMPERIAL IRRIGATION DISTRICT

_____ Date:_____

Chair
Imperial Irrigation District
Imperial, California

COACHELLA VALLEY WATER DISTRICT

_____ Date:_____

Chair
Coachella Valley Water District
~~Coachella~~Palm Desert, California

MISSION SPRINGS WATER DISTRICT

_____ Date:_____

Chair
Mission Springs Water District
Desert Hot Springs, California