Appendix A

Public Involvement

[This Page Intentionally Left Blank]

under contracts for telecommunications services. Contracting officers and other DoD personnel use the information to ensure that information systems are protected; to participate in the establishment of tariffs for telecommunications services; and to establish reasonable prices for special construction by common carriers.

Affected Public: Businesses or other for-profit and not-for-profit institutions.

Annual Burden Hours: 1,428.

Number of Respondents: 424.

Responses Per Respondent: Approximately 4.

Annual Responses: 1,571.

Average Burden Per Response: 1 hour.

Frequency: On occasion.

Summary of Information Collection

The clause at DFARS 252.239–7000, Protection Against Compromising Emanations, requires that the contractor provide, upon request of the contracting officer, documentation that information technology used or provided under the contract meets appropriate information assurance requirements.

The clause at DFARS 252.239–7006, Tariff Information, requires that the contractor provide to the contracting officer: (1) Upon request, a copy of the contractor's existing tariffs; (2) before filing, a copy of any application to a Federal, State, or other regulatory agency for new rates, charges, services, or regulations relating to any tariff or any of the facilities or services to be furnished solely or primarily to the government, and, upon request, a copy of all information, material, and data developed or prepared in support of or in connection with such an application; and (3) a notification to the contracting officer of any application submitted by anyone other than the contractor that may affect the rate or conditions of services under the agreement or contract.

DFARS 239.7408 requires the contracting officer to obtain a detailed special construction proposal from a common carrier that submits a proposal or quotation that has special construction requirements related to the performance of basic telecommunications services.

Michele P. Peterson,

Executive Editor, Defense Acquisition Regulations Council.

[FR Doc. 04–24286 Filed 10–29–04; 8:45 am]

BILLING CODE 5001–08–P

DEPARTMENT OF DEFENSE

Department of the Navy

DEPARTMENT OF THE INTERIOR

Bureau of Reclamation

Notice of Intent To Prepare an Environmental Impact Statement/ Environmental Impact Report for the Santa Margarita River Conjunctive Use Project, San Diego County, CA

AGENCIES: Department of the Navy, DOD. Bureau of Reclamation, DOI.

ACTION: Notice.

SUMMARY: Pursuant to Section (102)(2)(c) of the National Environmental Policy Act (NEPA) of 1969 (42 U.S.C. 4332 (2) (c)), as implemented by the Council on Environmental Quality Regulations (40 CFR parts 1500–1508), and the California Environmental Quality Act (CEQA) (PRC 21000 *et seq.*), as implemented by the California State CEQA Guidelines (14 CCR 15000–15387), the Department of the Navy, Marine Corps Base Camp Pendleton (MCB Camp Pendleton); the Bureau of Reclamation (Reclamation); and the Fallbrook Public Utility District (Fallbrook) intend to prepare an environmental impact statement/ environmental impact report (EIS/EIR) and conduct associated public scoping meetings for the proposed Santa Margarita River Conjunctive Use Project. Three public meetings will be held to collect scoping comments. The public and agencies are invited to attend and provide comments.

DATES: All written comments must be received by January 31, 2005. Public meeting dates are as follows:

1. January 12, 2005, 6 p.m. to 8 p.m., Oceanside, CA.
2. January 13, 2005, 6 p.m. to 8 p.m., Fallbrook, CA.

ADDRESSES: Written comments or requests for inclusion on the EIS/EIR mailing list may be submitted to: Bureau of Reclamation, Southern California Area Office, Attn: Bill Rohwer, 27708 Jefferson Ave, Suite 202, Temecula, CA 92590.

Public meeting locations are as follows:

1. Oceanside—Oceanside Civic Center Library and Community Rooms, 330 North Coast Hwy, Oceanside, CA.
2. Fallbrook—Fallbrook Public Utility District, 990 East Mission Rd, Fallbrook, CA.

FOR FURTHER INFORMATION CONTACT: Bureau of Reclamation, Mr. Bill Rohwer, telephone 951–695–5310, fax 951–695–5319, or e-mail: *wrohwer@lc.usbr.gov.* Please submit requests for sign language interpretation for the hearing impaired or for other auxiliary aids at the public meetings to Mr. Rohwer by January 5, 2005.

SUPPLEMENTARY INFORMATION: The proposed conjunctive use project would be located in the lower Santa Margarita River basin on MCB Camp Pendleton, San Diego County, California. The project would upgrade an existing groundwater recharge and recovery system currently producing 7,000 acre-feet of water per year. Studies suggest that this yield could be increased to as much as 16,200 acre-feet per year. The project would improve existing diversion and percolation facilities and install new wells, an advanced potable water treatment plant, pump stations and a pipeline to Fallbrook. Potential options could involve in-stream water retention structures, reclaimed wastewater, off-stream storage, and recharge of other groundwater basins on MCB Camp Pendleton.

The purpose of the proposed project is to help meet water demands for MCB Camp Pendleton and Fallbrook, reduce regional dependency on imported water, and improve water reliability by increasing the yield of the lower Santa Margarita River basin and perfecting water rights permits that were assigned to Reclamation in 1974 pursuant to State Water Resources Control Board Order WR 73–50.

Reclamation currently holds three state-approved permits to divert and store water from the Santa Margarita River. The proposed conjunctive use project would enable permits 15000, 11357, and 8511 to be perfected, and could facilitate settlement of *United States* v. *Fallbrook Public Utility District, et al.* (No. 1247–SD–C), filed in 1951.

The permits were originally issued to Fallbrook and MCB Camp Pendleton. In 1968, Fallbrook, the U.S. Attorney General, the Secretary of the Navy, and the Secretary of the Interior signed a Memorandum of Understanding and Agreement to negotiate a physical solution predicated on the construction of a two-dam project on the Santa Margarita River. Fallbrook and MCB Camp Pendleton subsequently assigned the permits to Reclamation, which had been authorized to prepare feasibility studies for the project (Sec. 3, Pub. L. 89–561).

Reclamation completed a Feasibility Report in 1971 and a Final EIS in 1976 for a two-dam project to impound, conserve, and deliver the natural flows of the Santa Margarita River, as well as

imported waters, to MCB Camp Pendleton and Fallbrook. Reclamation prepared a supplemental EIS for the project in 1984. However, Congress did not approve the project's funding. A subsequent effort to design a smaller, single dam project was also unsuccessful.

A 1994 study, with additional reports in 2001 and 2002, concluded that a groundwater recharge and extraction project (*i.e.*, conjunctive use) may result in an annual yield comparable to that of the two-dam project, at a lower cost and with fewer adverse environmental effects.

The conference report for the 2003 Omnibus Appropriations Act (Pub. L. 108–7) directed Reclamation, under the Santa Margarita feasibility authorization, to perform the studies needed to address current and future municipal, domestic, military, environmental, and other water uses from the Santa Margarita River. The 2004 Energy and Water Appropriations Act (Pub. L. 108–137) provided funding for Reclamation to study the feasibility of the Santa Margarita Conjunctive Use Project.

Through previous investigations, several areas of potential impact have been identified that apply to this proposed conjunctive use project. Potential impacts identified to date include, but are not be limited to, the following areas: Water quality/quantity (surface and groundwater), water rights, water reuse, fish passage, endangered species, estuarine habitat, riparian/wetland habitat, and sediment transport.

MCB Camp Pendleton, Reclamation, and Fallbrook have scheduled public meetings to describe the proposed project and obtain public input on the range of issues that should be studied in order to evaluate potential impacts of the proposed project. Each meeting will begin with a formal presentation about the proposed project from 6 p.m. to 6:30 p.m. followed by an informal open house from 6:30 p.m. to 8 p.m.

These meetings will assist the agencies in identifying additional alternatives or options to meet the stated purpose of the conjunctive use project and to assist in determining issues that will be analyzed in the EIS/EIR.

In response to issues developed during scoping, other alternative means of meeting the project's purpose will be explored and analyzed in the EIS/EIR, if found to be reasonable. Federal, state and local agencies, tribes, and the general public are invited to participate in the environmental review process.

Comments, including names and home addresses of respondents, will be made available for public review. Individual respondents may request their home address be withheld from public disclosure. Circumstances may exist in which we would withhold a respondent's identity from public disclosure, as allowable by law. Please prominently state at the beginning of your comment if you wish your name and/or address withheld from public disclosure. We will make all submissions from organizations or businesses, and from individuals identifying themselves as representatives or officials of organizations or businesses, available for public disclosure in their entirety. Please note, unidentified comments will not be considered.

Dated: October 27, 2004.

J.H. Wagshul,

Commander, Judge Advocate General's Corps, U.S. Navy, Federal Register Liaison Officer.

Dated: October 27, 2004.

Robert W. Johnson,

Regional Director, Department of the Interior, Bureau of Reclamation, Lower Colorado Region.

[FR Doc. 04–24335 Filed 10–29–04; 8:45 am]

BILLING CODE 3810–FF–P

DEPARTMENT OF EDUCATION

Submission for OMB Review; Comment Request

AGENCY: Department of Education.

SUMMARY: The Leader, Information Management Case Services Team, Regulatory Information Management Services, Office of the Chief Information Officer invites comments on the submission for OMB review as required by the Paperwork Reduction Act of 1995.

DATES: Interested persons are invited to submit comments on or before December 1, 2004.

ADDRESSES: Written comments should be addressed to the Office of Information and Regulatory Affairs, Attention: Carolyn Lovett, Desk Officer, Department of Education, Office of Management and Budget, 725 17th Street, NW., Room 10235, New Executive Office Building, Washington, DC 20503 or faxed to (202) 395–6974.

SUPPLEMENTARY INFORMATION: Section 3506 of the Paperwork Reduction Act of 1995 (44 U.S.C. Chapter 35) requires that the Office of Management and Budget (OMB) provide interested Federal agencies and the public an early opportunity to comment on information collection requests. OMB may amend or waive the requirement for public consultation to the extent that public participation in the approval process would defeat the purpose of the information collection, violate State or Federal law, or substantially interfere with any agency's ability to perform its statutory obligations. The Leader, Information Management Case Services Team, Regulatory Information Management Services, Office of the Chief Information Officer, publishes that notice containing proposed information collection requests prior to submission of these requests to OMB. Each proposed information collection, grouped by office, contains the following: (1) Type of review requested, *e.g.,* new, revision, extension, existing or reinstatement; (2) Title; (3) Summary of the collection; (4) Description of the need for, and proposed use of, the information; (5) Respondents and frequency of collection; and (6) Reporting and/or Recordkeeping burden. OMB invites public comment.

Dated: October 27, 2004.

Angela C. Arrington,

Leader, Information Management Case Services Team, Regulatory Information Management Servicesc, Office of the Chief Information Officer.

Institute of Education Sciences

Type of Review: Revision.

Title: 2005 National Household Education Surveys Program (NHES: 2005).

Frequency: One time.

Affected Public: Individuals or household.

Reporting and Recordkeeping Hour Burden: Responses: 92,476. Burden Hours: 11,663.

Abstract: NHES:2005 is a survey of households using random-digit-dialing and computer-assisted telephone interviewing. Three topical surveys are to be conducted in NHES:2005: Early Childhood Program Participation (ECPP), After-School Programs and Activities (ASPA), and Adult Education and Lifelong Learning (AELL). ECPP and ASPA will provide current measures of participation in early childhood education, after-school programs, and other forms of non-parental care, as well as in-home and out-of-home activities. AELL will provide in-depth information on the participation of adults in a wide range of training and education activities.

Requests for copies of the submission for OMB review; comment request may be accessed from *http://edicsweb.ed.gov,* by selecting the ''Browse Pending Collections'' link and by clicking on link number 2630. When you access the information collection, click on ''Download Attachments'' to view. Written requests for information

SCH Number	Title / Lead Agency / City--County / Description	Document Type	Ending Date
Documents Received on Wednesday, December 15, 2004			
	- General Plan Amendment No. 2004-05, changing the designation on 37.12 acres from Low Medium Density Residential (6 dwelling units/acre) to THSP; and - Zone Change No. 2004-06, changing on 37.12 acres from R-1 to THSP; and -Tentative Tract Map No. 31370, subdividing approximately 368 acres into 807 dwelling units, streets, community and neighborhood parks, and approximately 130 acres of natural open space.		
2004121067	Cielita Linda Residential Subdivision Vista, City of Vista--San Diego The project consists of the annexation of approximately 7.35 acres into the City of Vista and development of a 52-lot single family residential subdivision, private streets, and associated improvements on a 20.24-acre site.	**NOP**	01/13/2005
2004121068	Santa Margarita River Conjunctive Use Project Fallbrook Public Utility District Fallbrook--San Diego The proposed project would upgrade an existing groundwater recharge and recovery system to help meet water demands for Camp Pendleton and Fallbrook, reduce regional dependency on imported water, and improve water reliability. The project would improve existing diversion and percolation facilities and install new wells, an advanced potable water treatment plant, pump stations, and a pipeline to Fallbrook.	**NOP**	01/13/2005
2004121069	El Rancho Middle School Sportsfield Improvements and Lighting Anaheim, City of Anaheim--Orange Lighting and improvements of El Rancho Middle School ballfield for more efficient utilization. The proposed project would result in a Joint Use Agreement between the City of Anaheim and the Orange Unified School District. This agreement will allow the City to schedule youth sports practice activities after school operation. The project involves placing permanent athletic field lighting on the 2 existing sportsfields and providing turf repair on both fields and improvements to their irrigation system.	**Neg**	01/13/2005
2004121070	Magnolia High School Sportsfield Reconfiguration and Lighting Anaheim, City of Anaheim--Orange Reconfiguration and lighting of Magnola High School sportsfields for more efficient utilization. The proposed project would result in a Joint Use Agreement between the City of Anaheim & the Anaheim Union High School District. Project involves improving existing uses, relocating a running track elsewhere on the site, developing new field uses, and providing night lighting for extended practice uses. In addition, the existing turf and irrigation systems on the field will be replaced.	**Neg**	01/13/2005
2004121071	Miller Minor Use Permit and Grading Permit; DRC2003-00053 / PMT2003-02734 ED03-413 San Luis Obispo County Paso Robles--San Luis Obispo Request to allow grading for an access road and two building pads resulting in the total disturbance of approximately 2.5 acres (a majority of which has already been completed).	**Neg**	01/13/2005

[This Page Intentionally Left Blank]

Directory of Public Scoping Comments

Organization	Commenter	Comment Tracking Code	Page Number
Federal Agencies			
National Oceanic and Atmospheric Administration	Rodney R. McInnis	F1	3
U.S. Environmental Protection Agency	Lisa B. Hanf	F2	5
U.S. Fish and Wildlife Service	Karen A. Goebel	F3	16
State Agencies			
California Department of Fish and Game	Donald R. Chadwick	S1	22
Native American Heritage Commission	Carol Gaubatz	S2	23
State Water Resources Control Board	Katherine Mrowka	S3	26
Local Interest Groups			
Endangered Habitats League and Conservation Biology Institute	Dan Silver and Michael D. White	L1	31
Fallbrook Land Conservancy Trails Council	Jane Comella	L2	35
Fallbrook Land Conservancy Trails Council	Joe Comella	L3	36
Fallbrook Land Conservancy Trails Council	Donna Gebhart	L4	37
Individuals			
None	Barbara Hayden	I1	38
None	Alberta Jane Parker	I2	39
None	James F. Pigg	I3	40

[This Page Intentionally Left Blank]

F1 – National Oceanic and Atmospheric Administration ***(page 1 of 2)***

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802- 4213

JUL 27 2007

In response please refer to
SWR/2007/04852:SCG

OFFICIAL
RECEIVED 7/31/07
REPLY DA
DATE
7/31 150
Classifica
Project
Control No
Folder No
Keyword

Mr. Doug McPherson
Environmental Protection Specialist
U.S. Bureau of Reclamation
27708 Jefferson Avenue, Suite 202
Temecula, California 92590

Dear Mr. McPherson:

NOAA's National Marine Fisheries Service (NMFS) is contacting you regarding the Bureau of Reclamation's (BOR) proposal to build a Conjunctive Use Project (project) in the Santa Margarita River Watershed on the Camp Pendleton Marine Corps Base in San Diego County, California. The proposed project includes replacing an existing water diversion with an inflatable "Obermeyer" type diversion structure, upgrading an existing groundwater recharge and recovery system, installing new wells, pump stations, and a pipeline between the Base and Fallbrook Public Utilities District facilities. Other potential project elements involve instream water retention structures, reclaimed wastewater, off-stream storage, and recharge of other groundwater basins on the Base. The water yield from project implementation could increase from the current 7,000 acre-foot per year to 16,200 acre-feet per year. NMFS is concerned about the potential effects of the BOR's project on the long-term recovery of endangered southern California steelhead (*Oncorhynchus mykiss*) and would like to provide the following comments.

The Santa Margarita River watershed lies within the Southern California Distinct Population Segment (DPS) of endangered steelhead, which ranges from the Santa Maria River to the Mexican Border (71 FR 834). This watershed is included in the Santa Catalina Gulf Coast biogeographic group, which includes nine streams located in Orange and San Diego Counties. NMFS' Steelhead Technical Recovery Team has identified this group of streams as being crucial to the viability and recovery of the southern DPS of steelhead (Boughton et al. 2006, Boughton et al. 2007). NMFS believes that this watershed was historically inhabited by steelhead, and because steelhead have recently been found in other streams near the Santa Margarita River (*i.e.*, San Juan Creek, San Mateo Creek, and the San Luis Rey River) it is possible that steelhead will attempt to enter the Santa Margarita River during the winter and spring when rainstorms and increased wet-season flows occur. Based on the available information, NMFS believes that the proposed project will have substantial effects on the timing, magnitude, duration and frequency of surface flows in the lower Santa Margarita River. The project and corresponding effects on surface flows during the wet season could impede adult steelhead attempting to migrate to and from areas upstream of the diversion. Additionally, the project and corresponding effects on

Response:

1. A study was prepared (Reclamation et al. 2012) to investigate the project impacts on steelhead migration in the Santa Margarita River. This study is referenced in the impact analysis of the EIS/EIR.

   Santa Margarita surface water flow effects are discussed in Section 4.2, *Water Resources*. Potential effects to the endangered southern California steelhead are discussed in Section 4.3, *Biological Resources* and in the Biological Assessment submitted to NOAA Fisheries.

F1 – National Oceanic and Atmospheric Administration *(page 2 of 2)*

2

surface flows during the dry season could affect juvenile steelhead migrating to the ocean, or juvenile steelhead rearing in riverine areas near or downstream of the diversion and extraction wells. NMFS understands that there are preliminary plans for a fishway to be installed on the proposed diversion for steelhead passage, but until NMFS engineers can evaluate the final fishway design and corresponding water releases, the efficacy of any fish passage facility remains in question. 1 (cont)

As currently proposed, NMFS believes that the proposed project has the potential to impede or preclude recovery of steelhead in the Santa Margarita watershed. Because of the potential importance of this watershed for long term recovery of the endangered Southern California steelhead DPS, NMFS believes that BOR has the responsibility under Section 7(a)(1) of the Endangered Species Act to ensure that its actions in this watershed are carried out in a manner that will support the conservation and recovery of endangered steelhead. Accordingly, we request that you consult with us on the proposed project to ensure that the project is designed in a manner that will promote the conservation and recovery of steelhead in the Santa Margarita River, and the larger Southern California steelhead DPS. In this regard, we request that you provide us with information and plans for the project, including any design plans for fish passage, and planned water release regimes. 2

NMFS appreciates the opportunity to provide comments for the BOR's proposed action. Please contact Stan Glowacki at 562-980-4061 or via email at Stan.Glowacki@noaa.gov if you have any questions concerning this letter or if you require additional information.

Sincerely,

for Rodney R. McInnis
Regional Administrator

cc: Bill Barry, Camp Pendleton

Literature Cited

Boughton, D. A., P. B. Adams, E. Anderson, C. Fusaro, E. Keller, E. Kelley, L. Lentsch, J. Nielsen, K. Perry, H. Regan, J. Smith, C. Swift, L. Thompson, and F. Watson. 2006. Steelhead of the south-central/southern California coast: population characterization for recovery planning. NOAA Technical Memorandum, NOAA-TM-NMFS-SWFSC-394.

Boughton, D. A., P. B. Adams, E. Anderson, C. Fusaro, E. Keller, E. Kelley, L. Lentsch, J. Nielsen, K. Perry, H. Regan, J. Smith, C. Swift, L. Thompson, and F. Watson. 2007 Draft. Viability criteria for steelhead of the south-central and southern California coast. NOAA Technical Memorandum, NOAA-TM-NMFS-SWFSC-XXX.

Response:

2. Reclamation/DON would consult with NOAA Fisheries on southern California steelhead.

F2 – U.S. Environmental Protection Agency *(page 1 of 11)*

P.2

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

OFFICIAL FILE COPY
RECEIVED 02/16/05
REPLY DATE
DATE INITIALS
2/18/05 DM 7000 1500 1000
Classification
Project
Control No.
Folder I.D.

February 11, 2005

Bill Rohwer
Southern California Area Office
Bureau of Reclamation
27708 Jefferson Ave.
Suite 202
Temecula, CA 92590

Dear Mr. Rohwer:

The Environmental Protection Agency (EPA) has reviewed the Notice of Intent to prepare an environmental impact statement (EIS) for the **Santa Margarita River Conjunctive Use Project, San Diego County, CA.** Our review is pursuant to the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508), and Section 309 of the Clean Air Act.

Based on our review of the NOI and information provided at an October 7, 2004 briefing for regulatory agencies we are concerned that the proposed conjunctive use project may have adverse effects on the aquatic resources associated with the Santa Margarita River. EPA's concerns, as described in the enclosed detailed comments, focus on: (1) compliance with Section 404(b)(1) of the Clean Water Act, (2) the range of alternatives, (3) description of the environmental baseline, (4) study of environmental uses of the Santa Margarita River, (5) the method used to perfect water rights, (6) indirect and cumulative impacts, (7) potential impacts to special status species; and (8) general scoping comments for water supply projects.

In response to the December 13, 2004 letter from William Steele to our Regional Administrator, Wayne Nastri, inviting EPA to become a cooperating agency on this project, we respectfully decline the Bureau of Reclamation's invitation to participate as a Cooperating Agency due to resource constraints. While EPA has oversight responsibilities pursuant to the Clean Water Act (Section 404 wetlands, water quality), we do not have specific permitting authority and do not have the resources to assist in development of the action in a timely manner. EPA Region 9 encompasses the States of California, Nevada, Hawaii, and Arizona. Pursuant to Section 309 of the Clean Air Act, EPA is required to review and comment on all Environmental Impact Statements (EIS). As such, our office is involved in a high volume of environmental reviews.

Printed on Recycled Paper

F2 – U.S. Environmental Protection Agency *(page 2 of 11)*

F - 3

We appreciate the opportunity to provide comments on the preparation of the EIS. We appreciate the Bureau of Reclamation's interest in working with EPA. We intend to continue our participation through the review of future environmental documents pursuant to our formal responsibilities under the Clean Water Act and National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508), and Section 309 of the Clean Air Act.

Please send two copies of the Draft Environmental Impact Statement (DEIS) to this office at the same time it is officially released for public review or filed with our Washington D.C. Office. If you have questions, please contact me or Laura Fujii, the lead reviewer for this project. Laura can be reached at 415-972-3852 or fujii.laura@epa.gov.

Sincerely,

Lisa B. Hanf, Manager
Federal Activities Office
Cross Media Division

Enclosure:
EPA's Detailed Comments

Cc: Robert Hargrove, EPA
Horst Greczmiel, Council on Environmental Quality

2

F2 – U.S. Environmental Protection Agency *(page 3 of 11)*

P. 4

EPA DETAILED COMMENTS FOR THE NOI SANTA MARGARITA RIVER CONJUNCTIVE USE PROJECT, SAN DIEGO COUNTY, CA., FEBRUARY 11, 2005

The proposed conjunctive use project in the lower Santa Margarita River basin on Marine Corps Base Camp Pendleton (MCB Camp Pendleton) would: (1) upgrade an existing groundwater recharge and recovery system; (2) improve existing diversion and percolation facilities; (3) install new wells; (4) construct an advanced potable water treatment plant; (5) construct pump stations; and (6) construct a pipeline to Fallbrook. Potential project alternatives include in-stream water retention structures, reclaimed wastewater, off-stream storage, and recharge of other groundwater basins on MCB Camp Pendleton. The existing groundwater recharge and recovery system, which currently produces 7,000 acre-feet of water per year, could be increased to 16,200 acre-feet per year.

Compliance with Section 404(b)(1) of the Clean Water Act

1. Various components of the project will likely involve the discharge of dredged or fill material into the Santa Margarita River and/or other waters of the United States. This activity requires authorization by the Army Corps of Engineers and compliance with the substantive environmental criteria of the Federal Guidelines (Guidelines) at 40 CFR 230 promulgated under Section 404(b)(1) of the Clean Water Act. These criteria require a permitted discharge to: (1) be the least environmentally damaging practicable alternative (LEDPA); (2) avoid causing or contributing to a violation of a State water quality standard; (3) avoid jeopardizing a federally listed species or adversely modifying designated critical habitat for a federally listed species; (4) avoid causing or contributing to significant degradation of the waters of the U.S.; and (5) mitigate unavoidable impacts to waters.

Recommendation:

We encourage the Bureau of Reclamation (Reclamation) to integrate the requirements of Section 404 of the Clean Water Act with NEPA in the formulation of alternatives, analysis of impacts, and development of mitigation. In this regard, the draft environmental impact statement (DEIS) should include sufficient information to clearly demonstrate that the preferred alternative is also the LEDPA. The LEDPA is generally the alternative that avoids or minimizes impacts to waters of the United States (US) to the extent practicable. In developing an appropriate range of avoidance alternatives, the DEIS should factor in the potential effects of construction, operations, and maintenance activities of the different water supply system components. Potential impacts of the entire footprint of the project should be evaluated. We recommend consideration of alternatives that avoid impacts to wetlands and waters of the US.

Response:

1. Impacts to Water Resources and waters of the U.S., including compliance with Section 404 of the Clean Water Act are discussed in Section 4.2, *Water Resources* and Section 4.3, *Biological Resources*.

F2 – U.S. Environmental Protection Agency ***(page 4 of 11)***

Range of Alternatives

1. The potential range of alternatives to be analyzed in the DEIS is unclear. The Notice of Intent (NOI) identifies specific components to be included in the proposed project. However, the agency briefing material identifies three alternatives that include various combinations of these and other project components. A Pre-feasibility Study which analyzes 22 project alternatives and recommends three to five alternatives for further evaluation was scheduled to be completed in January 2005. 2

Recommendation:

We recommend Reclamation solicit additional public input on alternatives and other aspects of the proposed project after the Pre-Feasibility Study is made available for public review. The DEIS should include a summary of the Pre-Feasibility Study, describing the project alternatives eliminated from detailed analysis and the rationale their elimination.

2. EPA advocates an approach to water supply management and allocation which can adjust to changing conditions and help balance available water supplies, ecosystem health (e.g., in-stream beneficial uses), and user requirements. In the long-term, water supply actions should focus on sustainable management of developed supplies to meet these objectives.

Recommendations:

3

The range of alternatives should include alternatives that consider other water supply options (e.g., water transfers, reclaimed wastewater, enhanced conservation measures) and avoid impacts to waters of the US. Efficient use of existing water supplies should be maximized through conservation, reuse, and pollution prevention. We urge consideration of all available tools for enhancing water supply management flexibility, supply reliability, environmental conditions, and water quality. In addition to conjunctive use, these tools could include water transfers and exchanges, pricing, operational flexibility, market-based incentives for efficient water use, water acquisition, and wastewater reclamation and recycling. Alternatives considered in the DEIS should evaluate an integrated range of these tools.

Environmental Baseline

1. The selection of the environmental baseline is a critical step in the environmental analysis and the comparison with other action alternatives. "No action" does not equate with "no impact." Continuation of the existing management situation would constitute a discretionary commitment of resources that is, effectively, an action affecting the environment.

2

Response:

2. Chapter 2, of the EIS/EIR discusses the action alternatives, including the process used to formulate the alternatives carried forward for detailed analysis and a description of the those alternatives eliminated from detailed study and the rational for their elimination.

3. Numerous studies were prepared with the common goal of developing feasible alternatives that would enhance and optimize the productivity of the lower Santa Margarita groundwater basin. Various potential alternatives were examined in these previous studies, including local and regional projects located within and outside the Santa Margarita River basin. Factors that were considered when identifying potential project alternatives included: Chapter 2, of the EIS/EIR provided a detailed explanation of the Alternatives development process.

F2 – U.S. Environmental Protection Agency ***(page 5 of 11)***

p. 6

Recommendations:

The alternatives analysis of the DEIS should clearly describe the environmental baseline and disclose the environmental consequences of all reasonable alternatives, including no action alternative...." in comparative form, thus sharply defining the issues and providing a clear basis for choice among options for the decision maker and the public." (40 CFR Part 1502.14). 4

The DEIS should also clearly describe existing resource conditions in the "affected environment" and the policy and institutional context for the "no action" (without project) and with project alternatives. For example, the DEIS should describe current and historical litigation, tentative agreements, and the underlying assumptions, water rights, and legal mandates (if any) of the proposed new water supply and alternatives. 5

2. To adequately evaluate potential impacts of the proposed project, it is important to determine the surface flows and subsurface water elevations sufficient to maintain and restore the riparian ecosystem of the Santa Margarita River. Restoration opportunities for the Santa Margarita River and its tributaries should not be precluded by potential project alternatives.

Recommendations: 6

A water budget for the Santa Margarita River should be developed which takes into account all surface and subsurface water resource needs, including riparian and fisheries requirements.

Surface flows sufficient to successfully reintroduce and maintain a viable fishery in the Santa Margarita River and its major tributaries should be determined and disclosed in the DEIS. The effects of the project alternatives on this restoration opportunity should be analyzed in the DEIS. We note that the draft watershed management plan prepared by the Santa Margarita Watershed Project Team includes recommendations focused on the reintroduction of native fish such as steelhead, stickleback, and lamprey to the river. 7

3

Response:

4. Chapter 3, *Affected Environment* for each resource area provides the "baseline analysis" within the region of influence (ROI) for each alternative carried forward. Chapter 4, *Environmental Consequences*, for each resource area provides the "impact analysis" for each alternative carried forward, including the No-Action Alternative.

5. Section 1.4, *Project Background* describes the legal history and current institutional framework for the Conjunctive Use Project. Chapter 3, Affected Environment also describes the current conditions as they apply to each resource area.

6. The impact analysis for subsurface and surface water flow is provided in Section 4.2, *Water Resources*. The impact analysis for riparian and fisheries habitat is provided in Section 4.3, *Biological Resources*.

7. An analysis of flows to reintroduce species has not been included. It should be noted that the lower Santa Margarita River historically did not flow year round to the estuary. The river went underground over large stretches of the braided channel in the lower Santa Margarita River basin. Improving the ability to lower the weir and bypass flows throughout the year will improve in-stream conditions.

   However, a study was prepared (Reclamation et al. 2012) to investigate the project impacts on steelhead migration in the Santa Margarita River. This study is referenced in the impact analysis of the EIS/EIR. In addition, the diversion weir is being modified and project partners will consult with NOAA Fisheries regarding the appropriate mitigation to minimize/avoid impacts to steelhead migration (i.e., fish ladder and fish screen on O'Neill Ditch) at the weir.

F2 – U.S. Environmental Protection Agency *(page 6 of 11)*

Study of Environmental Uses

The NOI states that Reclamation will perform studies needed to address current and future uses of the Santa Margarita River, including environmental uses.

Recommendation: 8

We recommend Reclamation provide specific information on the type and scope of studies to be performed to determine the current and future uses of the Santa Margarita River in the Pre-Feasibility Study.

Perfecting Water Rights

One of the stated purposes of the proposed project is to perfect water rights permits that were assigned to Reclamation in 1974 pursuant to State Water Resources Control Board Order WR 73-50. However, the NOI does not state how the studies of various water uses will be used to perfect these water rights. For instance, it is unclear how the quantity of water needed to maintain current and future environmental uses of the Santa Margarita River will be factored into perfecting these water rights.

Recommendations:

The DEIS should fully disclose the process and studies to be used in perfecting water rights pursuant to WR 73-50. 9

The proposed project has the potential to increase the water withdrawals from the Santa Margarita River system. The overall water supply strategy for Camp Pendleton and Fallbrook should include explicit provisions in the DEIS for protecting the aquatic and riparian resources associated with the Santa Margarita River. 10

If flows to maintain current and future Santa Margarita River environmental uses will not be proposed, an alternative project approach may be to petition the State Water Resources Control Board for a change in use for purposes of preserving or enhancing wetlands habitat and fish and wildlife resources (e.g., California Water Code 1707). Whatever strategy is used to protect the beneficial uses of the Santa Margarita River, safeguards need to be in place for providing sufficient flows to maintain viable aquatic and riparian ecosystems along the Santa Margarita River. 11

4

Response:

8. Numerous studies have been conducted and reports written regarding use of water from the Santa Margarita River and how to best achieve the water supply improvement objectives of MCB Camp Pendleton and FPUD. These studies are identified in Section 2.2 and referenced throughout the EIS/EIR analysis.

9. The purpose has been modified as described in Section 1.3; the legal background of water rights pertaining to this project is discussed in Section 1.4.

10. Provisions for protecting aquatic and riparian resources associated with the Santa Margarita River and discussed in Section 4.3, *Biological Resources*.

11. Special Conservation Measures for providing sufficient flows for maintain viable aquatic and riparian ecosystems along the Santa Margarita River are discussed in Section 4.3, *Biological Resources*.

F2 – U.S. Environmental Protection Agency ***(page 7 of 11)***

p. 8

Indirect and Cumulative Impacts.

Full disclosure of cumulative and indirect impacts is of specific concern. The National Environmental Policy Act (NEPA) requires evaluation of indirect impacts which are caused by the action (40 CFR Part 1508.8(b)). Indirect effects may include "growth-inducing effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems." (40 CFR Part 1508.9(b)). Induced residential, commercial, and industrial growth can adversely affect water quality, wetlands, and other natural resources.

A comprehensive analysis of the existing and reasonably foreseeable projects affecting the water budget and environment of the Santa Margarita River is needed to determine the indirect and cumulative impacts of the proposed increased diversions and project alternatives.

Recommendations: 12

The cumulative impacts analysis should address: (1) changes in sediment transport processes; (2) in-stream structures and barriers to passage by fish and other aquatic organisms; (3) changes in surface flows and subsurface water elevations (accounting for seasonal and inter-year variation); (4) water quality and quantity; and (5) potential effects of these changes on the establishment and maintenance of wetland/riparian plant communities.

Past cumulative effects may have greatly influenced "existing conditions". These historical cumulative effects, which may be perpetuated under the no action and action alternatives, should be fully disclosed and evaluated in the environmental effects and cumulative impact analyses. Existing projects that may have altered the extent of waters of the US and riparian areas or the availability of water to such areas should be included in these analyses. Examples of such projects at MCB Camp Pendleton include: (1) expansion of MCB Camp Pendleton pursuant to the Base Closure and Realignment Act (BRAC), (2) construction of the flood control levee along the Santa Margarita River, and (3) diversion of treated effluent out of the Santa Margarita Basin.

Special Status Species

The proposed project has the potential to adversely affect several special status species that occur within or downstream of the general project area in the Camp Pendleton and Fallbrook area. For instance, the federally endangered least Bell's vireo (*Vireo bellii pusillus*), southwestern willow flycatcher (*Empidonax traillii extimus*), arroyo toad (*Bufo californicus*), California least tern (*Sterna antillarum brownii*), and tidewater goby (*Eucyclogobius newberri*) are all closely associated with the Santa Margarita River.

5

Response:

12. Cumulative impacts and Growth Inducement impacts are discussed in Chapter 5 and Chapter 6, respectively.
    The Santa Margarita River Flood Control Project (P-030) and CPEN Tertiary Treatment Plant Project are included Chapter 5, Cumulative Impacts.
    BRAC has not been included for Cumulative Impact Analysis because the BRAC action did not affect resources on the Santa Margarita River.

F2 – U.S. Environmental Protection Agency *(page 8 of 11)*

p. 9

Recommendation:

The DEIS should include an analysis of impacts to listed species, other sensitive plant and animal species, and plant communities from all aspects of the proposed project and alternatives including construction, operation, and maintenance activities. The status of the Section 7 consultation pursuant to the Endangered Species Act should also be provided in the DEIS. 13

General Scoping Comments for Water Supply Projects

Water Quality

1. Potential impacts of the proposed alternatives on surface and groundwater quality should be fully evaluated in the DEIS. Discuss water quality currently documented for waters within the project area, including agricultural drainage and return flows. Identify conditions which impair beneficial water use, such as pesticides and salinity. Evaluate the alternatives with respect to their impacts (beneficial or adverse) on designated beneficial uses. 14

2. Identify sensitive aquatic sites such as wetlands which are present and disclose potential impacts from the proposed action. 15

3. Discuss specific monitoring programs that are in place or will be implemented to determine potential impacts on surface, groundwater, and drinking water quality and beneficial uses. Identify responses to remedy detected impacts so that adequate water quality can be guaranteed. 16

Water Pricing

1. EPA endorses a general principle that beneficiaries should pay, to the extent practicable, the costs of water supply improvements. Water pricing can reinforce fairness and recognizes the need to encourage water use efficiency and reflect the true cost of developing new supplies. Thus, water-- particularly any newly developed supplies-- should not be underpriced. The DEIS should document the full cost (including environmental and other mitigation) of providing water benefits and explain how these costs can be allocated among parties, according to explicit criteria. 17

2. It has been demonstrated over the last decade that variable pricing of water can significantly influence water demand and supply. The DEIS should include an in-depth discussion of how pricing can be used in allocation of the new water supply and management of user's demands.

6

Response:

13. The impact analysis for biological resources is presented in Section 4.3. Separate Biological Assessments have been prepared and will be provided to the USFWS and NOAA Fisheries. The USFWS and NOAA Fisheries will each issue a Biological Opinion for the project.

14. Water quality is discussed in Section 4.2, *Water Resources*.

15. Sensitive aquatic sites are discussed under Water Resources and Biological Resources.

16. Monitoring programs are discussed in Section 4.2, *Water Resources* and Section 4.3, *Biological Resources*.

17. A cost analysis would be prepared as part of the project feasibility study.

F2 – U.S. Environmental Protection Agency ***(page 9 of 11)***

P.10

3. The DEIS should provide comparative information on the costs and benefits under the various alternatives, distinguishing discrete features of an alternative (such as surface versus ground water supplies, and conveyance facilities costs) where possible. Identify the total cost, and costs allocated to water users under the various alternatives. Also provide comparative information on the costs and benefits of non-storage measures which serve water management objectives, including conservation and water acquired through transfers. With respect to environmental benefits and costs, such as environmental water, document benefits and clearly identify the magnitude and allocation (or incidence) of the costs for all alternatives, including no action. 17 (cont)

Water Conservation

1. Identify the current status of water conservation planning and practices in beneficiary areas. Identify current practices in the project area(s) for measuring surface and ground water use. Proposed project alternatives should evaluate one or more methods of measurement that will provide comprehensive and suitably accurate tracking of water use and efficiencies. 18

Groundwater

1. The DEIS should fully document groundwater conditions and describe how, when, and by whom groundwater is used throughout the project area. Include information on groundwater levels and quality, identifying any long-term changes for with-project and without-project conditions. Identify information gaps, such as lack of direct groundwater measurements. Identify any existing conjunctive use of groundwater and surface water. Where applicable, the DEIS should document the relationship between current surface supplies, the proposed project surface supply, and groundwater. 19

2. In considering conjunctive use of groundwater and surface water supplies in the project alternatives, the DEIS should describe the specific objectives, requirements, and suitable locations for conjunctive use so that potential impacts can be fully evaluated. Analyze any water quality impacts to surface or groundwater associated with a proposed conjunctive use program. Document any changes in basin water balance, including amounts of seepage and return flows, and possible effects on the quantity, timing, and quality of water available. Analyze the potential for third party impacts under a conjunctive use program and, if impacts could occur, evaluate ways of avoiding or mitigating them. 20

Biological Resources

1. The DEIS should evaluate direct, indirect, and cumulative impacts to fish and wildlife at the proposed new storage locations, in association with diversions and conveyance facilities, and in affected rivers and the Delta. This evaluation should "follow the impacts" and examine the impacts that may extend beyond the immediate location of the new storage and/or diversion facilities. Describe the potential timing and magnitude of diversions to offstream storage. What 21

7

Response:

18. FPUD and MCB Camp Pendleton have developed and implemented Urban Water Management Plans and water conservation plans, respectively. Additional documentation of water conservation efforts beyond referencing the above documents will not be completed. Regarding "comprehensive" tracking of water use and efficiencies, this is not a requirement under CEQA or NEPA for inclusion in an EIS or EIR.

19. A discussion of baseline groundwater conditions and the analysis of groundwater impacts are provided in Sections 3.2 and 4.2, respectively, and Appendix B.

20. Surface water and groundwater quality impacts are evaluated in Section 4.2. Mitigation measures are also discussed under Section 4.2. Third party impacts are evaluated in Chapter 5, *Cumulative Impacts*.

21. A discussion of fish and wildlife impacts are provided in Section 4.3, *Biological Resources*. A discussion of changes in surface flow are provided in Section 4.2 and Appendix B.

F2 – U.S. Environmental Protection Agency *(page 10 of 11)*

P. 11

are the effects of diversions on instream flows from the perspective of aquatic life and geo-fluvial processes? What changes in quantity, timing, and quality of instream flows might occur under the alternatives? 21 (cont)

2. The DEIS should evaluate environmental requirements which affect flows--notably the Endangered Species Act and Clean Water Act. As implemented through the State Water Resources Control Board, consider flows, temperature needs, seasonality, and other water quality components and factors of critical importance to threatened and endangered species or other sensitive beneficial uses. Identify ways in which water managed through the proposed project might be used for environmental compliance. 22

3. We also recommend the DEIS evaluate the ability of the project to restore or enhance fish and wildlife habitat and wetlands which may have been affected by water diversions and by changes in flows, timing, and water quality as a result of earlier water supply development. 23

Air Quality

1. The DEIS should provide a detailed discussion of air quality standards, ambient conditions, and potential air quality impacts, for the region. Include a description of current and proposed activities and their impacts on air quality. Cumulative and indirect impacts should be fully evaluated. For instance, development or modified use of surrounding lands (e.g., conversion to urban, different cropping patterns) could influence sources of particulate matter with a diameter of 10 micrometers and smaller (PM10). 24

2. Federal agencies are required by the Clean Air Act to assure that actions conform to an approved air quality implementation plan. If the proposed project area is in a nonattainment area, Reclamation may need to demonstrate compliance with general conformity requirements of the Clean Air Act [Section 176(c)]. General Conformity Regulations can be found in 40 CFR Parts 51 and 93 (58 Federal Register, page 63214, November 30, 1993). These regulations should be examined for applicability to the proposed actions. 25

3. EPA issued revised standards for ozone and fine particulate matter (PM2.5)(smog and soot) in July 1997. Nonattainment areas for fine particulate matter were designated in December 2004. San Diego County is designated as nonattainment for fine particulate matter and will need to implement these standards. The adverse health effects of ozone and PM2.5 are well known. The DEIS should evaluate the extent that the proposed project may release significant amounts of these pollutants. We recommend the Air Quality section of the "Affected Environment" chapter, include a description of the new ozone and PM2.5 standards, their health effects, and disclose what, if any, monitoring has been done in the project area for these pollutants. Possible sources that may contribute to high levels of ozone and PM2.5 emissions include construction equipment, mobile sources, and high volumes of diesel truck traffic. 26

8

10

Response:

22. Environmental requirements as they apply to each resource area are disused under the *Regulatory Setting* for the corresponding resource area in Chapter 3.

23. The EIS/EIR is analyzing the action alternatives and the No-Action Alternative. The impact analysis is limited to the project components of each alternative and does not include an analysis of historical water supply development. Historical water use dates back to the mid-1800's, with the major base infrastructure (diversion, canal, and reservoir) being built in the 1880's. This infrastructure has been analyzed under the cultural resource sections of this EIS/EIR. Regarding biological resources and cumulative impacts, analyzing the impacts of water development projects over a century old with no baseline for assessing those impacts and no data collection from which to compare is not required under NEPA.

24. Baseline air quality conditions are discussed in Section 3.5. Section 4.5, *Air Quality*, provides estimated emissions associated with the Proposed Action and alternatives.

25. Air Quality concerns and General Conformity Applicability requirements are addressed in Sections 3.5 and 4.5.

26. Please refer to Sections 3.5 and 4.5 for the requested information.

F2 – U.S. Environmental Protection Agency ***(page 11 of 11)***

P.12

Environmental Justice

1. In keeping with Executive Order 12898, **Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations** (EO 12898), the DEIS should describe the measures taken by Reclamation to: 1) fully analyze the environmental effects of the proposed Federal action on minority or low-income populations, and 2) present opportunities for affected communities to provide input into the NEPA process. The intent and requirements of EO 12898 are clearly illustrated in the President's February 11, 1994 Memorandum for the Heads of all Departments and Agencies. 27

9

Response:

27. Compliance with EO 12898 is discussed under Chapter 3, *Socioeconomics and Environmental Justice* (for resources areas eliminated from detailed analysis).

F3 – U.S. Fish and Wildlife Service *and California Department of Fish & Game(page 1 of 6)*

U.S. Fish and Wildlife Service
Carlsbad Fish and Wildlife Office
6010 Hidden Valley Road
Carlsbad, California 92009
(760) 431-9440
FAX (760) 918-0638

CA Dept. of Fish & Game
South Coast Regional Office
4949 Viewridge Avenue
San Diego, California 92123
(858) 467-4201
FAX (858) 467-4299

In Reply Refer To:
FWS-FWS-MCBCP/SD-2710.3

Bill Rohwer
Bureau of Reclamation
Southern California Area Office
27708 Jefferson Ave., Suite 202
Temecula, California 92590-2628

JAN 3 1 2005

Re: Notice of Intent (NOI) to Prepare an Environmental Impact Statement/Environmental Impact Report for the Santa Margarita River Conjunctive Use Project, County of San Diego, California

Dear Mr. Rohwer:

The California Department of Fish and Game (Department) and the U.S. Fish and Wildlife Service (Service), collectively the Wildlife Agencies, have reviewed the above referenced NOI which we received on November 1, 2004. The proposed project involves upgrading an existing groundwater recharge and recovery system on Marine Corps Base Camp Pendleton (MCBCP) and installing new wells, pump stations and a pipeline between MCBCP and Fallbrook Public Utilities District (Fallbrook) facilities. Potential alternatives could involve in-stream water retention structures, reclaimed wastewater, off-stream storage, and recharge of other groundwater basins on MCBCP. Another project purpose is to perfect water rights permits that have been assigned to the Bureau of Reclamation (Bureau). The NOI indicates that the water recharge yield from project implementation could increase from the current 7,000 acre-foot per year to 16,200 acre-feet per year. We offer the following comments and recommendations to the Bureau regarding project-associated biological impacts based on our review of the NOI and our knowledge of habitat types and species within the proposed project area.

The Department is identified as a Trustee Agency pursuant to the California Environmental Quality Act (CEQA) section 15386 and is responsible for the conservation, protection, and management of the State's biological resources. The Department is also responsible, pursuant to the California Endangered Species Act, Fish and Game Code 2050 *et seq.*, for the protection of species listed by the State as endangered or threatened or identified as species of concern, and the habitats they require. Under section 5948 of the Fish and Game Code, no person shall cause or having caused, permit to exist, any artificial barrier (except a dam for the storage or diversion of water, public bridges and approaches thereto, groins, jetties, seawalls, breakwaters, bulkheads, wharves and piers permitted by law, and debris from mining operations), in any stream in this state, which will prevent the passing of fish up or down stream, or which is deleterious to fish as determined by the Fish and Game Commission, subject to review by the courts.

TAKE PRIDE IN AMERICA

F3 – U.S. Fish and Wildlife Service *and California Department of Fish & Game(page 2 of 6)*

Mr. Bill Rohwer (FWS/CDFG-MCBCP/SD-2710.3) 2

The Service's mission is to work "with others to conserve, protect, and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people." Specifically, the Service administers the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*). Section 7 of the Act requires Federal agencies to consult with the Service, should it be determined that their actions may affect federally listed threatened or endangered species. The Service also provides comments on public notices issued by the U.S. Army Corps of Engineers (Corps) for a Federal permit or license affecting the Nation's waters pursuant to the Clean Water Act.

The proposed project has the potential to affect State and federally listed threatened and endangered species that occur within and/or downstream of the general project areas in the Camp Pendleton and Fallbrook, including the federally endangered least Bell's vireo (*Vireo bellii pusillus*), southwestern willow flycatcher (*Empidonax traillii extimus*), arroyo toad (*Bufo californicus*), California least tern (*Sterna antillarum browni*), light-footed clapper rail (*Rallus longirostris longivipes*), Stephens' kangaroo rat (*Dipodomys stephensi*), Pacific pocket mouse (*Perognathus longimembris pacificus*), tidewater goby (*Eucyclogobius newberri*), southern steelhead (*Oncorhynchus mykiss*), Riverside fairy shrimp (*Streptocephalus woottoni*), San Diego fairy shrimp (*Branchinecta sandiegonensis*), San Diego ambrosia (*Ambrosia pumila*), San Diego button-celery (*Eryngium aristulatum* var. *parishii*) and the federally threatened coastal California gnatcatcher (*Polioptila californica californica*), thread-leaved brodiaea (*Brodiaea filifolia*) and spreading navarretia (*Navarretia fossalis*). Least Bell's vireo, southwestern willow flycatcher, California least tern, light-footed clapper rail, San Diego button-celery, and thread-leaved brodiaea are also State endangered species; Stephens' kangaroo rat is also a State threatened species; and, southern steelhead is a State species of special concern.

We are concerned about impacts to listed or other sensitive species in uplands and streams from new permanent structures. Pipelines and off-stream storage structures in upland habitats could negatively affect sensitive habitats and species during construction, operation and maintenance. Instream structures will alter sediment transport within the Santa Margarita River (SMR) system, increase barriers to fish passage and other aquatic organisms, and change hydrology by increasing diversion and/or withdrawal from the surface flows or groundwater in the project area. Given the suggestion in the NOI that water yield could be increased by over two fold from current withdrawals, we have significant concerns about deleterious project-related changes to hydrology in the SMR or other groundwater basins, such as the San Mateo watershed, on MCBCP. For example, steelhead in the SMR are included in the Southern California Steelhead Evolutionarily Significant Unit (ESU). Adequate instream flows, unimpeded fish passage, including access to suitable spawning and rearing habitat upstream and downstream of the project is essential to the conservation and recovery of steelhead in the southern portion of this ESU.

Therefore, we recommend that the Draft Environmental Impact Statement/Environmental Impact Report (DEIS/EIR) include a full summary and evaluation of the potential impacts of water withdrawal and/or diversion on the listed species that could potentially be affected by project implementation. To facilitate the evaluation of the proposed project from the standpoint of fish and wildlife protection, we request that the DEIS/EIR contain the following specific information.

F3 – U.S. Fish and Wildlife Service *and California Department of Fish & Game(page 3 of 6)*

Jan 31 05 02:42p p.5
01/31/2005 14:14 FAX 7609180618 US FISH AND WILDLIFE 004

Mr. Bill Rohwer (FWS/CDFG-MCBCP/SD-2710.3) 3

1. A complete description of the purpose and need of the proposed project, including all practicable alternatives that have been considered to avoid or significantly reduce project impacts to listed and other sensitive plant and animal species and vegetation types (*e.g.*, stream habitat, riparian, scrublands, grasslands, woodlands). 1

2. Detailed descriptions of the types of sensitive habitats, both terrestrial and aquatic, that may be affected by the proposed project or project alternatives. Maps and tables should be included to summarize such information. 2

3. A description of the biological resources associated with each habitat type. These descriptions should include both qualitative and quantitative assessments of the resources present and potentially occurring on the proposed project site and alternatives. The description should also include complete species lists for all sensitive or rare biological resources onsite. We recommend that protocol or focused surveys be conducted prior to circulation of the DEIS/EIR, and their results included in the DEIE/EIR, for the public to adequately assess impacts to Federal and State-listed species and other natural resources. Because we generally consider protocol surveys for listed species to be current for up to one year, updated surveys should be conducted within one year prior to project approval. 3

   a. The arroyo toad surveys should be conducted in appropriate habitat within all areas that may be directly or indirectly affected by the proposed project. For example, the footprint of operations, as well as all areas that would potentially be affected by artificial night lighting and changes (up- and down-stream) in hydrology, water quality, and fluvial geomorphology of the stream system should be surveyed. Please note that the toad is known to use both streambeds and drainages for breeding and dispersal (Service 2001), and the adjacent uplands for foraging and burrowing (Griffin et al. 1999; Griffin and Case 2001; Service 2001), up to 1.2 kilometers away from the occupied streambed (Holland and Sisk 2000). Additional information suggests that toads may move as much as five miles up- or down-stream within a drainage (U.S. Forest Service, unpublished data). Because of the documented biology of this species, it is the Service's policy to consider all suitable upland habitat within one kilometer of occupied streams as occupied.

   b. We recommend that a site assessment be conducted to determine whether there is suitable habitat for Southwestern pond turtle (*Emys marmorata pallida*, pond turtle), a California species of special concern, within the project footprint and area of potential effect. If there is suitable habitat, we recommend that surveys be conducted for pond turtle, and the results included in the DEIS/EIR, and avoidance, minimization, and mitigation be included in the DEIS/EIR if there pond turtles are present.

4. An assessment of direct, indirect, and cumulative impacts from the proposed project to fish and wildlife species and associated habitats. Direct impacts are the immediate effects of the project on the species or its habitat, and include the effects of interrelated and interdependent actions that would not occur but for the proposed project. All facets of the project (*e.g.*, construction, operation and maintenance) should be included in this assessment. Indirect impacts are caused by or result from the proposed action, are later in time, and are reasonably certain to occur. These impacts may occur outside of the area directly affected by the proposed project. We recommend that you make your cumulative impacts analysis broad 4

13

Response:

1. Please refer to Chapter 1 and Chapter 2 of the EIS/EIR for purpose and need and alternatives development.

2. Please refer to Sections 3.3 and 4.3, *Biological Resources* for the requested information.

3. Please refer to Sections 3.3 and 4.3, *Biological Resources* for the requested information.

4. Cumulative impacts with respect to Biological Resources is presented in Section 5.4.3.

F3 – U.S. Fish and Wildlife Service *and California Department of Fish & Game(page 4 of 6)*

Jan 31 05 02:42p
01/31/2005 14:15 FAX 7609180638 US FISH AND WILDLIFE 005 P.6

Mr. Bill Rohwer (FWS/CDFG-MCBCP/SD-2710.3) 4

enough to include the effects of future State, Tribal, local, or private actions that are reasonably certain to occur in the area affected by your project. 4 (cont)

5. Include specific plans for avoiding, minimizing, and mitigating project-related impacts, including cumulative impacts of direct and indirect habitat loss, degradation, or modification. These plans should be prepared by persons with specific expertise on southern California wildlife, native plants, and ecosystems. Each plan should include a detailed monitoring program with provisions for assessing the success of mitigation efforts and contingency plans to be implemented if initial efforts are unsuccessful. The plans should also discuss funding assurances and responsible parties that will guarantee the successful implementation of mitigation and monitoring programs and ensure the protection in perpetuity of conservation sites. Issues that should be addressed include restrictions on vehicle and human access, proposed land dedications, monitoring and management programs, control of illegal dumping, and restrictions on lighting near conservation areas. 5

6. An assessment of potential impacts to wetlands and jurisdictional waters of the United States. Section 404 of the Clean Water Act prohibits the unauthorized discharge of dredged or fill material into such waters, including wetlands. This section also provides that the Corps may issue permits for discharges of dredged or fill material into jurisdictional waters and wetlands. Potential areas of Corps jurisdiction should be evaluated and wetlands should be delineated using the methodology set forth in the Corps' Wetland Delineation Manual (Environmental Laboratory, 1987). The DEIS/EIR should disclose all impacts to jurisdictional waters and wetlands, and propose measures to be taken to avoid and minimize impacts, and mitigate unavoidable impacts. If it is determined that wetlands or jurisdictional waters of the United States will be affected by the proposed project, then a section 404 permit from the Corps and/or a streambed alteration agreement from the Department under section 1600 of the Fish and Game Code may be required. 6

If the project is subject to the Department's jurisdiction under section 1600, the Department will require, and the technical appendices of the CEQA document should include, a jurisdictional delineation of the affected wetlands pursuant to the U.S. Fish and Wildlife Service definition (Cowardin 1979) adopted by the Department. Please note that wetland and riparian habitats subject to the Department's authority may extend beyond the jurisdictional limits of the Corps.

7. In order to comply with Fish and Game Code Section 5937, which requires that sufficient water be released below a dam to allow fish downstream to be maintained in good condition, the DEIS/EIR should provide an analysis of the instream flows necessary to protect steelhead migration, spawning and rearing habitat in the Santa Margarita River. To establish the relationship between instream flow and habitat availability for different life stages of steelhead, the DEIS/EIR must include an Instream Flow Incremental Methodology (IFIM) analysis. IFIM is the Department's accepted standard for assessing instream flow needs for steelhead throughout California. 7

14

Response:

5. Please refer to Section 4.3, *Biological Resources* for a description of special conservation and mitigation measures.

6. Please refer to Sections 3.3 and 4.3, *Biological Resources* for the requested information.

7. Please refer to Section 4.3 *Biological Resources*, for the requested information.

F3 – U.S. Fish and Wildlife Service *and California Department of Fish & Game(page 5 of 6)*

Jan 31 05 02:48p p.2
01/31/2005 14:16 FAX 7609180839 US FISH AND WILDLIFE 008

Mr. Bill Rohwer (FWS/CDFG-MCBCP/SD-2710.3) 5

8. A discussion of potential adverse impacts from any increased inundation and/or decreased surface flows on streams and watercourses and associated resources within the watershed of the proposed project. 8

9. An analysis of how implementation of water diversion, storage and groundwater recharge plans may facilitate or induce additional development and growth in the project area. 9

10. Identification of methods to be employed (*i.e.*, Best Management Practices) to prevent the discharge and disposal of toxic and/or caustic substances, including oil and gasoline, on the project site especially during construction. 10

11. An analysis of impacts to listed and other sensitive species from expected noise, pollution, night lighting, erosion, sedimentation, roads, and measures to be taken to minimize any of those adverse impacts. 11

12. An analysis of how the project would affect hydrologic and hydraulic processes such as base flow, attenuation of peak flows, and sediment transport and retention should also be included in the DEIS/EIR. 12

13. A detailed description of the current groundwater recharge program on Camp Pendleton and the relationship of the proposed project with recently authorized activities to dredge O'Neill Lake and refurbish recharge ponds 6 and 7. 13

14. A detailed description of existing obligations of the U.S. Marine Corps under the terms of the settlement with the Rancho California Water District on the Change and Time Extensions Permit 7032, Application 11518, and how those obligations have been or are being met. Please include specifics of the water supply, water quality, sensitive species and riparian habitat monitoring program that was required from the settlement and the current status of the monitoring program. 14

We appreciate the opportunity to comment on the referenced NOI. We are available to work with project proponent(s) to avoid, minimize, and/or mitigate impacts to listed and sensitive species and their habitats. If you have any questions or comments regarding this letter, please contact John O'Brien or Mary Larson (Department) at (562) 342-7173 and Jill Terp (Service) at (760) 431-9440.

Sincerely,

Jill Terp for
Karen A. Goebel
Assistant Field Supervisor
U.S. Fish and Wildlife Service

Donald R. Chadwick
Habitat Conservation Planning Supervisor
California Department of Fish and Game

Response:

8. Please refer to Section 4.2, *Water Resources* for the requested information.

9. Please refer to Section 6.1 for a discussion of Growth Inducement factors.

10. Please refer to Section 2.3.1 for Special Conservation Measures that would be implemented to avoid significant hazardous materials and waste impacts associated with construction activities.

11. Please refer to Section 4.3, *Biological Resources* for a complete analysis of potential impacts to sensitive species.

12. Please refer to Section 4.2, *Water Resources* for the requested information.

13. Please refer to Section 4.2, *Water Resources* for the requested information.

14. Please refer to Section 1.4, Project Background for a discussion of historical and existing water rights obligations.

F3 – U.S. Fish and Wildlife Service *and California Department of Fish & Game(page 6 of 6)*

Literature Cited

Cowardin, Lewis M., V. Carter, G. C. Golet, and E. T. LaRoe. 1979. Classification of wetlands and deepwater habitats of the United States. Fish and Wildlife Service, U.S. Department of the Interior. U. S. Government Printing Office, Washington, D.C.

Griffin, P.C., T.J. Case, and R.N. Fisher. 1999. Radio telemetry of *Bufo californicus*, arroyo toad movement patterns and habitat preferences. Contract report to California Department of Transportation Southern Biology Pool. 66 pp.

Griffin, P.C., T.J. Case. 2001. Terrestrial habitat preferences of adult arroyo southwestern toads. Journal of Wildlife Management. 65(4): 633-644.

Holland, D.C., and N.R. Sisk. 2000. Habitat use and population demographics of the arroyo toad (*Bufo californicus*) on MCB Camp Pendleton, San Diego County, California: Final Report for 1998, 2000. 25pp + appendix.

U.S. Fish and Wildlife Service. 2001. Federal Register Vol 66, No. 26. Final Designation of Critical Habitat for the Arroyo Toad; Final Rule. Pp. 9414-9432.

S1 – California Department of Fish and Game ***(page 1 of 1)***	
The California Department of Fish and Game submitted a joint letter with the U.S. Fish and Wildlife Service. This joint letter is addressed in Comment F3 above.	**Response:** See responses to comments under F3 above.

S2 – Native American Heritage Commission *(page 1 of 3)*

Jan 31 05 04:33p P.2
01/07/2005 15:45 7607286829 FALLBROOK PUBLIC UTI PAGE 02

STATE OF CALIFORNIA Arnold Schwarzenegger, Governor

NATIVE AMERICAN HERITAGE COMMISSION
915 CAPITOL MALL, ROOM 364
SACRAMENTO, CA 95814
(916) 653-4082
(916) 657-5390 – Fax

December 23, 2004

Mr. Joe Jackson
Fallbrook Public Utility District
P.O. Box 2290
Fallbrook, CA 92082-2290

Re: NOP- Proposed Santa Margarita River Conjunctive Use Project
SCH# 2004121068

Dear Mr. Jackson

Thank you for the opportunity to comment on the above referenced Notice of Preparation. The Commission was able to perform a record search of its Sacred Lands File for the project area. The record search failed to indicate the presence of Native American cultural resources in the immediate project area; however, the absence of specific site information in the Sacred Lands File does not guarantee the absence of cultural resources in any project area. Other sources of cultural resources should also be contacted for information regarding known and recorded sites.

Section 800.2 of the Federal Section 106 process (36 CFR PART 800) requires that agencies carrying out projects using federal funding or located on federal lands consult with Native American tribes in order to provide them with "a reasonable opportunity to identify (their) concerns about historic properties, advise on the identification and evaluation of historic properties, including those of traditional religious and cultural importance, articulate (their) views on the undertaking's effects on such properties, and participate in the resolution of adverse effects." Enclosed is a list of Native American individuals/organizations who may have knowledge of cultural resources in the project area. This list should provide a starting place in locating areas of potential adverse impact within the proposed project area. The Commission makes no recommendation of a single individual or group over another. By contacting all those listed, your organization will be better prepared to address claims of failure to consult with the appropriate tribe or group. A minimum of two weeks must be allowed for responses following notification. If there has been no response following the two week period, we recommend that you follow-up by telephone to ensure that the information was received. 1

Prior to project approval, the NAHC recommends that you conduct an archaeological records search at the Information Center at San Diego State University. The records search will identify whether or not recorded cultural resources exist on the project site, whether or not an archaeological survey has been conducted at the site, and provide guidance on whether further archaeological study of the area is warranted. 2

Lack of surface evidence of archeological resources does not preclude the existence of archeological resources. Lead agencies should include provisions for accidentally discovered archeological resources during construction per California Environmental Quality Act (CEQA), Public Resources Code §15064.5 (f); Health and Safety Code §7050.5, and Public Resources Code §5097.98 mandate the process to be followed in the event of an accidental discovery of any human remains in a location other than a dedicated cemetery and should be included in all environmental documents. If you have any questions, please contact me at (916) 653-6251 3

Sincerely,

Carol Gaubatz
Program Analyst

cc: State Clearinghouse

Response:

1. As suggested the enclosed Native American Contacts have been added to the EIS/EIR distribution list.

2. Please refer to Sections 3.4 and 4.4, *Cultural Resources* for a complete discussion of records review and surveys performed for the Proposed Project.

3. Please refer to Section 4.4, *Cultural Resources* for the a discussion of the specific protocols that would be followed in the event that archeological resources are discovered during project implementation.

S2 – Native American Heritage Commission *(page 2 of 3)*

Jan 31 05 04:33p P.3
01/07/2005 15:45 7687206829 FALLBROOK PUBLIC UTI PAGE 02

Native American Contacts
San Diego County
December 23, 2004

Cupa Cultural Center (Pala Band)
William J. Contreras, Archaeology and Cultural Res.
P.O. Box 455 Luiseno
Pala , CA 92059
(760) 742-3784

Pauma & Yuima
Juanita Dixon, Environmental Coordinator
P.O. Box 369 Luiseno
Pauma Valley , CA 92061
(760) 742-1289
(760) 742-3422 Fax

La Jolla Band of Mission Indians
Mr. Terri Hughes, Chairperson
22000 Highway 76 Luiseno
Pauma Valley , CA 92061
(760) 742-3771/72
(760) 742-1701 Fax

Pechanga Band of Mission Indians
Paul Macarro, Cultural Resource Center
P.O. Box 2183 Luiseno
Temecula , CA 92593
(951) 308-9295
(951) 506-9491 Fax

Pala Band of Mission Indians
Robert Smith, Chairperson
P.O. Box 50 Luiseno
Pala , CA 92059 Cupeno
(760) 742-3784
(760) 742-1411 Fax

Pechanga Band of Mission Indians
Mark Macarro, Chairperson
P.O. Box 2183 Luiseno
Temecula , CA 92593
(951) 308-9295
(951) 506-9491 Fax

Pauma & Yuima
Christobal C. Devers, Chairperson
P.O. Box 369 Luiseno
Pauma Valley , CA 92061
(760) 742-1289
(760) 742-3422 Fax

Rincon Band of Mission Indians
Culture Committee
P.O. Box 68 Luiseno
Valley Center , CA 92082
(760) 749-1051
(760) 749-8901 Fax

Pauma & Yuima
Bennae Calac, Cultural Reosurce Coordinator
P.O. Box 369 Luiseno
Pauma Valley , CA 92061
(760) 802-1811
(760) 742-3422 Fax

Rincon Band of Mission Indians
John Currier, Chairperson
P.O. Box 68 Luiseno
Valley Center , CA 92082
(760) 749-1051
(760) 749-8901 Fax

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resource assessment for the proposed Santa Margarita River Conjunctive Use Project, SCH# 2004121068, San Diego County.

10

S2 – Native American Heritage Commission *(page 3 of 3)*

Jan 31 05 04:34p P.4
01/07/2005 15:45 7607286029 FALLBROOK PUBLIC UTI PAGE 03

Native American Contacts
San Diego County
December 23, 2004

Rincon Band of Mission Indians
Rob Shaffer, Tribal Administrator
P.O. Box 68 Luiseno
Valley Center , CA 92082
(760) 749-1051
(760) 749-8901 Fax

San Luis Rey Band of Mission Indians
Carmen Mojado, Co-Chair
1889 Sunset Dr. Luiseno
Vista , CA 92081 Cupeno

Rincon Band of Mission Indians
Kristie Orosco, Environmental Coordinator
P.O. Box 68 Luiseno
Valley Center , CA 92082
(760) 749-1051
(760) 749-8901 Fax

San Luis Rey Band of Mission Indians
Mark Mojado, Cultural Resources
P.O. Box 1 Luiseno
Pala , CA 92059
(760) 742-4488
(760) 586-4858 (cell)

Rincon Band of Mission Indians
Ruth Calac, President, Ricon Heritage Commission
P.O. Box 68 Luiseno
Valley Center , CA 92082
(760) 749-1051
(760) 749-8901 Fax

Soboba Band of Mission Indians
Robert J. Salgado, Sr., Chairperson
P.O. Box 487 Luiseno
San Jacinto , CA 92581
(909) 654-2765
Fax: (909) 654-4198

San Luis Rey Band of Mission Indians
Henry Contreras, Most Likely Descendent
1763 Chapulin Lane Luiseno
Fallbrook , CA 92028 Cupeno
(760) 728-6722 - Home
(760) 207-3618 - Cell

Twenty-Nine Palms Band of Mission Indians
Dean Mike, Chairperson
46-200 Harrison Place Luiseno
Coachella , CA 92236 Chemehuevi
(760) 775-5566
(760) 775-4639 Fax

San Luis Rey Band of Mission Indians
Russell Romo, Chairman
12064 Old Pomerado Road Luiseno
Poway , CA 92064 Cupeno
(858) 748-1586

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resource assessment for the proposed Santa Margarita River Conjunctive Use Project. SCH# 2004121068, San Diego County.

19

S3 – State Water Resources Control Board *(page 1 of 5)*

Mar 28 05 02:27p p.2

State Water Resources Control Board

Division of Water Rights

1001 I Street, 14th Floor • Sacramento, California 95814 • 916.341.5300
Mailing Address: P.O. Box 2000 • Sacramento, California 95812-2000
FAX: 916.341.5400 • www.waterrights.ca.gov

Alan C. Lloyd, Ph.D.
Agency Secretary

Arnold Schwarzenegger
Governor

RECEIVED Mar 24, 2005
REPLY DUE

DATE		
3/25	WPR	7000
		1500

In Reply Refer to:334:KDM:266.0

MAILED MARCH 15, 2005

U.S. Bureau of Reclamation
William J. Steele
27708 Jefferson Avenue, Suite 202
Temecula, CA 92590

Dear Mr. Steele:

SANTA MARGARITA RIVER CONJUNCTIVE USE PROJECT – PERMITS 8511, 11357 AND 15000 (APPLICATIONS 11587, 12179 AND 31471) OF U.S. BUREAU OF RECLAMATION (RECLAMATION)

It was a pleasure meeting with representatives of the Bureau, Fallbrook Public Utilities District (Fallbrook) and Marine Corps Base Camp Pendleton on February 1, 2005 to discuss the Santa Margarita River Conjunctive Use Project. Reclamation is in the process of preparing an Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for the project. At this time, 22 alternatives are being studied. Reclamation plans to narrow the alternatives to roughly the nine most feasible alternatives for further study.

During the meeting, I expressed my concerns regarding the lack of progress in developing a project pursuant to the permits listed above. Permit 8511 (priority date October 11, 1946) authorizes collection to storage of 10,000 acre-feet per annum (afa) throughout the year for domestic, municipal and irrigation purposes of use. The State Water Resources Control Board (State Water Board) has granted ten time extensions for this permit, extending the complete use date to December 31, 2008. Permit 11357 (priority date November 28, 1947) authorizes collection to storage of 10,000 afa throughout the year for domestic, municipal and irrigation purposes of use. The State Water Board has granted six time extensions for this permit, extending the complete use date to December 31, 2008. Permit 15000 (priority date September 23, 1965) authorizes collection to storage of 165,000 afa throughout the year for domestic, municipal, irrigation and military purposes of use. The State Water Board has granted three extensions of time for this permit, extending the date to complete use to December 31, 2008. The project has not been built, because Congress did not approve the project's funding.

At the meeting, it was evident that Reclamation is attempting to start construction prior to the permits' expiration date in 2008. Even if Reclamation finishes construction in 2008, it will not have an opportunity to complete full, beneficial use of water unless it obtains additional time to do so. Accordingly, Reclamation will need to submit time extension petitions for these filings. At the meeting, Division staff advised Reclamation that it is uncertain whether the State Water Board will grant additional time. The requirements for approval of any time extension are found in section 844, title 23, California Code of Regulations and are repeated in part below: 1

California Environmental Protection Agency

Recycled Paper

Response:

1. Please refer to Chapter 1 for a discussion of the legal and institutional framework and regulatory setting for the proposed project.

S3 – State Water Resources Control Board *(page 2 of 5)*

Mar 28 05 02:27p p.3

U.S. Bureau of Reclamation -2-

An extension of time within which to complete an application, to commence or complete construction work or apply water to full beneficial use will be granted only upon such conditions as the board determines to be in the public interest and upon a showing to the board's satisfaction that due diligence has been exercised, that failure to comply with previous time requirements has been occasioned by obstacles which could not reasonably be avoided, and that satisfactory progress will be made if an extension of time is granted. Lack of finances, occupation with other work, physical disability, and other conditions incident to the person and not to the enterprise will not generally be accepted as good cause for delay. 1 (cont)

Reclamation expressed concern about expending funds prior to knowing whether the State Water Board will approve additional time extensions for the permits. Division staff recommended that time extension petitions be timely filed in order to address this issue prior to initiating project construction.

Reclamation is currently studying 22 alternative projects. All of the proposed projects are for less water than authorized by the three permits. During the meeting, we discussed the fact that the permits should probably be reduced in size to reflect the actual project(s) that are eventually built. We also discussed the fact that any projects that involve changing the points of diversion, place of use or purpose of use will require change petitions. Pursuant to California Code of Regulations, title 23, section 794, the State Water Board requires a change petition to include certain information. The EIR/EIS should include the information required by section 794 for all proposed change petition actions. 2

Due to lack of detail regarding the proposed projects, Division staff cannot state with certainty the type of water right actions that are needed. All of the proposed projects would serve Fallbrook and the Naval Weapons Station. Change petitions are required to serve Fallbrook, because it is not in the authorized place of use. Division staff has not reviewed the permit maps to determine whether the Naval Weapons Station is within the place of use. If it is not, change petitions are required to serve this area. 3

One of the more likely projects is a groundwater recharge project. This project requires a petition to redistribute storage from the unconstructed De Luz Dam and Reservoir to the groundwater storage basin. An underground storage supplement is required for this project. 4

Some of the proposed projects include offstream storage. Unless conditions are established to assure that these storage facilities do not capture and store any water from any streams, including ephemeral streams, that flow into these storage facilities (other than temporary impoundment for flood control purposes followed by controlled releases after the flood event) these facilities will appropriate water from new water sources. New water sources cannot be added to the existing permits. Therefore, new appropriative water rights are required to initiate a basis of right to divert additional water sources for any offstream storage elements located on surface streams (including unnamed, seasonal streams). Moreover, the Santa Margarita River is identified as a fully appropriated stream system. (Wat. Code, § 1205 et seq.; SWRCB Order WR 98-08.) To acquire a new water right, the project proponents must file 5

Response:

2. Please refer to Chapter 1 for the requested information.

3. Please refer to Chapter 1 for the requested information.

4. Please refer to Chapter 1 for the requested information.

5. Other than Lake O'Neill, offstream storage is no longer being considered.

S3 – State Water Resources Control Board ***(page 3 of 5)***

Mar 28 05 02:28p p.4

U.S. Bureau of Reclamation -3-

an application to appropriate water and successfully petition the SWRCB for amendment of the declaration of fully appropriated streams. (Cal. Code Regs., tit. 23, § 871.) The NOP proposals include construction of the Pueblitos Canyon Treatment Wetland, the DET Fallbrook Treatment Wetland, the DET Fallbrook Storage site, the spreading basin, the Red Mountain Reservoir, Rehabilitation Ponds 1-5, Site 6 Offstream Storage, the Enhanced Extraction Pipeline, and the Newton Treatment Wetland. Division staff is uncertain whether these projects can be pursued via change petitions since the Division has not yet received information on whether these facilities are located on surface streams. New sources cannot be added by petition; therefore, a change petition can only be accepted if the inflow from the new source is bypassed. If the facilities are not located on surface streams, Reclamation may petition to change the place of storage for its permits. 5 (cont)

In order to approve change petitions for the offstream storage projects, Reclamation will need to demonstrate that there is no change in the rate or timing of diversions, as compared to the permitted project. The EIS/EIR should include an evaluation of this issue in order to facilitate petition processing.

The NOP describes construction of an Instream Check Structures project. A water right is required for any dam that will collect surface water to seasonal storage (including underground storage). If Reclamation petitions to add this project to its permits, it should state whether this is an element of the groundwater storage project on the petitions. 6

Another proposed project is direct diversion at new production wells on the Santa Margarita River. Direct diversion is not an authorized method of diversion under the permits. Any petition to change the method of diversion from storage to direct diversion should be accompanied by documentation on whether the petition will change the rate and timing of diversions, as compared to operation of the permitted project. In order to approve change petitions for the offstream storage projects, Reclamation will need to demonstrate that there is no change in the rate or timing of diverions, as compared to the permitted project. 7

Lake O'Neill rehabilitation is a proposed project element. Lake O'Neill is not located on the Santa Margarita River. The EIR/EIS should identify the existing basis of right for storage in Lake O'Neill. If this project element involves silt removal from Lake O'Neill, the EIR/EIS should identify when the reservoir capacity was lost due to siltation. Portions of a water right may be lost through five or more years of non-use. 8

If additional water will be diverted from the Santa Margarita River, or other sources, for storage in an enlarged Lake O'Neill, an appropriative water right is required. If Reclamation plans to redistribute De Luz Reservoir storage to Lake O'Neill, Reclamation should petition to redistribute storage to this facility. The petition review (and consequently, the environmental review) will require evaluation of whether diversion to offstream storage changes the rate and timing of diversions, as compared to the operation of the permitted project. 9

Division staff is uncertain whether diversions can be implemented throughout the year, as authorized by Reclamation's permits, due to fish and wildlife concerns. The EIS/EIR should evaluate the impacts of the proposed changes on instream beneficial uses and identify the 10

Response:

6. Instream Check Structures are no longer being considered.

7. Please refer to Section 1.4 and 1.6 for a discussion of permits required for project implementation.

8. The dredging of Lake O'Neill is no longer a part of the Conjunctive Use Project.

9. Please refer to Section 1.4 and 1.6 for a discussion of permits required for project implementation.

10. Annual and seasonal reductions of flow within the Santa Margarita River are provided in Section 4.2 and Appendix B. Impacts to beneficial uses have been evaluated in Sections 4.2 and 4.3.

S3 – State Water Resources Control Board ***(page 4 of 5)***

Mar 28 05 02:28p p.5

U.S. Bureau of Reclamation -4-

appropriate diversion season for the permits, or appropriate bypass, based on environmental and water availability considerations. 10 (cont)

A water availability analysis should be included in the EIS/EIR. The analysis should provide monthly data on water availability, for above normal, normal, below normal and critically dry water year types. The analysis should also include an evaluation of how much water must be left in the stream to keep fish in good condition. 11

Finally, Camp Pendleton is diverting water in excess of the amount authorized under License 10494 (A21471A) or any other water right acquired under California law.[1] The EIS/EIR should discuss the relationship between the project and Camp Pendleton's unauthorized diversions. Is the project intended to provide a legal basis under California law for Camp Pendleton's currently unauthorized diversions? If not, will Camp Pendleton discontinue those unauthorized diversions? If not, EIS/EIR will need to include a cumulative impacts analysis that includes consideration of present and reasonably foreseeable future unauthorized diversions by Camp Pendleton. Thank you for the opportunity to comment on the NOP. If you require further assistance, I can be contacted at (916) 341-5363. 12

Sincerely,

ORIGINAL SIGNED BY:

Katherine Mrowka, Chief
Watershed Unit #3

cc: Joe Jackson
Fallbrook Public Utility District
P.O. Box 2290
Fallbrook, CA 92088-2290

William Rohwer
U.S. Bureau of Reclamation
22708 Jefferson Avenue, Suite 202
Temecula, CA 92590

Chad P. Seber
Building 1254 WACO
Marine Corps Base
Camp Pendleton, CA 92055-5013

[1] Camp Pendleton has no federal reserved water rights, and Congress has directed that Camp Pendleton comply with California water right law.

Response:

11. Analysis of project impacts on surface water in the Santa Margarita River is provided in the *Santa Margarita River Conjunctive Use Project: Final Technical Memorandum No. 1 and 2.2* (surface water availability and surface/groundwater model, respectively). These reports were updated and include analysis to steelhead migration in the *Southern California Steelhead Passage Assessment, Lower Santa Margarita River, California and CUP Surface Water Availability Analysis (TM 1.1)*. Results from these studies are presented and evaluated in Sections 4.2 and 4.3 of this EIS/EIR.

12. MCB Camp Pendleton has three water "rights:" riparian, pre-1914, and license 21471. The license is perfected at 4,000 acre-feet. The pre-1914 is quantified at 1,200 acre-feet (excluding evaporative or other system losses). The riparian right has not been quantified. MCB Camp Pendleton has at no time exceeded their legal right to water and does not have any unauthorized diversions. For additional information, refer to the California State Water Resources Control Board, the Santa Margarita River Watermaster and/or the 70 years of documented legal briefs, adjudications, interlocutory judgments, etc.

S3 – State Water Resources Control Board *(page 5 of 5)*

Mar 28 05 02:29p p.6

U.S. Bureau of Reclamation -5

Marty Kaiser
U.S. Bureau of Reclamation
2800 Cottage Way
Sacramento, CA 95825

Amy Aufdemberge
U.S. Bureau of Reclamation
2800 Cottage Way
Sacramento, CA 95825

bcc: Megan Sheely
Kate Gaffney
Steve Herrera
Erin Mahaney
John O'Hagan

KDMrowka:kdm/xrivera:3-14-05
U:\PERDRV\Kathy Mrowka\santa margarita letter2.doc

L1 – Endangered Habitats League / Conservation Biology Institute ***(page 1 of 4)***

ENDANGERED HABITATS LEAGUE

DEDICATED TO ECOSYSTEM PROTECTION AND SUSTAINABLE LAND USE

JAN 31 2005

January 29, 2005

VIA FACSIMILE AND US MAIL

Fallbrook Public Utility District
ATTN: Joe Jackson
P.O. Box 2290, 990 E. Mission Road
Fallbrook, CA 92088-2290

RE: Santa Margarita River Conjunctive Use Project

Dear Mr. Jackson:

The Endangered Habitats League (EHL) appreciates the opportunity to comment on the Notice of Preparation for the above-referenced project. Please find enclosed a letter from the Conservation Biology Institute providing this information.

Please retain EHL on all distribution and notification lists for this project.

Sincerely,

Dan Silver
Executive Director

cc: Bill Rohwer, U.S. Bureau of Reclamation

8424 A Santa Monica Blvd. #592, Los Angeles, CA 90069-4267 • www.[illegible] • Phone 213.804.2750 • Fax 323.654.1931

L1 – Endangered Habitats League / Conservation Biology Institute ***(page 2 of 4)***

Jan 31 05 01:20p p.3

Conservation Biology Institute

651 Cornish Drive • Encinitas, California 92024
Phone/Fax: (760) 634-1590
http://www.consbio.org

January 26, 2005

Mr. Bill Rohwer
U.S. Bureau of Reclamation
Southern California Area Office
27708 Jefferson Ave., Suite 202
Temecula, CA 92590

Subject: **Notice of Intent to Prepare an Environmental Impact Statement/Environmental Impact Report for the Santa Margarita River Conjunctive Use Project, San Diego County, CA**

Dear Mr. Rohwer:

The Conservation Biology Institute (CBI) is a non-profit, conservation science organization, with expertise in habitat conservation planning, environmental impact studies, and special status species conservation and recovery efforts. We have prepared these comments on behalf of the Endangered Habitats League. The Santa Margarita River system is a regionally important resource, supporting a variety of high quality and sensitive habitats and species. Protection of these resources is an important responsibility of the Bureau of Reclamation (BR), Marine Corps Base (MCB) Camp Pendleton, and Fallbrook Public Utility District (FPUD). We recommend that the following issues be addressed as part of the Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for the subject project.

- A thorough analysis of surface and ground water dynamics and the potential effects of the proposed project on these dynamics should be conducted. The integrity or health of riverine ecosystems is dependent on their natural flow regimes. A natural flow regime includes a number of components, such as magnitude, frequency, timing, and rate of change. The flow regime of the Santa Margarita River exhibits a high degree of intra- and inter-annual variability, which resident organisms have adapted to and which is important to the long-term integrity of this ecosystem. In addition, surface and ground waters are likely to be strongly coupled in this system, particularly in the lower alluvial reaches of the river. Thus, extraction of groundwater from the alluvial aquifer of the lower basin has the potential of modifying the natural flow regime of the river which, in turn, has the potential to adversely affect the quality of habitats associated with the river and the species that rely on these habitats. 1

8

Response:

1. Sections 3.2 and 4.2, *Water Resources* includes a discussion of baseline and potential impacts on surface and groundwater resources. Potential impacts to Biological Resources with implementation of the action alternatives are discussed in Section 4.3.

L1 – Endangered Habitats League / Conservation Biology Institute *(page 3 of 4)*

Jan 31 05 01:20p p.4

Mr. Bill Rohwer, January 26, 2005
Pg. 2

- The potential for the project to adversely affect riparian vegetation communities should be addressed. The Santa Margarita River supports extensive high quality riparian habitat that supports a number of sensitive species. Riparian habitat depends both on periodic disturbances from flooding and high ground water levels. 2

- The effects of the proposed project on ephemeral pools and backwaters should be assessed. Several sensitive species rely on ephemeral pools and backwaters that form within and adjacent to the river channel during periods of high surface discharges and groundwater elevations for breeding and foraging habitat. Species such as the arroyo toad and southwestern pond turtle use these habitats for breeding. These habitats also are a source of invertebrate production, which is an important food source for breeding riparian birds such as the least Bell's vireo and southwestern willow flycatcher. 3

- The potential for the project to affect steelhead habitat and upstream and downstream migrations should be assessed. The Santa Margarita River is one of the last remaining rivers in Southern California that can potentially support southern steelhead. Steelhead rely on adequate flows to allow passage of adults and juveniles in upstream and downstream directions. High flow events are important to periodically opening the mouth of the Santa Margarita River estuary and to maintaining high water quality in the estuary. 4

- The potential for the proposed project to alter lagoon system dynamics should be analyzed. The Santa Margarita River estuary supports the endangered tidewater goby and sensitive salt marsh habitat. This tidewater goby has evolved in dynamic lagoon systems, where lagoon mouths close and are periodically opened by high flows and storm events. Maintaining the dynamic nature of these systems is crucial to the long-term viability of this species. Salt marsh habitats are also dependent on the balance of seawater circulation and freshwater inflows, and altering this balance could adversely affect this habitat and associated sensitive species. 5

- Growth inducing impacts of the proposed project must be adequately analyzed. Developing additional municipal supplies of water is potentially growth-inducing in that it facilitates increasing residential population within the service area of FPUD. Expanding residential housing density and the associated infrastructure in the service area creates significant direct, indirect, and cumulative impacts to natural resources, including terrestrial resources in areas removed from the river corridor. 6

Response:

2. Please refer to response to comment #1 on previous page.

3. Please refer to response to comment #1 on previous page.

4. Please refer to response to comment #1 on previous page.

5. Please refer to response to comment #1 on previous page.

6. Growth inducement factors are discussed in Section 6.1

L1 – Endangered Habitats League / Conservation Biology Institute ***(page 4 of 4)***

Jan 31 05 01:20p p.5

Mr. Bill Rohwer, January 26, 2005
Pg. 3

Please feel to contact me if you require clarification or wish to discuss these issues further.

Sincerely,

Michael D. White, Ph.D.
Senior Ecologist

Cc: Mr. Joe Jackson, Fallbrook Public Utility District

L2 – Jane Comella ***(page 1 of 1)***

Written Comment Form
Santa Margarita River Conjunctive Use Project

Department of the Navy, Marine Corps Base Camp Pendleton
Bureau of Reclamation
Fallbrook Public Utility District

Your input is important to us; please use this comment sheet to provide input on issues to be evaluated in the Draft EIS/EIR. Your comments will be addressed in the Draft EIS/EIR. Please include your name and address below to receive a copy of the Draft EIS/EIR.

member of the Fallbrook Land Conservancy Trail's Council. I am concerned that the Santa Margarita River Valley from the San Diego State Santa Margarita Ecological Reserve to the Sandia Creek / DeLuz Road intersection remain open to passive recreational use. 1

Additional space? Please use other side.

Name* Jane Comella
Address 1446 Hillcrest Lane
City/State/Zip Code Fallbrook, CA 92028

* *Comments, including names and home addresses of respondents, will be made available for public review. Individual respondents may request their home address be withheld from public disclosure. Please prominently state at the beginning of your comment if you wish your name and/or address withheld from public disclosure.*

Please submit your comments to the court stenographer at the Sign-In Station or mail your comments to:

Bureau of Reclamation, Southern California Area Office
Attention: Bill Rohwer, Planning Officer
27708 Jefferson Avenue, Suite 202
Temecula, CA 92590
Or comments can be faxed to: (951) 695-5319

To ensure that your comments are considered in the Draft EIS/EIR, comments must be received by January 31, 2005.

Response:

1. The preservation of the OMSZ is an important component of the Conjunctive Use Project and can occur through more than one route or mechanism. The Proposed Action involves a transfer of the land into Federal or other third party ownership as conservation land. In both cases, all existing passive recreational activities would be maintained.

L3 – Joe Comella ***(page 1 of 1)***

Written Comment Form
Santa Margarita River Conjunctive Use Project

Department of the Navy, Marine Corps Base Camp Pendleton
Bureau of Reclamation
Fallbrook Public Utility District

Your input is important to us; please use this comment sheet to provide input on issues to be evaluated in the Draft EIS/EIR. Your comments will be addressed in the Draft EIS/EIR. Please include your name and address below to receive a copy of the Draft EIS/EIR.

I am a member of the Fallbrook Land Conservancy Trails Council. I am concerned that as this project progresses through the various stages to completion, that there is consideration for passive recreational uses of the trails throughout the watershed area, specifically from the Southern end of the Santa Margarita Ecological Reserve to the border of Camp Pendleton. 1

The Trails Council has been monitoring the trail in the Santa Margarita watershed and it would be wonderful for everyone to continue the relationship (in writing) allowing the Fallbrook Land Conservancy Trails Council to continue with their voluntary trail maintenance to provide passive recreational use of this area for benefit to all entities to observe.

Additional space? Please use other side.

Name* Joe Comella
Address 1446 Hillcrest Ln
City/State/Zip Code Fallbrook, Ca 92028

* *Comments, including names and home addresses of respondents, will be made available for public review. Individual respondents may request their home address be withheld from public disclosure. Please prominently state at the beginning of your comment if you wish your name and/or address withheld from public disclosure.*

Please submit your comments to the court stenographer at the Sign-In Station or mail your comments to:

Bureau of Reclamation, Southern California Area Office
Attention: Bill Rohwer, Planning Officer
27708 Jefferson Avenue, Suite 202
Temecula, CA 92590
Or comments can be faxed to: (951) 695-5319

To ensure that your comments are considered in the Draft EIS/EIR, comments must be received by January 31, 2005.

3

Response:

1. The preservation of the OMSZ is an important component of the Conjunctive Use Project and can occur through more than one route or mechanism. The Proposed Action involves a transfer of the land into Federal or other third party ownership as conservation land. In both cases, all existing passive recreational activities would be maintained.

L4 – Donna Gebhart ***(page 1 of 1)***

Feb 02 05 02:01p p.2

02/01/2005 12:58 7607319919 GEBHART & ASSOC. INC. PAGE 01/01

[redacted]onjunctive Use Project

[redacted]t of the Navy, Marine Corps Base Camp Pendleton
Bureau of Reclamation
Fallbrook Public Utility District

Your input is important to us; please use this comment sheet to provide input on issues to be evaluated in the Draft EIS/EIR. Your comments will be addressed in the Draft EIS/EIR. Please include your name and address below to receive a copy of the Draft EIS/EIR.

We appreciate the opportunity to be able to comment. I chair the Fallbrook Land Conservancy Trails Council - We maintain the trails in the Santa Margarita Riverbed. We have approx. 10 m/s of trails. This is an integral part of the trail system in Fallbrook which also has one block away from the Courts SM Park which is not open yet but we do have an operating agreement with the courts for. Our maps of trails & pathways have also been accepted by the Co. of San Diego as part of the S.D. Co. Trails Master Plan. When the conjunctive use agreement is finalized we would very much appreciate being able to have input as far as siting trails for passive recreational use for the community. As you get closer to the end, we would be happy to meet with you to discuss how we can accomplish these goals. Additional space? Please use other side

Name* Donna Gebhart 760-731-9441
Address 1609 Santa Margarita Dr.
City/State/Zip Code Fallbrook, Ca 92028 dgebhartepacbell.net

* *Comments, including names and home addresses of respondents, will be made available for public review. Individual respondents may request their home address be withheld from public disclosure. Please prominently state at the beginning of your comment if you wish your name and/or address withheld from public disclosure.*

Please submit your comments to the court stenographer at the Sign-In Station or mail your comments to:

Bureau of Reclamation, Southern California Area Office
Attention: Bill Rohwer, Planning Officer
27708 Jefferson Avenue, Suite 202
Temecula, CA 92590
Or comments can be faxed to: (951) 695-5319

To ensure that your comments are considered in the Draft EIS/EIR, comments must be received by January 31, 2005.

21

Response:

1. The preservation of the OMSZ is an important component of the Conjunctive Use Project and can occur through more than one route or mechanism. The Proposed Action involves a transfer of the land into Federal or other third party ownership as conservation land. In both cases, all existing passive recreational activities would be maintained.

I1 – Barbara Hayden ***(page 1 of 1)***

Written Comment Form
Santa Margarita River Conjunctive Use Project

Department of the Navy, Marine Corps Base Camp Pendleton
Bureau of Reclamation
Fallbrook Public Utility District

Your input is important to us; please use this comment sheet to provide input on issues to be evaluated in the Draft EIS/EIR. Your comments will be addressed in the Draft EIS/EIR. Please include your name and address below to receive a copy of the Draft EIS/EIR.

I am very concerned that the public have recreational access to the 1400 acres for hiking, horse back riding, bird watching, etc. 1

Additional space? Please use other side.

Name* Barbara Hayden
Address 2411 N Stage Coach Ln
City/State/Zip Code Fallbrook, Ca. 92028

* *Comments, including names and home addresses of respondents, will be made available for public review. Individual respondents may request their home address be withheld from public disclosure. Please prominently state at the beginning of your comment if you wish your name and/or address withheld from public disclosure.*

Please submit your comments to the court stenographer at the Sign-In Station or mail your comments to:

Bureau of Reclamation, Southern California Area Office
Attention: Bill Rohwer, Planning Officer
27708 Jefferson Avenue, Suite 202
Temecula, CA 92590
Or comments can be faxed to: (951) 695-5319

To ensure that your comments are considered in the Draft EIS/EIR, comments must be received by January 31, 2005.

Response:

1. The preservation of the OMSZ is an important component of the Conjunctive Use Project and can occur through more than one route or mechanism. The Proposed Action involves a transfer of the land into Federal or other third party ownership as conservation land. In both cases, all existing passive recreational activities would be maintained.

I2 – Alberta Jane Parker ***(page 1 of 1)***

Written Comment Form
Santa Margarita River Conjunctive Use Project

Department of the Navy, Marine Corps Base Camp Pendleton
Bureau of Reclamation
Fallbrook Public Utility District

Your input is important to us; please use this comment sheet to provide input on issues to be evaluated in the Draft EIS/EIR. Your comments will be addressed in the Draft EIS/EIR. Please include your name and address below to receive a copy of the Draft EIS/EIR.

I have a question pertaining to the purity + safety of the water pumped out of the aquifiers.
Much of the water entering the Santa Margarita River (particularly in summer) is agriculture runoff, + as such includes both fertilizers + pestisides. 1
How much of these contaminants are removed in the aquifier? Won't the effect of these contaminants increase over time (years)? Monitoring is a passive activity. What can be actively done to preserve purity? *Additional space? Please use other side.*

Name* Alberta Jane Parker
Address 1694 Santa Margarita
City/State/Zip Code Fallbrook 92028

* *Comments, including names and home addresses of respondents, will be made available for public review. Individual respondents may request their home address be withheld from public disclosure. Please prominently state at the beginning of your comment if you wish your name and/or address withheld from public disclosure.*

Please submit your comments to the court stenographer at the Sign-In Station or mail your comments to:

Bureau of Reclamation, Southern California Area Office
Attention: Bill Rohwer, Planning Officer
27708 Jefferson Avenue, Suite 202
Temecula, CA 92590
Or comments can be faxed to: (951) 695-5319

To ensure that your comments are considered in the Draft EIS/EIR, comments must be received by January 31, 2005.

Response:

1. Water quality concerns are addressed under Section 4.2, *Water Resources*.

I3 – James E. Pigg *(page 1 of 1)*

Jan 31 05 04:34p p.5

1 CLASSIFIED COPY
RECEIVED 11/8/04
CODE
7006
Classification
Project
Contractor
Folder I.D.
Keyword

James F. Pigg
4851 Quail Run
Las Cruces, NM 88011

1 November 2004

Bureau of Reclamation
Southern California Area Office
Attn: Bill Rohwer
27708 Jefferson Ave, Suite 202
Temecula, CA 92590

EIS/EIR Mailing List

Please include me on the mailing list for the EIS/EIR for the Santa Margarita River Conjunctive Use Project. Electronic format is preferred, if available. 1

Mailing address:

James Pigg
4851 Quail Run
Las Cruces, NM 88011

Email address:

jfpigg@mindspring.com

Thank you,

James Pigg

20

Response:

1. Individual has been added to the EIS/EIR mailing list as requested.

Appendix B

Surface Water and Groundwater Model Results

[This Page Intentionally Left Blank]

APPENDIX B

SUMMARY OF SURFACE WATER AND GROUNDWATER MODEL RESULTS

A surface water and groundwater model (Model) has been used to provide information necessary to make decisions related to the Santa Margarita River (SMR) Conjunctive Use Project (SMR CUP) (U.S. Bureau of Reclamation [Reclamation] 2007). The Model is a three-dimensional USGS MODFLOW surface water and groundwater model originally developed in 2001 for the Permit 15000 Study (Reclamation 2001). The Model was updated in 2005 and used to develop over 16 project alternatives, including ten original alternatives (Reclamation 2007a) and six subsequent alternatives (Stetson Engineers Inc. [Stetson] 2012a,b). Of the 16 model runs, only two project alternatives (Alternatives 1 and 2) were found to efficiently meet the long-term water demands of Marine Corps Base (MCB) Camp Pendleton and Fallbrook Public Utility District (FPUD), reduce FPUD's dependence on imported water, maintain watershed resources, and improve water supply reliability by managing the yield of the Lower SMR Basin while protecting environmental resources.

This appendix discusses the most recent Model results for surface water flows and groundwater levels in the lower SMR Basin using flow data from the updated *CUP Surface Water Availability Analysis (TM 1.1)* (Reclamation et al. 2012). This report utilizes model simulations performed by Stetson to compare the effects of Alternatives 1 and 2 Model simulations with results from a Baseline Model simulation.

B.1 MODEL DESCRIPTION

Using the Model, a study was completed to maximize the potential yield for the SMR CUP within limitations set by physical and environmental constraints. The streamflow, groundwater production, environmental, and infrastructure parameters and constraints used for the Baseline and Alternatives 1 and 2 simulations are provided in Table B-1. The parameters and constraints include: historical water levels and hydrologic conditions; Cooperative Water Resources Management Agreement (CWRMA) or Title 22 releases; 3 cubic feet per second (cfs) minimum bypass flows at the diversion structure to meet downstream riparian needs; water quality; and prevention of seawater intrusion and compaction (i.e., subsidence) to the groundwater aquifer (Reclamation 2007). Figure B-1 shows the spatial domain of the Model used for this study. The Model encompasses the Upper Ysidora, Chappo, and Lower Ysidora groundwater sub-basins.

A 50-year simulation period was developed for the Model to describe physical and environmental characteristics during varying hydrologic conditions that are typical in the SMR watershed. The 50-year simulation period utilizes historical hydrologic data (i.e., 1952 through 2001) that encompasses the range of varying hydrologic conditions within the watershed. These hydrologic conditions are described as Extremely Dry (ED), Very Dry (VD), Below Normal (BN), Above Normal (AN), and Very Wet (VW). ED and VD hydrologic conditions are identical except for that ED conditions are based on antecedent conditions and may only occur immediately following a VD or ED year. During the 50-year period, ED/VD conditions occurred for 12 years (24%), BN conditions for 14 years (28%), AN conditions for 15 years (30%), and VW conditions for 9 years (18%).

Table B-1. Modeling Assumptions Used for Alternative Analysis

Operational Parameter \ Run	No-Action Alternative (Baseline)	Alternative 1 Groundwater Wells Only	Alternative 2 Groundwater and Gallery Wells
Streamflow			
CWRMA	✓	✓	✓
3-cfs Bypass	✓	✓	✓
CWRMA Emergency Water	✓	✓	✓
Groundwater Production			
Upper Ysidora/Chappo Pumping	✓	✓	✓
Water Conservation during Droughts	✓	✓	✓
Gallery Wells			✓
Lower Ysidora Pumping (Title 22)			
Historical Pumping Distribution	✓	✓	✓
Environmental Parameters			
VOC Constraint[1]	✓	✓	✓
No Aquifer Compaction[2]		✓	✓
Riparian Water Level Constraint[3]		✓	
Subsurface Flow at LY Narrows		✓	✓
Infrastructure			
Existing Groundwater Wells	12	12	12
New Groundwater Wells		4	4
New Gallery Wells			4
Recharge Ponds	7	7	7
Bi-Directional Pipeline		✓	✓
Minimum Basin Yield (af/y)	6,300	4,600	5,000
Maximum Basin Yield (afy)	8,800	15,800	21,500
Average Basin Yield (af/y)	8,400	10.800	12,800

Notes: [1] The VOC Constraint requires that water not be pumped from wells with known contamination. Groundwater from Well 26018 has shown TCE concentrations below the MCL and has been included in all model runs per discussions with the Base.
[2] The potential for aquifer compaction is indicated by dewatering of areas with a higher percentage of clay sediments.
[3] The Riparian Water Level Constraint requires that groundwater levels in the riparian corridor are not dropped below historical measured water levels.

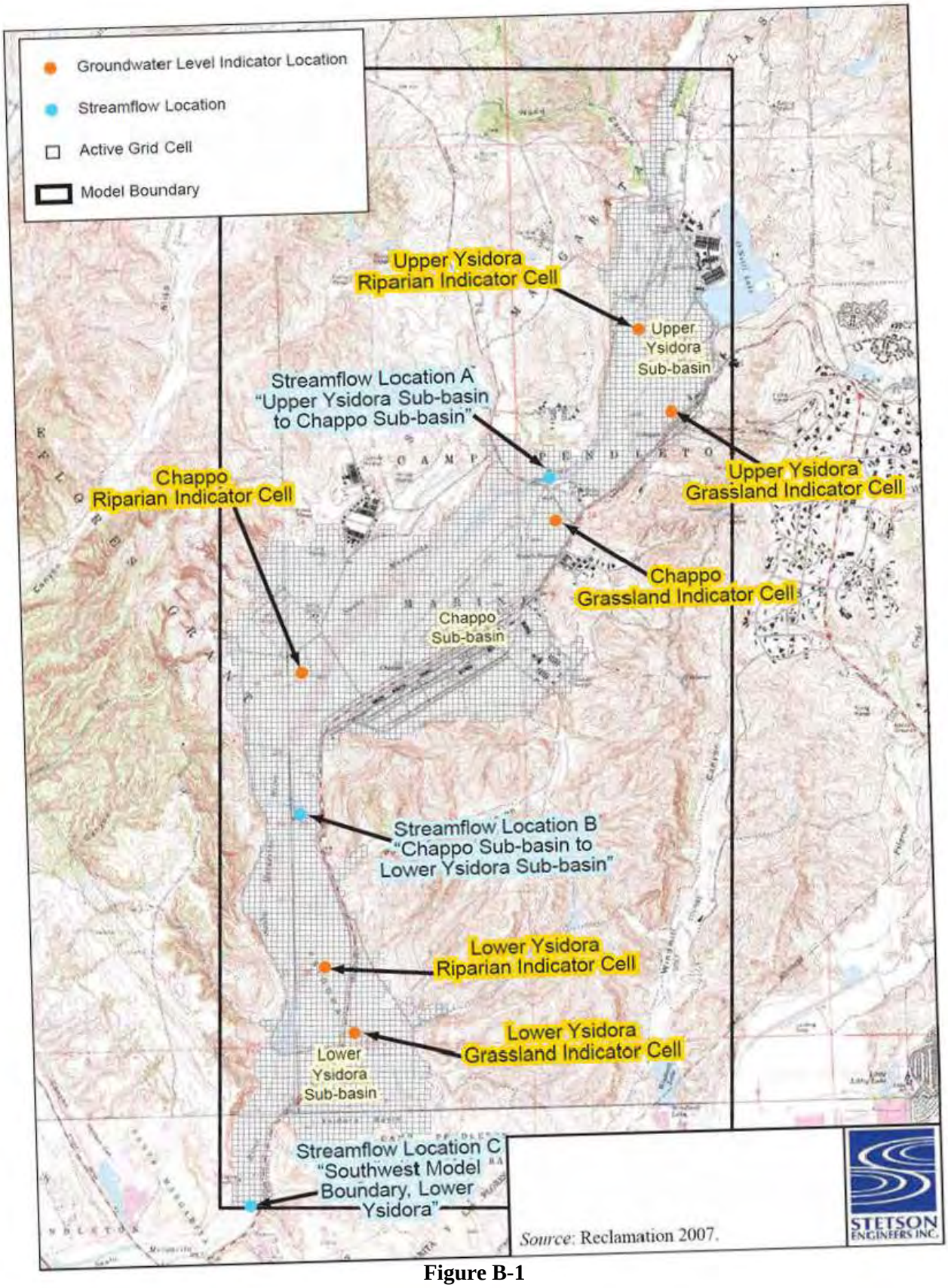


Figure B-1

Model Grid, Boundary, Groundwater Indicator Locations,and Streamflow Locations

The Model was used to assess the effects of various project components such as groundwater pumping, diversions from the SMR, and recharge from the SMR and recharge ponds. A Baseline Model simulation (Attachment 1; Stetson 2012a) was developed and serves as the basis for comparison of other simulations representing Alternative 1 (Attachment 2; Stetson 2012b) and Alternative 2 (Attachment 3; Stetson 2012c). Comparison of groundwater levels and streamflow quantities during different hydrologic conditions allows for assessment of potential impacts between the No-Action Alternative (Baseline) and the action alternatives.

The Baseline Model establishes physical parameters under existing conditions that rely only on existing infrastructure to meet potable groundwater requirements on MCB Camp Pendleton. Alternatives 1 and 2 would rely on increased diversion and recharge rates and new production and gallery wells to increase sustained basin yield to meet MCB Camp Pendleton and FPUD demands, but include water management constraints to prevent negative environmental impacts. These constraints vary by alternative and would include maintenance of groundwater levels within their historical range to protect riparian water levels (Alternative 1), no aquifer compaction (both action alternatives), and/or no seawater intrusion by maintaining minimum subsurface flow out of the model at the Lower Ysidora Narrows (both action alternatives). The action alternatives include the construction of a bi-directional pipeline that would connect MCB Camp Pendleton to an off-base source of imported water. MCB Camp Pendleton access to imported water would allow for an increase in sustained basin yield due to the availability of an alternative water supply during prolonged drought conditions. Under Alternative 1 and 2 operations, groundwater pumping would be curtailed during dry hydrologic conditions to protect physical and environmental concerns and instead rely on imported water to meet a portion of MCB Camp Pendleton's water demand.

B.2 RESULTS AND DISCUSSION

The average annual groundwater pumping under the Baseline Model simulation is 8,400 af/y (Stetson 2012a), which is 400 af/y less than the 8,800 af/y allowed under existing water rights due to conservation measures during ED/VD hydrologic conditions. Based on the environmental constraints and operational parameters that were used to develop each action alternative, increases in Alternatives 1 and 2 sustained basin yield above baseline yield would be limited to 10,800 af/y and 12,800 af/y, respectively (Stetson 2012b,c); this equates to an increase over the Baseline by 2,400 af/y and 4,400 af/y, respectively. Imported water supplies required to meet sustained basin yield requirements for Alternatives 1 and 2 are 500 af/y and 1,100 af/y, respectively.

The Model simulates evapotranspiration which measures consumptive use of groundwater by riparian phreatophytes. Modeled evapotranspiration can be used as an indicator of potential impacts to riparian habitat and the riverine environment. A substantial decline in annual evapotranspiration could be indirectly related to a stressed riverine environment. Evapotranspiration for the Baseline and two action alternatives is described in the annual Model budget shown in Attachments 1 through 3. Baseline evapotranspiration averaged 2,500 af/y under Baseline conditions and decreased by 100 af/y (4%) for both Alternatives 1 and 2. This is not considered a significant decline in annual evapotranspiration.

Analysis of specific environmental parameters may be assessed from the Model's groundwater budget and groundwater level hydrographs shown in Section B.2-1. VOC migration occurs when groundwater production wells are placed near known contaminant plumes. Aquifer compaction may occur when groundwater levels drop below the highest clay layer in the aquifer. Impacts to riparian habitat may occur when groundwater levels below the SMR drop below the root extinction depth of riparian vegetation. Lastly, seawater intrusion may occur when subsurface outflow from the Model at the Lower Ysidora

Narrows becomes a negative number. Each of these physical and environmental factors was reviewed throughout the development of the Baseline and Alternative 1 and 2 Model simulations.

The simulated groundwater level and SMR streamflow information relating to Alternatives 1 and 2 is summarized below in Section B.2-1, *Groundwater Levels* and Section B.2-2, *SMR Streamflow*, respectively.

B.2.1 GROUNDWATER LEVELS

In order to assess the changes in groundwater levels between the Baseline Model simulation and the Model simulations for Alternatives 1 and 2, six "indicator" locations were identified that depict water levels representative of conditions in each sub-basin. Two locations were chosen in each sub-basin, with one location representing conditions in the riparian zone and the other location representing conditions in grassland areas that do not contain phreatophyte vegetation. Figure B-1 shows the locations of each of these six indicator locations.

B.2.1.1 Alternative 1 Simulation

Figures 1 to 3 in Attachment 2 (Stetson 2012b) show the simulated groundwater levels in Upper Ysidora, Chappo, and Lower Ysidora sub-basins, respectively, comparing the Baseline Model simulation to the Alternative 1 Model simulation (*Note*: Alternative 1 is referred to as "Run 16b" in Attachment 2). Each figure presents two graphs, one for the riparian indicator location and one for the grassland location. The following information is presented on each graph:

<u>Riparian Indicator</u>

The following lines are shown on each of the graphs for the riparian indicator locations:

- *Land Surface Elevation*: This line represents the elevation of the ground surface at this location.
- *Low Water Level*: This line shows the elevation of the lowest recorded groundwater level in the area of the indicator location.
- *Baseline Simulated Water Level*: The red dashed line is the calculated groundwater level from the baseline simulation.
- *Alternative 1 Simulated Water Level*: The green line is the calculated groundwater level from the Alternative 1 simulation. This simulation was termed "Run 16B" by Stetson (Stetson 2012b).

<u>Grassland Indicator</u>

The following lines are shown on each of the graphs for the riparian indicator locations:

- *Land Surface Elevation*: This line represents the elevation of the ground surface at this location.
- *Baseline Simulated Water Level*: The red dashed line is the calculated groundwater level from the baseline simulation.
- *Alternative 1 Simulated Water Level*: The green line is the calculated groundwater level from Alternative 1 simulation.

The riparian and grassland indicator graphs also have shaded vertical bands behind the lines. Each of the colors of these bands represents the hydrologic condition for a specific year (i.e., ED [Drought], VD, BN, AN, or VW).

Results

During several ED/VD years groundwater levels in the riparian indicator drop to the measured historical low in the Upper Ysidora and Chappo sub-basins. The Alternative 2 Model includes the same constraints outlined in an Adaptive Management Plan (AMP) (Stetson 2009) that reduce pumping rates during ED/VD and further reduce pumping rates as historical low groundwater levels are approached. Specifically, groundwater pumping would be curtailed when the average monthly groundwater level drops to within 3 feet (ft) of the historical minimum. These groundwater levels would be determined by a series of telemetered groundwater monitoring wells. Pumping would be further reduced or shut off if the groundwater level is within 0.5 ft of the historic minimum. Pumping rates would remain reduced until the average monthly groundwater levels returned to 0.5 ft above the historical minimum (Stetson 2009). As a result, groundwater levels would not drop below historical groundwater lows.

Under Alternative 1, the effect of lowered groundwater levels in the Upper Ysidora and Chappo sub-basins may result in reduced pumping efficiency or production from other MCB Camp Pendleton supply wells. However, the AMP would monitor water levels throughout the groundwater basin and production rates at individual wells would be adjusted accordingly to maintain yield.

Simulated groundwater levels in the grassland area of the Upper Ysidora and Chappo sub-basins are allowed to drop lower than in the riparian indicator because these areas have no phreatophytes to be adversely affected by the lowered groundwater table (i.e., no historical groundwater level constraint has been set). Simulated groundwater levels at the riparian and grassland indicators in the Lower Ysidora sub-basin (Figure 3 in Attachment 2) are similar to baseline conditions because agricultural pumping would continue to be discontinued in this sub-basin.

B.2.1.2 Alternative 2 Simulation

Figures 1 to 3 in Attachment 3 (Stetson 2012c) show the simulated groundwater levels in Upper Ysidora, Chappo, and Lower Ysidora sub-basins, respectively, comparing the Baseline Model simulation to the Alternative 2 Model simulation (*Note*: Alternative 2 is referred to as “Run 13A” in Attachment 3). Each figure presents two graphs, one for the riparian indicator location and one for the grassland location. The types of data included on each of the graphs are the same as described in Section B.2.1.1.

Results

Simulated groundwater levels at the riparian indicator in the Upper Ysidora Sub-basin typically drop below Baseline conditions during AN conditions and drop below measured historical groundwater levels during 19 dryer years in the 50-year simulation period (Figure 1 in Attachment 3). Groundwater levels in the Chappo and Lower Ysidora sub-basins are projected to remain above the historic low measured water level throughout the 50-year simulation period (Figures 2 and 3 in Attachment 3).

If groundwater levels drop below historical levels as a result of Alternative 2, there is the potential for significant impacts to occur to groundwater resources. However, an AMP (similar to Alternative 1) would be adopted to mitigate these impacts. Specifically, groundwater pumping would be curtailed when the average monthly groundwater level drops to within 3 ft of the historical minimum. These groundwater levels would be determined by a series of telemetered groundwater monitoring wells. Pumping would be further reduced or shut off if the groundwater level is within 0.5 ft of the historic minimum. Pumping rates would remain reduced until the average monthly groundwater levels returned to 0.5 ft above the historical minimum (Stetson 2009).

Simulated groundwater levels in the grassland area of the Upper Ysidora and Chappo sub-basins are

allowed to drop lower than in the riparian indicator because these areas have no phreatophytes to be adversely affected by the lowered groundwater table (i.e., no historical groundwater level constraint has been set). The effects to existing MCB Camp Pendleton supply wells and riparian areas would be similar to those under Alternative 1.

B.2.2 SMR STREAMFLOW

The Model provides simulated streamflow data for the following three locations on the SMR: (1) at the boundary between the Upper Ysidora and Chappo sub-basins, (2) between the Chappo and Lower Ysidora sub-basins, and (3) at the southwest model boundary, which is approximately 0.5 mile upstream of the SMR Estuary (Reclamation 2007). In addition, average monthly streamflow data were compiled for each of the hydrologic conditions (i.e., ED/VD, BN, AN, or VW) and for the entire 50-year simulation period.

B.2.2.1 Alternative 1 Simulation

Figure 4 in Attachment 2 (Stetson 2012b) shows the simulated streamflow in the SMR at the three locations mentioned above. Each graph shows two separate lines. The lines represent:

- *Baseline Simulated Water Level*: The red dashed line is the calculated streamflow in the SMR from the baseline simulation.
- *Alternative 1 Simulation*: The green line is the calculated streamflow in the SMR from the Alternative 1 simulation.

Note that the vertical axis of each of the graphs is shown on a "log" scale and represents variations in streamflow over several orders of magnitude.

Table B-2 shows the average monthly SMR flow for all years and the four hydrologic conditions in Alternative 1 simulation at streamflow location "C," the Lower Ysidora Narrows (see Figure B-1), which is located approximately 0.5 mile upstream of the SMR Estuary. For comparison, the simulated flow data for the Baseline Model simulation (i.e., the No-Action Alternative), and changes in SMR flow between the Baseline and Alternative 1 Model simulations are also provided in Table B-2. The changes in flow are presented in terms of flow rate (acre-feet per month [af/m]) and percent change from Baseline conditions. The change in flow between the Baseline and Alternative 1 Model simulations is also shown graphically in Table B-2.

<u>Results</u>

The results in Figure 4 in Attachment 2 show the changes in monthly streamflow in the SMR due to increased diversions and pumping rates under Alternative 1 compared with the Baseline Model simulation. As shown in Table B-2, streamflow reduction would occur during the summer months during AN and VW hydrologic conditions; and early/late wet season during BN hydrologic conditions. There is a slight improvement in streamflow due to the AMP during most months of ED/VD hydrologic conditions.

B.2.2.2 Alternative 2 Simulation

Figure 4 in Attachment 3 (Stetson 2012c) shows the Alternative 2 simulated streamflow in the SMR at the same three locations described in Section B.2.2.1. The types of data included on each of the graphs are the same as described in Section B.2.2.1.

Table B-3 shows the average monthly SMR flow for all years and the four hydrologic conditions in the

Alternative 2 Model simulation at streamflow location "C," the Lower Ysidora Narrows (see Figure B-1), which is located approximately 0.5 mile upstream of the SMR Estuary. The change in flow between the Baseline and Alternative 2 Model simulations is also shown graphically in Table B-3.

Results

The results in Figure 4 in Attachment 3 show the decrease in streamflow in the SMR due to increased diversions and pumping rates with four new gallery wells under Alternative 2. Additional periods of lower (than Baseline) flow are evident during several years. The peak flows in the SMR are relatively unchanged under Alternative 2.

Similar to Alternative 1, average streamflow under Alternative 2 would be reduced during the summer months during VW hydrologic conditions (Table B-3). Alternative 2 shows more streamflow reduction than Alternative 1 throughout the year during AN and BN hydrologic conditions. There is a substantial improvement in streamflow due to the AMP during most months of ED/VD hydrologic conditions.

B.3 REFERENCES.

Reclamation. 2007. Santa Margarita River Conjunctive Use Project: Final Technical Memorandum No. 2.2, 2 Volumes. Prepared by Stetson Engineers. April 2007. Available at: http://www.usbr.gov/lc/socal/planning.html.

Reclamation, MCB Camp Pendleton, and Fallbrook Public Utility District. 2012. Southern California Steelhead Passage Assessment, Lower Santa Margarita River, California and CUP Surface Water Availability Analysis (TM 1.1). Prepared by Stetson and Cardno Entrix. 27 April. Available at: http://www.usbr.gov/lc/socal/planning.html.

Stetson. 2008. Technical Memorandum to Camp Pendleton Office of Water Resources: Surface Water and Groundwater Modeling Analyses of Gallery Well Alternatives for the Santa Margarita River Conjunctive Use Project (CUP). September 10, 2008.

_____. 2009. Draft Technical Memorandum to Reclamation: Response to Questions Regarding the Santa Margarita Conjunctive Use Project Environmental Impact Statement. April28, 2009.

_____. 2012a. Baseline Run: using updated TM 1.1 Streamflow.

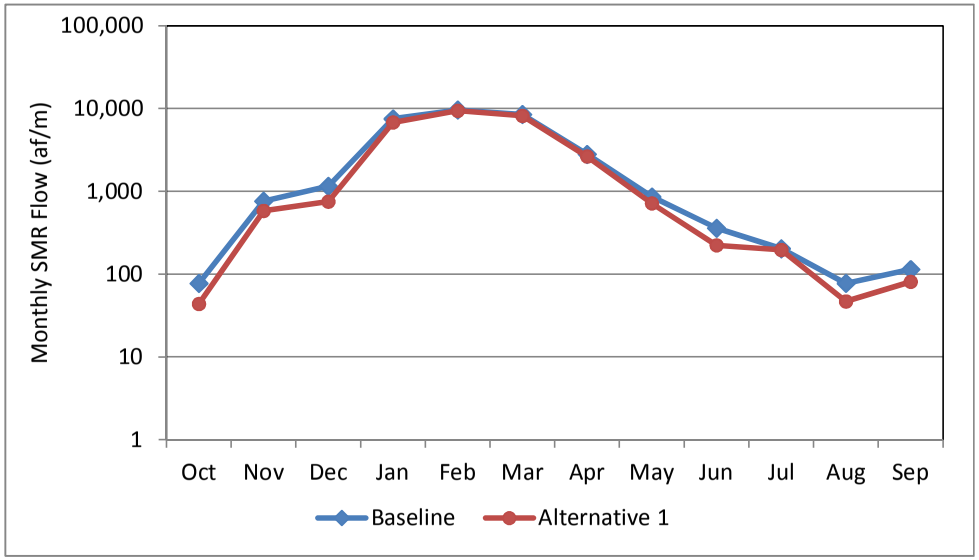
_____. 2012b. Run 16B Annual Pumping Summary: using updated TM 1.1 Streamflow.

_____. 2012c. Run 13A Basin Yield: using updated TM 1.1 Streamflow.

_____. 2012d. Average Monthly Streamflow by Subbasin/Hydrologic Condition for Baseline, Run 13A, and Run 16B. Provided via email by Reclamation. 17 April.

Table B-2. Baseline and Alternative 1 Comparison of Monthly SMR Flow at Lower Ysidora Narrows

All Years Month	Baseline af/m	Alternative 1 af/m	Change in SMR Flow af/m	%
Oct	78	44	-34	-43%
Nov	761	582	-179	-24%
Dec	1,154	754	-400	-35%
Jan	7,515	6,813	-702	-9%
Feb	9,601	9,416	-186	-2%
Mar	8,499	8,160	-339	-4%
Apr	2,807	2,645	-163	-6%
May	858	718	-140	-16%
Jun	359	224	-136	-38%
Jul	204	196	-7	-4%
Aug	78	47	-31	-39%
Sep	114	81	-33	-29%



VW Month	Baseline af/m	Alternative 1 af/m	Change in SMR Flow af/m	%
Oct	57	10	-46	-81%
Nov	374	265	-108	-29%
Dec	1,655	1,141	-514	-31%
Jan	34,007	32,264	-1,743	-5%
Feb	44,934	44,528	-406	-1%
Mar	34,020	33,103	-916	-3%
Apr	8,446	8,070	-376	-4%
May	3,356	3,065	-291	-9%
Jun	1,415	1,025	-390	-28%
Jul	866	887	21	2%
Aug	309	179	-130	-42%
Sep	577	419	-157	-27%

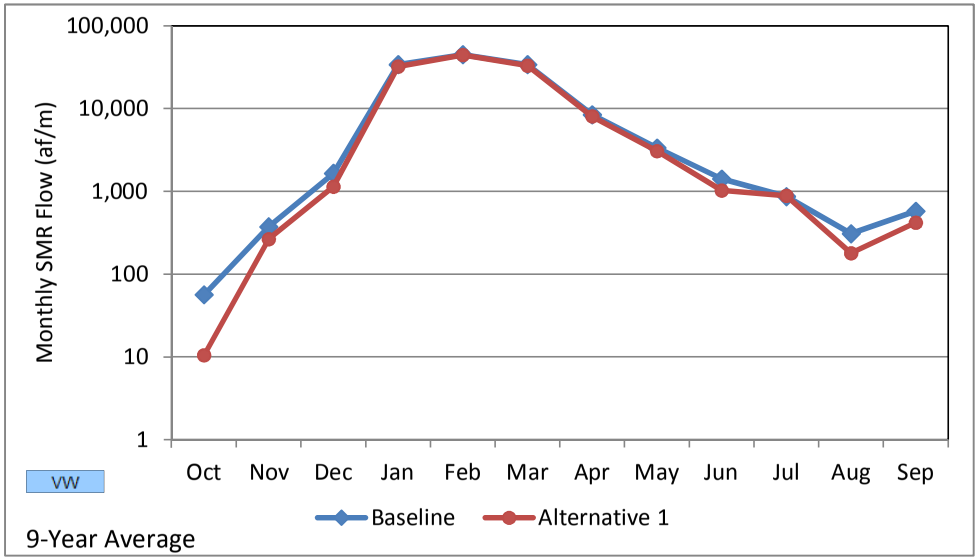
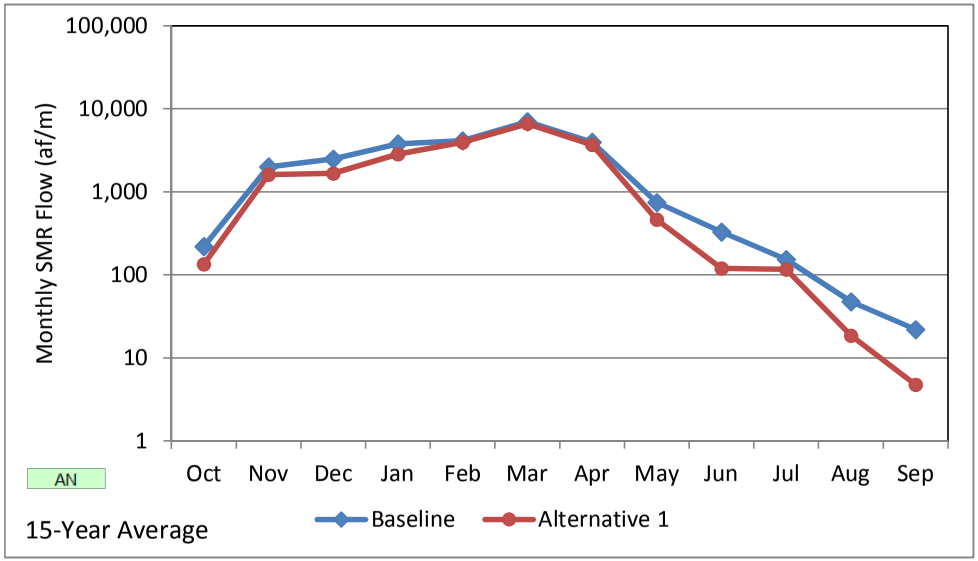


Table B-2. Baseline and Alternative 1 Comparison of Monthly SMR Flow at Lower Ysidora Narrows (cont.)

AN	Baseline	Alternative 1	Change in SMR Flow	
Month	af/m	af/m	af/m	%
Oct	219	134	-85	-39%
Nov	1,998	1,612	-386	-19%
Dec	2,483	1,664	-819	-33%
Jan	3,781	2,842	-939	-25%
Feb	4,126	3,947	-178	-4%
Mar	6,973	6,631	-342	-5%
Apr	3,961	3,688	-272	-7%
May	744	463	-281	-38%
Jun	329	120	-210	-64%
Jul	154	116	-37	-24%
Aug	48	19	-29	-61%
Sep	22	5	-17	-78%



BN	Baseline	Alternative 1	Change in SMR Flow	
Month	af/m	af/m	af/m	%
Oct	3	3	0	-9%
Nov	306	125	-181	-59%
Dec	368	167	-201	-55%
Jan	690	346	-344	-50%
Feb	923	719	-204	-22%
Mar	992	733	-259	-26%
Apr	325	271	-54	-17%
May	103	89	-14	-14%
Jun	17	7	-9	-56%
Jul	4	4	0	-9%
Aug	3	2	0	-5%
Sep	2	2	0	-3%

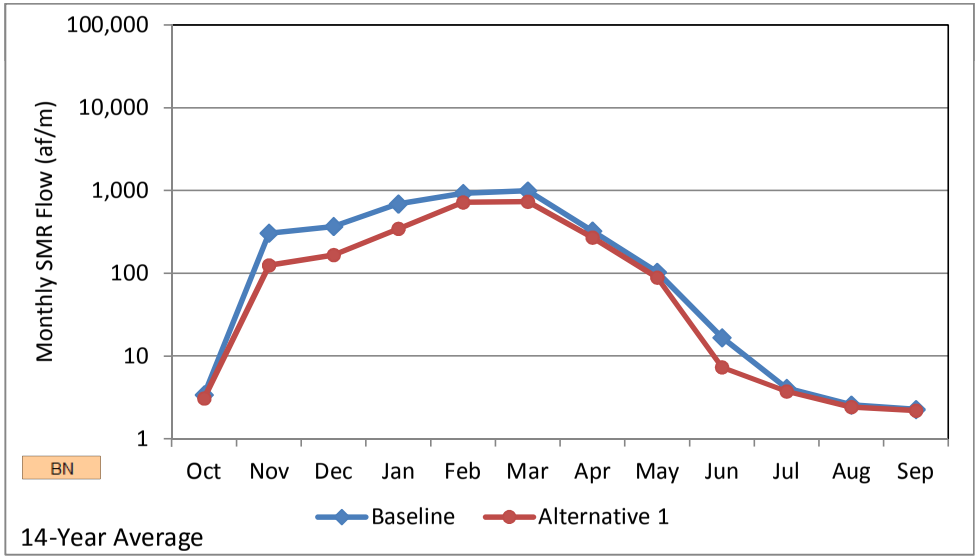


Table B-2. Baseline and Alternative 1 Comparison of Monthly SMR Flow at Lower Ysidora Narrows (cont.)

VD/ED Month	Baseline af/m	Alternative 1 af/m	Change in SMR Flow af/m	%
Oct	3	3	0	15%
Nov	38	67	29	76%
Dec	34	10	-23	-69%
Jan	275	235	-40	-15%
Feb	70	62	-8	-12%
Mar	24	29	5	22%
Apr	33	41	8	24%
May	7	9	1	18%
Jun	4	5	1	19%
Jul	2	3	0	15%
Aug	29	35	6	21%
Sep	13	15	2	14%

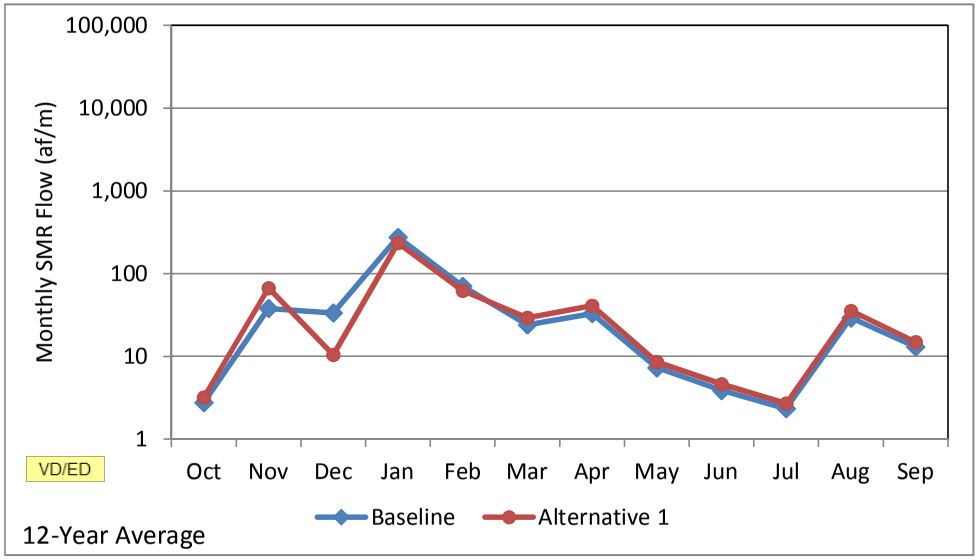
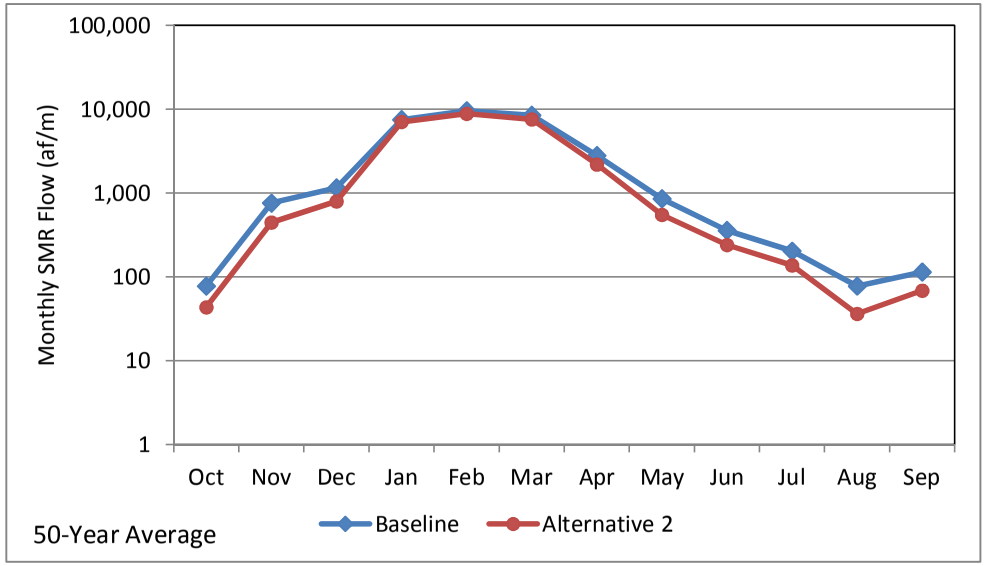


Table B-3. Baseline and Alternative 2 Comparison of Monthly SMR Flow at Lower Ysidora Narrows

All Years Month	Baseline af/m	Alternative 2 af/m	Change in SMR Flow af/m	%
Oct	78	43	-34	-44%
Nov	761	445	-316	-41%
Dec	1,154	796	-358	-31%
Jan	7,515	7,078	-437	-6%
Feb	9,601	8,831	-770	-8%
Mar	8,499	7,588	-911	-11%
Apr	2,807	2,192	-615	-22%
May	858	550	-308	-36%
Jun	359	240	-119	-33%
Jul	204	137	-66	-33%
Aug	78	36	-41	-53%
Sep	114	69	-46	-40%



VW Month	Baseline af/m	Alternative 2 af/m	Change in SMR Flow af/m	%
Oct	57	24	-33	-58%
Nov	374	79	-295	-79%
Dec	1,655	1,086	-569	-34%
Jan	34,007	32,957	-1,050	-3%
Feb	44,934	42,930	-2,004	-4%
Mar	34,020	31,559	-2,461	-7%
Apr	8,446	6,929	-1,517	-18%
May	3,356	2,436	-920	-27%
Jun	1,415	1,046	-370	-26%
Jul	866	627	-239	-28%
Aug	309	117	-192	-62%
Sep	577	324	-253	-44%

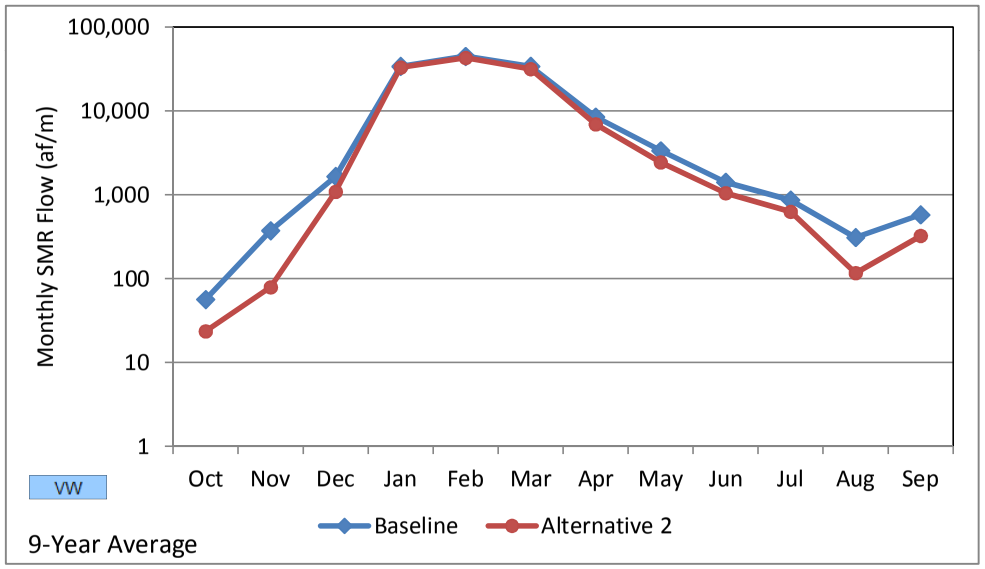
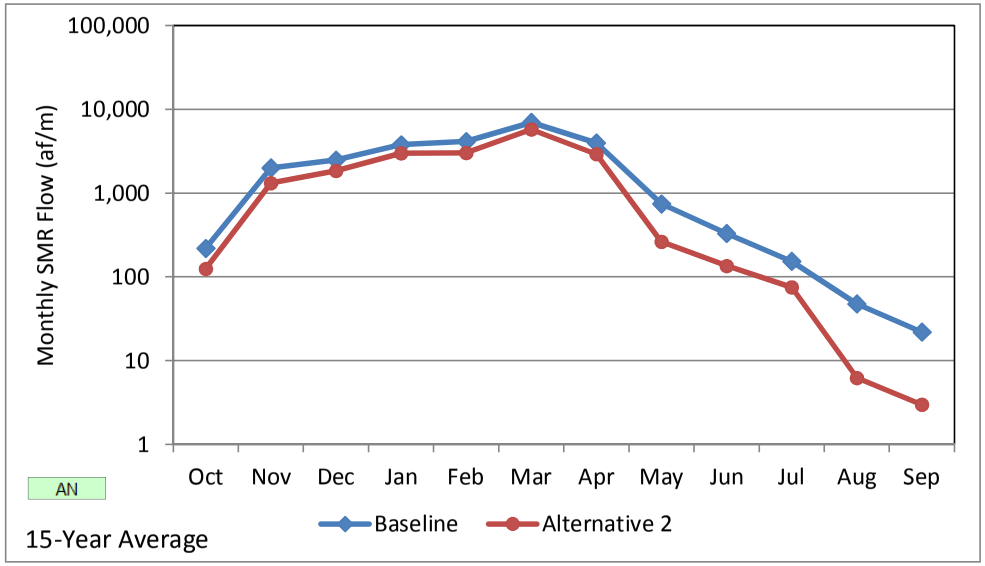


Table B-3. Baseline and Alternative 2 Comparison of Monthly SMR Flow at Lower Ysidora Narrows (cont.)

AN	Baseline	Alternative 2	Change in SMR Flow	
Month	af/m	af/m	af/m	%
Oct	219	125	-95	-43%
Nov	1,998	1,314	-684	-34%
Dec	2,483	1,839	-644	-26%
Jan	3,781	2,984	-797	-21%
Feb	4,126	3,010	-1,116	-27%
Mar	6,973	5,744	-1,229	-18%
Apr	3,961	2,919	-1,042	-26%
May	744	262	-482	-65%
Jun	329	135	-195	-59%
Jul	154	75	-78	-51%
Aug	48	6	-41	-87%
Sep	22	3	-19	-86%



BN	Baseline	Alternative 2	Change in SMR Flow	
Month	af/m	af/m	af/m	%
Oct	3	3	0	-13%
Nov	306	69	-237	-78%
Dec	368	164	-203	-55%
Jan	690	523	-167	-24%
Feb	923	511	-412	-45%
Mar	992	518	-474	-48%
Apr	325	140	-185	-57%
May	103	41	-62	-60%
Jun	17	22	5	32%
Jul	4	4	-1	-13%
Aug	3	2	0	-5%
Sep	2	2	0	-5%

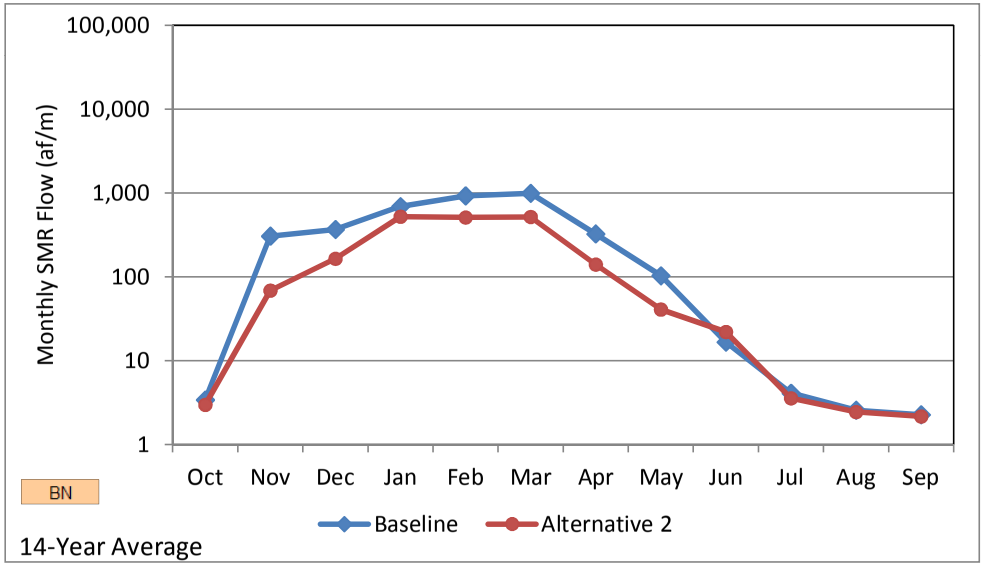
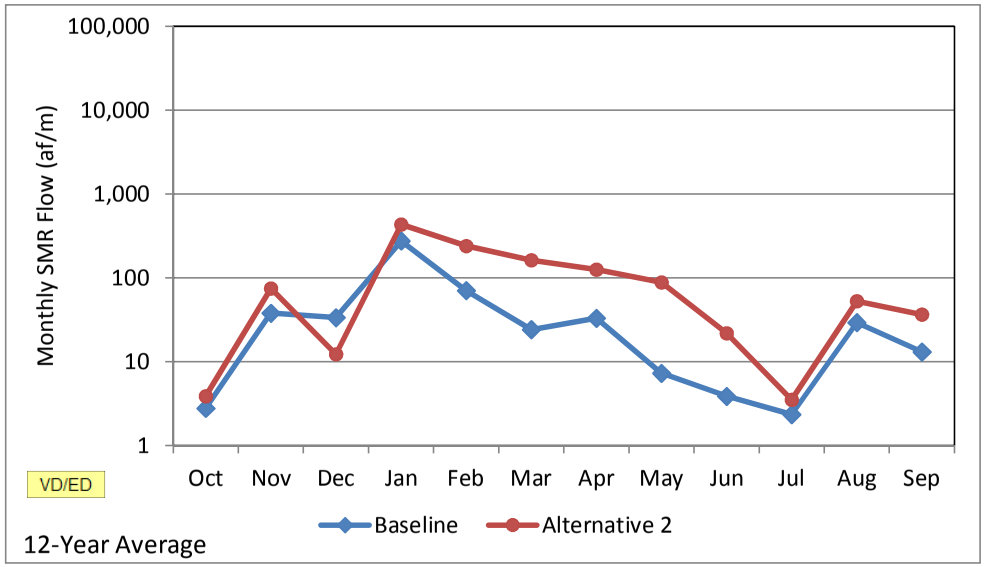


Table B-3. Baseline and Alternative 2 Comparison of Monthly SMR Flow at Lower Ysidora Narrows (cont.)

VD/ED	Baseline	Alternative 2	Change in SMR Flow	
Month	af/m	af/m	af/m	%
Oct	3	4	1	40%
Nov	38	75	37	97%
Dec	34	12	-21	-63%
Jan	275	433	158	57%
Feb	70	240	169	240%
Mar	24	162	138	573%
Apr	33	125	92	280%
May	7	88	81	1112%
Jun	4	22	18	464%
Jul	2	4	1	50%
Aug	29	53	23	80%
Sep	13	37	23	179%



Attachment 1

Baseline Run: Lower Santa Margarita River Surface and Groundwater Model

Draft: for negotiation purposes

TABLE 1 BASELINE RUN; using TM 1.1 Streamflow
LOWER SANTA MARGARITA RIVER GROUNDWATER MODEL

Hydrologic Condition

HC	Cnt	Oct to Apr Strflw
VW	9	Very Wet > 58,032
AN	15	Above Normal > 15,957
BN	14	Below Normal < 15,957
VD	5	Very Dry < 5,781
ED	7	Extremely Dry (2nd+ VD)

8,400 AFY 50-Year Average Annual Production

			Groundwater Production *				
Model Year	HC	Oct-Apr HC descrip	UY Total af/WY	CH Total af/WY	LY Total af/WY	LSMR Total af/WY	CWRMA Emergency Water af/WY
1	VW	Very Wet	3,520	5,280	-	8,800	-
2	BN	Below Normal	4,016	4,784	-	8,800	-
3	BN	Below Normal	4,488	4,312	-	8,800	-
4	VD	Very Dry	4,258	4,091	-	8,349	-
5	ED	Extremely Dry	3,626	3,483	-	7,109	603
6	ED	Extremely Dry	3,231	3,105	-	6,336	400
7	AN	Above Normal	3,379	4,219	-	7,598	-
8	VD	Very Dry	3,786	4,564	-	8,349	-
9	ED	Extremely Dry	3,626	3,483	-	7,109	600
10	ED	Extremely Dry	3,231	3,105	-	6,336	2,055
11	BN	Below Normal	3,875	3,723	-	7,598	591
12	VD	Very Dry	4,258	4,091	-	8,349	-
13	ED	Extremely Dry	3,626	3,483	-	7,109	-
14	ED	Extremely Dry	3,231	3,105	-	6,336	-
15	AN	Above Normal	3,379	4,219	-	7,598	-
16	AN	Above Normal	3,520	5,280	-	8,800	-
17	BN	Below Normal	4,016	4,784	-	8,800	-
18	VW	Very Wet	3,992	4,808	-	8,800	-
19	BN	Below Normal	4,016	4,784	-	8,800	-
20	BN	Below Normal	4,488	4,312	-	8,800	-
21	VD	Very Dry	4,258	4,091	-	8,349	-
22	BN	Below Normal	4,269	4,102	-	8,371	-
23	BN	Below Normal	4,488	4,312	-	8,800	-
24	BN	Below Normal	4,488	4,312	-	8,800	-
25	VD	Very Dry	4,258	4,091	-	8,349	-
26	ED	Extremely Dry	3,626	3,483	-	7,109	-
27	VW	Very Wet	3,379	4,219	-	7,598	-
28	AN	Above Normal	3,520	5,280	-	8,800	-
29	VW	Very Wet	3,520	5,280	-	8,800	-
30	AN	Above Normal	3,520	5,280	-	8,800	-
31	AN	Above Normal	3,520	5,280	-	8,800	-
32	VW	Very Wet	3,520	5,280	-	8,800	-
33	AN	Above Normal	3,520	5,280	-	8,800	-
34	AN	Above Normal	3,520	5,280	-	8,800	-
35	AN	Above Normal	3,520	5,280	-	8,800	-
36	BN	Below Normal	4,016	4,784	-	8,800	-
37	AN	Above Normal	3,992	4,808	-	8,800	-
38	BN	Below Normal	4,016	4,784	-	8,800	-
39	BN	Below Normal	4,488	4,312	-	8,800	-
40	VW	Very Wet	3,992	4,808	-	8,800	-
41	AN	Above Normal	3,520	5,280	-	8,800	-
42	VW	Very Wet	3,520	5,280	-	8,800	-
43	AN	Above Normal	3,520	5,280	-	8,800	-
44	VW	Very Wet	3,520	5,280	-	8,800	-
45	AN	Above Normal	3,520	5,280	-	8,800	-
46	AN	Above Normal	3,520	5,280	-	8,800	-
47	VW	Very Wet	3,520	5,280	-	8,800	-
48	BN	Below Normal	4,016	4,784	-	8,800	-
49	BN	Below Normal	4,488	4,312	-	8,800	-
50	AN	Above Normal	3,992	4,808	-	8,800	-
		Min	3,231	3,105	-	6,336	-
		Max	4,488	5,280	-	8,800	2,055
		Median	3,626	4,784	-	8,800	-
		Average	3,803	4,564	-	8,367	85

* *Note: groundwater pumping limited by vested water rights.*

Draft: for negotiation purposes

TABLE 1 BASELINE RUN; using TM 1.1 Streamflow
LOWER SANTA MARGARITA RIVER GROUNDWATER MODEL

Average Annual Pumping

	Yearly Count	UY Total af/WY	CH Total af/WY	LY Total af/WY	LSMR Total af/WY	CWRMA Emergency Water af/WY
VW	9	3,609	5,057	-	8,666	-
AN	15	3,564	5,075	-	8,640	-
BN	14	4,226	4,457	-	8,683	42
VD	5	4,164	4,186	-	8,349	-
ED	7	3,457	3,321	-	6,778	523

Average Monthly Pumping

%	Month	UY Total af/m	CH Total af/m	LY Total af/m	LSMR Total af/m	CWRMA Emergency Water af/m
8.3%	Oct	316	379	-	695	16
7.1%	Nov	270	324	-	593	20
5.9%	Dec	224	269	-	493	20
6.2%	Jan	236	283	-	519	2
5.6%	Feb	212	255	-	467	2
7.8%	Mar	296	355	-	651	2
7.9%	Apr	302	362	-	664	2
8.6%	May	328	393	-	721	4
10.0%	Jun	381	457	-	839	4
11.4%	Jul	434	521	-	956	4
10.9%	Aug	416	500	-	916	4
10.2%	Sep	388	465	-	853	4
100%	Avg Anl	3,803	4,564	-	8,367	85

TABLE 2 BASELINE Run (using TM 1.1 Streamflow) Pumping Summaries

	Subbasin	Building #	State ID	# mos Q	% of 600 mos	% of Subbasin	80% Utilization af/m	Potential 100% Yield gpm
1	UY	2673	10/4-7A2	600	100%	21%	110	1,000
2	UY	26072	10/4-7A3	600	100%	21%	110	1,000
3	UY	2602	10/4-7R2	600	100%	21%	110	1,000
4	UY	26018	10/4-18B1	600	100%	19%	99	900
5	UY	26071	10/4-7H3	600	100%	17%	88	800
6	CH	23093	10/4-18E3	600	100%	20%	121	1,100
7	CH	23073	10/4-18M5	600	100%	21%	132	1,200
8	CH	23063	10/5-13R2	600	100%	20%	121	1,100
9	CH	330925	10/5-23G4	600	100%	5%	31	283
10	CH	23001	10/5-23J1	600	100%	22%	137	1,250
11	CH	330924	10/5-23K2	600	100%	7%	41	375
12	CH	330923	10/5-23K3	600	100%	5%	30	275
13	LY	2200	10/5-26F1				181	1,650
14	LY	2D3	11/5-2D3				55	500
15	LY	2D4	11/5-2D4				55	500

UY/CH Well Capacity:	**1,127 af/m**	**10,283 gpm**

% Pumping in Subbasin for Camp Supply

May through April		DRY <4			WET >4		
		51%	**49%**	**0%**	**40%**	**60%**	**0%**
mo	Anl %	UY	CH	LY	UY	CH	LY
MAY	8.6%	4.4%	4.2%	-	3.4%	5.2%	-
JUN	10.0%	5.1%	4.9%	-	4.0%	6.0%	-
JUL	11.4%	5.8%	5.6%	-	4.6%	6.9%	-
AUG	10.9%	5.6%	5.4%	-	4.4%	6.6%	-
SEP	10.2%	5.2%	5.0%	-	4.1%	6.1%	-
OCT	8.3%	4.2%	4.1%	-	3.3%	5.0%	-
NOV	7.1%	3.6%	3.5%	-	2.8%	4.3%	-
DEC	5.9%	3.0%	2.9%	-	2.4%	3.5%	-
JAN	6.2%	3.2%	3.0%	-	2.5%	3.7%	-
FEB	5.6%	2.8%	2.7%	-	2.2%	3.4%	-
MAR	7.8%	4.0%	3.8%	-	3.1%	4.7%	-
APR	7.9%	4.0%	3.9%	-	3.2%	4.8%	-

Max Pumping in Subbasin adding wells as needed

	UY	CH	LY	Total (afm)
# exst wells	5	7	-	
af/m (80%)	515	612	-	1,127
avg af/well	103	87	-	
% of total	46%	54%		

TABLE 3 Baseline Run (TM 1.1 strflw) Annual Pumping by Well
Annual Well Production (AF/Y)

	Building #:	2673	26072	2602	26018	26071
	Max Annual Pumping	955	955	955	859	764
	Potential w/ 80% Util	1,315	1,315	1,315	1,184	1,052
	Potential Well Yield (gpm)	1,000	1,000	1,000	900	800
		UY	UY-VOC	UY	UY	UY
Settlement		10/4-7A2	10/4-7A3	10/4-7R2	10/4-18B1	10/4-7H3
Year	HC	(af/y)	(af/y)	(af/y)	(af/y)	(af/y)
1	VW	749	749	749	674	599
2	BN	854	854	854	769	684
3	AN	955	955	955	859	764
4	VD	906	906	906	815	725
5	ED	771	771	771	694	617
6	ED	688	688	688	619	550
7	AN	719	719	719	647	575
8	VD	806	806	806	725	644
9	ED	771	771	771	694	617
10	ED	688	688	688	619	550
11	BN	824	824	824	742	660
12	VD	906	906	906	815	725
13	ED	771	771	771	694	617
14	ED	688	688	688	619	550
15	AN	719	719	719	647	575
16	AN	749	749	749	674	599
17	BN	854	854	854	769	684
18	VW	849	849	849	764	680
19	BN	854	854	854	769	684
20	BN	955	955	955	859	764
21	VD	906	906	906	815	725
22	BN	908	908	908	817	727
23	BN	955	955	955	859	764
24	BN	955	955	955	859	764
25	VD	906	906	906	815	725
26	ED	771	771	771	694	617
27	VW	719	719	719	647	575
28	AN	749	749	749	674	599
29	VW	749	749	749	674	599
30	AN	749	749	749	674	599
31	AN	749	749	749	674	599
32	VW	749	749	749	674	599
33	AN	749	749	749	674	599
34	AN	749	749	749	674	599
35	AN	749	749	749	674	599
36	BN	854	854	854	769	684
37	AN	849	849	849	764	680
38	BN	854	854	854	769	684
39	BN	955	955	955	859	764
40	VW	849	849	849	764	680
41	AN	749	749	749	674	599
42	VW	749	749	749	674	599
43	AN	749	749	749	674	599
44	VW	749	749	749	674	599
45	BN	749	749	749	674	599
46	AN	749	749	749	674	599
47	VW	749	749	749	674	599
48	BN	854	854	854	769	684
49	BN	955	955	955	859	764
50	AN	849	849	849	764	680
	Min	688	688	688	619	550
	Max	955	955	955	859	764
	Median	771	771	771	694	617
	Average	809	809	809	728	647

Month	UY 10/4-7A2 (af/m)	UY-VOC 10/4-7A3 (af/m)	UY 10/4-7R2 (af/m)	UY 10/4-18B1 (af/m)	UY 10/4-7H3 (af/m)
Oct	67	67	67	60	54
Nov	57	57	57	52	46
Dec	48	48	48	43	38
Jan	50	50	50	45	40
Feb	45	45	45	41	36
Mar	63	63	63	57	50
Apr	64	64	64	58	51
May	70	70	70	63	56
Jun	81	81	81	73	65
Jul	92	92	92	83	74
Aug	89	89	89	80	71
Sep	82	82	82	74	66
Annual Total	809	809	809	728	647

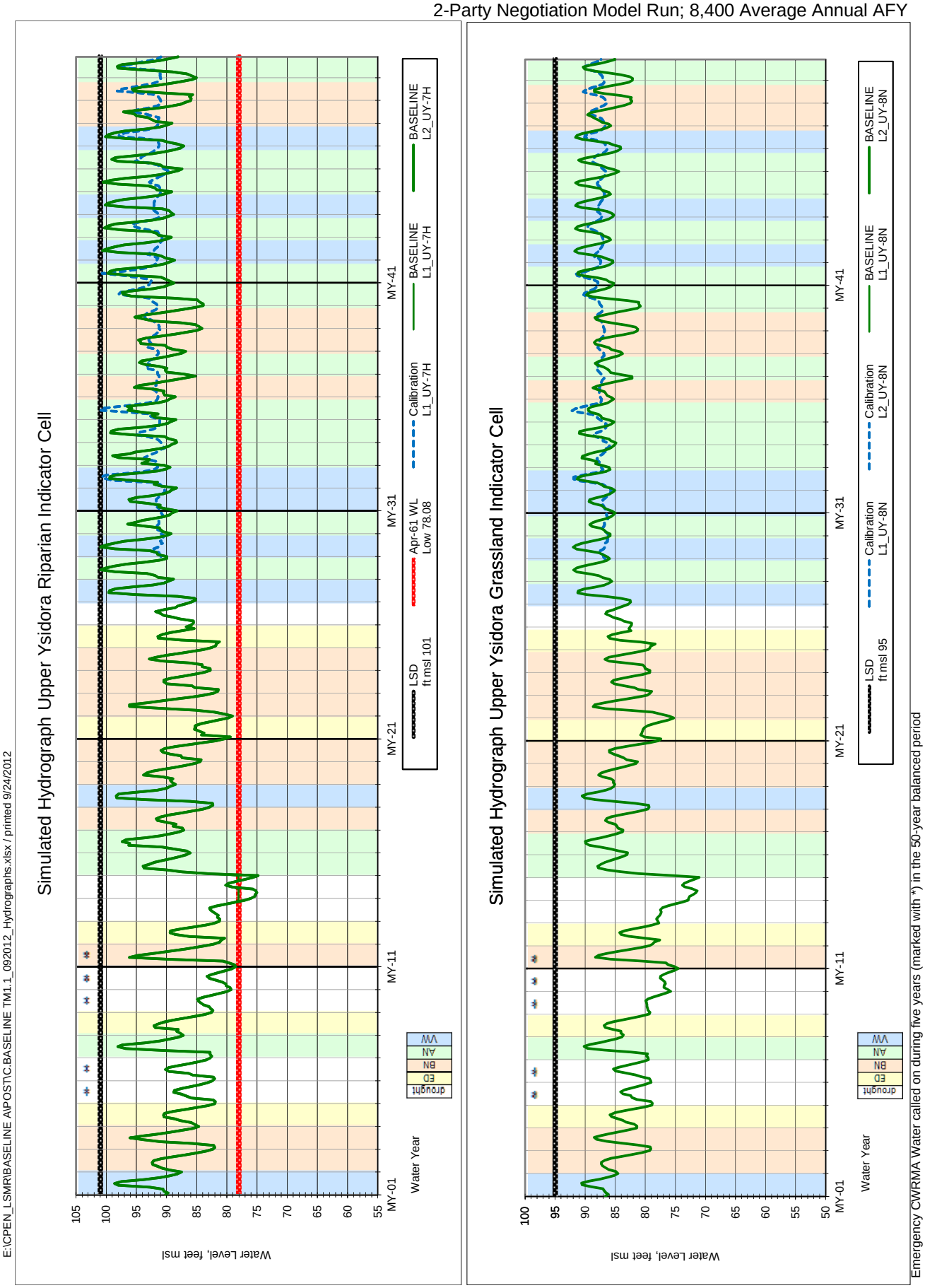
E:\CPEN_LSMR\BASELINE A\PRE\WEL\WEL_BASELINE TM1.1strflw as WY for EIS-EIR 092012.xlsx / printed 9/21/2012

TABLE 3 Baseline Run (TM 1.1 strflw) Annual Pumping by Well (Continued)

	Building #:	23093	23073	23063	330925	23001	330924	330923
	Max Annual Pumping	761	830	761	782	865	519	761
	Potential w/ 80% Util	1,447	1,578	1,447	1,486	1,644	986	1,447
	Potential Well Yield (gpm)	1,100	1,200	1,100	1,130	1,250	750	1,100
Settlement Year	HC	CH 10/4-18E3 (af/y)	CH 10/4-18M5 (af/y)	CH 10/5-13R2 (af/y)	CH 10/5-23G4 (af/y)	CH 10/5-23J1 (af/y)	CH 10/5-23K2R (af/y)	CH 10/5-23K3 (af/y)
1	VW	761	830	761	782	865	519	761
2	BN	690	752	690	709	784	470	690
3	AN	622	678	622	639	706	424	622
4	VD	590	643	590	606	670	402	590
5	ED	502	548	502	516	571	342	502
6	ED	448	488	448	460	509	305	448
7	AN	608	663	608	625	691	415	608
8	VD	658	718	658	676	748	449	658
9	ED	502	548	502	516	571	342	502
10	ED	448	488	448	460	509	305	448
11	BN	537	586	537	551	610	366	537
12	VD	590	643	590	606	670	402	590
13	ED	502	548	502	516	571	342	502
14	ED	448	488	448	460	509	305	448
15	AN	608	663	608	625	691	415	608
16	AN	761	830	761	782	865	519	761
17	BN	690	752	690	709	784	470	690
18	VW	693	756	693	712	788	473	693
19	BN	690	752	690	709	784	470	690
20	BN	622	678	622	639	706	424	622
21	VD	590	643	590	606	670	402	590
22	BN	591	645	591	607	672	403	591
23	BN	622	678	622	639	706	424	622
24	BN	622	678	622	639	706	424	622
25	VD	590	643	590	606	670	402	590
26	ED	502	548	502	516	571	342	502
27	VW	608	663	608	625	691	415	608
28	AN	761	830	761	782	865	519	761
29	VW	761	830	761	782	865	519	761
30	AN	761	830	761	782	865	519	761
31	AN	761	830	761	782	865	519	761
32	VW	761	830	761	782	865	519	761
33	AN	761	830	761	782	865	519	761
34	AN	761	830	761	782	865	519	761
35	AN	761	830	761	782	865	519	761
36	BN	690	752	690	709	784	470	690
37	AN	693	756	693	712	788	473	693
38	BN	690	752	690	709	784	470	690
39	BN	622	678	622	639	706	424	622
40	VW	693	756	693	712	788	473	693
41	AN	761	830	761	782	865	519	761
42	VW	761	830	761	782	865	519	761
43	AN	761	830	761	782	865	519	761
44	VW	761	830	761	782	865	519	761
45	BN	761	830	761	782	865	519	761
46	AN	761	830	761	782	865	519	761
47	VW	761	830	761	782	865	519	761
48	BN	690	752	690	709	784	470	690
49	BN	622	678	622	639	706	424	622
50	AN	693	756	693	712	788	473	693
	Min	448	488	448	460	509	305	448
	Max	761	830	761	782	865	519	761
	Median	690	752	690	709	784	470	690
	Average	658	718	658	676	748	449	658
	Month	CH 10/4-18E3 (af/m)	CH 10/4-18M5 (af/m)	CH 10/5-13R2 (af/m)	CH 10/5-23G4 (af/m)	CH 10/5-23J1 (af/m)	CH 10/5-23K2R (af/m)	CH 10/5-23K3 (af/m)
	Oct	55	60	55	56	62	37	55
	Nov	47	51	47	48	53	32	47
	Dec	39	42	39	40	44	26	39
	Jan	41	45	41	42	46	28	41
	Feb	37	40	37	38	42	25	37
	Mar	51	56	51	53	58	35	51
	Apr	52	57	52	54	59	36	52
	May	57	62	57	58	64	39	57
	Jun	66	72	66	68	75	45	66
	Jul	75	82	75	77	85	51	75
	Aug	72	79	72	74	82	49	72
	Sep	67	73	67	69	76	46	67
	Annual Total	658	718	658	676	748	449	658

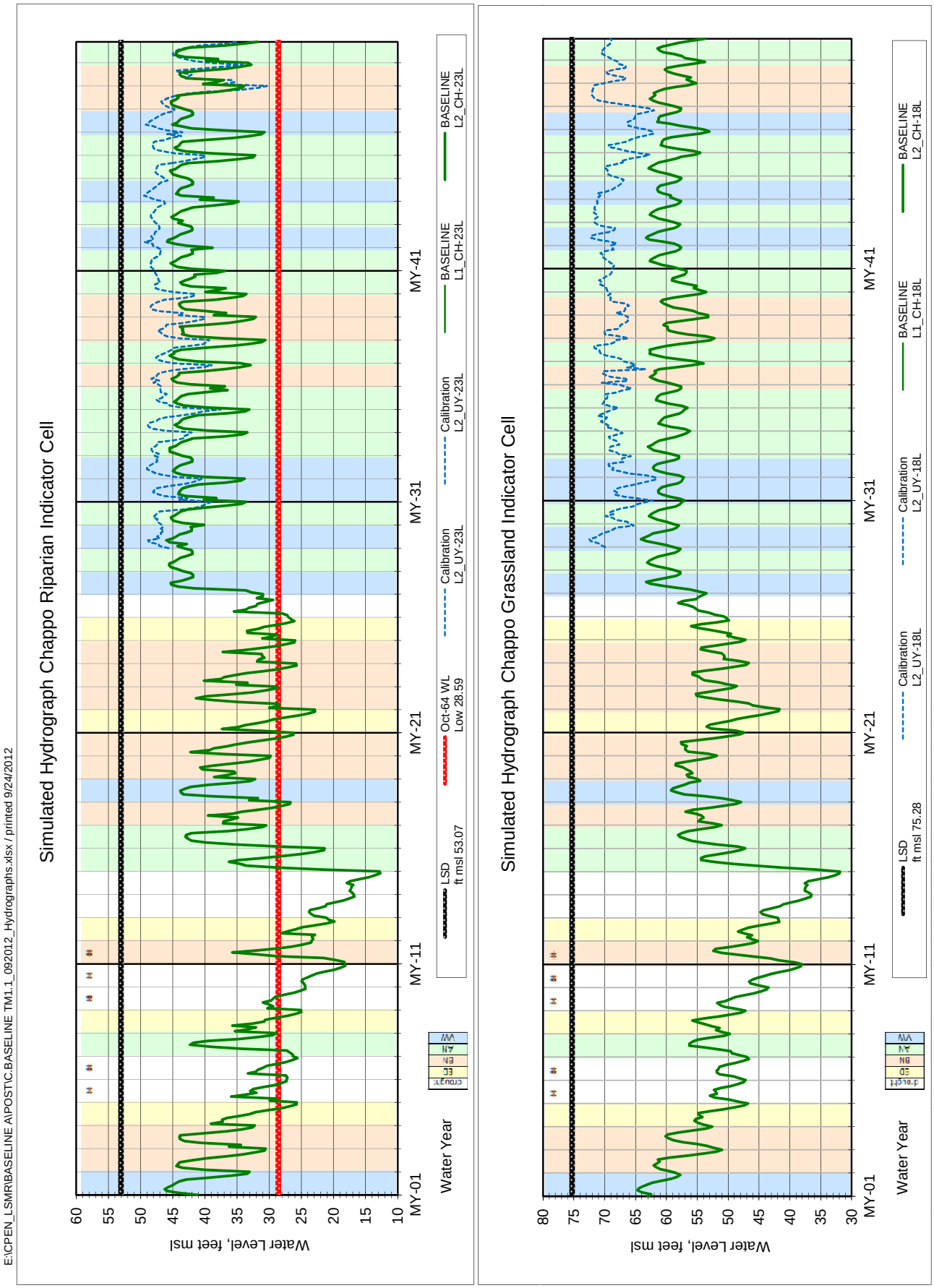
E:\CPEN_LSMR\BASELINE A\PRE\WEL\WEL_BASELINE TM1.1strflw as WY for EIS-EIR 092012.xlsx / printed 9/21/2012

FIGURE 1 Baseline (TM1.1 strflw) and Calibration Hydrographs
2-Party Negotiation Model Run; 8,400 Average Annual AFY



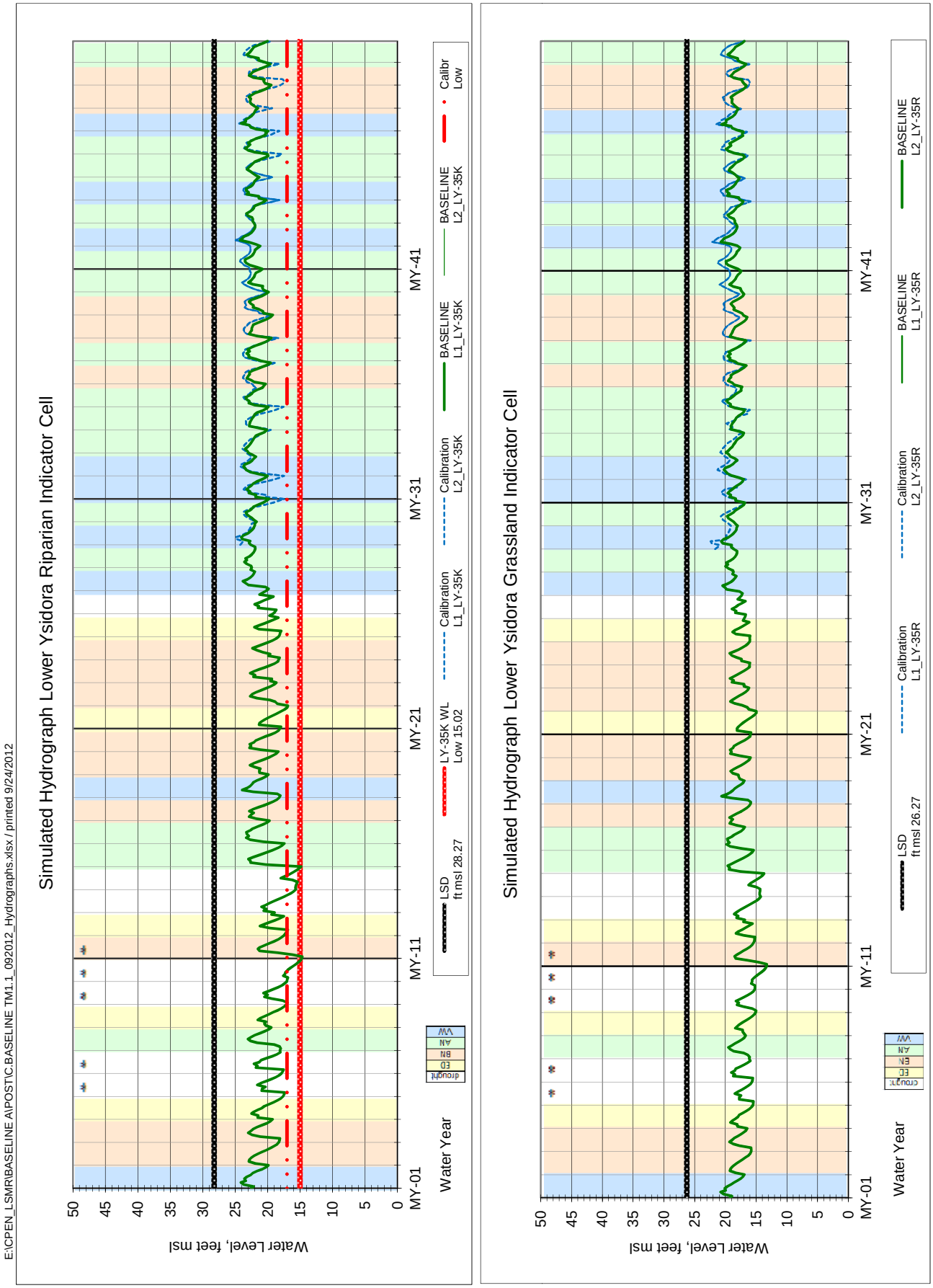
Emergency CWRMA Water called on during five years (marked with *) in the 50-year balanced period
Layer 1 (L1) and Layer 2 (L2) simulated groundwater levels are at similar elevations and the graph lines are printed on top of each other.

FIGURE 2 Baseline (TM1.1 strflw) and Calibration Hydrographs
2-Party Negotiation Model Run; 8,400 Average Annual AFY



Emergency CWRMA Water called on during five years (marked with *) in the 50-year balanced period.
Layer 1 (L1) and Layer 2 (L2) simulated groundwater levels are at similar elevations and the graph lines are printed on top of each other.

FIGURE 3 Baseline (TM1.1 strflw) and Calibration Hydrographs
2-Party Negotiation Model Run; 8,400 Average Annual AFY



Emergency CWRMA Water called on during five years (marked with *) in the 50-year balanced period.
Layer 1 (L1) and Layer 2 (L2) simulated groundwater levels are at similar elevations and the graph lines are printed on top of each other.

FIGURE 4 Baseline and Calibration Streamflow
2-Party Negotiation Model Run; Baseline 8,400 Average Annual AFY

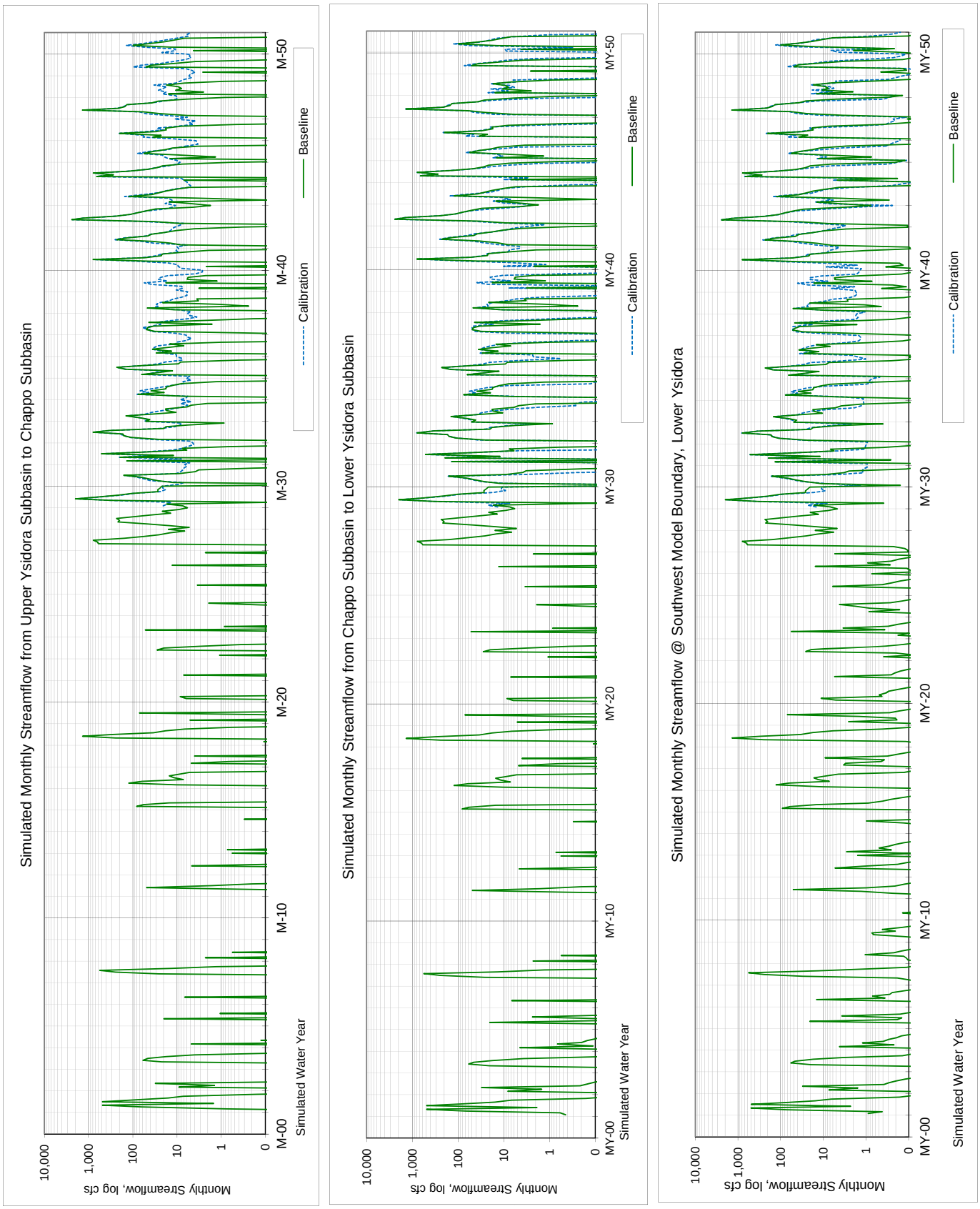


TABLE 4 2-Party Negotiation Baseline Model Run; 8,400 Average Annual AFY

Average Hydrologic Condition Water Budget (af/y)

% Time Exceedence	*> 76%*	*76% to 50%*	*50% to 19%*	*< 19%*
# Years	*12*	*14*	*15*	*9*
	Very & Extrm Dry	Below Normal	Above Normal	Very Wet
Inflow:				
Santa Margarita River Inflow	5,500	11,600	32,800	132,900
Subsurface Underflow	600	600	600	600
Lake O'Neill Spill and Release	700	1,400	1,700	2,100
Fallbrook Creek	100	400	1,400	3,800
Title 22 Water	0	0	0	0
Minor Tributary Drainages	1,600	1,500	2,400	4,900
Areal Precipitation	500	400	700	1,600
Total Inflow:	9,000	15,900	39,600	145,900
Outflow:				
Santa Margarita River Outflow	500	3,800	24,800	130,000
Subsurface Underflow	0	100	100	100
Groundwater Pumping	7,400	8,700	8,600	8,700
Evapotranspiration	1,300	2,400	3,000	3,300
Diversions to Lake O'Neill	900	1,800	2,300	2,700
Total Outflow:	10,100	16,800	38,800	144,800
Net Simulated Change of Groundwater in Storage:				
	-1,100	-700	700	1,100
	-	(200)	100	-

Median Hydrologic Condition Water Budget (af/y)

% Time Exceedence	*> 76%*	*76% to 50%*	*50% to 19%*	*< 19%*
# Years	*12*	*14*	*15*	*9*
	Very & Extrm Dry	Below Normal	Above Normal	Very Wet
Inflow:				
Santa Margarita River Inflow	5,800	12,300	26,700	121,300
Subsurface Underflow	600	600	600	600
Lake O'Neill Spill and Release	800	1,300	2,000	2,300
Fallbrook Creek	100	300	1,100	3,500
Title 22 Water	0	0	0	0
Minor Tributary Drainages	1,500	1,400	2,500	4,700
Areal Precipitation	400	300	500	1,600
Outflow:				
Santa Margarita River Outflow	400	3,400	19,600	117,300
Subsurface Underflow	0	100	100	100
Groundwater Pumping	7,100	8,800	8,800	8,800
Evapotranspiration	1,300	2,400	3,100	3,300
Diversions to Lake O'Neill	900	1,700	2,500	2,700
Net Simulated Change of Groundwater in Storage:				
	-1,400	-1,200	300	900

Average Subbasin Water Budget (af/y)

	Upper Ysidora	Chappo	Lower Ysidora	SMR Basin	
Inflow:					
Santa Margarita River Inflow	38,300	34,800	31,400	38,300	85%
Subsurface Underflow *	600	1,200	400	600	1%
Lake O'Neill Spill and Release	1,500	-	-	1,500	3%
Fallbrook Creek	1,200	-	-	1,200	3%
Title 22 Water	-	-	0	0	0%
Minor Tributary Drainages	600	1,100	700	2,400	5%
Areal Precipitation	200	300	200	800	2%
Total Inflow:	42,400	37,400	32,700	44,800	
Outflow:					
Santa Margarita River Outflow	34,800	31,400	32,000	32,000	71%
Subsurface Underflow *	1,200	400	100	100	0%
Groundwater Pumping	3,800	4,600	0	8,400	19%
Evapotranspiration *	700	1,100	700	2,500	6%
Diversions to Lake O'Neill	1,900	-	-	1,900	4%
Total Outflow:	42,400	37,500	32,800	44,900	
Net Simulated Change of Groundwater in Storage: *					
	0	0	0	-100	
	-	(100)	(100)	-	

Note: * Subbasin Averages are based on the last rate of the stress period
Values are rounded to the nearest 100 acre-feet, which may result in a summation rounding error

Median Subbasin Water Budget (af/y)

	Upper Ysidora	Chappo	Lower Ysidora	SMR Basin
Inflow:				
Santa Margarita River Inflow	16,700	11,400	7,900	16,700
Subsurface Underflow *	600	1,100	400	600
Lake O'Neill Spill and Release	1,500	-	-	1,500
Fallbrook Creek	600	-	-	600
Title 22 Water	-	-	-	0
Minor Tributary Drainages	600	900	600	2,100
Areal Precipitation	200	200	200	500
Outflow:				
Santa Margarita River Outflow	11,400	7,900	7,800	7,800
Subsurface Underflow *	1,100	400	100	100
Groundwater Pumping	3,600	4,800	0	8,800
Evapotranspiration *	800	1,200	800	2,700
Diversions to Lake O'Neill	2,000	-	-	2,000
Net Simulated Change of Groundwater in Storage: *				
	-100	-200	0	0

Note: The sum of median values does not reflect the change of groundwater in storage.
Median values are not cummulative.
* Subbasin Medians are based on the last rate of the stress period
Values are rounded to the nearest 100 acre-feet

E:\CPEN_LSMR\BASELINE A\POST\D.BASELINE TM1.1_092012_Budget-out.xlsx / printed 9/24/2012

TABLE 5 Baseline Run Annual Water Budget Summary

Lower Santa Margarita River Groundwater Model — Baseline w TM1.1strflw 092012

Modflow Volumetric Budget Output and Streamflow — 9/21/12

Annual Surface Water Budget

MY		SMR Flow In	LON Diversion	Ponds Diversion	Release & Spill	Str Gain+ / Loss-	GAGE SMR @ UY->CH	Str Gain+ / Loss-	SMR @ CH->LY	Str Gain+ / Loss-	SMR Flow Out	LSMR Str Gain+ / Loss-
1	VW	72,916	-2754	-6575	1,399	-2,030	70,886	-1,500	69,386	1,655	71,041	-1,875
2	BN	9,851	-1646	-3545	1,552	-3,969	5,882	-3,374	2,508	-26	2,482	-7,369
3	AN	19,081	-1468	-5437	1,058	-6,424	12,657	-3,957	8,701	-228	8,472	-10,609
4	VD	6,075	-1440	-2315	1,120	-5,014	1,061	-773	288	125	413	-5,662
5	ED	6,672	-908	-1410	971	-4,415	2,256	-979	1,277	270	1,547	-5,124
6	ED	4,277	-710	-1593	387	-4,214	63	348	411	596	1,007	-3,270
7	AN	59,305	-1596	-6986	383	-5,915	53,390	-2,832	50,558	479	51,037	-8,267
8	VD	6,521	-1361	-2683	1,217	-4,409	2,112	-1,946	166	-47	119	-6,402
9	ED	4,099	-1013	-1048	1,016	-3,401	697	-694	3	150	152	-3,946
10	ED	4,629	-848	-1609	519	-4,534	94	-94	-	33	33	-4,595
11	BN	11,484	-902	-5045	501	-6,308	5,176	-2,340	2,836	157	2,993	-8,491
12	VD	5,622	-580	-2104	434	-5,012	610	-318	292	208	499	-5,123
13	ED	3,321	-573	-1160	285	-3,321	-	43	43	226	269	-3,052
14	ED	3,589	-300	-1583	234	-3,589	-	18	18	71	89	-3,500
15	AN	20,522	-2438	-5035	551	-8,303	12,220	-2,957	9,262	897	10,159	-10,363
16	AN	22,816	-1985	-6917	1,558	-3,995	18,821	-4,087	14,734	732	15,466	-7,350
17	BN	6,199	-1426	-2565	1,196	-4,187	2,012	-1,444	568	472	1,040	-5,159
18	VW	117,031	-2248	-7919	1,642	-2,455	114,576	-2,849	111,726	1,314	113,040	-3,990
19	BN	12,744	-2305	-3811	1,680	-5,063	7,680	-3,051	4,629	-51	4,578	-8,166
20	BN	6,645	-1257	-2416	1,190	-4,280	2,364	-1,476	889	225	1,114	-5,531
21	VD	7,214	-1614	-1401	1,009	-5,407	1,807	-1,374	433	-40	393	-6,821
22	BN	13,310	-1576	-6098	1,206	-6,514	6,796	-3,761	3,035	-201	2,835	-10,475
23	BN	9,953	-1385	-2536	1,037	-5,504	4,449	-1,223	3,226	512	3,738	-6,215
24	BN	7,708	-1613	-3881	1,115	-5,725	1,984	-1,861	123	388	511	-7,197
25	VD	7,560	-797	-3217	1,010	-5,607	1,953	-1,754	199	268	467	-7,093
26	ED	6,746	-1217	-2413	576	-4,661	2,085	-1,157	928	476	1,404	-5,342
27	VW	138,265	-2906	-8290	2,063	-220	138,046	-2,391	135,654	1,827	137,481	-784
28	AN	61,252	-2721	-11307	2,352	-2,734	58,519	-4,627	53,891	323	54,215	-7,038
29	VW	195,725	-2739	-11207	2,413	1,176	196,901	-2,302	194,599	1,704	196,304	578
30	AN	27,995	-2749	-5856	2,126	-3,796	24,199	-4,619	19,580	-27	19,553	-8,442
31	AN	61,581	-2697	-5904	2,204	-1,738	59,842	-4,022	55,820	458	56,278	-5,302
32	VW	105,365	-2720	-8572	2,385	268	105,632	-4,111	101,521	736	102,258	-3,107
33	AN	28,766	-2714	-8555	2,173	-3,529	25,238	-4,155	21,082	191	21,273	-7,493
34	AN	21,480	-2702	-7839	2,094	-4,538	16,942	-5,111	11,831	-232	11,599	-9,881
35	AN	38,995	-2197	-7066	1,812	-1,512	37,483	-4,444	33,039	445	33,483	-5,512
36	BN	13,900	-2115	-4177	1,524	-3,343	10,557	-3,405	7,152	3	7,155	-6,745
37	AN	18,856	-1744	-5158	1,293	-2,851	16,004	-3,371	12,633	413	13,047	-5,809
38	BN	12,534	-1767	-4681	1,311	-3,453	9,080	-3,746	5,334	82	5,416	-7,118
39	BN	12,024	-2156	-5634	1,717	-5,858	6,166	-4,086	2,080	-277	1,803	-10,221
40	VW	66,151	-2779	-7721	2,318	-3,995	62,155	-4,729	57,427	61	57,488	-8,663
41	AN	40,738	-2711	-8745	2,263	-3,800	36,938	-5,082	31,855	86	31,941	-8,797
42	VW	256,836	-2723	-10492	2,325	1,608	258,444	-2,932	255,512	994	256,506	-330
43	AN	23,081	-2752	-10335	2,268	-4,354	18,727	-4,644	14,084	24	14,107	-8,974
44	VW	122,236	-2675	-9801	2,233	-930	121,305	-3,624	117,681	1,001	118,682	-3,553
45	BN	17,853	-2748	-9355	2,043	-4,544	13,309	-4,337	8,972	-177	8,795	-9,058
46	AN	26,690	-1995	-7991	1,461	-3,483	23,208	-3,232	19,975	496	20,472	-6,218
47	VW	121,259	-2716	-9884	2,559	-781	120,477	-4,230	116,247	1,080	117,327	-3,932
48	BN	13,194	-2744	-7175	2,078	-4,938	8,257	-4,024	4,233	-151	4,082	-9,112
49	BN	15,504	-1815	-5717	1,199	-5,757	9,746	-3,440	6,306	-229	6,077	-9,427
50	AN	20,633	-2478	-7882	2,028	-5,489	15,144	-4,015	11,129	9	11,139	-9,495
	avg	38,336	-1,920	-5,613	1,462	**-3,857**	34,479	**-2,801**	31,678	**350**	32,028	**-6,308**
	med	16,678	-1,990	-5,676	1,430	-4,200	11,388	-3,142	7,926	216	7,814	-6,574
AVERAGES												
VD/ED	12	5,527	-947	-1,878	731	-4,465	1,062	-723	338	195	533	-4,994
BN	14	11,636	-1,818	-4,760	1,382	-4,960	6,676	-2,969	3,706	52	3,758	-7,877
AN	15	32,786	-2,330	-7,401	1,708	-4,164	28,622	-4,077	24,545	271	24,816	-7,970
VW	9	132,865	-2,696	-8,940	2,149	-818	132,047	-3,185	128,862	1,152	130,014	-2,851
	50											
MEDIANS												
VD/ED	12	5,849	-878	-1,601	774	-4,475	879	-734	244	179	403	-5,123
BN	14	12,279	-1,706	-4,429	1,258	-5,001	6,481	-3,389	3,131	(12)	3,366	-7,767
AN	15	26,690	-2,478	-7,066	2,028	-3,800	23,208	-4,087	19,580	323	19,553	-8,267
VW	9	121,259	-2,723	-8,572	2,318	-781	120,477	-2,932	116,247	1,080	117,327	-3,107
	50											

E:\CPEN_LSMR\BASELINE A\POST\D.BASELINE TM1.1_092012_Budget-out.xlsx / printed 9/24/2012

TABLE 5 Baseline Run Annual Water Budget Summary (continued)

Lower Santa Margarita River Groundwater Model

Modflow Volumetric Budget Output

Annual Groundwater Budget Model Run: Baseline w TM1.1strflw 092012

	INFLOW:					**OUTFLOW:**					
MY	Storage	Recharge	Stream Leakance	GHB	TOTAL GW IN	Storage	Wells	ET	Stream Leakance	GHB	TOTAL GW OUT
1	5,164	7,622	6,809	603	20,199	3,165	8,800	3,366	4,819	67	20,217
2	5,332	3,729	5,833	604	15,498	2,899	8,800	2,526	1,236	50	15,511
3	5,481	5,637	8,434	609	20,160	6,492	8,800	2,519	2,315	48	20,174
4	5,757	2,598	4,810	608	13,773	3,329	8,349	1,712	343	51	13,784
5	4,657	1,708	6,361	618	13,344	4,682	7,107	1,440	79	45	13,353
6	4,364	2,323	4,741	615	12,043	4,075	6,336	1,400	197	52	12,059
7	4,752	7,578	8,111	606	21,047	7,452	7,599	2,247	3,702	56	21,056
8	5,976	2,831	4,814	607	14,227	3,570	8,349	1,637	650	44	14,250
9	3,960	1,398	4,793	619	10,770	2,404	7,110	1,149	77	47	10,786
10	3,517	1,724	3,092	625	8,959	1,756	6,336	814	37	31	8,974
11	5,822	5,500	7,893	612	19,827	8,843	7,596	1,452	1,906	42	19,839
12	5,262	2,376	5,769	621	14,028	4,357	8,349	1,183	110	43	14,042
13	4,679	1,393	3,180	627	9,879	1,687	7,110	944	107	48	9,896
14	3,687	1,905	3,212	650	9,454	2,392	6,336	674	36	34	9,471
15	4,663	6,067	10,615	612	21,957	10,863	7,596	1,703	1,756	53	21,972
16	4,920	7,514	9,718	598	22,750	6,986	8,802	2,668	4,246	57	22,758
17	5,767	2,874	5,891	607	15,138	3,669	8,799	1,988	640	53	15,149
18	4,885	9,098	9,513	599	24,096	7,753	8,799	2,713	4,789	59	24,114
19	5,418	3,992	6,258	603	16,271	3,749	8,799	2,298	1,396	50	16,292
20	6,182	2,780	5,797	610	15,369	4,203	8,799	1,866	461	52	15,383
21	5,682	1,680	5,760	629	13,751	4,059	8,349	1,237	80	44	13,770
22	6,139	6,437	8,354	607	21,537	8,728	8,372	1,947	2,452	50	21,550
23	5,914	2,987	6,798	618	16,316	5,354	8,799	1,758	376	51	16,339
24	5,450	4,318	6,726	607	17,101	5,606	8,799	1,697	957	53	17,112
25	5,083	3,788	7,328	614	16,813	6,224	8,349	1,547	657	51	16,828
26	4,038	2,826	6,520	607	13,991	4,580	7,107	1,765	496	55	14,003
27	3,818	9,490	9,307	598	23,213	6,784	7,599	3,081	5,696	65	23,224
28	3,763	11,685	7,844	591	23,883	3,730	8,799	3,515	7,787	59	23,890
29	3,829	12,229	7,661	589	24,308	3,898	8,790	3,590	7,966	66	24,311
30	3,861	6,072	7,583	599	18,115	2,764	8,815	3,239	3,262	54	18,135
31	3,914	6,329	8,310	598	19,152	3,988	8,792	3,065	3,258	57	19,159
32	3,910	9,307	8,928	593	22,738	4,858	8,792	3,333	5,698	63	22,744
33	4,548	8,751	7,241	597	21,136	3,398	8,815	3,324	5,565	56	21,158
34	4,343	8,056	8,391	599	21,388	4,378	8,792	3,065	5,110	53	21,398
35	3,910	7,477	8,609	597	20,593	4,504	8,792	3,147	4,102	57	20,604
36	5,257	4,421	6,680	602	16,961	3,111	8,815	2,913	2,096	56	16,991
37	4,545	5,553	8,173	602	18,874	4,949	8,792	2,918	2,142	58	18,859
38	5,230	4,920	7,668	604	18,420	4,617	8,792	2,670	2,282	52	18,413
39	5,266	5,808	7,759	606	19,440	5,585	8,815	2,709	2,307	53	19,470
40	3,845	7,920	9,091	608	21,465	5,904	8,792	2,899	3,813	52	21,462
41	3,673	9,086	8,701	599	22,059	4,020	8,792	3,365	5,829	56	22,063
42	4,132	11,361	7,805	590	23,889	4,300	8,815	3,471	7,247	62	23,895
43	4,222	10,491	7,254	595	22,562	3,510	8,792	3,379	6,839	53	22,574
44	3,955	10,468	8,310	592	23,326	4,614	8,792	3,301	6,591	58	23,357
45	5,409	9,504	6,428	597	21,938	3,643	8,815	3,209	6,240	53	21,961
46	5,406	8,379	7,553	597	21,935	5,112	8,792	2,899	5,083	57	21,944
47	3,563	10,836	9,435	590	24,424	5,650	8,792	3,269	6,630	65	24,407
48	4,669	7,346	6,405	597	19,017	2,824	8,815	3,157	4,190	54	19,039
49	5,923	5,854	6,635	606	19,017	5,149	8,792	2,617	2,440	49	19,048
50	5,142	8,219	7,920	599	21,880	5,785	8,792	2,879	4,364	54	21,875
avg	4,774	6,045	7,136	606	18,561	4,719	8,367	2,425	3,009	53	18,573
med	4,715	5,961	7,440	604	19,296	4,368	8,792	2,669	2,378	53	19,314
AVERAGES											
VD/ED	4,722	2,213	5,032	620	12,586	3,593	7,432	1,292	239	45	12,601
BN	5,556	5,034	6,795	606	17,989	4,856	8,687	2,343	2,070	51	18,007
AN	4,476	7,793	8,297	600	21,166	5,195	8,638	2,929	4,357	55	21,175
VW	4,122	9,815	8,540	596	23,073	5,214	8,664	3,225	5,917	62	23,081
MEDIANS											
VD/ED	4,668	2,114	4,812	618	13,548	3,814	7,110	1,319	109	46	13,561
BN	5,434	4,671	6,657	606	17,761	4,410	8,799	2,412	2,001	52	17,763
AN	4,545	7,578	8,173	599	21,388	4,504	8,792	3,065	4,246	56	21,398
VW	3,910	9,490	8,928	593	23,326	4,858	8,792	3,301	5,698	63	23,357

TABLE 5 Baseline Run Annual Water Budget Summary (continued)

Lower Santa Margarita River Groundwater Model

Modflow Volumetric Budget Output

Annual Groundwater Budget

MY	NET Storage	NET Str Lknc	In-Out	% bal
1	-2,000	1,990	-18.3	-0.09%
2	-2,433	4,597	-13.0	-0.08%
3	1,011	6,119	-13.5	-0.07%
4	-2,427	4,467	-11.1	-0.08%
5	25	6,283	-8.8	-0.07%
6	-289	4,544	-15.6	-0.13%
7	2,700	4,408	-9.5	-0.05%
8	-2,406	4,164	-22.5	-0.16%
9	-1,556	4,716	-15.5	-0.14%
10	-1,761	3,056	-14.9	-0.17%
11	3,021	5,987	-11.8	-0.06%
12	-904	5,659	-14.8	-0.11%
13	-2,991	3,073	-17.1	-0.17%
14	-1,295	3,176	-17.2	-0.18%
15	6,201	8,860	-14.8	-0.07%
16	2,066	5,471	-8.4	-0.04%
17	-2,098	5,251	-10.9	-0.07%
18	2,867	4,724	-18.2	-0.08%
19	-1,669	4,862	-20.8	-0.13%
20	-1,979	5,335	-14.0	-0.09%
21	-1,623	5,680	-18.6	-0.14%
22	2,590	5,902	-12.4	-0.06%
23	-560	6,421	-22.3	-0.14%
24	156	5,769	-11.2	-0.07%
25	1,141	6,671	-15.6	-0.09%
26	542	6,024	-12.4	-0.09%
27	2,966	3,611	-11.4	-0.05%
28	-32	57	-7.6	-0.03%
29	69	-305	-2.7	-0.01%
30	-1,097	4,320	-20.4	-0.11%
31	73	5,053	-6.9	-0.04%
32	948	3,230	-6.6	-0.03%
33	-1,150	1,676	-21.5	-0.10%
34	34	3,281	-9.7	-0.05%
35	595	4,506	-11.3	-0.05%
36	-2,146	4,584	-30.4	-0.18%
37	404	6,031	14.5	0.08%
38	-613	5,386	7.5	0.04%
39	319	5,452	-29.8	-0.15%
40	2,059	5,278	3.0	0.01%
41	347	2,872	-3.7	-0.02%
42	168	558	-6.5	-0.03%
43	-712	416	-11.7	-0.05%
44	659	1,719	-30.8	-0.13%
45	-1,765	188	-23.4	-0.11%
46	-294	2,470	-9.2	-0.04%
47	2,087	2,805	17.2	0.07%
48	-1,846	2,215	-21.8	-0.11%
49	-774	4,194	-30.5	-0.16%
50	643	3,556	5.5	0.03%
avg	-55	4,127	-12.6	-0.08%
med	-4	4,525	-12.7	-0.07%
AVERAGES				
VD/ED	(1,129)	4,793	(15)	(0)
BN	(700)	4,725	(17)	(0)
AN	719	3,940	(9)	(0)
VW	1,091	2,623	(8)	(0)
MEDIANS				
VD/ED	(1,426)	4,630	(16)	(0)
BN	(1,221)	5,293	(17)	(0)
AN	347	4,320	(10)	(0)
VW	948	2,805	(7)	(0)

TABLE 6 Baseline Run Average Monthly Water Budget Summary

Lower Santa Margarita River Groundwater Model — Baseline w TM1.1strflw 092012

Modflow Volumetric Budget Output and Streamflow — 9/21/12

Atreamflow

Avg AF/M	SMR Flow In	Diversion	Str Gain+ / Loss-	SMR @ UY->CH	Str Gain+ / Loss-	SMR @ CH->LY	Str Gain+ / Loss-	SMR Flow Out	LSMR Str Gain+ / Loss-
Oct	502	292	-320	182	-110	73	5	78	-425
Nov	1,072	491	261	1,333	-545	787	-26	761	-311
Dec	1,833	526	-550	1,283	-178	1,105	49	1,154	-679
Jan	8,239	834	-740	7,499	-123	7,376	138	7,515	-725
Feb	10,610	1,433	-956	9,654	-159	9,495	106	9,601	-1,009
Mar	9,203	1,477	-543	8,660	-255	8,406	93	8,499	-704
Apr	3,354	1,033	-256	3,097	-321	2,777	30	2,807	-547
May	1,387	705	-175	1,212	-342	870	-12	858	-530
Jun	727	505	-72	655	-279	375	-16	359	-368
Jul	494	128	-68	426	-211	215	-11	204	-291
Aug	421	61	-195	226	-143	82	-5	78	-344
Sep	493	49	-241	251	-135	116	-2	114	-379
Avg Monthly	3,195	628	-321	2,873	-233	2,640	29	2,669	-526
Med Monthly	1,230	516	-249	1,248	-195	829	1	810	-477
Avg Total=Anl	38,336	7,533	-3,857	34,479	-2,801	31,678	350	32,028	-6,308

Lower Santa Margarita River Groundwater Model

Modflow Volumetric Budget Output

Groundwater Model

	INFLOW:					OUTFLOW:							OUT-IN	OUT-IN		
Avg AF/M	Storage	Recharge	Stream Leakance	GHB	TOTAL IN	Storage	Wells	ET	Stream Leakance	GHB	TOTAL OUT		NET Storage	NET Str Lknc	In-Out	% bal
Oct	451	31	377	53	912	73	695	129	13	4	914		-379	364	-1.8	-0.19%
Nov	64	459	1,201	51	1,774	1,041	593	99	36	4	1,773		977	1,165	1.4	0.08%
Dec	259	137	665	52	1,112	466	494	90	58	6	1,113		207	607	-0.6	-0.05%
Jan	102	362	909	51	1,423	699	518	107	88	6	1,419		598	821	4.1	0.29%
Feb	72	1,351	717	46	2,186	1,262	468	146	305	6	2,186		1,190	412	-0.3	-0.01%
Mar	97	1,537	665	50	2,350	772	652	220	699	6	2,349		675	-33	1.0	0.04%
Apr	263	1,068	566	49	1,945	275	663	269	733	5	1,945		12	-168	0.3	0.01%
May	425	754	473	50	1,702	69	721	316	593	4	1,703		-355	-120	-1.4	-0.08%
Jun	765	264	403	49	1,481	10	840	311	322	3	1,486		-755	81	-5.6	-0.38%
Jul	890	64	368	51	1,373	2	956	298	119	3	1,378		-888	250	-4.1	-0.30%
Aug	782	10	370	52	1,214	14	916	253	32	3	1,218		-768	338	-3.9	-0.32%
Sep	604	9	424	51	1,088	35	852	187	13	3	1,090		-569	411	-1.6	-0.15%
Avg Monthly	398	504	595	50	1,547	393	697	202	251	4	1,548		-5	344	-1.1	-0.09%
Med Monthly	344	313	519	51	1,452	174	679	204	103	4	1,453		-172	351	-1.0	-0.07%
Avg Total=Anl	4,774	6,045	7,136	606	18,561	4,719	8,367	2,425	3,009	53	18,573		-55	4,127	-12.6	

E:\CPEN_LSMR\BASELINE A\POST\D.BASELINE TM1.1_092012_Budget-out.xlsx / printed 9/24/2012

Attachment 2

Alternative 1: Lower Santa Margarita River Surface and Groundwater Model

TABLE 1 Run 16b Annual Pumping Summary
LOWER SANTA MARGARITA RIVER GROUNDWATER MODEL

Hydrologic Condition

HC	Cnt	Oct to Apr Strflw
VW	9	Very Wet > 58,032
AN	15	Above Normal > 15,957
BN	14	Below Normal < 15,957
VD	5	Very Dry < 5,781
ED	7	Extremely Dry (2nd+ VD)

10,800 AFY 50-Year Average Annual Production, May through April

			GW Production			Water Allocation			
Model Year	HC	Oct-Apr HC descrip	UY Total af/WY	CH Total af/WY	LSMR Total af/WY	CPEN af/WY	FPUD af/WY	Additional Water af/WY	CWRMA Emergency Water af/WY
1	VW	Very Wet	8,644	4,958	13,602	7,822	5,780	-	-
2	BN	Below Normal	7,546	3,976	11,522	7,702	3,820	-	-
3	BN	Below Normal	5,333	3,269	8,602	7,642	960	-	-
4	VD	Very Dry	4,482	2,747	7,230	6,730	500	-	-
5	ED	Extremely Dry	3,484	2,136	5,620	5,359	261	-	603
6	ED	Extremely Dry	3,152	1,932	5,084	5,084	-	-	400
7	AN	Above Normal	5,655	3,515	9,170	6,450	2,720	-	-
8	VD	Very Dry	5,919	3,033	8,952	6,730	2,223	-	-
9	ED	Extremely Dry	3,285	2,014	5,299	5,299	-	-	600
10	ED	Extremely Dry	3,115	1,909	5,024	5,024	-	-	2,055
11	BN	Below Normal	4,092	2,508	6,600	6,450	150	-	591
12	VD	Very Dry	4,575	2,804	7,380	6,730	650	-	-
13	ED	Extremely Dry	3,411	2,090	5,501	5,239	263	-	-
14	ED	Extremely Dry	2,867	1,757	4,624	4,624	-	-	-
15	AN	Above Normal	5,392	3,358	8,750	6,350	2,400	-	-
16	AN	Above Normal	8,529	4,793	13,322	7,722	5,600	-	-
17	BN	Below Normal	6,443	3,384	9,827	7,517	2,310	-	-
18	VW	Very Wet	7,933	5,496	13,430	7,582	5,848	-	-
19	BN	Below Normal	7,463	3,949	11,412	7,532	3,880	-	-
20	BN	Below Normal	5,501	3,371	8,872	7,617	1,255	-	-
21	VD	Very Dry	4,442	2,723	7,165	6,415	750	-	-
22	BN	Below Normal	4,646	2,848	7,494	6,614	880	-	-
23	BN	Below Normal	5,656	3,466	9,122	7,822	1,300	-	-
24	BN	Below Normal	5,625	3,447	9,072	7,772	1,300	-	-
25	VD	Very Dry	4,684	2,871	7,555	6,630	925	-	-
26	ED	Extremely Dry	3,682	2,257	5,939	5,359	580	-	-
27	VW	Very Wet	7,510	5,980	13,490	6,450	4,046	2,994	-
28	AN	Above Normal	9,305	5,817	15,122	7,822	5,980	1,320	-
29	VW	Very Wet	8,838	6,814	15,652	7,822	5,460	2,370	-
30	AN	Above Normal	9,155	5,647	14,802	7,822	5,980	1,000	-
31	AN	Above Normal	8,705	4,877	13,582	7,822	5,120	640	-
32	VW	Very Wet	8,774	6,583	15,357	7,822	5,460	2,075	-
33	AN	Above Normal	9,401	5,881	15,282	7,822	5,980	1,480	-
34	AN	Above Normal	8,413	4,689	13,102	7,822	5,120	160	-
35	AN	Above Normal	8,488	4,934	13,422	7,822	5,120	480	-
36	BN	Below Normal	7,120	3,722	10,842	7,822	3,020	-	-
37	AN	Above Normal	7,027	4,675	11,702	7,822	3,400	480	-
38	BN	Below Normal	7,120	3,722	10,842	7,822	3,020	-	-
39	BN	Below Normal	5,656	3,466	9,122	7,822	1,300	-	-
40	VW	Very Wet	7,432	6,250	13,682	7,822	3,740	2,120	-
41	AN	Above Normal	9,236	6,316	15,552	7,822	5,980	1,750	-
42	VW	Very Wet	8,866	6,976	15,842	7,822	5,460	2,560	-
43	AN	Above Normal	9,155	5,757	14,912	7,822	5,980	1,110	-
44	VW	Very Wet	8,838	6,704	15,542	7,822	5,460	2,260	-
45	AN	Above Normal	9,145	5,337	14,482	7,822	5,980	680	-
46	AN	Above Normal	8,705	5,037	13,742	7,822	5,120	800	-
47	VW	Very Wet	8,729	6,763	15,492	7,822	5,460	2,210	-
48	BN	Below Normal	7,658	4,044	11,702	7,822	3,880	-	-
49	BN	Below Normal	5,656	3,466	9,122	7,822	1,300	-	-
50	AN	Above Normal	7,027	4,515	11,542	7,822	3,400	320	-
		Min	2,867	1,757	4,624	4,624	-	-	-
		Max	9,401	6,976	15,842	7,822	5,980	2,994	2,055
		Median	7,074	3,835	11,127	7,797	3,210	-	-
		Average	6,630	4,172	10,802	7,163	3,102	536	85

WEL_JWS16b 10800 as WY.xlsx / printed 4/5/2012

TABLE 1 Run 16b Annual Pumping Summary
LOWER SANTA MARGARITA RIVER GROUNDWATER MODEL

Average Annual Pumping

	Yearly Count	UY Total af/WY	CH Total af/WY	LSMR Total af/WY	CPEN af/WY	FPUD af/WY	Additional Water af/WY	CWRMA Emergency Water af/WY
VW	9	8,396	6,281	14,676	7,643	*5,190*	*1,843*	-
AN	15	8,223	5,010	13,232	7,626	*4,925*	*681*	-
BN	14	6,108	3,474	9,582	7,556	*2,027*	-	*42*
VD	5	4,820	2,836	7,656	6,647	*1,010*	-	-
ED	7	3,285	2,014	5,299	5,141	*158*	-	*523*

Average Monthly Pumping

%	Month	UY Total af/m	CH Total af/m	LSMR Total af/m	CPEN af/m	FPUD af/m	Additional Water af/m	CWRMA Emergency Water af/m
7.7%	Oct	523	304	827	614	*168*	45	16
6.9%	Nov	474	267	742	524	*177*	41	20
6.6%	Dec	469	245	714	473	*238*	3	20
7.3%	Jan	518	274	792	466	*297*	29	2
7.2%	Feb	507	272	780	414	*306*	59	2
8.3%	Mar	564	333	897	511	*311*	75	2
9.1%	Apr	596	388	984	582	*306*	95	2
9.4%	May	585	429	1,014	659	*331*	24	4
9.6%	Jun	597	443	1,040	699	*313*	27	4
10.0%	Jul	620	462	1,082	780	*265*	37	4
9.4%	Aug	609	407	1,016	751	*216*	49	4
8.5%	Sep	568	347	915	691	*175*	50	4
100%	Avg Anl	6,630	4,172	10,802	7,163	3,102	536	85

TABLE 2 Run 16b Pumping Summaries

	Subbasin	Building #	State ID	# mos Q	% of 600 mos		80% Utilization af/m	Potential 100% Yield gpm		
1	UY	2673R	10/4-7A2	600	100%	UY	99	1,000	existing	
2	UY-VOC	26072	10/4-7A3	600	100%	UY-VOC	110	1,000	existing	repair
3	UY	26002	10/4-7R2	600	100%	UY	110	1,000	existing	rehabilitate
4	UY	26018	10/4-18B1	503	84%	UY	99	900	existing	rehabilitate
5	UY	26071	10/4-7H3	412	69%	UY	77	800	existing	
6	UY	uyNEW_1	UY-4A	356	59%	UY	110	1,000	new	
7	UY	uyNEW_2	UY-2A	260	43%	UY	110	1,000	new	
8	UY	uyNEW_3	UY-1B	209	35%	UY	77	700	new	
9	CH	23093	10/4-18E3R	600	100%	CH	93	1,100	existing	
10	CH	330925	10/5-23G7	600	100%	CH	124	1,130	existing	
11	CH	23001	10/5-23J1	600	100%	CH	137	1,250	existing	ES replcmnt
12	CH	R330924	CH-5A	182	30%	CH	82	750	existing	ES replcmnt
13	CH	23063	10/5-13R3	140	23%	CH	110	1,100	existing	rehabilitate
14	CH	23073	10/4-18M5	100	17%	CH	132	1,200	existing	rehabilitate
15	CH	330923	10/5-23K3	43	7%	CH	121	1,100	existing	
16	CH	chNEW_1	CH-1B	14	2%	CH	110	1,000	new	

Well Capacity:	**1,697 af/m**	**16,030 gpm**

% Pumping in Subbasin

		62%	38%	0%	68%	32%	0%
mo	Anl %	UY	CH	LY	UY	CH	LY
MAY	9.1%	5.7%	3.5%	-	6.2%	2.9%	-
JUN	9.7%	6.0%	3.7%	-	6.6%	3.1%	-
JUL	10.8%	6.7%	4.1%	-	7.4%	3.5%	-
AUG	10.5%	6.5%	4.0%	-	7.1%	3.4%	-
SEP	9.7%	6.0%	3.7%	-	6.6%	3.1%	-
OCT	8.7%	5.4%	3.3%	-	5.9%	2.8%	-
NOV	7.4%	4.6%	2.8%	-	5.0%	2.4%	-
DEC	6.6%	4.1%	2.5%	-	4.5%	2.1%	-
JAN	6.5%	4.0%	2.5%	-	4.4%	2.1%	-
FEB	5.8%	3.6%	2.2%	-	3.9%	1.8%	-
MAR	7.1%	4.4%	2.7%	-	4.8%	2.3%	-
APR	8.1%	5.0%	3.1%	-	5.5%	2.6%	-

Max Pumping in Subbasin adding wells as needed

	UY		CH	LY	Total
# exst wells	5	# exst wells	7		(afm)
first 3 wells	318	first 3 wells	354	-	672
+26018	416	+23073	436	-	853
+26071	**493**	+330925	546	-	1,039
+UY-4A	603	+330923	677	-	1,280
+UY-2A	712	+330924	**798**	-	1,510
+UY-1B	789	1 adntl well	908	-	1,697

TABLE 3 Run 16b Annual Pumping by Well
Annual Well Production (AF/Y)

	Building #:	2673R	26072	26002	26018	26071	uyNEW_1	uyNEW_2	uyNEW_3
	Max Annual Pumping	1,175	1,306	1,306	1,175	914	1,306	1,306	914
	Potential w/ 80% Util	1,184	1,315	1,315	1,184	921	1,315	1,315	921
	Potential Well Yield (gpm)	900	1,000	1,000	900	700	1,000	1,000	700
		UY	UY-VOC	UY	UY	UY	UY	UY	UY
Settlement		10/4-7A2	10/4-7A3	10/4-7R2	10/4-18B1	10/4-7H3	UY-4A	UY-2A	UY-1B
Year	HC	(af/y)	(af/y)	(af/y)	(af/y)	(af/y)	(af/y)	(af/y)	(af/y)
1	VW	1,133	1,259	1,259	1,133	881	1,259	1,051	669
2	BN	1,129	1,254	1,254	1,129	878	938	743	222
3	BN	1,036	1,151	1,151	1,036	478	481	0	0
4	VD	1,029	1,143	1,143	1,029	138	0	0	0
5	ED	1,008	1,121	1,121	235	0	0	0	0
6	ED	929	1,032	1,032	159	0	0	0	0
7	AN	987	1,096	1,096	645	377	538	538	377
8	VD	1,049	1,165	1,165	1,049	495	707	290	0
9	ED	970	1,078	1,078	159	0	0	0	0
10	ED	917	1,019	1,019	159	0	0	0	0
11	BN	954	1,060	1,060	463	360	195	0	0
12	VD	1,034	1,149	1,149	1,034	208	0	0	0
13	ED	1,009	1,121	1,121	161	0	0	0	0
14	ED	865	961	961	81	0	0	0	0
15	AN	970	1,078	1,078	490	381	544	544	307
16	AN	1,140	1,267	1,267	1,140	887	1,267	959	601
17	BN	1,073	1,193	1,193	1,073	835	874	202	0
18	VW	1,144	1,271	1,271	1,144	753	870	870	609
19	BN	1,112	1,236	1,236	1,112	865	1,020	729	152
20	BN	1,071	1,190	1,190	1,071	612	367	0	0
21	VD	1,064	1,182	1,182	876	138	0	0	0
22	BN	1,028	1,142	1,142	604	345	386	0	0
23	BN	1,079	1,199	1,199	1,079	619	480	0	0
24	BN	1,092	1,213	1,213	1,092	629	384	0	0
25	VD	1,024	1,138	1,138	1,024	269	90	0	0
26	ED	1,044	1,160	1,160	319	0	0	0	0
27	VW	1,090	1,211	1,211	868	675	964	964	527
28	AN	1,172	1,303	1,303	1,172	912	1,303	1,303	837
29	VW	1,157	1,286	1,286	1,157	900	1,286	1,077	688
30	AN	1,163	1,293	1,293	1,163	905	1,293	1,293	754
31	AN	1,141	1,268	1,268	1,141	887	1,268	1,059	675
32	VW	1,149	1,277	1,277	1,149	894	1,277	1,069	682
33	AN	1,175	1,306	1,306	1,175	914	1,306	1,306	914
34	AN	1,121	1,246	1,246	1,121	872	1,246	1,037	523
35	AN	1,131	1,256	1,256	1,131	879	1,256	1,048	530
36	BN	1,078	1,198	1,198	1,078	838	1,091	496	144
37	AN	1,120	1,244	1,244	1,120	651	732	538	377
38	BN	1,078	1,198	1,198	1,078	838	1,091	496	144
39	BN	1,079	1,199	1,199	1,079	619	480	0	0
40	VW	1,137	1,264	1,264	1,137	664	848	658	460
41	AN	1,164	1,293	1,293	1,164	905	1,293	1,293	831
42	VW	1,161	1,290	1,290	1,161	903	1,290	1,081	691
43	AN	1,163	1,293	1,293	1,163	905	1,293	1,293	754
44	VW	1,157	1,286	1,286	1,157	900	1,286	1,077	688
45	AN	1,162	1,291	1,291	1,162	904	1,291	1,291	753
46	AN	1,141	1,268	1,268	1,141	887	1,268	1,059	675
47	VW	1,153	1,281	1,281	1,153	896	1,281	1,072	614
48	BN	1,113	1,236	1,236	1,113	865	1,129	743	222
49	BN	1,079	1,199	1,199	1,079	619	480	0	0
50	AN	1,120	1,244	1,244	1,120	651	732	538	377
	Min	865	961	961	81	0	0	0	0
	Max	1,175	1,306	1,306	1,175	914	1,306	1,306	914
	Median	1,091	1,212	1,212	1,086	670	859	538	222
	Average	1,082	1,202	1,202	930	601	744	554	316

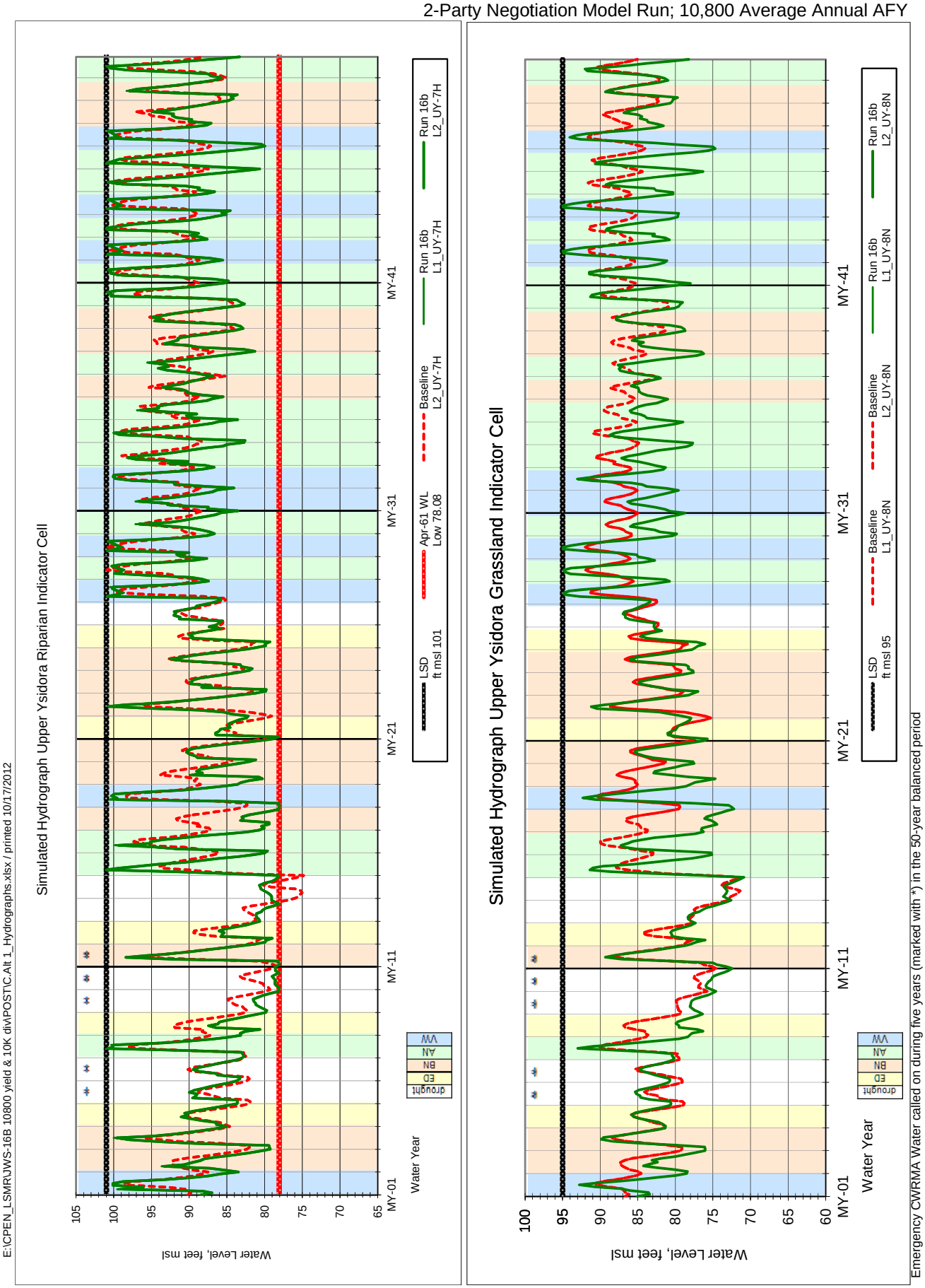
Month	UY 10/4-7A2 (af/m)	UY-VOC 10/4-7A3 (af/m)	UY 10/4-7R2 (af/m)	UY 10/4-18B1 (af/m)	UY 10/4-7H3 (af/m)	UY UY-4A (af/m)	UY UY-2A (af/m)	UY UY-1B (af/m)
Oct	88	98	98	68	53	65	44	9
Nov	87	97	97	69	48	47	19	9
Dec	90	100	100	73	36	51	19	2
Jan	88	98	98	73	38	52	50	22
Feb	85	94	94	71	38	54	52	19
Mar	90	99	99	78	51	57	53	36
Apr	92	102	102	82	58	65	57	38
May	95	105	105	80	58	53	53	37
Jun	92	102	102	79	55	77	53	37
Jul	93	103	103	93	57	81	53	37
Aug	92	102	102	88	56	78	53	37
Sep	90	100	100	76	54	64	50	33
Annual Total	1,082	1,202	1,202	930	601	744	554	316

TABLE 3 Run 16b Annual Pumping by Well (Continued)

	Building #:	23093	330925	23001	R330924	23063	23073	330923	chNEW_1
	Max Annual Pumping	1,035	1,376	1,522	830	908	854	567	204
	Potential w/ 80% Util	1,118	1,486	1,644	986	1,315	1,578	1,447	1,315
	Potential Well Yield (gpm)	850	1,130	1,250	750	1,000	1,200	1,100	1,000
		CH	CH	CH	CH	CH	CH	CH	CH
Settlement		10/4-18E3R	10/5-23G7	10/5-23J1	CH-5A	10/5-13R3	10/4-18M5	10/5-23K3	CH-1B
Year	HC	(af/y)	(af/y)	(af/y)	(af/y)	(af/y)	(af/y)	(af/y)	(af/y)
1	VW	969	1,288	1,425	505	403	367	0	0
2	BN	987	1,313	1,452	136	89	0	0	0
3	BN	860	1,144	1,265	0	0	0	0	0
4	VD	723	961	1,063	0	0	0	0	0
5	ED	562	747	826	0	0	0	0	0
6	ED	508	676	748	0	0	0	0	0
7	AN	713	948	1,049	298	288	219	0	0
8	VD	798	1,061	1,174	0	0	0	0	0
9	ED	530	704	779	0	0	0	0	0
10	ED	502	668	739	0	0	0	0	0
11	BN	660	877	971	0	0	0	0	0
12	VD	738	981	1,085	0	0	0	0	0
13	ED	550	731	809	0	0	0	0	0
14	ED	462	615	680	0	0	0	0	0
15	AN	672	893	988	298	288	219	0	0
16	AN	983	1,306	1,445	452	389	219	0	0
17	BN	891	1,184	1,310	0	0	0	0	0
18	VW	928	1,234	1,365	581	686	592	110	0
19	BN	980	1,303	1,441	136	89	0	0	0
20	BN	887	1,179	1,305	0	0	0	0	0
21	VD	716	952	1,054	0	0	0	0	0
22	BN	749	996	1,102	0	0	0	0	0
23	BN	912	1,213	1,341	0	0	0	0	0
24	BN	907	1,206	1,334	0	0	0	0	0
25	VD	755	1,004	1,111	0	0	0	0	0
26	ED	594	790	873	0	0	0	0	0
27	VW	883	1,174	1,299	678	691	612	444	198
28	AN	1,033	1,373	1,519	757	688	448	0	0
29	VW	978	1,300	1,438	670	804	853	567	204
30	AN	1,030	1,369	1,514	598	688	448	0	0
31	AN	987	1,312	1,451	520	389	219	0	0
32	VW	990	1,316	1,455	601	712	854	450	204
33	AN	1,030	1,369	1,515	830	688	448	0	0
34	AN	976	1,298	1,435	373	389	219	0	0
35	AN	968	1,287	1,423	444	377	332	104	0
36	BN	961	1,278	1,414	68	0	0	0	0
37	AN	932	1,239	1,370	295	285	342	214	0
38	BN	961	1,278	1,414	68	0	0	0	0
39	BN	912	1,213	1,341	0	0	0	0	0
40	VW	961	1,278	1,414	464	619	743	567	204
41	AN	1,035	1,376	1,522	680	694	582	426	0
42	VW	990	1,316	1,456	681	908	853	567	204
43	AN	1,030	1,370	1,515	599	689	449	104	0
44	VW	979	1,301	1,439	671	805	854	450	204
45	AN	1,012	1,346	1,489	583	576	331	0	0
46	AN	977	1,299	1,437	511	377	332	104	0
47	VW	982	1,306	1,444	603	804	853	567	204
48	BN	1,005	1,337	1,478	136	89	0	0	0
49	BN	912	1,213	1,341	0	0	0	0	0
50	AN	925	1,229	1,360	289	277	332	104	0
	Min	462	615	680	0	0	0	0	0
	Max	1,035	1,376	1,522	830	908	854	567	204
	Median	926	1,232	1,362	136	89	0	0	0
	Average	860	1,143	1,264	270	276	234	96	28

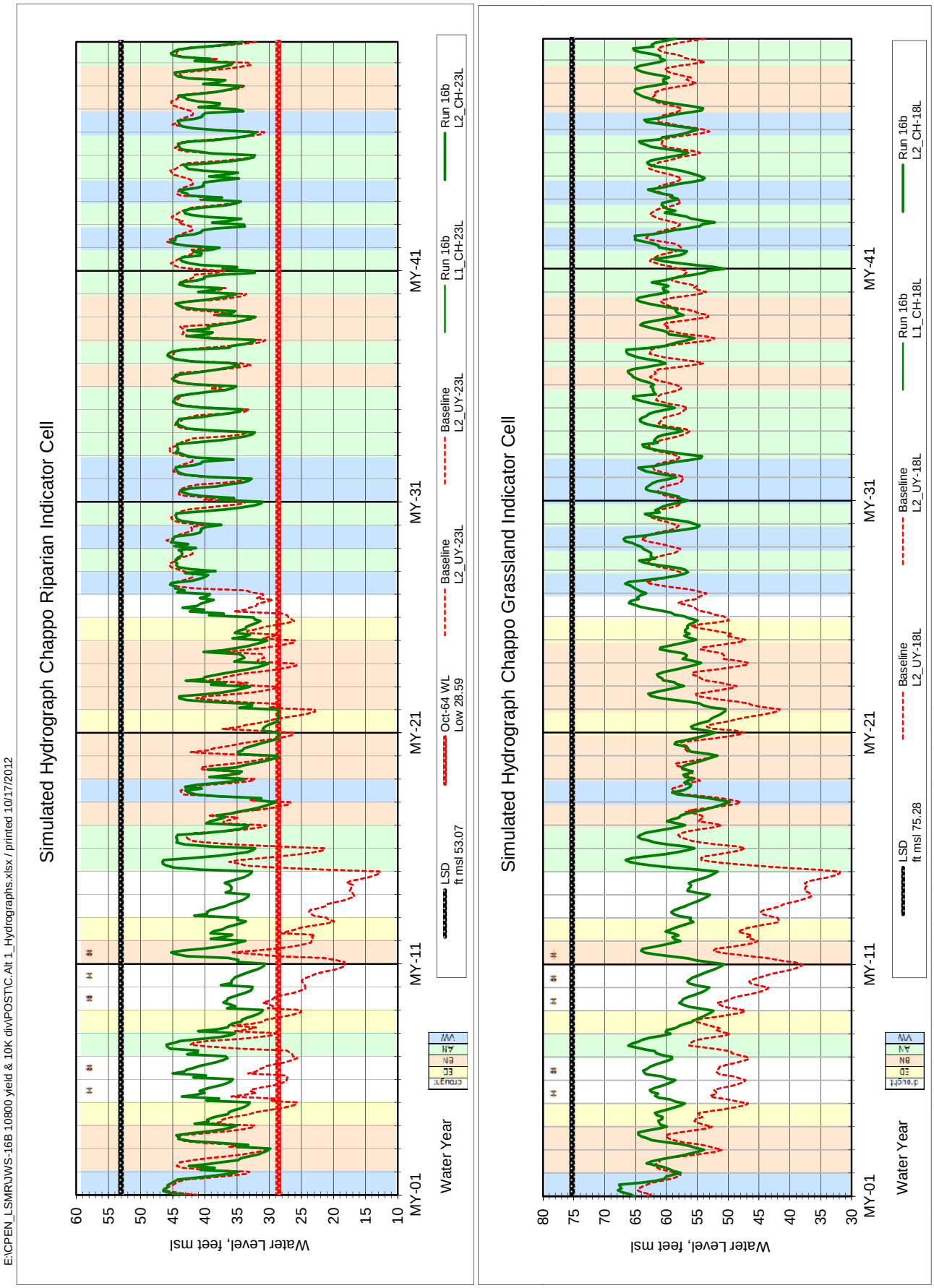
	CH	CH	CH	CH	CH	CH	CH	CH
	10/4-18E3R	10/5-23G7	10/5-23J1	CH-5A	10/5-13R3	10/4-18M5	10/5-23K3	CH-1B
Month	(af/m)	(af/m)	(af/m)	(af/m)	(af/m)	(af/m)	(af/m)	(af/m)
Oct	70	93	103	8	11	14	4	0
Nov	65	86	95	10	13	0	0	0
Dec	64	85	94	1	0	0	0	0
Jan	68	90	100	15	2	0	0	0
Feb	66	87	97	13	9	0	0	0
Mar	70	94	104	29	23	13	0	0
Apr	73	97	108	37	43	29	0	0
May	75	99	110	36	49	33	28	0
Jun	75	99	110	35	47	56	21	0
Jul	78	103	114	34	46	55	18	14
Aug	80	107	118	38	18	17	15	14
Sep	77	102	113	14	15	18	9	0
Annual Total	860	1,143	1,264	270	276	234	96	28

FIGURE 1 Run 16b & Baseline Hydrographs
2-Party Negotiation Model Run; 10,800 Average Annual AFY



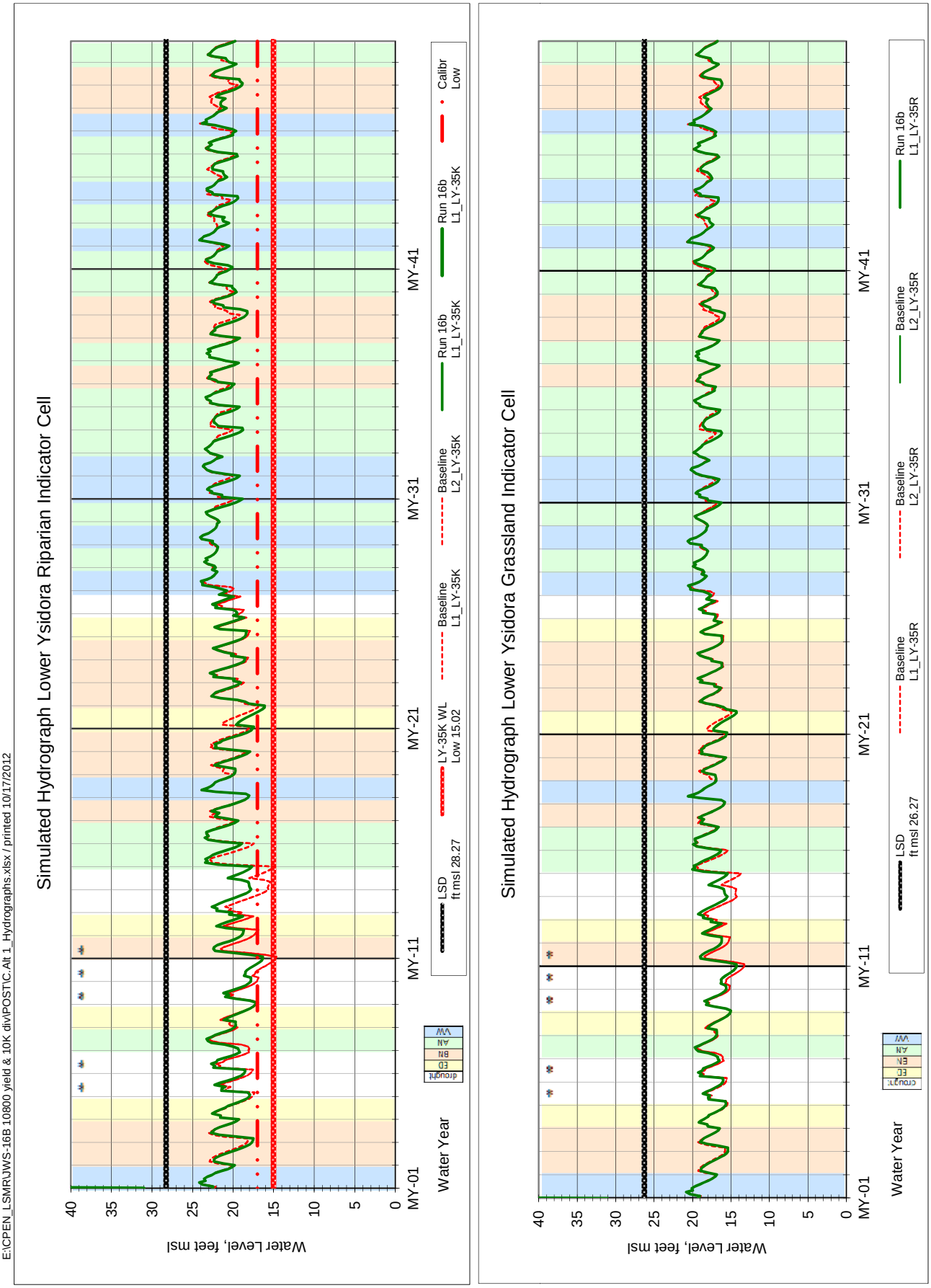
Emergency CWRMA Water called on during five years (marked with *) in the 50-year balanced period
Layer 1 (L1) and Layer 2 (L2) simulated groundwater levels are at similar elevations and the graph lines are printed on top of each other.

FIGURE 2 Run 16b & Baseline Hydrographs
2-Party Negotiation Model Run; 10,800 Average Annual AFY



Emergency CWRMA Water called on during five years (marked with *) in the 50-year balanced period.
Layer 1 (L1) and Layer 2 (L2) simulated groundwater levels are at similar elevations and the graph lines are printed on top of each other.

FIGURE 3 Run 16b & Baseline Hydrographs
2-Party Negotiation Model Run; 10,800 Average Annual AFY



Emergency CWRMA Water called on during five years (marked with *) in the 50-year balanced period.
Layer 1 (L1) and Layer 2 (L2) simulated groundwater levels are at similar elevations and the graph lines are printed on top of each other.

FIGURE 4 Run 16b with 10,000 AFY Diversion and Baseline Streamflow
2-Party Negotiation Model Run; 10,800 Average Annual AFY

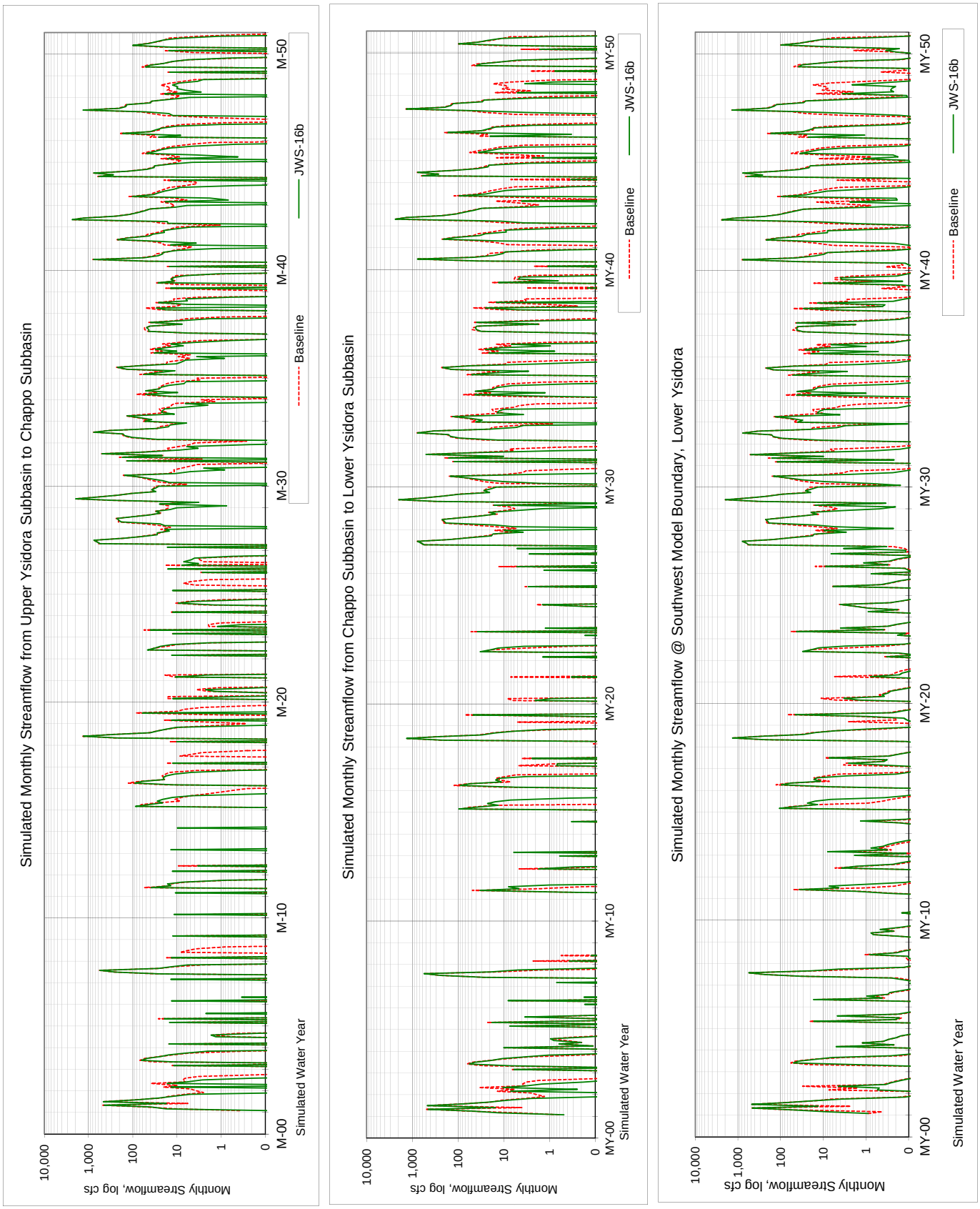


TABLE 4 2-Party Negotiation Model Run 16b; 10,800 AFY Pumping & 10,000 AFY Diversion

Average Hydrologic Condition Water Budget (af/y)

% Time Exceedence	*> 76%*	*76% to 50%*	*50% to 19%*	*< 19%*
# Years	*12*	*14*	*15*	*9*
	Very & Extrm Dry	Below Normal	Above Normal	Very Wet
Inflow:				
Santa Margarita River Inflow	5,500	11,700	32,700	132,900
Subsurface Underflow	600	600	600	600
Lake O'Neill Spill and Release	1,100	1,100	1,100	1,200
Fallbrook Creek	100	400	1,400	3,800
Title 22 Water	0	0	0	0
Minor Tributary Drainages	1,600	1,500	2,400	4,900
Areal Precipitation	600	500	700	1,600
Total Inflow:	9,500	15,800	38,900	145,000
Outflow:				
Santa Margarita River Outflow	500	2,500	21,200	125,000
Subsurface Underflow	0	100	100	100
Groundwater Pumping	6,300	9,600	13,200	14,700
Evapotranspiration	1,700	2,200	2,800	3,300
Diversions to Lake O'Neill	1,500	1,500	1,600	1,600
Total Outflow:	10,000	15,900	38,900	144,700
Net Simulated Change of Groundwater in Storage:				
	-500	0	-100	400
	-	(100)	100	(100)

Median Hydrologic Condition Water Budget (af/y)

% Time Exceedence	*> 76%*	*76% to 50%*	*50% to 19%*	*< 19%*
# Years	*12*	*14*	*15*	*9*
	Very & Extrm Dry	Below Normal	Above Normal	Very Wet
Inflow:				
Santa Margarita River Inflow	5,800	12,300	26,700	121,300
Subsurface Underflow	600	600	600	600
Lake O'Neill Spill and Release	1,100	1,100	1,200	1,200
Fallbrook Creek	100	300	1,100	3,500
Title 22 Water	0	0	0	0
Minor Tributary Drainages	1,500	1,400	2,500	4,700
Areal Precipitation	400	300	500	1,600
Outflow:				
Santa Margarita River Outflow	500	2,900	15,200	110,600
Subsurface Underflow	0	0	100	100
Groundwater Pumping	5,800	9,100	13,600	15,400
Evapotranspiration	1,600	2,300	2,700	3,000
Diversions to Lake O'Neill	1,500	1,500	1,600	1,600
Net Simulated Change of Groundwater in Storage:				
	-400	-200	400	300

Average Subbasin Water Budget (af/y)

	Upper Ysidora	Chappo	Lower Ysidora	SMR Basin	
Inflow:					
Santa Margarita River Inflow	38,300	31,900	29,300	38,300	86%
Subsurface Underflow *	600	1,300	400	600	1%
Lake O'Neill Spill and Release	1,100	-	-	1,100	2%
Fallbrook Creek	1,200	-	-	1,200	3%
Title 22 Water	-	-	0	0	0%
Minor Tributary Drainages	600	1,100	700	2,400	5%
Areal Precipitation	200	300	200	800	2%
Total Inflow:	42,000	34,600	30,600	44,400	
Outflow:					
Santa Margarita River Outflow	31,900	29,300	29,700	29,700	67%
Subsurface Underflow *	1,300	400	100	100	0%
Groundwater Pumping	6,500	4,300	0	10,800	24%
Evapotranspiration *	700	900	800	2,400	5%
Diversions to Lake O'Neill	1,600	-	-	1,600	4%
Total Outflow:	42,000	34,900	30,600	44,600	
Net Simulated Change of Groundwater in Storage: *					
	0	0	0	-100	
	-	(300)	-	(100)	

Note: * Subbasin Averages are based on the last rate of the stress period
Values are rounded to the nearest 100 acre-feet, which may result in a summation rounding error

Median Subbasin Water Budget (af/y)

	Upper Ysidora	Chappo	Lower Ysidora	SMR Basin
Inflow:				
Santa Margarita River Inflow	16,700	8,600	4,900	16,700
Subsurface Underflow *	600	1,300	400	600
Lake O'Neill Spill and Release	1,100	-	-	1,100
Fallbrook Creek	600	-	-	600
Title 22 Water	-	-	-	0
Minor Tributary Drainages	600	900	600	2,100
Areal Precipitation	100	0	6,499	500
Outflow:				
Santa Margarita River Outflow	8,600	4,900	4,700	4,700
Subsurface Underflow *	1,300	400	100	100
Groundwater Pumping	6,800	4,200	0	11,100
Evapotranspiration *	800	1,000	800	2,600
Diversions to Lake O'Neill	1,600	-	-	1,600
Net Simulated Change of Groundwater in Storage: *				
	-400	-100	0	-100

Note: The sum of median values does not reflect the change of groundwater in storage.
Median values are not cummulative.
* Subbasin Medians are based on the last rate of the stress period
Values are rounded to the nearest 100 acre-feet

E:\CPEN_LSMR\JWS 16B 10800 yield & 10K div\POST\D.JWS-16b 10800 yield 10k div_Budget-out.xlsx / printed 4/13/2012

TABLE 5 Run 16b Annual Water Budget Summary

Lower Santa Margarita River Groundwater Model — JWS-16b 10,800 AFY Pumping & 10,000 AFY Diversion

Modflow Volumetric Budget Output and Streamflow — 12/22/11

Annual Surface Water Budget

MY		SMR Flow In	LON Diversion	Ponds Diversion	Release & Spill	Str Gain+ / Loss-	GAGE SMR @ UY->CH	Str Gain+ / Loss-	SMR @ CH->LY	Str Gain+ / Loss-	SMR Flow Out	LSMR Str Gain+ / Loss-
1	VW	72,916	-1,543	-12,768	1,152	-5,545	67,371	-952	66,419	1,655	68,074	-4,842
2	BN	9,851	-1,358	-5,516	1,104	-7,522	2,329	-1,946	383	17	400	-9,450
3	BN	19,081	-1,804	-7,680	1,124	-8,261	10,820	-4,012	6,808	-277	6,530	-12,551
4	VD	6,075	-1,324	-2,824	1,122	-4,989	1,087	-752	335	127	462	-5,613
5	ED	6,672	-1,538	-1,599	1,125	-4,475	2,197	-1,144	1,054	318	1,372	-5,300
6	ED	4,277	-1,417	-1,067	1,000	-3,461	816	-302	514	670	1,184	-3,093
7	AN	59,305	-1,724	-8,831	1,080	-6,459	52,846	-2,232	50,613	611	51,225	-8,080
8	VD	6,521	-1,381	-2,856	1,134	-5,724	797	-768	29	70	98	-6,422
9	ED	4,099	-1,522	-549	1,110	-3,365	734	-731	3	158	161	-3,938
10	ED	4,629	-1,717	-740	1,080	-3,941	688	-688	-	37	37	-4,591
11	BN	11,484	-1,432	-5,713	1,126	-6,390	5,094	-2,419	2,675	243	2,918	-8,566
12	VD	5,622	-1,500	-1,309	1,057	-4,681	941	-790	150	319	469	-5,153
13	ED	3,321	-1,471	-277	1,100	-2,500	821	-461	360	253	613	-2,708
14	ED	3,589	-1,461	-431	1,011	-3,006	583	-563	20	105	125	-3,464
15	AN	20,522	-1,781	-8,943	1,111	-7,503	13,019	-1,378	11,641	1,121	12,763	-7,760
16	AN	22,816	-1,556	-10,771	1,167	-8,544	14,272	-2,609	11,663	946	12,609	-10,207
17	BN	6,199	-1,527	-2,487	1,135	-5,462	736	-506	230	486	716	-5,483
18	VW	117,031	-1,613	-13,773	1,160	-6,977	110,054	-3,160	106,894	1,292	108,186	-8,845
19	BN	12,744	-1,612	-4,628	1,135	-8,255	4,488	-1,605	2,884	24	2,908	-9,836
20	BN	6,645	-1,324	-3,416	1,120	-5,639	1,006	-827	179	214	393	-6,252
21	VD	7,214	-1,788	-2,134	1,038	-6,441	773	-753	20	70	90	-7,124
22	BN	13,310	-1,318	-7,699	1,162	-5,785	7,525	-3,446	4,079	-257	3,822	-9,488
23	BN	9,953	-1,768	-3,097	1,068	-6,675	3,278	-888	2,390	546	2,936	-7,017
24	BN	7,708	-1,376	-4,323	1,191	-6,062	1,647	-1,550	97	416	513	-7,195
25	VD	7,560	-1,684	-2,740	1,103	-6,657	903	-735	168	295	463	-7,097
26	ED	6,746	-1,338	-3,279	1,119	-4,141	2,605	-2,034	571	531	1,102	-5,644
27	VW	138,265	-1,693	-18,003	1,204	-3,513	134,753	-2,292	132,461	1,890	134,352	-3,914
28	AN	61,252	-1,595	-22,187	1,189	-9,006	52,246	-5,115	47,131	326	47,458	-13,795
29	VW	195,725	-1,600	-20,316	1,297	-4,468	191,257	-2,610	188,648	1,732	190,380	-5,345
30	AN	27,995	-1,621	-8,538	1,154	-9,172	18,823	-3,654	15,169	75	15,243	-12,752
31	AN	61,581	-1,565	-9,222	1,160	-7,059	54,522	-3,441	51,081	453	51,534	-10,046
32	VW	105,365	-1,569	-14,362	1,247	-5,413	99,952	-4,793	95,159	640	95,800	-9,565
33	AN	28,766	-1,600	-11,999	1,123	-9,069	19,697	-4,126	15,572	318	15,890	-12,877
34	AN	21,480	-1,585	-12,438	1,112	-9,456	12,024	-4,655	7,369	-231	7,138	-14,342
35	AN	38,995	-1,527	-9,383	1,132	-6,802	32,193	-3,808	28,385	436	28,820	-10,175
36	BN	13,900	-1,588	-5,878	1,111	-6,960	6,940	-3,000	3,940	-14	3,926	-9,974
37	AN	18,856	-1,552	-6,754	1,140	-4,485	14,370	-2,790	11,581	429	12,009	-6,846
38	BN	12,534	-1,564	-6,622	1,111	-7,022	5,512	-2,797	2,715	177	2,892	-9,642
39	BN	12,024	-1,485	-7,429	1,138	-7,051	4,973	-3,649	1,323	-246	1,078	-10,946
40	VW	66,151	-1,760	-12,355	1,170	-7,276	58,874	-4,436	54,439	76	54,514	-11,636
41	AN	40,738	-1,581	-15,038	1,163	-10,080	30,658	-5,844	24,814	137	24,951	-15,787
42	VW	256,836	-1,603	-20,281	1,244	-3,940	252,896	-3,652	249,244	1,229	250,473	-6,363
43	AN	23,081	-1,628	-13,783	1,157	-10,069	13,013	-4,411	8,601	-10	8,591	-14,490
44	VW	122,236	-1,552	-19,256	1,181	-6,915	115,321	-4,061	111,260	1,014	112,274	-9,962
45	AN	17,853	-1,586	-11,866	1,142	-9,396	8,456	-3,996	4,460	-181	4,279	-13,573
46	AN	26,690	-1,624	-12,460	1,169	-8,194	18,496	-3,062	15,435	513	15,948	-10,743
47	VW	121,259	-1,570	-17,558	1,244	-7,487	113,772	-4,404	109,368	1,194	110,562	-10,696
48	BN	13,194	-1,618	-8,962	1,134	-8,696	4,498	-3,940	559	-115	444	-12,750
49	BN	15,504	-1,620	-6,760	1,140	-6,842	8,662	-3,347	5,314	-243	5,072	-10,432
50	AN	20,633	-1,578	-10,860	1,179	-7,217	13,417	-3,334	10,083	69	10,152	-10,481
	avg	38,336	-1,563	-8,435	1,138	**-6,481**	31,855	**-2,569**	29,286	**393**	29,679	**-8,657**
	med	16,678	-1,574	-7,689	1,135	-6,739	8,559	-2,700	4,887	274	4,676	-9,148
AVERAGES												
VD/ED	12	5,527	(1,512)	(1,650)	1,083	(4,448)	1,079	(810)	269	246	515	(5,012)
BN	14	11,724	(1,528)	(5,729)	1,129	(6,902)	4,822	(2,424)	2,398	69	2,468	(9,256)
AN	15	32,704	(1,607)	(11,538)	1,145	(8,167)	24,537	(3,630)	20,906	334	21,241	(11,464)
VW	9	132,865	(1,612)	(16,519)	1,211	(5,726)	127,139	(3,373)	123,766	1,191	124,957	(7,908)
	50											
MEDIANS												
VD/ED	12	5,849	(1,486)	(1,454)	1,101	(4,308)	819	(743)	159	205	463	(5,226)
BN	14	12,279	(1,545)	(5,795)	1,130	(6,901)	4,735	(2,608)	2,533	21	2,900	(9,565)
AN	15	26,690	(1,586)	(10,860)	1,154	(8,544)	18,496	(3,654)	15,169	326	15,243	(10,743)
VW	9	121,259	(1,600)	(17,558)	1,204	(5,545)	113,772	(3,652)	109,368	1,229	110,562	(8,845)
	50											

E:\CPEN_LSMR\JWS 16B 10800 yield & 10K div\POST\D.JWS-16b 10800 yield 10k div_Budget-out.xlsx / printed 4/13/2012

TABLE 5 Run 16b Annual Water Budget Summary (continued)

Lower Santa Margarita River Groundwater Model

Modflow Volumetric Budget Output

Annual Groundwater Budget Model Run: JWS-16b 10,800 AFY Pumping & 10,000 AFY Diversion

	INFLOW:					**OUTFLOW:**					
MY	Storage	Recharge	Stream Leakance	GHB	TOTAL GW IN	Storage	Wells	ET	Stream Leakance	GHB	TOTAL GW OUT
1	7,659	13,815	6,838	598	28,911	4,831	13,602	3,315	7,119	67	28,934
2	6,770	5,702	5,734	603	18,809	4,162	11,522	1,917	1,188	49	18,838
3	5,228	7,878	8,587	610	22,304	8,106	8,602	2,522	3,039	46	22,315
4	4,716	3,118	4,425	606	12,865	3,186	7,229	2,011	398	51	12,876
5	4,118	1,917	5,898	617	12,550	4,664	5,620	2,135	105	46	12,570
6	4,098	1,820	4,952	616	11,486	3,967	5,085	2,244	154	53	11,503
7	6,095	9,433	7,394	606	23,529	6,958	9,169	2,884	4,464	58	23,534
8	5,815	3,010	4,063	611	13,499	2,828	8,953	1,550	152	44	13,528
9	2,943	923	4,874	630	9,370	2,599	5,298	1,359	81	47	9,384
10	2,883	870	3,655	639	8,048	1,889	5,025	1,070	43	36	8,063
11	5,790	6,194	7,626	618	20,228	9,187	6,600	2,272	2,137	47	20,243
12	4,890	1,607	6,267	626	13,390	4,190	7,378	1,703	83	47	13,401
13	4,341	530	3,678	640	9,190	2,000	5,500	1,522	148	51	9,221
14	3,074	794	3,965	669	8,502	2,599	4,626	1,185	55	45	8,510
15	7,277	9,984	8,150	613	26,024	10,085	8,749	2,569	4,589	58	26,049
16	6,694	11,377	8,843	596	27,511	7,133	13,322	2,684	4,332	58	27,528
17	5,799	2,808	5,638	614	14,859	3,235	9,828	1,621	145	52	14,880
18	6,671	14,940	10,606	603	32,820	10,064	13,430	2,544	6,745	59	32,841
19	6,359	4,809	6,322	606	18,096	4,470	11,412	1,733	461	49	18,125
20	5,636	3,799	5,354	609	15,398	4,527	8,871	1,529	434	51	15,411
21	3,797	2,413	5,165	629	12,004	3,678	7,165	1,081	57	40	12,021
22	6,325	8,058	7,119	603	22,104	8,710	7,495	2,273	3,593	48	22,119
23	6,113	3,561	6,568	619	16,861	5,459	9,121	1,995	257	51	16,883
24	5,248	4,784	6,467	605	17,104	5,278	9,073	1,887	831	54	17,122
25	4,483	3,340	6,657	618	15,099	5,627	7,555	1,579	298	52	15,112
26	3,682	3,717	6,685	606	14,690	5,372	5,939	2,539	803	56	14,709
27	6,536	19,197	8,581	591	34,904	6,816	13,492	3,324	11,221	66	34,919
28	5,992	22,521	9,155	583	38,250	6,455	15,129	3,354	13,267	59	38,264
29	6,892	21,322	8,464	584	37,262	6,164	15,634	3,441	11,956	66	37,261
30	6,054	8,747	8,611	597	24,008	4,024	14,807	2,626	2,505	54	24,016
31	5,321	9,640	9,624	597	25,181	5,944	13,590	2,548	3,069	55	25,207
32	6,189	15,090	10,973	590	32,842	7,314	15,358	3,039	7,084	62	32,858
33	6,221	12,183	8,717	594	27,716	4,559	15,266	2,782	5,051	55	27,713
34	5,611	12,649	8,871	595	27,725	6,263	13,108	2,727	5,588	50	27,736
35	4,784	9,780	9,826	597	24,986	5,647	13,430	2,897	2,989	56	25,020
36	4,449	6,129	7,438	601	18,618	3,776	10,836	2,732	1,221	55	18,620
37	5,691	7,163	7,713	601	21,168	4,428	11,708	2,778	2,199	57	21,171
38	5,673	6,864	7,645	603	20,784	5,921	10,836	2,300	1,680	51	20,787
39	5,255	7,599	6,956	604	20,413	6,203	9,137	2,576	2,475	49	20,439
40	6,635	12,534	9,183	606	28,958	6,740	13,682	2,798	5,702	51	28,975
41	5,774	15,335	10,904	595	32,608	6,818	15,542	2,911	7,282	55	32,608
42	6,974	21,120	8,838	583	37,516	6,433	15,840	3,246	11,949	61	37,529
43	6,726	13,935	8,586	592	29,839	6,104	14,922	2,700	6,093	51	29,870
44	6,979	19,904	9,504	588	36,974	7,622	15,542	3,007	10,751	57	36,978
45	7,966	12,006	7,484	595	28,051	5,969	14,463	2,530	5,023	52	28,037
46	7,874	12,856	8,770	595	30,094	7,645	13,751	2,553	6,152	57	30,158
47	6,152	18,480	10,973	588	36,194	8,379	15,496	3,014	9,240	65	36,194
48	5,165	9,114	7,277	597	22,153	4,752	11,708	2,647	3,028	52	22,187
49	6,015	6,910	6,933	604	20,461	6,015	9,114	2,656	2,642	47	20,474
50	7,231	11,180	7,025	597	26,033	6,221	11,547	2,815	5,395	54	26,032
avg	5,693	8,869	7,392	606	22,560	5,620	10,802	2,394	3,706	53	22,575
med	5,807	7,968	7,416	603	22,129	5,784	11,124	2,551	2,816	52	22,153
AVERAGES											
VD/ED	4,070	2,005	5,024	626	11,724	3,550	6,281	1,665	198	47	11,741
BN	5,702	6,015	6,833	607	19,157	5,700	9,582	2,190	1,652	50	19,175
AN	6,354	11,919	8,645	597	27,515	6,284	13,234	2,757	5,200	55	27,529
VW	6,743	17,378	9,329	592	34,042	7,151	14,675	3,081	9,085	62	34,054
MEDIANS											
VD/ED	4,108	1,869	4,913	622	12,277	3,432	5,779	1,565	126	47	12,295
BN	5,731	6,162	6,944	605	19,518	5,368	9,129	2,272	1,451	50	19,541
AN	6,095	11,377	8,717	596	27,511	6,221	13,590	2,727	5,023	55	27,528
VW	6,671	18,480	9,183	590	34,904	6,816	15,358	3,039	9,240	62	34,919

TABLE 5 Run 16b Annual Water Budget Summary (continued)

Lower Santa Margarita River Groundwater Model

Modflow Volumetric Budget Output

Annual Groundwater Budget

MY	NET Storage	NET Str Lknc	In-Out	% bal
1	-2,828	-281	-23.3	-0.08%
2	-2,607	4,546	-29.9	-0.16%
3	2,878	5,548	-11.6	-0.05%
4	-1,530	4,027	-10.4	-0.08%
5	545	5,793	-20.1	-0.16%
6	-131	4,798	-16.4	-0.14%
7	863	2,930	-5.0	-0.02%
8	-2,987	3,911	-29.2	-0.22%
9	-344	4,792	-14.5	-0.15%
10	-994	3,612	-15.9	-0.20%
11	3,398	5,489	-15.0	-0.07%
12	-700	6,185	-11.4	-0.08%
13	-2,342	3,530	-31.2	-0.34%
14	-475	3,909	-8.0	-0.09%
15	2,808	3,561	-25.3	-0.10%
16	438	4,511	-16.8	-0.06%
17	-2,564	5,494	-21.6	-0.15%
18	3,393	3,861	-21.2	-0.06%
19	-1,889	5,861	-28.6	-0.16%
20	-1,109	4,920	-13.3	-0.09%
21	-119	5,108	-16.6	-0.14%
22	2,385	3,526	-14.9	-0.07%
23	-654	6,311	-22.4	-0.13%
24	30	5,636	-17.6	-0.10%
25	1,143	6,359	-12.4	-0.08%
26	1,690	5,882	-18.8	-0.13%
27	280	-2,640	-14.6	-0.04%
28	464	-4,112	-13.4	-0.03%
29	-728	-3,492	1.2	0.00%
30	-2,029	6,107	-7.5	-0.03%
31	622	6,554	-25.6	-0.10%
32	1,125	3,889	-16.0	-0.05%
33	-1,662	3,666	2.6	0.01%
34	652	3,283	-10.7	-0.04%
35	863	6,837	-33.1	-0.13%
36	-673	6,217	-2.9	-0.02%
37	-1,263	5,514	-3.1	-0.01%
38	248	5,964	-3.3	-0.02%
39	948	4,481	-26.3	-0.13%
40	106	3,480	-16.8	-0.06%
41	1,045	3,623	-0.4	0.00%
42	-542	-3,111	-12.9	-0.03%
43	-622	2,493	-30.8	-0.10%
44	643	-1,247	-3.9	-0.01%
45	-1,997	2,461	14.5	0.05%
46	-230	2,617	-63.6	-0.21%
47	2,227	1,733	-0.2	0.00%
48	-413	4,249	-33.7	-0.15%
49	0	4,291	-12.4	-0.06%
50	-1,010	1,630	1.4	0.01%
avg	-73	3,686	-15.7	-0.09%
med	-125	4,138	-15.0	-0.08%
AVERAGES				
VD/ED	(520)	4,825	(17)	(0)
BN	(2)	5,181	(18)	(0)
AN	(71)	3,445	(14)	(0)
VW	408	244	(12)	(0)
MEDIANS				
VD/ED	(410)	4,795	(16)	(0)
BN	(207)	5,492	(16)	(0)
AN	438	3,561	(11)	(0)
VW	280	(281)	(15)	(0)

TABLE 6 Run 16b Average Monthly Water Budget Summary

Lower Santa Margarita River Groundwater Model — JWS-16b 10,800 AFY Pumping & 10,000 AFY Diversion

Modflow Volumetric Budget Output and Streamflow — 12/22/11

Atreamflow

Avg AF/M	SMR Flow In	Diversion	Str Gain+ / Loss-	SMR @ UY->CH	Str Gain+ / Loss-	SMR @ CH->LY	Str Gain+ / Loss-	SMR Flow Out	LSMR Str Gain+ / Loss-
Oct	502	292	-449	53	-17	36	7	44	-458
Nov	1,072	504	199	1,271	-679	593	-11	582	-490
Dec	1,833	924	-1,011	822	-120	701	52	754	-1,079
Jan	8,239	1,736	-1,477	6,763	-93	6,670	143	6,813	-1,426
Feb	10,610	1,761	-1,115	9,494	-184	9,310	106	9,416	-1,194
Mar	9,203	1,950	-887	8,316	-246	8,070	90	8,160	-1,043
Apr	3,354	1,318	-446	2,908	-290	2,618	27	2,645	-709
May	1,387	879	-336	1,052	-325	726	-9	718	-670
Jun	727	502	-266	461	-231	230	-6	224	-503
Jul	494	48	-94	400	-196	204	-8	196	-298
Aug	421	47	-268	153	-107	46	1	47	-374
Sep	493	39	-331	161	-81	80	1	81	-412
Avg Monthly	3,195	833	-540	2,655	-214	2,440	33	2,473	-721
Med Monthly	1,230	691	-391	937	-190	647	4	650	-587
Avg Total=Anl	38,336	9,998	-6,481	31,855	-2,569	29,286	393	29,679	-8,657

Lower Santa Margarita River Groundwater Model

Modflow Volumetric Budget Output

Groundwater Model

	INFLOW:					OUTFLOW:							OUT-IN	OUT-IN		
Avg AF/M	Storage	Recharge	Stream Leakance	GHB	TOTAL IN	Storage	Wells	ET	Stream Leakance	GHB	TOTAL OUT		NET Storage	NET Str Lknc	In-Out	% bal
Oct	557	195	261	53	1,067	110	826	121	8	4	1,068		-447	253	-1.6	-0.15%
Nov	73	552	1,465	51	2,141	1,256	743	96	42	4	2,141		1,183	1,424	0.0	0.00%
Dec	337	471	678	52	1,537	661	714	90	68	6	1,537		323	610	0.0	0.00%
Jan	143	1,301	858	51	2,353	1,206	792	108	241	6	2,353		1,063	618	-0.7	-0.03%
Feb	107	1,645	791	46	2,590	1,143	779	148	512	6	2,588		1,036	279	2.0	0.08%
Mar	151	1,935	707	50	2,843	850	898	224	860	6	2,838		699	-153	4.1	0.14%
Apr	426	1,299	565	48	2,338	230	983	273	847	5	2,338		-196	-283	-0.1	0.00%
May	631	868	476	50	2,026	65	1,015	317	631	4	2,031		-567	-154	-5.5	-0.27%
Jun	803	479	374	49	1,706	12	1,039	306	350	3	1,710		-791	24	-3.9	-0.23%
Jul	960	107	389	52	1,507	9	1,082	290	127	3	1,512		-951	261	-4.8	-0.32%
Aug	860	8	382	52	1,303	27	1,015	245	15	3	1,304		-834	367	-1.6	-0.12%
Sep	645	9	445	51	1,151	53	916	177	5	3	1,154		-592	440	-3.5	-0.31%
Avg Monthly	474	739	616	50	1,880	468	900	200	309	4	1,881		-6	307	-1.3	-0.10%
Med Monthly	491	516	521	51	1,866	170	907	201	184	4	1,871		-321	270	-1.2	-0.08%
Avg Total=Anl	5,693	8,869	7,392	606	22,560	5,620	10,802	2,394	3,706	53	22,575		-73	3,686	-15.7	

Attachment 3

Alternative 2: Lower Santa Margarita River Surface and Groundwater Model

TABLE 1 RUN 13A BASIN YIELD: using TM 1.1 Streamflow
LOWER SANTA MARGARITA RIVER GROUNDWATER MODEL

12,840 AFY 50-Year Average Annual Production

Hydrologic Condition

HC	Cnt	Oct to Apr Strflw
VW	9	Very Wet > 58,032
AN	15	Above Normal > 15,957
BN	14	Below Normal < 15,957
VD	5	Very Dry < 5,781
ED	7	Extremely Dry (2nd+ VD)
	50	

PC	HC	Q Adjst	Anl Q	Cnt	
1	2+ AN @ VW	2,800	16,900	5	10%
2	2+ AN @ AN	1,300	15,400	9	18%
3	Standard	0	14,100	10	20%
4	1st BN	-3,800	10,300	6	12%
5	2ndBN	-5,300	8,800	3	6%
6	3+BN/all Dry	-9,000	5,100	17	34%
				50	100%

MY	HC	Oct-Apr HC descrip	May-Apr Pumping Condition	Gallery Wells (af/y)	UY Total (af/y)	CH Total (af/y)	LY Total (af/y)	Groundwater Production Total (af/y)	Total Basin Yield (af/y)	CWRMA Emergency Water (af/y)	Additional Supply of Water (af/y)
1	VW	Very Wet	3	5,028	8,725	4,371	-	13,096	18,124	-	-
2	BN	Below Normal	4	1,606	7,119	3,451	-	10,570	12,176	-	-
3	BN	Below Normal	3	2,962	5,413	2,383	-	7,796	10,758	-	1,600
4	VD	Very Dry	6	872	4,307	1,656	-	5,963	6,835	-	-
5	ED	Extremely Dry	6	642	3,116	1,208	-	4,323	4,965	100	400
6	ED	Extremely Dry	6	654	3,171	1,275	-	4,446	5,100	2,252	-
7	AN	Above Normal	3	3,045	5,915	2,860	-	8,776	11,821	-	-
8	VD	Very Dry	6	984	5,721	2,786	-	8,507	9,491	-	-
9	ED	Extremely Dry	6	654	3,171	1,275	-	4,446	5,100	150	-
10	ED	Extremely Dry	6	654	3,171	1,275	-	4,446	5,100	350	200
11	BN	Below Normal	6	1,702	3,223	1,275	-	4,498	6,200	1,781	400
12	VD	Very Dry	6	654	3,171	1,275	-	4,446	5,100	1,813	-
13	ED	Extremely Dry	6	654	3,171	1,275	-	4,446	5,100	-	-
14	ED	Extremely Dry	6	654	3,171	1,275	-	4,446	5,100	-	-
15	AN	Above Normal	3	5,233	6,031	2,860	-	8,891	14,125	-	-
16	AN	Above Normal	2	4,616	9,166	4,569	-	13,735	18,351	-	-
17	BN	Below Normal	6	1,098	7,078	3,370	-	10,448	11,547	-	-
18	VW	Very Wet	3	4,896	7,783	3,495	-	11,278	16,174	-	-
19	BN	Below Normal	4	1,955	7,648	3,451	-	11,099	13,054	-	-
20	BN	Below Normal	5	1,064	6,085	2,383	-	8,468	9,532	-	-
21	VD	Very Dry	6	787	3,816	1,726	-	5,542	6,329	-	1,400
22	BN	Below Normal	6	1,951	3,274	1,275	-	4,549	6,500	-	200
23	BN	Below Normal	6	854	3,171	1,275	-	4,446	5,300	-	-
24	BN	Below Normal	6	654	3,171	1,275	-	4,446	5,100	-	-
25	VD	Very Dry	6	654	3,171	1,275	-	4,446	5,100	2,093	-
26	ED	Extremely Dry	6	654	3,171	1,275	-	4,446	5,100	2,417	-
27	VW	Very Wet	3	4,984	5,992	2,860	-	8,853	13,837	-	-
28	AN	Above Normal	2	5,255	9,319	4,833	-	14,152	19,407	-	-
29	VW	Very Wet	1	5,866	9,601	5,362	-	14,963	20,829	-	-
30	AN	Above Normal	2	4,269	9,592	5,011	-	14,602	18,871	-	-
31	AN	Above Normal	2	5,659	9,379	4,995	-	14,375	20,033	-	-
32	VW	Very Wet	1	6,271	9,573	5,296	-	14,870	21,140	-	-
33	AN	Above Normal	2	6,275	9,814	4,993	-	14,807	21,082	-	-
34	AN	Above Normal	2	4,443	9,184	4,702	-	13,887	18,329	-	-
35	AN	Above Normal	2	4,447	9,276	4,768	-	14,044	18,491	-	-
36	BN	Below Normal	4	2,174	8,167	3,648	-	11,815	13,988	-	-
37	AN	Above Normal	3	3,454	7,701	3,495	-	11,196	14,650	-	-
38	BN	Below Normal	4	1,955	7,648	3,451	-	11,099	13,054	-	-
39	BN	Below Normal	5	2,074	6,175	2,383	-	8,558	10,632	3,030	-
40	VW	Very Wet	3	3,292	7,126	3,312	-	10,438	13,730	-	-
41	AN	Above Normal	2	4,439	9,102	4,775	-	13,878	18,317	-	-
42	VW	Very Wet	1	6,370	9,734	5,421	-	15,155	21,525	-	-
43	AN	Above Normal	2	3,969	9,592	5,011	-	14,602	18,571	-	-
44	VW	Very Wet	1	5,866	9,601	5,362	-	14,963	20,829	-	-
45	AN	Above Normal	4	3,665	9,570	5,001	-	14,571	18,236	-	-
46	AN	Above Normal	3	5,055	9,187	4,774	-	13,961	19,016	-	-
47	VW	Very Wet	1	5,558	9,432	5,329	-	14,761	20,320	-	-
48	BN	Below Normal	4	2,011	8,535	3,875	-	12,410	14,420	-	-
49	BN	Below Normal	5	2,286	6,262	2,383	-	8,645	10,932	-	-
50	AN	Above Normal	3	3,421	7,580	3,476	-	11,056	14,477	-	-
			Min	642	3,116	1,208	-	4,323	4,965	0	0
			Max	6,370	9,814	5,421	-	15,155	21,525	3,030	1,600
			Median	**2,624**	**7,122**	**3,411**	**-**	**10,509**	**13,392**		
			% of Median	25.0%	67.8%	32.5%	0.0%				
			Average	**2,965**	**6,666**	**3,208**	**-**	**9,873**	**12,838**	**280**	**84**
			% of Average Total Basin Yield	23.1%	51.9%	25.0%	0.0%				

E:\CPEN_LSMR\JWS-16a\POST RUN 13A\PRE WEL\WEL_Run13A w TM1.1strflw.xlsx / printed 2/23/2012

LOWER SANTA MARGARITA RIVER GROUNDWATER MODEL

12,840 AFY 50-Year Average Annual Production

Hydrologic Condition

HC	Cnt	Oct to Apr Strflw
VW	9	Very Wet > 58,032
AN	15	Above Normal > 15,957
BN	14	Below Normal < 15,957
VD	5	Very Dry < 5,781
ED	7	Extremely Dry (2nd+ VD)
	50	

PC	HC	Q Adjst	Anl Q	Cnt	
1	2+ AN @ VW	2,800	16,900	5	10%
2	2+ AN @ AN	1,300	15,400	9	18%
3	Standard	0	14,100	10	20%
4	1st BN	-3,800	10,300	6	12%
5	2ndBN	-5,300	8,800	3	6%
6	3+BN/all Dry	-9,000	5,100	17	34%
				50	100%

Average Annual and Median Pumping

AVERAGES	Yearly Count	Gallery Wells (af/y)	UY Total (af/y)	CH Total (af/y)	LY Total (af/y)	Production Groundwater Total (af/y)	Total Basin Yield (af/y)	CWRMA Emergency Water (af/y)	Additional Supply of Water (af/y)
VW	9	5,348	8,619	4,534	-	13,153	18,501	-	-
AN	15	4,483	8,694	4,408	-	13,102	17,585	-	-
BN	14	1,739	5,926	2,563	-	8,489	10,228	344	157
VD/ED	12	710	3,527	1,465	-	4,992	5,702	765	167
	50								
MEDIANS									
VW	9	5,558	9,432	5,296	-	14,761	20,320	-	-
AN	15	4,443	9,187	4,774	-	13,961	18,351	-	-
BN	14	1,953	6,219	2,383	-	8,602	10,845	-	-
VD/ED	12	654	3,171	1,275	-	4,446	5,100	125	-

Average Monthly Pumping

%	Month	Gallery Wells (af/m)	UY Total (af/m)	CH Total (af/m)	LY Total (af/m)	LSMR Total (af/m)	Total Basin Yield (af/m)	CWRMA Emergency Water (af/m)	Additional Supply of Water (af/m)
8%	Oct	84	535	257	-	792	877	4	16
7%	Nov	93	457	223	-	680	772	51	20
6%	Dec	139	385	186	-	571	710	48	12
6%	Jan	323	440	202	-	641	964	21	8
6%	Feb	440	426	187	-	613	1,053	19	-
9%	Mar	549	580	264	-	844	1,393	24	4
9%	Apr	600	608	274	-	881	1,481	24	4
9%	May	106	579	272	-	851	957	42	4
10%	Jun	116	662	317	-	979	1,094	41	-
11%	Jul	200	682	360	-	1,043	1,243	5	4
10%	Aug	162	684	345	-	1,029	1,191	1	4
10%	Sep	154	628	321	-	949	1,103	-	8
	Avg Anl	2,965	6,666	3,208	-	9,873	12,838	280	84

TABLE 2 RUN 13A (using TM 1.1 Streamflow) Pumping Summaries

		Bldg #	State ID #	# mos Q	% of 600 mos	% of Subbasin	80% Utilization af/m	Potential 100% Yield gpm
1	UY	2673	10/4-7A2	600	100%	10%	142	1,000
2	UY	26072	10/4-8D1	600	100%	11%	121	1,100
3	UY	2671	10/4-7H2	600	100%	8%	82	750
4	UY	26018	10/4-18B	600	100%	10%	110	1,000
5	UY	2603	10/4-7R2	600	100%	10%	110	1,000
6	UY	Gallery1	Gallery1	139	23%	*n/a*	252	2,300
7	UY	Gallery2	Gallery2	159	27%	*n/a*	252	2,300
8	UY	Gallery3	Gallery3	139	23%	*n/a*	252	2,300
9	UY	Gallery4	Gallery4	600	100%	*n/a*	252	2,300
10	UY	UY-1	UY-1	362	60%	10%	110	1,000
11	UY	UY-2	UY-2	600	100%	10%	110	1,000
12	UY	UY-3	UY-3	294	49%	10%	110	1,000
13	UY	UY-4	UY-4	178	30%	10%	110	1,000
14	UY	UY-5	UY-5	138	23%	10%	110	1,000
15	CH	2393	10/4-18E3	600	100%	19%	121	1,100
16	CH	2373	10/4-18M4&5	600	100%	25%	153	1,400
17	CH	2363	10/5-13R2	600	100%	21%	132	1,200
18	CH	33925	10/5-23G4	600	100%	21%	132	1,200
19	CH	2301	10/5-23J1	-	0%	0%	0	-
20	CH	33924	10/5-23K2	-	0%	0%	0	-
21	CH	33923	10/5-23K3	-	0%	0%	0	-
22	CH	CH-1	CH-1	600	100%	14%	88	800

% Pumping in Subbasin

		Wet Year Subbasin Split			Dry Year Subbasin Split		
		69%	31%	0%	75%	25%	0%
mo	Anl %	UY	CH	LY	UY	CH	LY
OCT	8.3%	5.7%	2.6%	0.00%	6.2%	2.1%	0.00%
NOV	7.1%	4.9%	2.2%	0.00%	5.3%	1.8%	0.00%
DEC	5.9%	4.1%	1.8%	0.00%	4.4%	1.5%	0.00%
JAN	6.2%	4.3%	1.9%	0.00%	4.7%	1.6%	0.00%
FEB	5.6%	3.9%	1.7%	0.00%	4.2%	1.4%	0.00%
MAR	7.8%	5.4%	2.4%	0.00%	5.8%	1.9%	0.00%
APR	7.9%	5.5%	2.5%	0.00%	6.0%	2.0%	0.00%
MAY	8.6%	5.9%	2.7%	0.00%	6.5%	2.2%	0.00%
JUN	10.0%	6.9%	3.1%	0.00%	7.5%	2.5%	0.00%
JUL	11.4%	7.9%	3.5%	0.00%	8.6%	2.9%	0.00%
AUG	10.9%	7.6%	3.4%	0.00%	8.2%	2.7%	0.00%
SEP	10.2%	7.0%	3.2%	0.00%	7.6%	2.5%	0.00%

Max monthly pumping in subbasin adding wells as needed

af/m	UY	CH	Total
# exst wells	4	4	8
af/m (80%)	422	537	959
avg af/well	105	134	240
Gallery Wells	1,430		1,430
1 adntl well	1,540	625	2,165
2 adntl well	1,650	712	2,362
3 adntl well	1,759	800	2,559
4 adntl well	1,869	888	2,757
5 adntl well	1,978		2,866

Wet Year Algorithm Monthly Counts

	AN 3000 af/y	VW 6100 af/y	Total	% of 50 yrs
Oct	-	-	-	0%
Nov	-	-	-	0%
Dec	-	-	-	0%
Jan	6	1	7	16%
Feb	6	4	10	22%
Mar	8	5	13	29%
Apr	9	6	15	33%
May	-	-	-	0%
	29	16	45	

TABLE 3 RUN 13A (using TM 1.1 Streamflow) Annual Pumping by Well

Annual Well Production (AF/Y)

	Building #:	2673	26072	2671	26018	2603	new	new	new	new	new	new	new	new	new
	Max Annual Pumping	0	1,337	911	1,215	1,215	1,215	1,215	1,213	988	789	1,308	2,098	1,308	1,960
	Potential w/ 80% Util	1,315	1,447	986	1,315	1,315	1,315	1,315	1,315	1,315	1,315	3,025	3,025	3,025	3,025
	Potential Well Yield (gpm)	1,000	1,100	750	1,000	1,000	1,000	1,000	1,000	1,000	1,000	2,300	2,300	2,300	2,300
		UY	UY	UY	UY	UY	UY	UY	UY	UY	UY	UY	UY	UY	UY
		10/4-7A2	10/4-8D1	10/4-7H2	10/4-18B	10/4-7R2	UY-1	UY-2	UY-3	UY-4	UY-5	Gallery1	Gallery2	Gallery3	Gallery4
MY	HC	(af/y)	(af/y)	(af/y)	(af/y)	(af/y)	(af/y)	(af/y)	(af/y)	(af/y)	(af/y)	(af/y)	(af/y)	(af/y)	(af/y)
1	VW	0	1,271	867	1,156	1,156	1,156	1,156	971	594	399	1,004	1,218	1,004	1,801
2	BN	0	1,216	829	1,106	1,106	1,053	1,106	604	100	0	250	0	250	1,106
3	BN	0	1,000	682	909	909	657	909	347	0	0	600	552	600	1,210
4	VD	0	959	654	872	872	80	872	0	0	0	0	0	0	872
5	ED	0	707	482	642	642	0	642	0	0	0	0	0	0	642
6	ED	0	719	490	654	654	0	654	0	0	0	0	0	0	654
7	AN	0	908	619	825	825	506	825	609	399	399	552	714	552	1,226
8	VD	0	1,083	738	984	984	650	984	298	0	0	0	0	0	984
9	ED	0	719	490	654	654	0	654	0	0	0	0	0	0	654
10	ED	0	719	490	654	654	0	654	0	0	0	0	0	0	654
11	BN	0	719	490	654	654	0	654	52	0	0	400	150	400	752
12	VD	0	719	490	654	654	0	654	0	0	0	0	0	0	654
13	ED	0	719	490	654	654	0	654	0	0	0	0	0	0	654
14	ED	0	719	490	654	654	0	654	0	0	0	0	0	0	654
15	AN	0	908	619	825	825	506	825	724	399	399	1,050	1,368	1,050	1,765
16	AN	0	1,306	890	1,187	1,187	1,187	1,187	1,003	609	609	900	1,116	900	1,699
17	BN	0	1,208	824	1,098	1,098	1,050	1,098	601	100	0	0	0	0	1,098
18	VW	0	1,199	818	1,090	1,090	857	1,090	839	399	399	956	1,218	956	1,766
19	BN	0	1,268	865	1,153	1,153	1,153	1,153	704	198	0	300	150	300	1,205
20	BN	0	1,170	798	1,064	1,064	830	1,064	96	0	0	0	0	0	1,064
21	VD	0	866	590	787	787	0	787	0	0	0	0	0	0	787
22	BN	0	719	490	654	654	0	654	103	0	0	400	300	400	851
23	BN	0	719	490	654	654	0	654	0	0	0	100	0	100	654
24	BN	0	719	490	654	654	0	654	0	0	0	0	0	0	654
25	VD	0	719	490	654	654	0	654	0	0	0	0	0	0	654
26	ED	0	719	490	654	654	0	654	0	0	0	0	0	0	654
27	VW	0	908	619	825	825	506	825	686	399	399	1,056	1,218	1,056	1,653
28	AN	0	1,316	897	1,196	1,196	1,196	1,196	1,012	706	602	900	1,663	900	1,792
29	VW	0	1,303	888	1,184	1,184	1,184	1,184	1,093	890	691	1,056	1,948	1,056	1,806
30	AN	0	1,332	908	1,211	1,211	1,211	1,211	1,005	804	701	700	1,309	700	1,560
31	AN	0	1,299	886	1,181	1,181	1,181	1,181	1,090	791	588	1,102	1,663	1,102	1,792
32	VW	0	1,299	886	1,181	1,181	1,181	1,181	1,181	791	691	1,154	2,098	1,154	1,864
33	AN	0	1,334	910	1,213	1,213	1,213	1,213	1,213	804	701	1,200	1,915	1,200	1,960
34	AN	0	1,295	883	1,178	1,178	1,178	1,178	990	807	499	800	1,309	800	1,534
35	AN	0	1,294	882	1,176	1,176	1,176	1,176	988	806	602	700	1,411	700	1,636
36	BN	0	1,305	890	1,186	1,186	1,186	1,186	815	412	0	300	300	300	1,274
37	AN	0	1,199	818	1,090	1,090	857	1,090	757	399	399	650	762	650	1,391
38	BN	0	1,268	865	1,153	1,153	1,153	1,153	704	198	0	300	150	300	1,205
39	BN	0	1,170	798	1,064	1,064	830	1,064	186	0	0	400	150	400	1,124
40	VW	0	1,147	782	1,043	1,043	586	1,043	683	399	399	604	714	604	1,370
41	AN	0	1,295	883	1,178	1,178	1,178	1,178	905	706	602	700	1,411	700	1,628
42	VW	0	1,293	881	1,175	1,175	1,175	1,175	1,084	988	789	1,308	1,948	1,308	1,806
43	AN	0	1,332	908	1,211	1,211	1,211	1,211	1,005	804	701	550	1,309	550	1,560
44	VW	0	1,303	888	1,184	1,184	1,184	1,184	1,093	890	691	1,056	1,948	1,056	1,806
45	AN	0	1,329	906	1,208	1,208	1,208	1,208	1,002	802	698	500	1,207	500	1,458
46	AN	0	1,297	884	1,179	1,179	1,179	1,179	1,088	809	393	800	1,663	800	1,792
47	VW	0	1,291	880	1,174	1,174	1,174	1,174	986	890	691	1,106	1,696	1,106	1,650
48	BN	0	1,337	911	1,215	1,215	1,215	1,215	817	405	203	300	150	300	1,261
49	BN	0	1,170	798	1,064	1,064	830	1,064	273	0	0	400	300	400	1,186
50	AN	0	1,162	793	1,057	1,057	689	1,057	760	503	503	550	864	550	1,457
	Min	0	707	482	642	642	0	642	0	0	0	0	0	0	642
	Max	0	1,337	911	1,215	1,215	1,215	1,215	1,213	988	789	1,308	2,098	1,308	1,960
	Median	0	1,185	808	1,077	1,077	844	1,077	695	399	101	450	426	450	1,244
		0.0%	11.3%	7.7%	10.2%	10.2%	8.0%	10.2%	6.6%	3.8%	1.0%	4.3%	4.1%	4.3%	11.8%
	Average	0	1,080	736	981	981	707	981	567	356	275	494	718	494	1,259
		0.0%	10.9%	7.5%	9.9%	9.9%	7.2%	9.9%	5.7%	3.6%	2.8%	5.0%	7.3%	5.0%	12.7%

	UY	UY	UY	UY	UY	UY	UY	UY	UY	UY	UY	UY	UY	UY
	10/4-7A2	10/4-8D1	10/4-7H2	10/4-18B	10/4-7R2	UY-1	UY-2	UY-3	UY-4	UY-5	Gallery1	Gallery2	Gallery3	Gallery4
Month	(af/m)	(af/m)	(af/m)	(af/m)	(af/m)	(af/m)	(af/m)	(af/m)	(af/m)	(af/m)	(af/m)	(af/m)	(af/m)	(af/m)
Oct	0	88	60	80	80	60	80	46	30	10	2	0	2	80
Nov	0	84	57	77	77	56	77	30	0	0	8	0	8	77
Dec	0	76	52	70	70	43	70	5	0	0	26	11	26	76
Jan	0	83	56	75	75	47	75	23	2	2	72	63	72	115
Feb	0	76	52	69	69	44	69	39	8	0	103	102	103	132
Mar	0	89	61	81	81	58	81	62	38	28	130	129	130	160
Apr	0	91	62	83	83	61	83	66	44	34	138	150	138	173
May	0	95	65	86	86	68	86	50	31	10	10	0	10	86
Jun	0	99	67	90	90	69	90	61	49	49	2	22	2	90
Jul	0	100	68	91	91	67	91	67	59	47	0	109	0	91
Aug	0	103	70	93	93	70	93	62	49	49	0	68	0	93
Sep	0	95	65	86	86	64	86	56	46	46	2	64	2	86
Annual Total	0	1,080	736	981	981	707	981	567	356	275	494	718	494	1,259
	-	-	-	-	-	-	-	-	-	-	-	-	-	-

E:\CPEN_LSMR\JWS-16a\POST RUN 13A\PRE WEL\WEL_Run13A w TM1.1strflw.xlsx / printed 2/23/2012

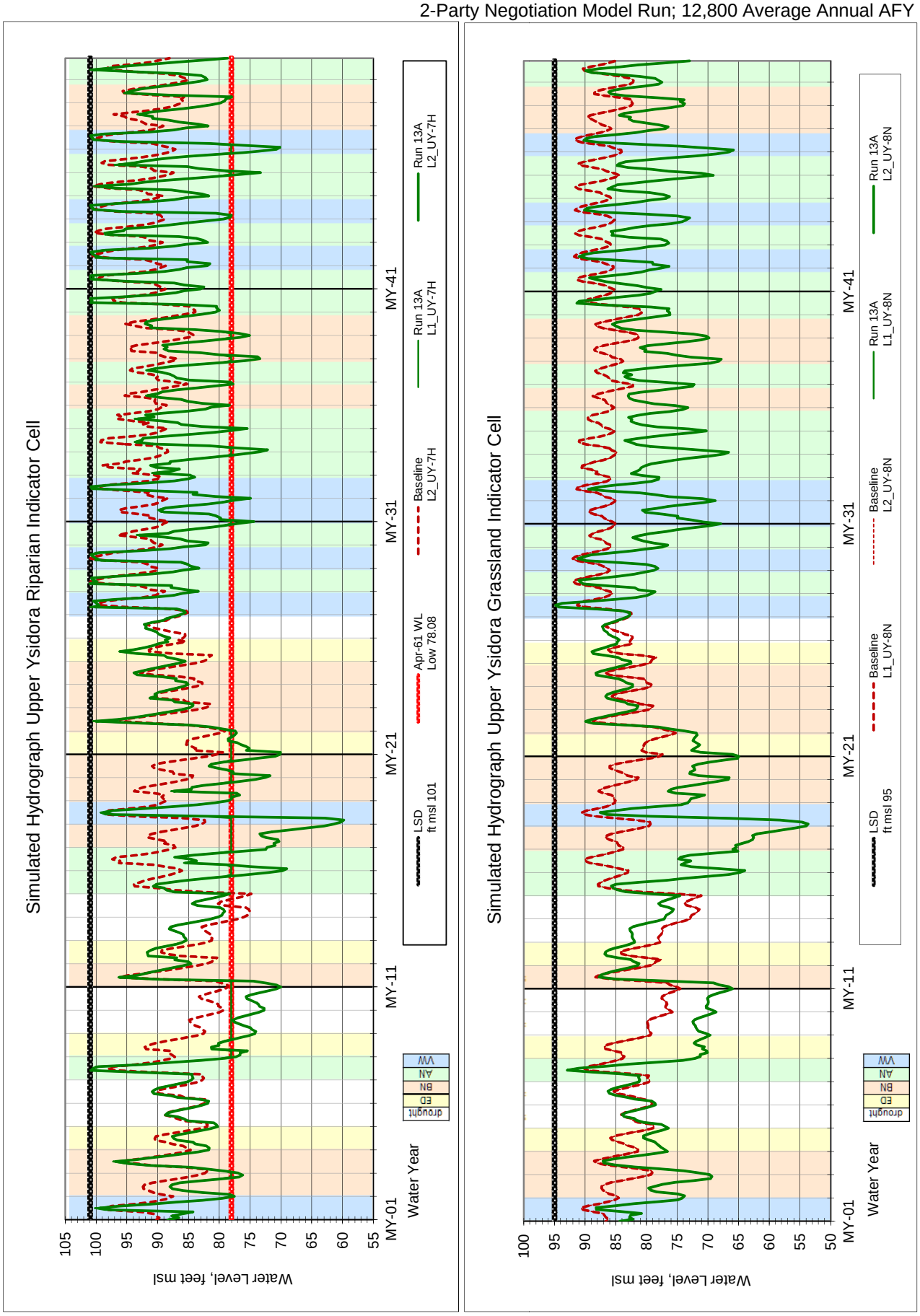
TABLE 3 RUN 13A (using TM 1.1 Streamflow) Annual Pumping by Well (Continued)

	Building #:	2393	2373	2363	33925	2301	33924	33923	new
	Max Annual Pumping	1,046	1,332	1,141	1,141	0	0	0	761
	Potential w/ 80% Util	1,447	1,841	1,578	1,578	0	0	0	1,052
	Potential Well Yield (gpm)	1,100	1,400	1,200	1,200	0	0	0	800
		CH	CH	CH	CH	CH	CH	CH	CH
		10/4-18E3	10/4-18M4&5	10/5-13R2	10/5-23G4	10/5-23J1	10/5-23K2	10/5-23K3	CH-1
MY	HC	(af/y)	(af/y)	(af/y)	(af/y)	(af/y)	(af/y)	(af/y)	(af/y)
1	VW	844	1,074	920	920	0	0	0	613
2	BN	666	848	727	727	0	0	0	484
3	BN	460	585	502	502	0	0	0	334
4	VD	319	407	349	349	0	0	0	232
5	ED	233	297	254	254	0	0	0	169
6	ED	246	313	268	268	0	0	0	179
7	AN	552	703	602	602	0	0	0	401
8	VD	538	684	586	586	0	0	0	391
9	ED	246	313	268	268	0	0	0	179
10	ED	246	313	268	268	0	0	0	179
11	BN	246	313	268	268	0	0	0	179
12	VD	246	313	268	268	0	0	0	179
13	ED	246	313	268	268	0	0	0	179
14	ED	246	313	268	268	0	0	0	179
15	AN	552	703	602	602	0	0	0	401
16	AN	882	1,122	962	962	0	0	0	641
17	BN	650	828	710	710	0	0	0	473
18	VW	674	858	736	736	0	0	0	490
19	BN	666	848	727	727	0	0	0	484
20	BN	460	585	502	502	0	0	0	334
21	VD	333	424	363	363	0	0	0	242
22	BN	246	313	268	268	0	0	0	179
23	BN	246	313	268	268	0	0	0	179
24	BN	246	313	268	268	0	0	0	179
25	VD	246	313	268	268	0	0	0	179
26	ED	246	313	268	268	0	0	0	179
27	VW	552	703	602	602	0	0	0	401
28	AN	933	1,187	1,018	1,018	0	0	0	678
29	VW	1,035	1,317	1,129	1,129	0	0	0	753
30	AN	967	1,231	1,055	1,055	0	0	0	703
31	AN	964	1,227	1,052	1,052	0	0	0	701
32	VW	1,022	1,301	1,115	1,115	0	0	0	743
33	AN	964	1,226	1,051	1,051	0	0	0	701
34	AN	907	1,155	990	990	0	0	0	660
35	AN	920	1,171	1,004	1,004	0	0	0	669
36	BN	704	896	768	768	0	0	0	512
37	AN	674	858	736	736	0	0	0	490
38	BN	666	848	727	727	0	0	0	484
39	BN	460	585	502	502	0	0	0	334
40	VW	639	813	697	697	0	0	0	465
41	AN	922	1,173	1,005	1,005	0	0	0	670
42	VW	1,046	1,332	1,141	1,141	0	0	0	761
43	AN	967	1,231	1,055	1,055	0	0	0	703
44	VW	1,035	1,317	1,129	1,129	0	0	0	753
45	AN	965	1,228	1,053	1,053	0	0	0	702
46	AN	921	1,173	1,005	1,005	0	0	0	670
47	VW	1,028	1,309	1,122	1,122	0	0	0	748
48	BN	748	952	816	816	0	0	0	544
49	BN	460	585	502	502	0	0	0	334
50	AN	671	854	732	732	0	0	0	488
	Min	233	297	254	254	0	0	0	169
	Max	1,046	1,332	1,141	1,141	0	0	0	761
	Median	658	838	718	718	0	0	0	479
		6.3%	8.0%	6.8%	6.8%	0.0%	0.0%	0.0%	4.6%
	Average	619	788	675	675	0	0	0	450
		6.3%	8.0%	6.8%	6.8%	0.0%	0.0%	0.0%	4.6%

	CH	CH	CH	CH	CH	CH	CH	CH
	10/4-18E3	10/4-18M4&5	10/5-13R2	10/5-13R2	10/5-23J1	10/5-23K2	10/5-23K3	CH-1
Month	(af/m)	(af/m)	(af/m)	(af/m)	(af/m)	(af/m)	(af/m)	(af/m)
Oct	50	63	54	54	0	0	0	36
Nov	43	55	47	47	0	0	0	31
Dec	36	46	39	39	0	0	0	26
Jan	39	49	42	42	0	0	0	28
Feb	36	46	39	39	0	0	0	26
Mar	51	65	56	56	0	0	0	37
Apr	53	67	58	58	0	0	0	38
May	53	67	57	57	0	0	0	38
Jun	61	78	67	67	0	0	0	44
Jul	70	89	76	76	0	0	0	51
Aug	67	85	73	73	0	0	0	48
Sep	62	79	68	68	0	0	0	45
Annual Total	619	788	675	675	0	0	0	450
	-	-	-	-	-	-	-	-

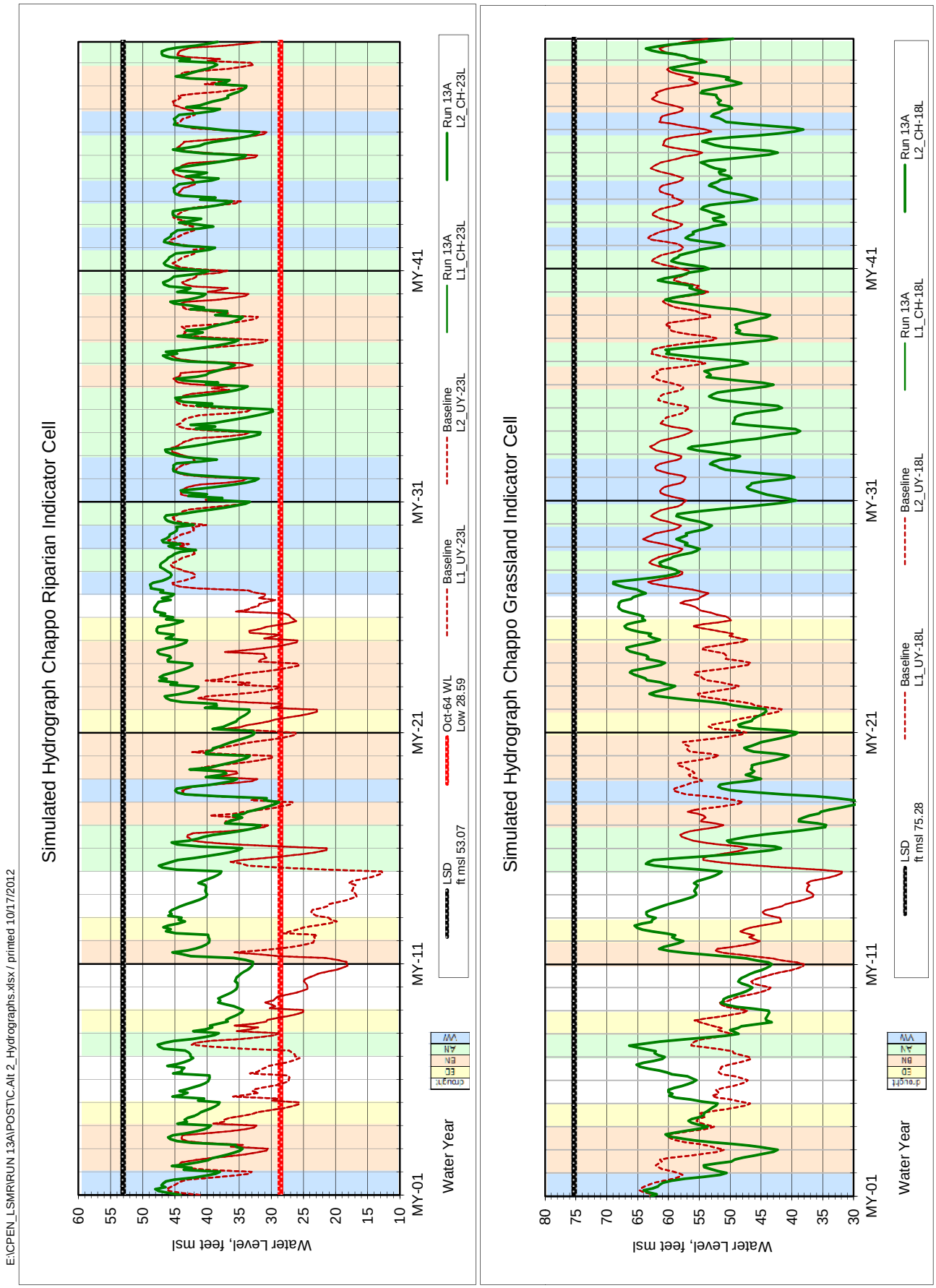
E:\CPEN_LSMR\JWS-16a\POST RUN 13A\PRE WEL\WEL_Run13A w TM1.1strflw.xlsx / printed 2/23/2012

FIGURE 1 Run 13A and Baseline Hydrographs using TM1.1 Streamflow
2-Party Negotiation Model Run; 12,800 Average Annual AFY



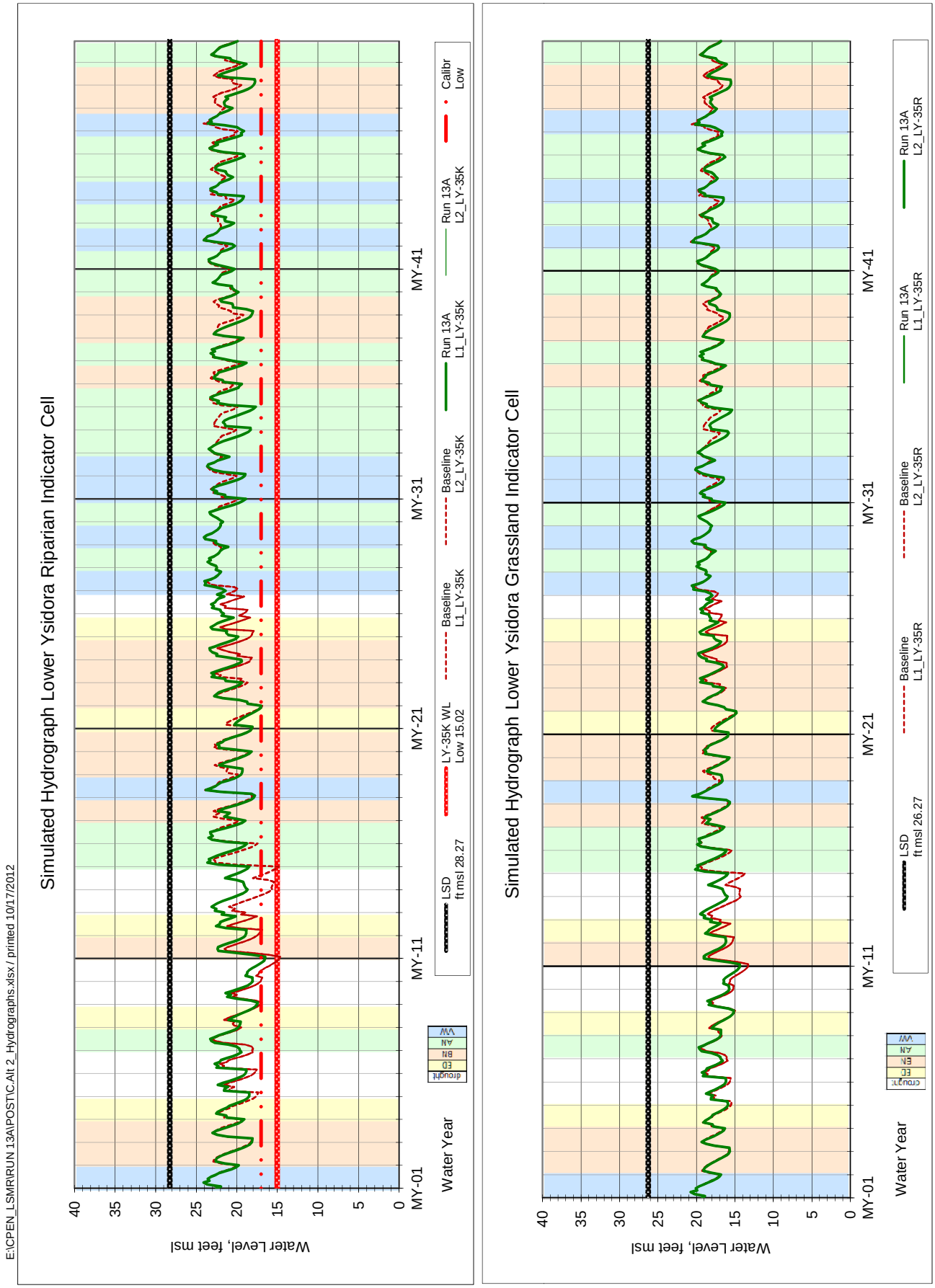
Layer 1 (L1) and Layer 2 (L2) simulated groundwater levels are at similar elevations and the graph lines are printed on top of each other.

FIGURE 2 Run 13A and Baseline Hydrographs using TM1.1 Streamflow
2-Party Negotiation Model Run; 12,800 Average Annual AFY



Layer 1 (L1) and Layer 2 (L2) simulated groundwater levels are at similar elevations and the graph lines are printed on top of each other.

FIGURE 3 Run 13A and Baseline Hydrographs using TM1.1 Streamflow
2-Party Negotiation Model Run; 12,800 Average Annual AFY



Layer 1 (L1) and Layer 2 (L2) simulated groundwater levels are at similar elevations and the graph lines are printed on top of each other.

FIGURE 4 Run 13 A and Baseline Streamflow, TM 1.1
2-Party Negotiation Model Run; 12,800 Average Annual AFY

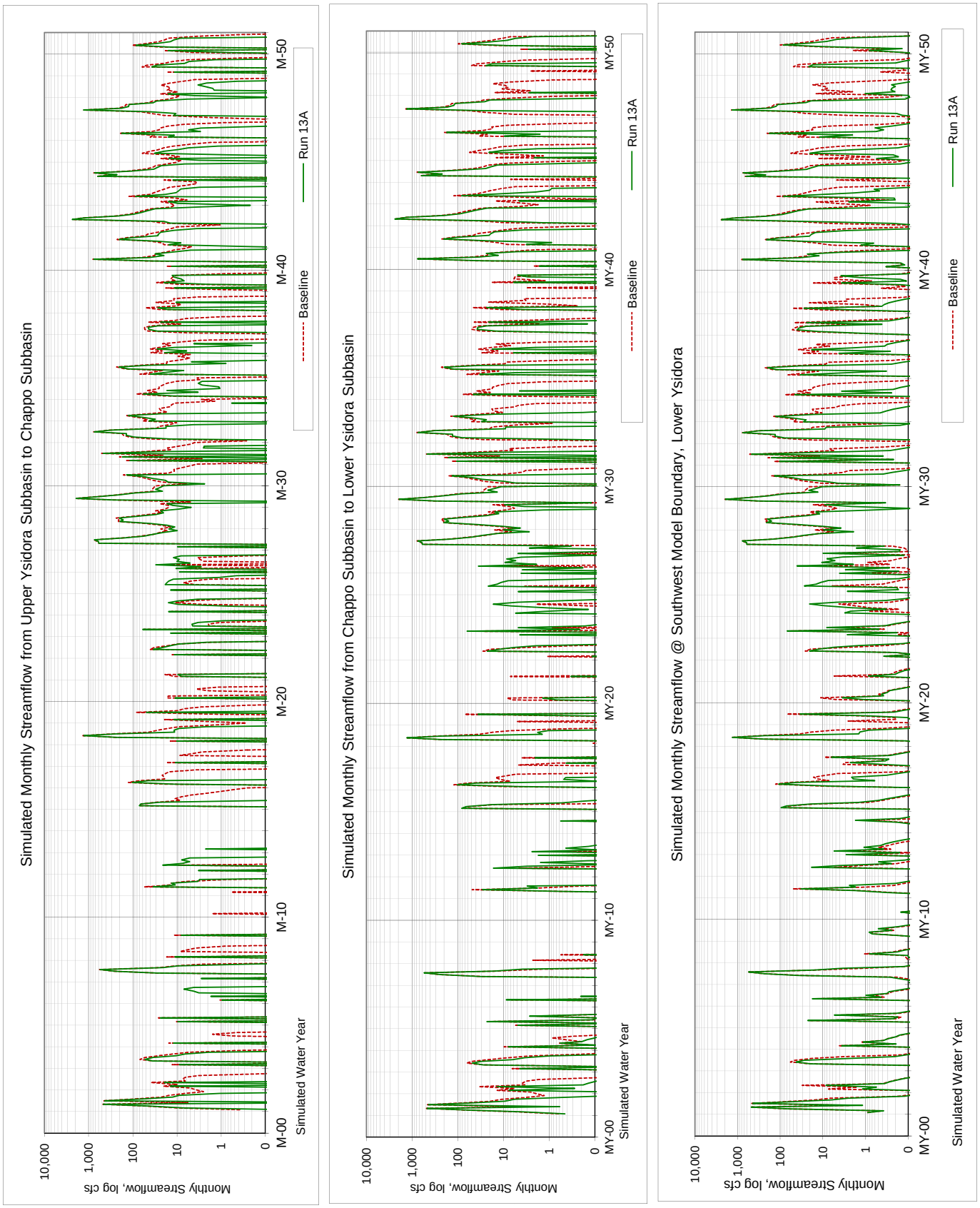


TABLE 4 2-Party Negotiation Gallery Well Model Run 13A; 12,800 Average Annual AFY

Average Hydrologic Condition Water Budget (af/y)

% Time Exceedence	*> 76%*	*76% to 50%*	*50% to 19%*	*< 19%*
# Years	*12*	*14*	*15*	*9*
	Very & Extrm Dry	Below Normal	Above Normal	Very Wet
Inflow:				
Santa Margarita River Inflow	6,200	12,000	32,900	132,900
Subsurface Underflow	600	600	600	600
Lake O'Neill Spill and Release	700	1,400	1,700	2,100
Fallbrook Creek	100	400	1,400	3,800
Title 22 Water	0	0	0	0
Minor Tributary Drainages	1,600	1,500	2,400	4,900
Areal Precipitation	600	500	700	1,600
Total Inflow:	9,800	16,400	39,700	145,900
Outflow:				
Santa Margarita River Outflow	1,300	1,800	18,600	120,100
Subsurface Underflow	0	100	100	100
Groundwater Pumping	5,700	10,800	17,100	18,500
Evapotranspiration	2,200	2,200	2,500	3,100
Diversions to Lake O'Neill	900	1,800	2,300	2,700
Total Outflow:	10,100	16,700	40,600	144,500
Net Simulated Change of Groundwater in Storage:				
	-200	-200	-900	1,500
	(100)	(100)	-	(100)

Median Hydrologic Condition Water Budget (af/y)

% Time Exceedence	*> 76%*	*76% to 50%*	*50% to 19%*	*< 19%*
# Years	*12*	*14*	*15*	*9*
	Very & Extrm Dry	Below Normal	Above Normal	Very Wet
Inflow:				
Santa Margarita River Inflow	6,300	12,900	26,700	121,300
Subsurface Underflow	600	600	600	600
Lake O'Neill Spill and Release	800	1,300	2,000	2,300
Fallbrook Creek	100	300	1,100	3,500
Title 22 Water	0	0	0	0
Minor Tributary Drainages	1,500	1,400	2,500	4,700
Areal Precipitation	400	300	500	1,600
Outflow:				
Santa Margarita River Outflow	400	1,900	12,000	103,800
Subsurface Underflow	0	100	100	100
Groundwater Pumping	5,100	11,200	18,500	20,300
Evapotranspiration	2,100	2,100	2,400	2,900
Diversions to Lake O'Neill	900	1,700	2,500	2,700
Net Simulated Change of Groundwater in Storage:				
	-200	-600	-800	1,200

Average Subbasin Water Budget (af/y)

	Upper Ysidora	Chappo	Lower Ysidora	SMR Basin	
Inflow:					
Santa Margarita River Inflow	38,600	29,300	27,600	38,600	86%
Subsurface Underflow *	600	1,400	400	600	1%
Lake O'Neill Spill and Release	1,500	-	-	1,500	3%
Fallbrook Creek	1,200	-	-	1,200	3%
Title 22 Water	-	-	0	0	0%
Minor Tributary Drainages	600	1,100	700	2,400	5%
Areal Precipitation	200	300	200	800	2%
Total Inflow:	42,700	32,100	28,900	45,100	
Outflow:					
Santa Margarita River Outflow	29,300	27,600	28,000	28,000	62%
Subsurface Underflow *	1,400	400	100	100	0%
Groundwater Pumping	6,700	3,200	0	9,900	22%
Gallery Well Production	3,000	-	-	3,000	7%
Evapotranspiration *	600	1,000	800	2,400	5%
Diversions to Lake O'Neill	1,900	-	-	1,900	4%
Total Outflow:	42,900	32,200	28,900	45,300	
Net Simulated Change of Groundwater in Storage: *					
	-100	0	0	-100	
	(100)	(100)	-	(100)	

Note: * Subbasin Averages are based on the last rate of the stress period
Values are rounded to the nearest 100 acre-feet, which may result in a summation rounding error

Median Subbasin Water Budget (af/y)

	Upper Ysidora	Chappo	Lower Ysidora	SMR Basin
Inflow:				
Santa Margarita River Inflow	16,700	5,400	4,100	16,700
Subsurface Underflow *	600	1,300	400	600
Lake O'Neill Spill and Release	1,500	-	-	1,500
Fallbrook Creek	600	-	-	600
Title 22 Water	-	-	-	0
Minor Tributary Drainages	600	900	600	2,100
Areal Precipitation	200	200	200	500
Outflow:				
Santa Margarita River Outflow	5,400	4,100	4,500	4,500
Subsurface Underflow *	1,300	400	100	100
Groundwater Pumping	7,100	3,400	0	13,400
Evapotranspiration *	600	1,000	900	2,300
Diversions to Lake O'Neill	2,000	-	-	2,000
Net Simulated Change of Groundwater in Storage: *				
	-300	-300	0	-300

Note: The sum of median values does not reflect the change of groundwater in storage.
Median values are not cummulative. Values are rounded to the nearest 100 acre-foot
* Subbasin Medians are based on the last rate of the stress period

E:\CPEN_LSMR\JWS-16a\POST RUN 13A\D.RUN 13A TM1.1_Budget-out v2.xlsx / printed 2/24/2012

TABLE 5 Model Run 13A Annual Water Budget Summary
Lower Santa Margarita River Groundwater Model — RUN 13A w TM1.1strflw
Modflow Volumetric Budget Output and Streamflow — 2/23/12
Annual Surface Water Budget

MY		SMR Flow In	LON Diversion	Ponds Diversion	Release & Spill	Str Gain+ / Loss-	GAGE SMR @ UY->CH	Str Gain+ / Loss-	SMR @ CH->LY	Str Gain+ / Loss-	SMR Flow Out	LSMR Str Gain+ / Loss-
1	VW	72,916	-2754	-9005	1,399	-10,181	62,735	-131	62,604	1,697	64,301	-8,615
2	BN	9,851	-1646	-3545	1,552	-7,832	2,019	-1,333	686	4	690	-9,160
3	AN	20,681	-1468	-6773	1,058	-11,724	8,957	-3,344	5,613	-178	5,435	-15,246
4	VD	6,075	-1440	-2315	1,120	-5,363	712	-463	249	122	371	-5,705
5	ED	6,569	-908	-1410	971	-4,542	2,027	-630	1,397	365	1,762	-4,807
6	ED	6,129	-710	-1593	387	-4,843	1,286	-741	545	689	1,234	-4,895
7	AN	59,305	-1596	-9311	383	-8,401	50,904	-760	50,144	679	50,823	-8,482
8	VD	6,521	-1361	-2859	1,217	-5,863	658	-648	10	86	96	-6,425
9	ED	3,649	-1013	-1048	1,016	-3,177	472	-468	3	167	170	-3,479
10	ED	3,123	-848	-1609	519	-3,123	-	0	-	39	39	-3,085
11	BN	13,074	-902	-6018	501	-9,307	3,767	-1,832	1,935	283	2,218	-10,856
12	VD	7,435	-580	-2267	434	-4,529	2,906	-1,581	1,325	193	1,517	-5,918
13	ED	3,321	-573	-1160	285	-3,187	133	52	185	318	503	-2,818
14	ED	3,589	-300	-1593	234	-3,589	-	33	33	123	156	-3,433
15	AN	20,522	-2438	-5330	551	-10,745	9,778	299	10,076	1,255	11,331	-9,191
16	AN	22,816	-1985	-7341	1,558	-13,151	9,665	-637	9,028	979	10,007	-12,809
17	BN	6,199	-1426	-2565	1,196	-5,554	645	-493	151	475	627	-5,572
18	VW	117,031	-2248	-11669	1,642	-14,156	102,875	-2,535	100,340	1,677	102,016	-15,015
19	BN	12,744	-2305	-4217	1,680	-9,029	3,715	-1,500	2,214	3	2,217	-10,526
20	BN	6,645	-1257	-2416	1,190	-5,986	659	-533	126	258	384	-6,260
21	VD	8,614	-1614	-1401	1,009	-7,568	1,046	-1,025	21	81	101	-8,513
22	BN	13,510	-1576	-7095	1,206	-8,072	5,437	-2,948	2,490	-139	2,351	-11,159
23	BN	9,953	-1385	-2542	1,037	-4,695	5,258	-827	4,431	551	4,982	-4,971
24	BN	7,708	-1613	-3963	1,115	-4,494	3,214	-999	2,215	366	2,581	-5,127
25	VD	9,653	-797	-3611	1,010	-4,439	5,214	-1,427	3,787	221	4,009	-5,645
26	ED	9,163	-1217	-2413	576	-3,882	5,281	-809	4,472	620	5,092	-4,071
27	VW	138,265	-2906	-12948	2,063	-6,498	131,767	312	132,079	1,975	134,054	-4,211
28	AN	61,252	-2721	-16066	2,352	-13,559	47,693	-3,591	44,102	427	44,529	-16,723
29	VW	195,725	-2739	-16536	2,413	-10,839	184,886	-2,097	182,790	1,697	184,487	-11,238
30	AN	27,995	-2749	-6406	2,126	-12,089	15,906	-2,130	13,776	113	13,889	-14,106
31	AN	61,581	-2697	-6807	2,204	-13,402	48,178	-2,272	45,906	465	46,371	-15,210
32	VW	105,365	-2720	-11912	2,385	-13,711	91,654	-4,395	87,259	712	87,971	-17,394
33	AN	28,766	-2714	-8864	2,173	-14,329	14,438	-1,481	12,956	376	13,333	-15,433
34	AN	21,480	-2702	-8476	2,094	-15,431	6,049	-2,968	3,081	-73	3,008	-18,472
35	AN	38,995	-2197	-8109	1,812	-12,505	26,491	-3,208	23,282	338	23,620	-15,375
36	BN	13,900	-2115	-4623	1,524	-9,801	4,100	-2,544	1,556	4	1,560	-12,340
37	AN	18,856	-1744	-5429	1,293	-8,822	10,034	-1,993	8,041	415	8,456	-10,400
38	BN	12,534	-1767	-4732	1,311	-9,272	3,262	-1,609	1,653	250	1,903	-10,630
39	BN	15,053	-2156	-5887	1,717	-10,807	4,246	-3,445	801	-243	558	-14,495
40	VW	66,151	-2779	-11080	2,318	-10,023	56,128	-2,917	53,210	158	53,369	-12,782
41	AN	40,738	-2711	-12043	2,263	-13,781	26,957	-3,690	23,266	182	23,448	-17,290
42	VW	256,836	-2723	-15723	2,325	-11,236	245,600	-2,232	243,367	1,147	244,514	-12,322
43	AN	23,081	-2752	-12099	2,268	-13,745	9,336	-3,575	5,761	46	5,807	-17,274
44	VW	122,236	-2675	-14823	2,233	-13,774	108,462	-3,081	105,381	1,080	106,461	-15,774
45	BN	17,853	-2748	-10619	2,043	-12,648	5,205	-3,111	2,094	-111	1,982	-15,870
46	AN	26,690	-1995	-8838	1,461	-13,389	13,302	-1,830	11,472	561	12,032	-14,658
47	VW	121,259	-2716	-14977	2,559	-14,797	106,462	-3,763	102,699	1,141	103,840	-17,419
48	BN	13,194	-2744	-7414	2,078	-11,342	1,853	-1,689	164	-10	154	-13,040
49	BN	15,504	-1815	-6800	1,199	-10,169	5,335	-2,825	2,510	-187	2,323	-13,180
50	AN	20,633	-2478	-9322	2,028	-10,316	10,317	-2,737	7,580	18	7,598	-13,035
	avg	38,615	-1,920	-6,912	1,462	**-9,274**	29,340	**-1,763**	27,577	**428**	28,006	**-10,609**
	med	16,678	-1,990	-6,590	1,430	-9,912	5,386	-1,649	4,109	271	4,496	-11,008
AVERAGES												
VD/ED	12	6,153	-947	-1,940	731	-4,509	1,645	-642	1,002	252	1,254	-4,899
BN	14	11,980	-1,818	-5,174	1,382	-8,501	3,480	-1,835	1,645	108	1,752	-10,228
AN	15	32,893	-2,330	-8,747	1,708	-12,359	20,533	-2,261	18,272	374	18,646	-14,247
VW	9	132,865	-2,696	-13,186	2,149	-11,691	121,174	-2,315	118,859	1,254	120,113	-12,752
	50											
MEDIANS												
VD/ED	12	6,325	-878	-1,601	774	-4,484	879	-639	217	180	437	-4,851
BN	14	12,909	-1,706	-4,677	1,258	-9,150	3,741	-1,649	1,794	4	1,943	-10,743
AN	15	26,690	-2,478	-8,476	2,028	-13,151	13,302	-2,272	11,472	376	12,032	-15,210
VW	9	121,259	-2,723	-12,948	2,318	-11,236	106,462	-2,535	102,699	1,147	103,840	-12,782
	50											

E:\CPEN_LSMR\JWS-16a\POST RUN 13A\D.RUN 13A TM1.1_Budget-out v2.xlsx / printed 2/24/2012

TABLE 5 Model Run 13A Annual Water Budget Summary (continued)
Lower Santa Margarita River Groundwater Model
Modflow Volumetric Budget Output
Annual Groundwater Budget Model Run: RUN 13A w TM1.1strflw

	INFLOW:					OUTFLOW:					
MY	Storage	Recharge	Stream Leakance	GHB	TOTAL GW IN	Storage	Wells	ET	Stream Leakance	GHB	TOTAL GW OUT
1	8,722	10,069	8,537	615	27,942	4,404	18,124	3,131	2,239	67	27,965
2	7,348	3,740	6,629	614	18,331	4,043	12,174	1,838	240	49	18,344
3	4,951	6,978	10,578	615	23,122	8,752	10,758	2,410	1,155	47	23,122
4	4,498	2,613	4,683	612	12,406	3,351	6,837	2,005	174	51	12,417
5	4,040	1,722	6,074	623	12,460	5,143	4,966	2,206	109	47	12,470
6	3,710	2,344	6,508	612	13,174	5,051	5,099	2,631	339	54	13,173
7	7,576	9,917	5,657	608	23,758	5,546	11,820	2,961	3,378	59	23,764
8	6,265	3,014	4,082	621	13,982	2,980	9,493	1,423	72	44	14,011
9	3,147	1,414	4,433	649	9,644	3,267	5,099	1,271	86	48	9,770
10	3,297	1,731	2,275	673	7,976	1,804	5,101	951	45	37	7,938
11	4,426	6,490	8,650	632	20,198	10,523	6,201	2,164	1,269	47	20,204
12	3,239	2,555	6,850	613	13,257	4,773	5,099	2,780	559	48	13,258
13	4,442	1,405	3,088	618	9,553	1,694	5,101	2,472	250	52	9,570
14	3,526	1,931	3,168	637	9,262	2,332	5,099	1,717	69	49	9,266
15	8,386	6,389	7,734	622	23,131	6,384	14,125	2,241	341	58	23,149
16	8,733	7,964	10,852	625	28,173	7,408	18,538	1,827	348	57	28,179
17	6,954	2,893	5,794	633	16,274	3,393	11,545	1,173	129	52	16,292
18	7,025	12,856	13,985	645	34,511	14,263	16,175	2,158	1,868	58	34,523
19	7,661	4,408	6,912	617	19,598	4,862	13,053	1,561	97	48	19,621
20	6,292	2,798	6,198	627	15,917	4,832	9,532	1,380	135	51	15,930
21	3,214	1,690	7,440	649	12,993	5,427	6,329	1,146	67	42	13,010
22	4,617	7,452	7,819	608	20,496	9,174	6,499	2,546	2,232	50	20,501
23	3,930	3,012	5,840	616	13,399	4,467	5,301	2,927	670	52	13,418
24	3,880	4,426	5,372	604	14,282	4,201	5,099	3,177	1,756	56	14,289
25	3,675	4,201	6,786	607	15,269	4,927	5,101	3,237	1,955	56	15,275
26	2,975	2,849	5,833	604	12,262	2,539	5,099	3,494	1,081	58	12,271
27	6,233	14,167	8,150	606	29,155	5,868	13,843	3,618	5,777	66	29,172
28	5,776	16,430	10,211	600	33,018	4,938	19,399	3,375	5,250	59	33,020
29	5,691	17,557	11,221	601	35,070	5,820	20,822	3,326	5,041	66	35,075
30	8,251	6,635	9,906	610	25,401	3,597	18,893	2,410	459	54	25,414
31	8,090	7,252	14,284	617	30,243	8,003	20,041	1,931	241	55	30,271
32	6,602	12,668	16,919	608	36,798	10,204	21,120	2,649	2,741	61	36,776
33	8,827	9,070	9,917	613	28,427	4,516	21,097	2,146	652	54	28,465
34	7,560	8,703	12,443	617	29,322	7,982	18,480	1,641	1,191	47	29,342
35	6,662	8,540	14,004	610	29,816	8,322	18,572	2,181	673	54	29,802
36	6,800	4,881	10,170	609	22,459	5,978	13,981	2,013	452	54	22,478
37	7,466	5,847	10,721	612	24,646	7,156	14,669	2,401	379	57	24,662
38	7,415	4,977	9,252	615	22,258	6,944	13,039	1,816	413	50	22,263
39	5,048	6,084	10,376	615	22,124	8,219	10,629	2,323	895	48	22,114
40	5,948	11,272	9,343	618	27,181	7,169	13,728	2,938	3,287	52	27,175
41	5,716	12,374	11,478	606	30,174	5,395	18,320	3,060	3,386	56	30,216
42	6,749	16,575	11,823	604	35,751	6,566	21,534	3,049	4,532	61	35,740
43	7,323	12,259	9,688	604	29,874	5,854	18,572	2,668	2,743	51	29,888
44	6,543	15,496	12,810	608	35,457	7,943	20,845	2,785	3,866	56	35,495
45	9,458	10,767	8,173	606	29,004	5,923	18,251	2,339	2,433	51	28,997
46	9,068	9,252	11,180	615	30,115	7,966	19,031	1,995	1,100	56	30,148
47	5,647	15,909	15,266	613	37,436	10,262	20,317	2,725	4,082	64	37,449
48	6,474	7,599	7,140	604	21,816	4,201	14,417	1,928	1,217	51	21,814
49	6,198	6,956	7,920	615	21,690	7,507	10,927	2,156	1,074	43	21,708
50	7,599	9,642	8,104	606	25,950	6,772	13,935	2,805	2,443	53	26,008
avg	6,073	7,355	8,646	617	22,691	5,973	12,837	2,342	1,500	53	22,704
med	6,279	6,795	8,161	613	22,791	5,683	13,391	2,331	985	52	22,800
AVERAGES											
VD/ED	3,836	2,289	5,102	627	11,853	3,607	5,702	2,111	400	49	11,869
BN	6,179	5,463	7,589	615	19,846	6,019	10,761	2,096	929	50	19,855
AN	7,466	9,150	10,450	612	27,678	6,573	17,083	2,404	1,583	54	27,697
VW	6,573	14,063	12,006	613	33,256	8,055	18,501	2,931	3,715	61	33,263
MEDIANS											
VD/ED	3,601	2,137	5,258	620	12,433	3,309	5,100	2,105	141	48	12,444
BN	6,383	4,929	7,479	615	20,347	5,393	11,236	2,084	783	51	20,352
AN	7,576	8,703	10,578	612	28,427	6,772	18,538	2,401	1,100	55	28,465
VW	6,543	14,167	11,823	608	35,070	7,169	20,317	2,938	3,866	61	35,075

TABLE 5 Model Run 13A Annual Water Budget Summary (continued)
Lower Santa Margarita River Groundwater Model
Modflow Volumetric Budget Output
Annual Groundwater Budget

MY	NET Storage	NET Str Lknc	In-Out	% bal
1	-4,317	6,298	-23.0	-0.08%
2	-3,305	6,389	-12.8	-0.07%
3	3,801	9,423	-0.1	0.00%
4	-1,147	4,509	-11.2	-0.09%
5	1,102	5,966	-10.3	-0.08%
6	1,341	6,169	0.9	0.01%
7	-2,029	2,279	-6.4	-0.03%
8	-3,285	4,010	-29.0	-0.21%
9	119	4,347	-126.6	-1.30%
10	-1,492	2,230	37.2	0.47%
11	6,097	7,382	-6.0	-0.03%
12	1,534	6,291	-1.0	-0.01%
13	-2,748	2,838	-16.5	-0.17%
14	-1,194	3,099	-4.2	-0.05%
15	-2,002	7,393	-18.0	-0.08%
16	-1,325	10,503	-5.6	-0.02%
17	-3,561	5,665	-17.9	-0.11%
18	7,238	12,117	-12.2	-0.04%
19	-2,798	6,816	-23.3	-0.12%
20	-1,460	6,063	-13.7	-0.09%
21	2,213	7,374	-17.4	-0.13%
22	4,557	5,587	-5.1	-0.02%
23	537	5,170	-19.1	-0.14%
24	321	3,616	-7.5	-0.05%
25	1,251	4,831	-5.9	-0.04%
26	-436	4,752	-9.3	-0.08%
27	-365	2,373	-16.8	-0.06%
28	-838	4,961	-2.7	-0.01%
29	129	6,180	-4.8	-0.01%
30	-4,653	9,447	-13.5	-0.05%
31	-87	14,043	-28.0	-0.09%
32	3,602	14,178	21.5	0.06%
33	-4,311	9,265	-37.9	-0.13%
34	422	11,251	-19.7	-0.07%
35	1,660	13,331	14.5	0.05%
36	-822	9,718	-19.1	-0.08%
37	-310	10,342	-16.0	-0.06%
38	-471	8,838	-4.7	-0.02%
39	3,170	9,481	9.6	0.04%
40	1,221	6,056	5.9	0.02%
41	-321	8,092	-42.0	-0.14%
42	-184	7,291	10.4	0.03%
43	-1,469	6,944	-14.5	-0.05%
44	1,400	8,944	-37.9	-0.11%
45	-3,535	5,739	6.2	0.02%
46	-1,102	10,080	-32.8	-0.11%
47	4,614	11,185	-13.3	-0.04%
48	-2,273	5,923	2.1	0.01%
49	1,309	6,846	-18.1	-0.08%
50	-826	5,661	-57.2	-0.22%
avg	-101	7,146	-13.4	-0.07%
med	-343	6,343	-12.5	-0.06%
AVERAGES				
VD/ED	(229)	4,701	(16)	(0)
BN	(160)	6,659	(9)	(0)
AN	(893)	8,868	(19)	(0)
VW	1,482	8,291	(8)	(0)
MEDIANS				
VD/ED	(158)	4,631	(10)	(0)
BN	(646)	6,226	(10)	(0)
AN	(838)	9,423	(16)	(0)
VW	1,221	7,291	(12)	(0)

TABLE 6 Gallery Well Model Run 13A Average Monthly Water Budget Summary

Lower Santa Margarita River Groundwater Model — RUN 13A w TM1.1strflw

Modflow Volumetric Budget Output and Streamflow — 2/23/12

Atreamflow

Avg AF/M	SMR Flow In	Diversion	Str Gain+ / Loss-	SMR @ UY->CH	Str Gain+ / Loss-	SMR @ CH->LY	Str Gain+ / Loss-	SMR Flow Out	LSMR Str Gain+ / Loss-
Oct	506	292	-414	92	-53	39	4	43	-462
Nov	1,124	511	-163	960	-507	454	-8	445	-678
Dec	1,873	526	-1,006	867	-120	748	49	796	-1,077
Jan	8,266	834	-1,290	6,975	-42	6,933	145	7,078	-1,188
Feb	10,626	1,793	-1,814	8,812	-98	8,714	116	8,831	-1,796
Mar	9,229	1,934	-1,581	7,648	-157	7,491	97	7,588	-1,641
Apr	3,380	1,299	-1,022	2,358	-203	2,155	37	2,192	-1,187
May	1,429	866	-664	765	-210	555	-5	550	-879
Jun	764	539	-338	426	-178	248	-8	240	-524
Jul	500	128	-255	244	-102	143	-5	137	-362
Aug	422	61	-339	83	-53	30	6	36	-386
Sep	497	49	-388	109	-41	68	0	69	-428
Avg Monthly	3,218	736	-773	2,445	-147	2,298	36	2,334	-884
Med Monthly	1,276	533	-539	816	-111	504	5	498	-779
Avg Total=Anl	38,615	8,832	-9,274	29,340	-1,763	27,577	428	28,006	-10,609

Lower Santa Margarita River Groundwater Model

Modflow Volumetric Budget Output

Groundwater Model

	INFLOW:					OUTFLOW:									
Avg AF/M	Storage	Recharge	Stream Leakance	GHB	TOTAL IN	Storage	Wells	ET	Stream Leakance	GHB	TOTAL OUT	OUT-IN NET Storage	OUT-IN NET Str Lknc	In-Out	% bal
Oct	605	31	412	54	1,102	94	878	123	7	3	1,105	-512	405	-3.4	-0.31%
Nov	87	479	1,525	52	2,143	1,261	771	95	11	4	2,143	1,174	1,515	0.1	0.01%
Dec	305	142	1,027	53	1,526	703	711	87	19	6	1,526	399	1,009	0.1	0.00%
Jan	178	367	1,312	52	1,910	799	967	105	32	6	1,909	620	1,280	0.5	0.02%
Feb	137	1,687	942	47	2,814	1,508	1,055	142	99	6	2,810	1,371	843	3.6	0.13%
Mar	162	1,992	794	52	3,000	1,033	1,396	218	347	6	2,999	871	448	0.9	0.03%
Apr	420	1,340	582	50	2,393	281	1,471	263	375	5	2,396	-139	207	-3.1	-0.13%
May	427	920	430	52	1,829	201	956	307	358	4	1,827	-226	72	1.6	0.09%
Jun	867	310	401	50	1,628	36	1,095	301	198	3	1,633	-831	203	-5.1	-0.31%
Jul	1,092	68	363	52	1,575	7	1,243	285	42	3	1,581	-1,084	321	-5.5	-0.35%
Aug	995	11	389	53	1,448	9	1,191	240	6	3	1,449	-986	382	-1.3	-0.09%
Sep	798	9	466	52	1,324	40	1,102	177	5	3	1,326	-758	461	-1.8	-0.14%
Avg Monthly	506	613	720	51	1,891	498	1,070	195	125	4	1,892	-8	595	-1.1	-0.09%
Med Monthly	424	338	524	52	1,728	241	1,075	197	37	4	1,730	-182	426	-0.6	-0.04%
Avg Total=Anl	6,073	7,355	8,646	617	22,691	5,973	12,837	2,342	1,500	53	22,704	-101	7,146	-13.4	

[This Page Intentionally Left Blank]

Appendix C

Biological Resources Technical Data/Reports

[This Page Intentionally Left Blank]

Appendix C-1

Plant Community Descriptions

Plant Community Tables

Plant Community Figures

Threatened, Endangered, and Sensitive Wildlife Species Figures

[This Page Intentionally Left Blank]

Plant Community Descriptions

Upland Scrub Communities

- **Diegan Coastal Sage Scrub** (DCSS) (32510) consists of sparsely to densely spaced, low-growing, drought-deciduous shrubs. Plant species characteristic of DCSS include coastal sagebrush (*Artemisia californica*), California buckwheat (*Eriogonum fasciculatum*), black sage (*Salvia mellifera*), white sage (*Salvia apiana*), and bush monkey-flower (*Mimulus aurantiacus*).
- **Diegan Coastal Sage Scrub: Baccharis-Dominated** (CSSB) (32530) is similar to DCSS but is dominated by coyote brush (*Baccharis pilularis*). This community is often found within other forms of DCSS on mesic slopes and adjacent to drainages, particularly on previously disturbed sites. Other characteristic species include California sagebrush, California buckwheat, and coastal goldenbush (*Isocoma menziesii*).
- **Coastal Sage-Chaparral Scrub** (CSS-CHAP) (37G00) is a mixed community of both low, soft leaved coastal sage species and taller leathery leaved shrubs. The dominant taller evergreen species within the project area include lemonade berry (*Rhus integrifolia*), toyon (*Heteromeles arbutifolia*) and laurel sumac.
- **Southern Mixed Chaparral** (SMC) (37130) is a sclerophyll shrub dominated community often with patches of bare soil or forming a mosaic with scrub communities. This community is typically found on dry, rocky slopes with little soil and moderate temperatures. In the project area, SMC is typically dominated by chamise (*Adenostema fasciculatum*), with laurel sumac (*Malosma laurina*) and scrub oak (*Quercus berberidifolia*) as common components.

Riparian Communities

- **Southern Riparian Woodland** (SRW) (62500) is a medium-density riparian woodland community dominated by small trees or shrubs, with scattered taller riparian tree species. Characteristic species within SRW include California sycamore (*Platanus racemosa*), willows (*Salix* spp.), and elderberry (*Sambucus nigra* ssp. *caerulea*).
- **Southern Coast Live Oak Riparian Forest** (CLORF) (61310) is a dense riparian forest dominated by coast live oak with a closed, or nearly-closed, canopy. Characteristic species include mugwort, toyon (*Heteromeles arbutifolia*), California wild rose (*Rosa californica*), California blackberry, poison oak, and blue elderberry.
- **Southern Arroyo Willow Riparian Forest** (SWRF) (61320) is a winter-deciduous riparian forest dominated by arroyo willow (*Salix lasiolepis*) and having closed, or nearly-closed canopies. Characteristic species include mugwort, mule-fat (*Baccharis salicifolia*), California sycamore, cottonwoods (*Populus* spp.), black willow (*Salix gooddingii*), and stinging nettle (*Urtica dioica*).
- **Southern Cottonwood/Willow Riparian Forest** (CWRF) (61330) is a tall, open, broad-leaved winter-deciduous riparian forest that is dominated by willows (*Salix* spp.), western cottonwood (*Populus fremontii*), and/or black cottonwood (*Populus trichocarpa*).
- **Southern Willow Scrub** (SWS) (63320) is a dense, winter-deciduous riparian scrub community. In the project areas, it is typically dominated by arroyo willow and may include several other willow species (e.g., black willow and western sand bar willow [*Salix exigua*]) and mule-fat.

- **Southern Riparian Forest** (SRF) (61300) is a riparian community with mixed tree canopy, but no apparent dominant species. Typical trees may include coast live oak (*Quercus agrifolia*), willows (*Salix* spp.), western sycamore (*Platanus racemosa*), and/or western cottonwood.
- **Southern Riparian Scrub** (SRS) (63300) is a shrubby riparian thicket dominated by willows and coyote brush.
- **Sycamore Grassland** (SG) (62100) is open to moderately closed, winter-deciduous broad-leaved riparian woodland overwhelmingly dominated by well-spaced sycamore (*Platanus racemosa*), with blue elderberry widely spaced in the subcanopy. The understory is usually dominated by non-native grasses.
- **Mule-fat Scrub** (MFS) (63310) is a riparian scrub community dominated by mule-fat and often represents an early seral stage in the establishment of willow- or sycamore-dominated riparian forests. Other species that are characteristic of this vegetation community include arroyo willow and poison hemlock.
- **Non-native Riparian** (NNR) (65000) is dominated by non-native species, including giant reed (*Arundo donax*), tamarisk (*Tamarix* spp.), common reed (*Phragmites australis*), and pampas grass (*Cortaderia* spp.). NNR is found in a variety of wetland habitats, often where disturbance has occurred.
- **Arundo-dominated Riparian** (ARU) (65100) describes riparian thickets that are almost exclusively dominated by giant reed (*Arundo donax*).

Grasslands and other Herb Communities

- **Valley Needlegrass Grassland** (VNG) (42110) is dominated by the perennial, bunch-forming purple needlegrass (*Stipa pulchra*). This community usually occurs on fine-textured (often clay) soils. Native and introduced annual grasses usually occur between the perennials, often exceeding the bunchgrasses in cover.
- **Non-native Grassland** (NNG) (42200) is dominated by non-native annual grasses and weedy herbaceous species. Dominant exotic species include ripgut brome (*Bromus diandrus*), red brome (*Bromus madritensis* ssp. *rubens*), wild oats (*Avena* spp.), wild barley (*Hordeum* spp.), Italian ryegrass (*Festuca perennis*), filaree (*Erodium* spp.), and soft chess brome (*Bromus hordeaceus*).
- **Non-native Grassland: Broadleaf-dominated** (NNGB) (42210) is dominated by non-native, invasive broadleaf species. NNGB is generally found in disturbed areas. Within the project area this community is dominated by sweet fennel (*Foeniculum vulgare*), non-native thistle species (*Carduus pycnocephalus*, *Silybum marianum*, *Centaurea melitensis*), and mustard species (*Brassica nigra*, *Hirschfeldia incana*).

Bottomland Communities

- **Coastal and Valley Freshwater Marsh** (CVFM) is typically dominated by perennial, emergent monocots (e.g., rushes [*Juncus* spp.], sedges [*Carex* spp.], cattails [*Typha* spp.]), and often consists of uniform stands with closed canopies. This community occurs in wetlands that are permanently to semi-permanently flooded by standing freshwater lacking a significant current. Prolonged saturation of such areas permits the accumulation of deep, peaty soils.

- **Freshwater Marsh** (FWM) (52400) typically occurs on MCB Camp Pendleton in coastal floodplains and valleys; dominated by sedges, (*Carex* spp.), bulrushes (*Scripus* spp.), and cattails (*Typha* spp.).
- **Non-vegetated Floodplain or Channel** (FLO) (64200) includes the sandy, gravelly, or rocky fringe of waterways or flood channels. Vegetation may occur in these floodplains or channels but is usually less than 10% total cover.
- **Open Water** (OW) (13140) areas include the freshwater waters and substrates of mostly unvegetated bodies of water. This habitat type includes ponds, lakes, creeks, streams, and rivers.

Upland Woodland Communities

- **Eucalyptus Woodland** (EUC) (11100) is a type of non-native woodland dominated by large naturalized blue and/or red gum trees (*Eucalyptus* spp.).
- **Coast Live Oak Woodland** (CLO) (71160) is a woodland dominated by coast live oak that occurs on shaded slopes, bottomlands, and valleys, but not particularly in riparian corridors. Holland/Oberbauer identifies variations for open canopy (71161) and dense canopy (71162).

Disturbed/Developed

- **Agriculture** (AGR) (18300) describes areas used as agricultural fields in the past and/or present.
- **Disturbed Habitat** (DIST) (11000) is where past or present physical disturbance is prevalent such that an area is no longer recognizable as a native or naturalized vegetation association.
- **Urban/Developed** (DEV) (12000) areas do not support native vegetation and are characterized by permanent or semi-permanent structures.

Plant Community Tables

Table C1-1. Potential Temporary Impacts to Plant Communities within the Santa Margarita River Conjunctive Use Project Area for Alternative 1

Plant Community	*Acreages within the Project Areas*							
	Diversion Weir[1]	*O'Neill Ditch*	*Production Wells*[2]	*Bi-directional Pipeline*[3]			*FPUD WTP*	*Project TOTAL*
	MCBCP	*MCBCP*	*MCBCP*	*MCBCP*	*DET Fallbrook*	*Non-DOD*	*Non-DOD*	
UPLAND SCRUB								
Diegan Coastal Sage Scrub: Baccharis-dominated (CSSB)	-	-	0.09	0.34	0.35	-	-	0.78
Coastal Sage-Chaparral Scrub (CSS-CHAP)	-	-	0.10	0.06	-	-	-	0.16
Diegan Coastal Sage Scrub (DCSS)	0.23	1.84	0.01	11.26	30.30	2.76	-	46.40
Southern Mixed Chaparral (SMC)		-	-	-	-	3.98	-	3.98
Subtotal	***0.23***	***1.84***	***0.20***	***11.67***	***30.64***	***6.74***	***-***	***51.32***
RIPARIAN								
Southern Coast Live Oak Riparian Forest (CLORF)	-	-	-	-	1.06	-	-	1.06
Southern Cottonwood-willow Riparian Forest (CWRF)	-	-	-	-	-	0.58	-	0.58
Mule-fat Scrub (MFS)	-	-	0.24	-	0.39	-	-	0.63
Non-native Riparian (NNR)			0.08	-	-	-		0.08
Sycamore Grassland (SG)	-	2.12	0.16	-	-	-	-	2.28
Southern Riparian Forest (SRF)	-	-	-	0.25	-	-	-	0.25
Southern Riparian Scrub (SRS)	0.07	1.06	4.75	0.77	1.16	-	-	7.81
Southern Riparian Woodland (SRW)	0.57	0.74	2.61	-	0.07	-	-	3.99
Southern Arroyo Willow Riparian Forest (SWRF)	-	-	0.02	-	-	-	-	0.02
Southern Willow Scrub (SWS)	-	-	0.01	0.04			-	0.05
Subtotal	***0.65***	***3.92***	***7.87***	***1.06***	***2.68***	***0.58***	***-***	***16.75***

Table C1-1. Potential Temporary Impacts to Plant Communities within the Santa Margarita River Conjunctive Use Project Area for Alternative 1 (cont.)

Plant Community	*Acreages within the Project Areas*							
	Diversion Weir[1]	*O'Neill Ditch*	*Production Wells*[2]	*Bi-directional Pipeline*[3]			*FPUD WTP*	*Project TOTAL*
	MCBCP	*MCBCP*	*MCBCP*	*MCBCP*	*DET Fallbrook*	*Non-DOD*	*Non-DOD*	
GRASSLAND/HERB								
Non-native Grassland (NNG)	-	-	0.13	4.05	13.66	4.26	-	22.10
Non-Native Grassland: Broadleaf-dominated (NNGB)	0.25	3.77	2.44	0.75	-	-	-	7.21
Valley Needlegrass Grassland (VNG)	-	-	-	0.11	1.27	-	-	1.38
Subtotal	***0.25***	***3.77***	***2.56***	***4.91***	***14.93***	***4.26***	**-**	***30.68***
BOTTOMLAND								
Coastal and Valley Freshwater Marsh (CVFM)	-	-	0.01	-	-	-	-	0.01
Non-Vegetated Floodplain/Channel (FLO)	0.08	0.02	0.07	-	-	-	-	0.17
Freshwater Marsh (FWM)	0.24	0.05	-	-	0.75	-	-	1.04
Open Water (OW)	-	-	0.07	-		-	-	0.07
Subtotal	***0.33***	***0.07***	***0.15***	**-**	***0.75***	**-**	**-**	***1.30***
UPLAND WOODLAND								
Coast Live Oak Woodland (CLO)	-	-	-	-	-	4.21	-	4.21
Eucalyptus Woodland (EUC)	-	0.22	0.001	0.91	2.89	0.40	-	4.42
Subtotal	**-**	***0.22***	***0.001***	**0.91**	**2.89**	**4.61**	**-**	***8.63***
DISTURBED/DEVELOPED								
Agriculture (AGR)	-	-	-	-	-	15.24	-	15.24
Urban/Developed (DEV)	0.05	1.85	4.53	21.33	8.80	33.97	-	70.54
Disturbed Habitat (DIST)	-	-	0.13	0.04	2.29	-	2.15	4.62
Subtotal	***0.05***	***1.85***	***4.67***	**21.38**	**11.09**	**49.21**	***2.15***	***90.40***
Total	**1.50**	**11.67**	**15.47**	**39.92**	**62.98**	**65.40**	**2.15**	**199.09**

Notes: [1]Includes the inflatable weir control building structure.
[2]Includes the conveyance pipelines and access roads.
[3]Includes the booster pump stations.

Table C1-2. Potential Permanent Impacts to Plant Communities within the Santa Margarita River Conjunctive Use Project Area for Alternative 1

Plant Community	*Acreages within the Project Areas*							
	Diversion Weir[1]	*O'Neill Ditch*	*Production Wells*[2]	*Bi-directional Pipeline*[3]			*FPUD WTP*	*Project TOTAL*
	MCBCP	*MCBCP*	*MCBCP*	*MCBCP*	*DET Fallbrook*	*Non-DOD*	*Non-DOD*	
UPLAND SCRUB								
Diegan Coastal Sage Scrub: Baccharis-dominated (CSSB)	-	-	-	0.10	-	-	-	0.10
Diegan Coastal Sage Scrub (DCSS)	0.23	0.23	-	0.16	-	-	-	0.62
Southern Mixed Chaparral (SMC)	-	-	-	-	0.004	-	-	0.004
Subtotal	***0.23***	***0.23***	***0.20***	***0.26***	***0.004***	**-**	**-**	**0.72**
RIPARIAN								
Sycamore Grassland (SG)	-	0.63	-	-	-	-	-	0.63
Southern Riparian Scrub (SRS)	0.28	0.68	0.81	-	-	-	-	1.76
Southern Riparian Woodland (SRW)	0.04	0.11	0.07	-	-	-	-	0.21
Subtotal	**0.32**	**1.42**	**0.87**	**-**	**-**	**-**	**-**	**2.61**
GRASSLAND/HERB								
Non-Native Grassland: Broadleaf-dominated (NNGB)	0.02	0.56	0.83	-	-	-	-	1.41
BOTTOMLAND								
Non-Vegetated Floodplain/Channel (FLO)	0.07	-	-	-	-	-	-	0.07
Freshwater Marsh (FWM)	0.07	-	-	-	-	-	-	0.07
Subtotal	**0.14**	**-**	**-**	**-**	**-**	**-**	**-**	**0.14**
UPLAND WOODLAND								
Eucalyptus Woodland (EUC)	-	0.05	-	-	-	-	-	0.05

Table C1-2. Potential Permanent Impacts to Plant Communities within the Santa Margarita River Conjunctive Use Project Area for Alternative 1 (cont.)

Plant Community	*Acreages within the Project Areas*							
	Diversion Weir[1]	*O'Neill Ditch*	*Production Wells*[2]	*Bi-directional Pipeline*[3]			*FPUD WTP*	*Project TOTAL*
	MCBCP	*MCBCP*	*MCBCP*	*MCBCP*	*DET Fallbrook*	*Non-DOD*	*Non-DOD*	
DISTURBED/DEVELOPED								
Urban/Developed (DEV)	0.0004	0.06	0.25	0.17	0.21	-	-	0.69
Disturbed Habitat (DIST)	-	-	-	-	-	-	5.09	5.09
Subtotal	**0.0004**	**0.06**	**0.25**	***0.17***	***0.21***	**-**	***5.09***	**5.78**
Total	**0.71**	**2.32**	**1.95**	**0.43**	**0.21**	**-**	**5.09**	**10.71**

Notes: [1]Includes the inflatable weir control building structure.
[2]Includes the conveyance pipelines and access roads.
[3]Includes the booster pump stations.

Table C1-3. Potential Temporary Impacts to Plant Communities within the Santa Margarita River Conjunctive Use Project Area for Alternative 2

Plant Community	*Acreages within the Project Areas*							
	Diversion Weir[1]	*O'Neill Ditch*	*Production Wells*[2]	*Gallery Wells*[2]	*Bi-directional Pipeline*[3]			*Project TOTAL*
	MCBCP	*MCBCP*	*MCBCP*	*MCBCP*	*MCBCP*	*DET Fallbrook*	*Non-DOD*	
UPLAND SCRUB								
Diegan Coastal Sage Scrub: Baccharis-dominated (CSSB)	-	-	0.09	-	0.59	0.35	-	1.03
Coastal Sage-Chaparral Scrub (CSS-CHAP)	-	-	0.10	-	2.97	-	-	3.07
Diegan Coastal Sage Scrub (DCSS)	0.23	1.84	0.01	-	11.25	28.49		41.82
Southern Mixed Chaparral (SMC)	-	-	-	-	-	-	3.34	3.34
Subtotal	***0.23***	***1.84***	***0.20***	***-***	***14.81***	***28.84***	***3.34***	***49.26***
RIPARIAN								
Southern Coast Live Oak Riparian Forest (CLORF)	-	-	-	-	-	1.06	-	1.06
Southern Cottonwood-willow Riparian Forest (CWRF)	-	-	-	-	-	-	0.58	0.58
Mule-fat Scrub (MFS)	-	-	0.24		0.18	0.14	-	0.56
Non-native Riparian (NNR)			0.08	0.07	-	-	-	0.16
Sycamore Grassland (SG)	-	2.12	0.16	0.11	-	-	-	2.39
Southern Riparian Forest (SRF)	-	-	-	-	0.25	-	-	0.25
Southern Riparian Scrub (SRS)	0.07	1.06	4.75	0.90	0.77	0.88	-	8.43
Southern Riparian Woodland (SRW)	0.57	0.74	2.61	1.88	-	-	-	5.80
Southern Arroyo Willow Riparian Forest (SWRF)	-	-	0.02	-	-	-	-	0.02
Southern Willow Scrub (SWS)	-	-	0.01	-	-	-	-	0.01
Subtotal	***0.65***	***3.92***	***7.87***	***2.96***	***1.20***	***2.08***	***0.58***	***19.28***

Table C1-3. Potential Temporary Impacts to Plant Communities within the Santa Margarita River Conjunctive Use Project Area for Alternative 2 (cont.)

Plant Community	*Acreages within the Project Areas*							
	Diversion Weir[1]	*O'Neill Ditch*	*Production Wells*[2]	*Gallery Wells*[2]	*Bi-directional Pipeline*[3]			*Project TOTAL*
	MCBCP	*MCBCP*	*MCBCP*	*MCBCP*	*MCBCP*	*DET Fallbrook*	*Non-DOD*	
GRASSLAND/HERB								
Non-native Grassland (NNG)	-	-	0.13	-	3.08	13.53	1.10	17.84
Non-Native Grassland: Broadleaf-dominated (NNGB)	0.25	3.77	2.44	0.48	-	-	-	6.94
Valley Needlegrass Grassland (VNG)	-	-	-	-	-	1.27	-	1.27
Subtotal	***0.25***	***3.77***	***2.56***	***0.48***	***3.08***	***14.80***	***1.10***	***26.04***
BOTTOMLAND								
Coastal and Valley Freshwater Marsh (CVFM)	-	-	0.01	-	-	-	-	0.01
Non-Vegetated Floodplain/Channel (FLO)	0.08	0.02	0.07	-	-	-	-	1.04
Freshwater Marsh (FWM)	0.24	0.05	-	0.11	-	0.75	-	0.28
Open Water (OW)	-	-	0.07	-	-	-	-	0.07
Subtotal	***0.33***	***0.07***	***0.15***	***0.11***	**-**	***0.75***	**-**	***1.41***
UPLAND WOODLAND								
Coast Live Oak Woodland (CLO)	-	-	-	-	-	-	0.57	0.57
Eucalyptus Woodland (EUC)	-	0.22	0.001	-	1.15	1.79	0.002	3.16
Subtotal	**-**	***0.22***	***0.001***	**-**	**1.15**	**1.79**	**0.57**	***3.73***
DISTURBED/DEVELOPED								
Agriculture (AGR)	-	-	-	-	-	-	9.03	9.03
Urban/Developed (DEV)	0.05	1.85	4.53	-	20.14	11.77	24.22	2.64
Disturbed Habitat (DIST)	-	-	0.13	0.52	0.21	2.29	-	63.09
Subtotal	***0.05***	***1.85***	***4.67***	***0.52***	**20.35**	**14.05**	**33.25**	***74.74***
Total	**1.50**	**11.67**	**15.45**	**4.08**	**40.59**	**62.31**	**38.84**	**174.44**

Notes: [1]Includes the inflatable weir control building structure.
[2]Includes the conveyance pipelines and access roads.
[3]Includes the booster pump stations.

Table C1-4. Potential Permanent Impacts to Plant Communities within the Santa Margarita River Conjunctive Use Project Area for Alternative 2

Plant Community	*Acreages within the Project Areas*							
	Diversion Weir[1]	*O'Neill Ditch*	*Production Wells*[2]	*Gallery Wells*[2]	*Bi-directional Pipeline*[3]			*Project TOTAL*
	MCBCP	*MCBCP*	*MCBCP*	*MCBCP*	*MCBCP*	*DET Fallbrook*	*Non-DOD*	
UPLAND SCRUB								
Diegan Coastal Sage Scrub: Baccharis-dominated (CSSB)	-	-	-	-	0.10	-	-	0.10
Diegan Coastal Sage Scrub (DCSS)	0.23	0.23	-	-	0.16	-	-	0.62
Southern Mixed Chaparral (SMC)	-	-	-	-	-	0.004	-	0.004
Subtotal	**0.23**	**0.23**	**-**	**-**	***0.26***	***0.004***	**-**	**0.72**
RIPARIAN								
Non-native Riparian (NNR)	-	-		0.09	-	-	-	0.09
Sycamore Grassland (SG)	-	0.63	-	-	-	-	-	0.63
Southern Riparian Scrub (SRS)	0.28	0.68	0.81	0.89	-	-	-	2.65
Southern Riparian Woodland (SRW)	0.04	0.11	0.07	3.21	-	-	-	3.52
Subtotal	**0.32**	**1.42**	**0.87**	**4.19**	**-**	**-**	**-**	**6.80**
GRASSLAND/HERB								
Non-Native Grassland: Broadleaf-dominated (NNGB)	0.02	0.56	0.83	0.03	-	-	-	1.44
BOTTOMLAND								
Non-Vegetated Floodplain/Channel (FLO)	0.07	-	-	-	-	-	-	0.07
Freshwater Marsh (FWM)	0.07	-	-	-	-		-	0.07
Subtotal	**0.14**	**-**	**-**	**-**	**-**		**-**	**0.14**
UPLAND WOODLAND								
Eucalyptus Woodland (EUC)	-	0.05	-	-	-	-	-	0.05
DISTURBED/DEVELOPED								
Urban/Developed (DEV)	0.0004	0.06	0.25	0.05	0.17	-	0.21	0.74
Total	**0.71**	**2.32**	**1.95**	**4.27**	**0.43**	**0.004**	**0.21**	**9.89**

Notes: [1]Includes the inflatable weir control building structure.
[2]Includes the conveyance pipelines and access roads.
[3]Includes the booster pump stations.

Plant Community Figures

Key to Plant Community Codes

AGR	Agriculture
CLO	Coast Live Oak Woodland
CLORF	Southern Coast Live Oak Riparian Forest
CSSB	Diegan Coastal Sage Scrub: Baccharis-dominated
CSS-CHAP	Coastal Sage-Chaparral Scrub
CVFM	Coastal and Valley Freshwater Marsh
CWRF	Southern Cottonwood-willow Riparian Forest
DCSS	Diegan Coastal Sage Scrub
DEV	Urban/Developed
DIST	Disturbed Habitat
EUC	Eucalyptus Woodland
FLO	Non-Vegetated Floodplain/Channel
FWM	Freshwater Marsh
GF	Grass-forb Mix
MFS	Mule-fat Scrub
NNG	Non-native Grassland
NNGB	Non-Native Grassland: Broadleaf-dominated
NNR	Non-native Riparian
OW	Open Water
SG	Sycamore Grassland
SMC	Southern Mixed Chaparral
SRF	Southern Riparian Forest
SRS	Southern Riparian Scrub
SRW	Southern Riparian Woodland
SWRF	Southern Arroyo Willow Riparian Forest
SWS	Southern Willow Scrub
VNG	Valley Needlegrass Grassland
ARU	Arundo-dominated Riparian

[This Page Intentionally Left Blank]

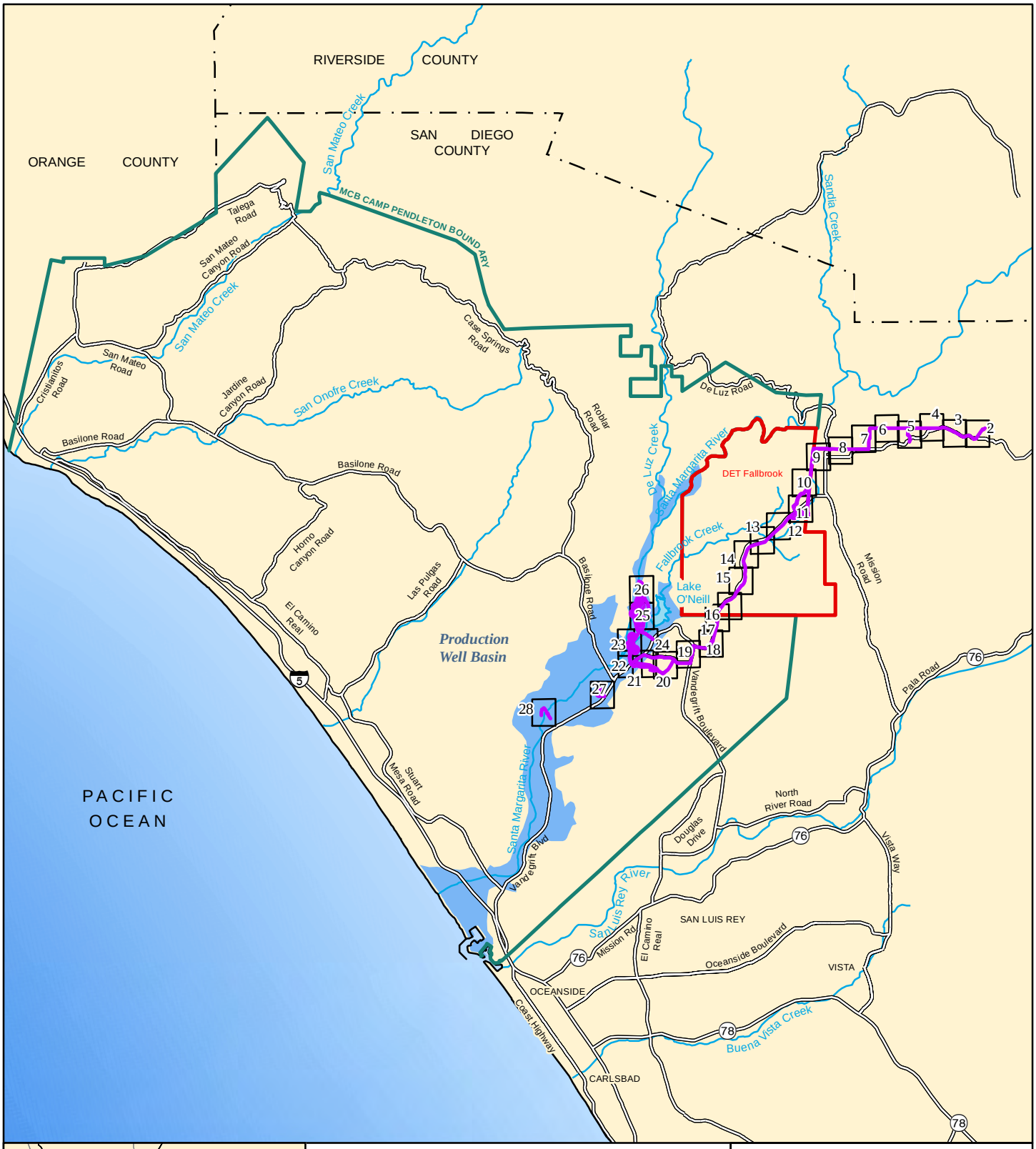
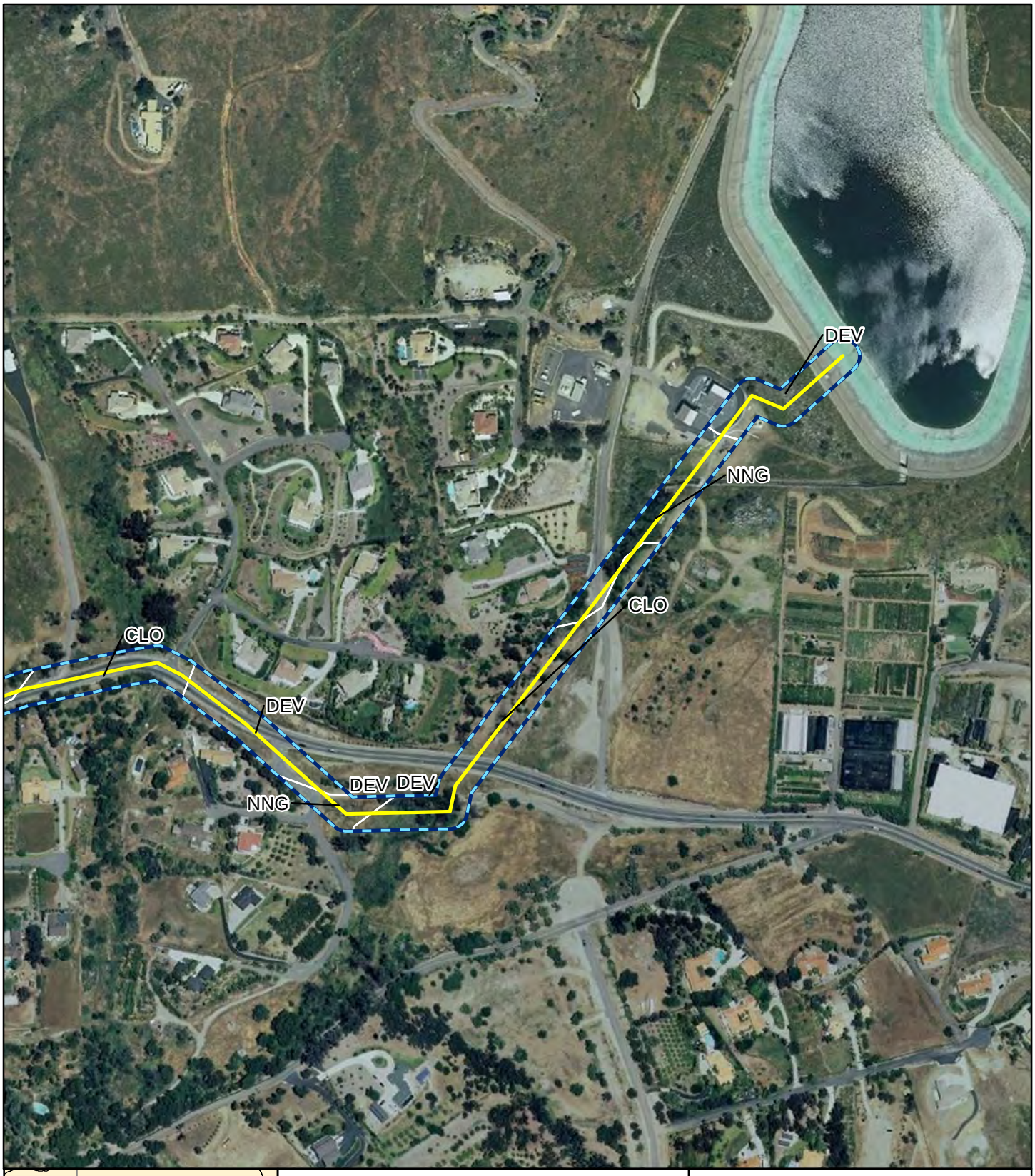
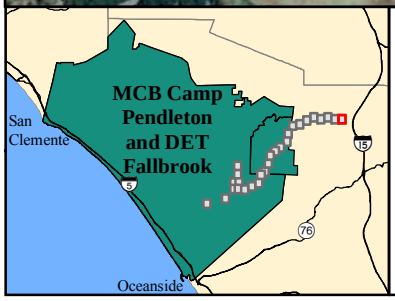


Figure C1-1
Plant Communities Figure Index for Alternatives 1 and 2





Legend

Permanent Impact Area

Temporary Impact Area

Alternative 1

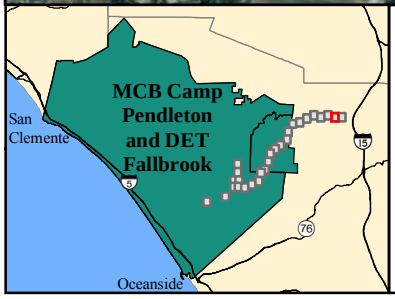
XYZ Plant Community Code

Figure C1-2
Plant Communities for Alternatives 1 and 2

0 200 400 Feet

0 100 200 Meters

Sources: San Diego County 2010; MCB Camp Pendleton 2012; DET Fallbrook 2012



Legend

Permanent Impact Area

Temporary Impact Area

Alternative 1

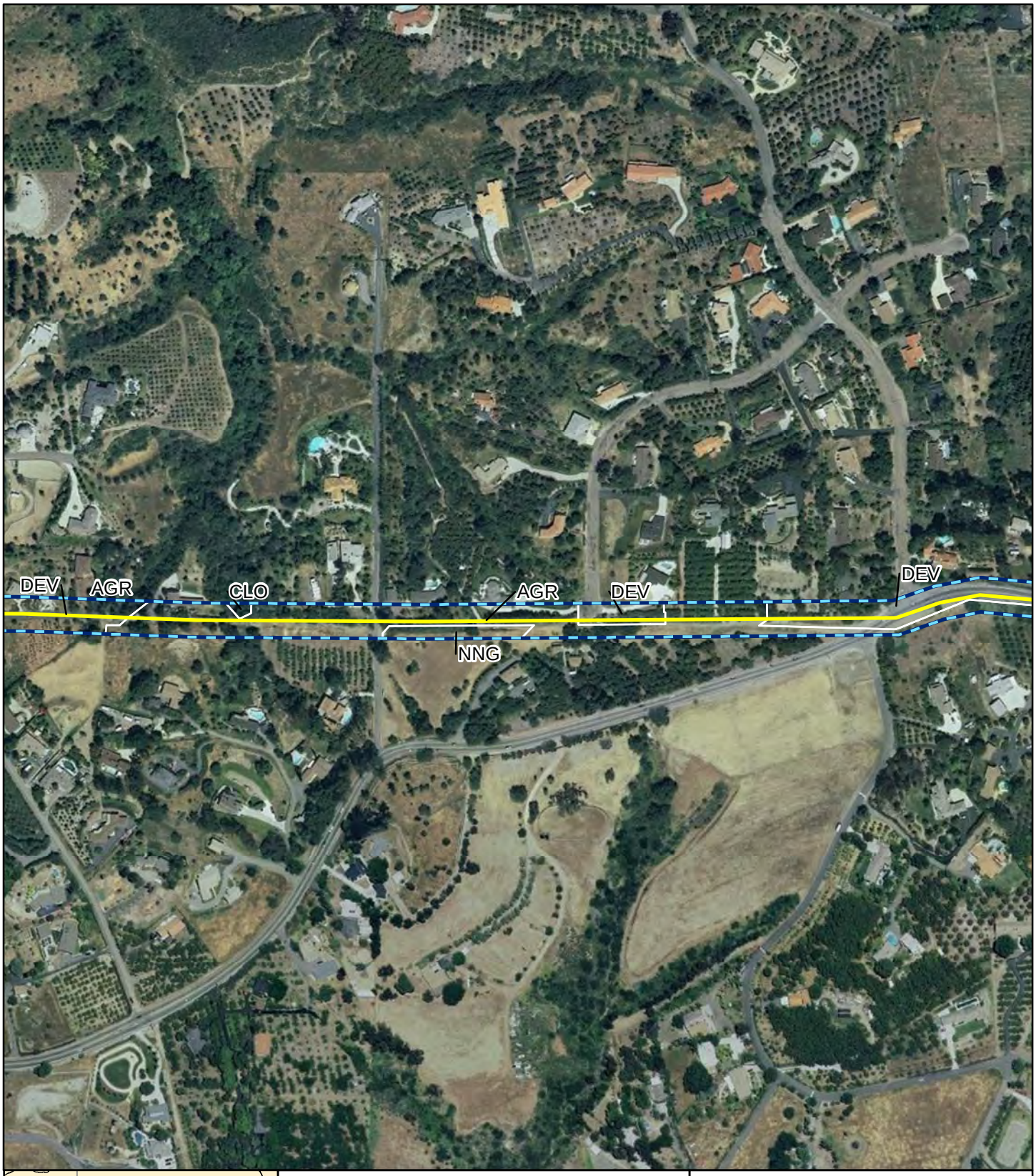
XYZ Plant Community Code

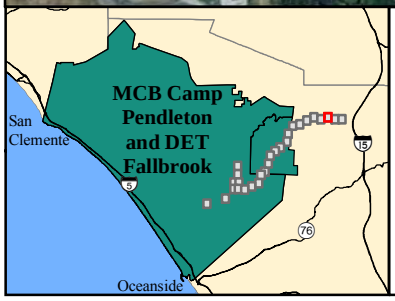
Figure C1-3
Plant Communities for Alternatives 1 and 2

0 200 400 Feet

0 100 200 Meters

Sources: San Diego County 2010; MCB Camp Pendleton 2012; DET Fallbrook 2012





Legend

Permanent Impact Area

Temporary Impact Area

Alternative 1

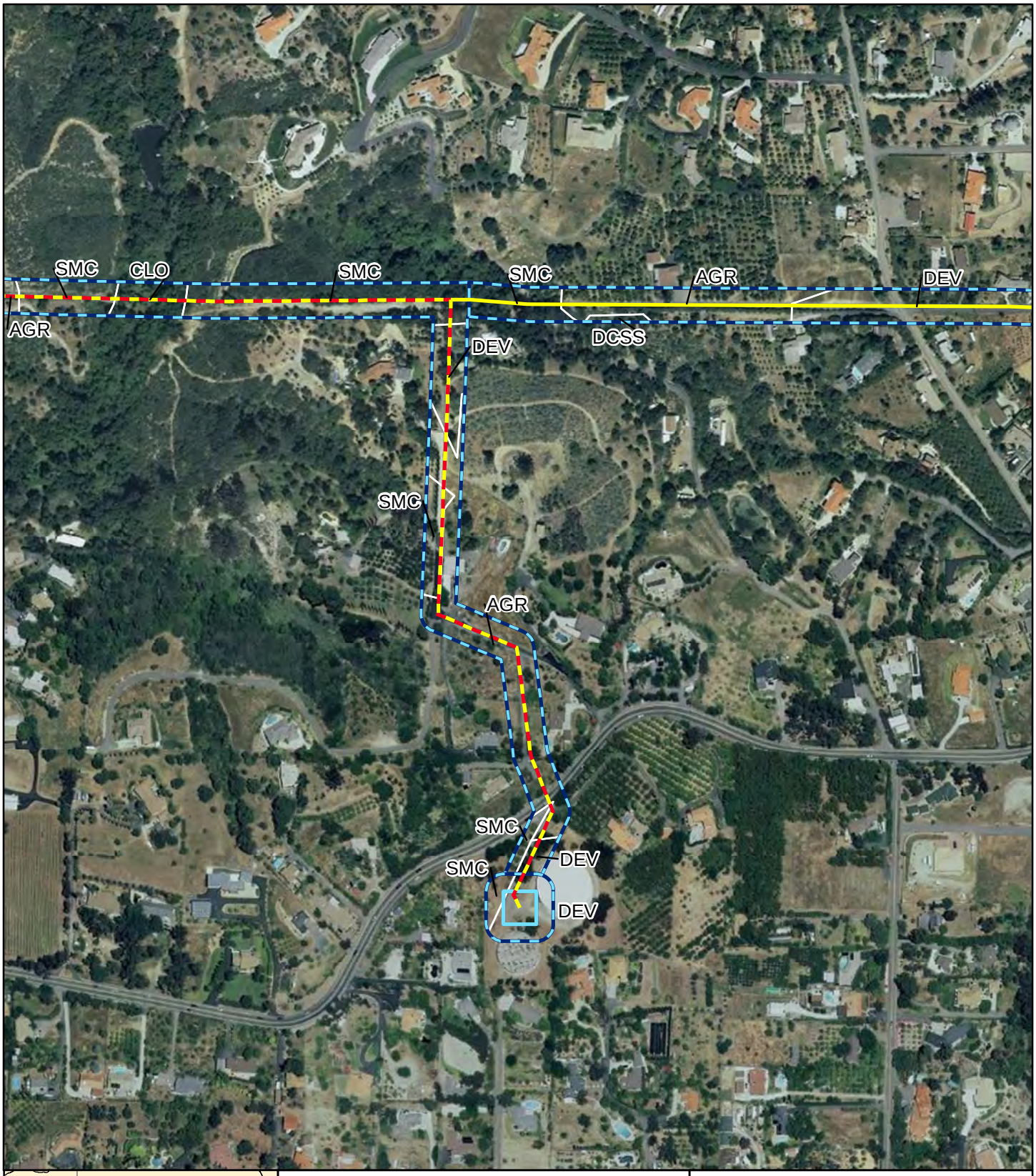
XYZ Plant Community Code

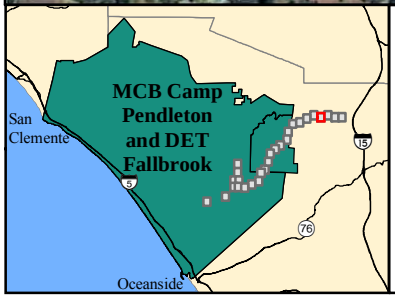
Figure C1-4
Plant Communities for Alternatives 1 and 2

0 200 400 Feet

0 100 200 Meters

Sources: San Diego County 2010; MCB Camp Pendleton 2012; DET Fallbrook 2012





Legend

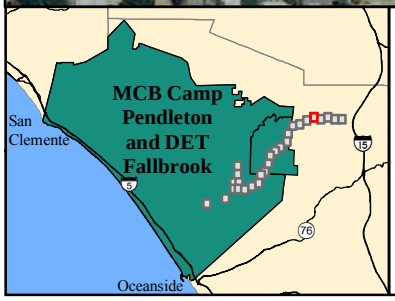
- Permanent Impact Area
- Temporary Impact Area
- Alternative 1 and 2
- Alternative 1

XYZ Plant Community Code

Figure C1-5
Plant Communities for Alternatives 1 and 2

0 200 400 Feet
0 100 200 Meters

Sources: San Diego County 2010; MCB Camp Pendleton 2012; DET Fallbrook 2012



Legend

Permanent Impact Area

Temporary Impact Area

Alternative 1 and 2

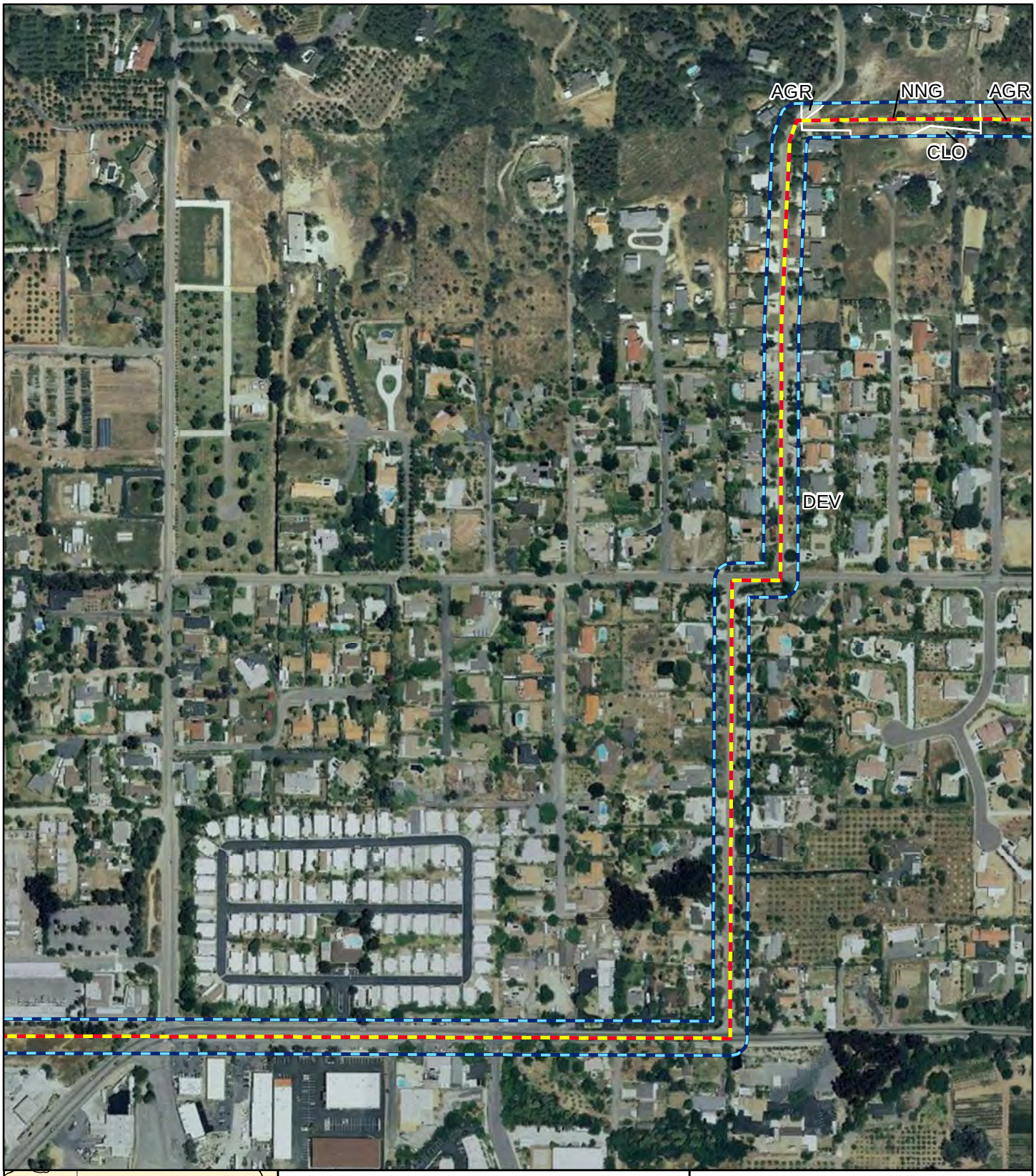
XYZ Plant Community Code

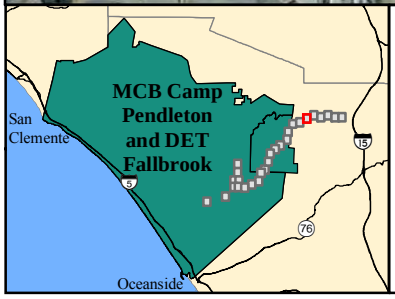
Figure C1-6
Plant Communities for
Alternatives 1 and 2

0 200 400 Feet

0 100 200 Meters

Sources: San Diego County 2010;
MCB Camp Pendleton 2012; DET Fallbrook 2012





Legend

Permanent Impact Area

Temporary Impact Area

Alternative 1 and 2

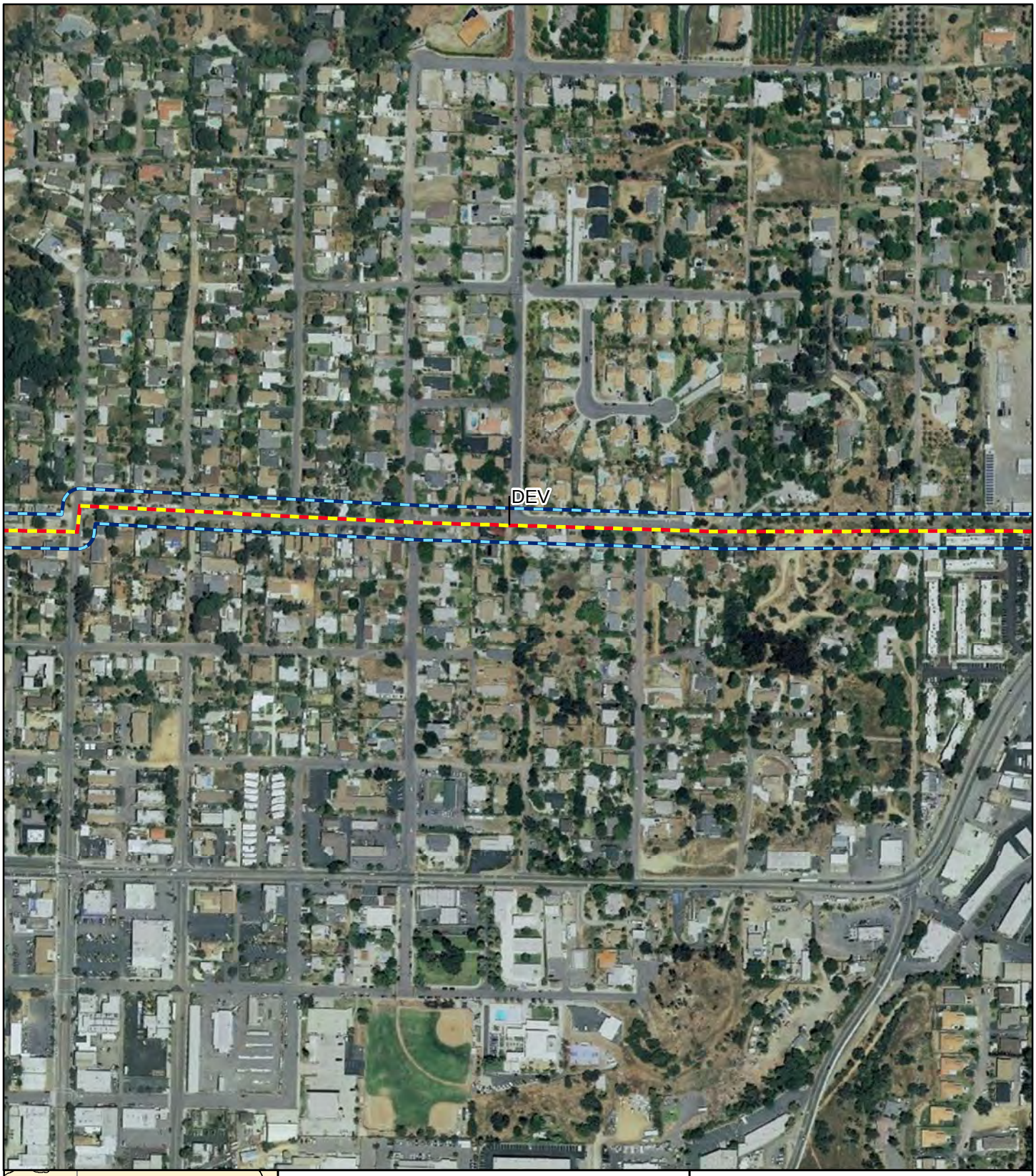
XYZ Plant Community Code

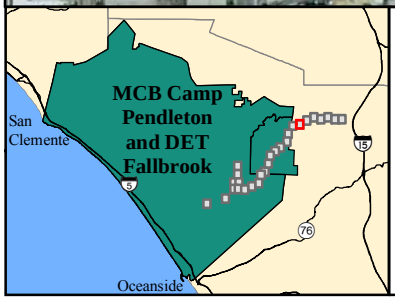
Figure C1-7
Plant Communities for Alternatives 1 and 2

0 200 400 Feet

0 100 200 Meters

Sources: San Diego County 2010; MCB Camp Pendleton 2012; DET Fallbrook 2012





Legend

Permanent Impact Area

Temporary Impact Area

Alternative 1 and 2

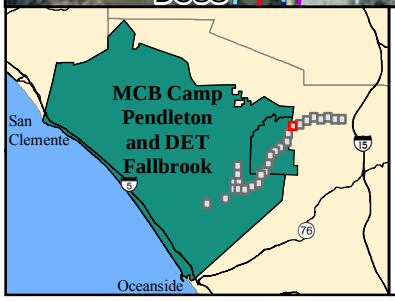
XYZ Plant Community Code

Figure C1-8
Plant Communities for
Alternatives 1 and 2

0 200 400 Feet

0 100 200 Meters

Sources: San Diego County 2010;
MCB Camp Pendleton 2012; DET Fallbrook 2012



Legend

- Permanent Impact Area
- Temporary Impact Area
- Alternative 1 and 2
- DET Fallbrook Boundary
- XYZ Plant Community Code

Figure C1-9
Plant Communities for Alternatives 1 and 2

0 200 400 Feet
0 100 200 Meters

Sources: San Diego County 2010; MCB Camp Pendleton 2012; DET Fallbrook 2012

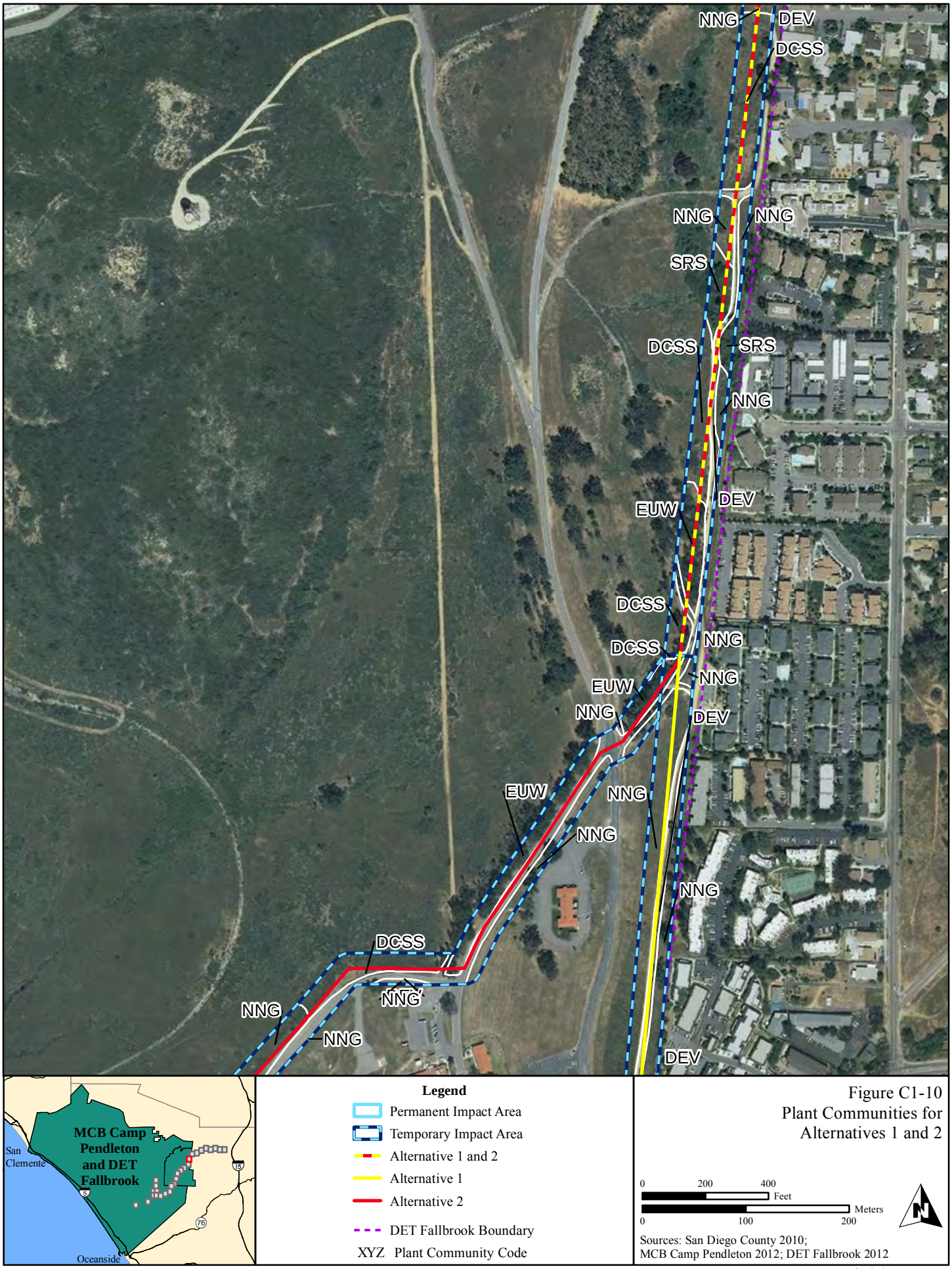
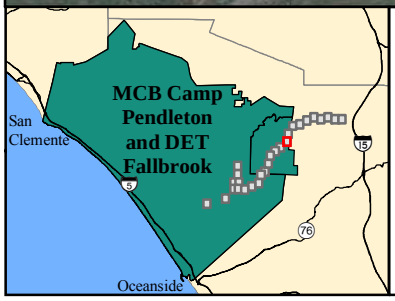


Figure C1-10
Plant Communities for Alternatives 1 and 2

Sources: San Diego County 2010; MCB Camp Pendleton 2012; DET Fallbrook 2012



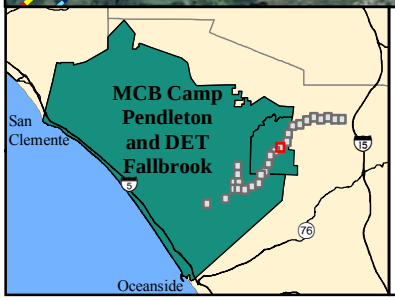
Legend

- Permanent Impact Area
- Temporary Impact Area
- Alternative 1 and 2
- Alternative 1
- Alternative 2
- DET Fallbrook Boundary
- XYZ Plant Community Code

Figure C1-11
Plant Communities for
Alternatives 1 and 2

0 200 400 Feet
0 100 200 Meters

Sources: San Diego County 2010;
MCB Camp Pendleton 2012; DET Fallbrook 2012



Legend

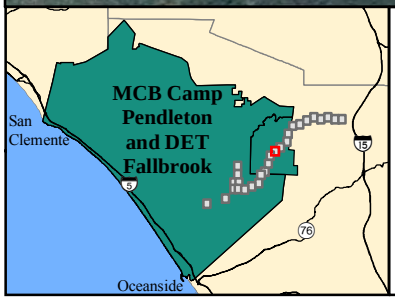
- Permanent Impact Area
- Temporary Impact Area
- Alternative 1 and 2
- Alternative 1
- Alternative 2

XYZ Plant Community Code

Figure C1-12
Plant Communities for Alternatives 1 and 2

0 200 400 Feet
0 100 200 Meters

Sources: San Diego County 2010; MCB Camp Pendleton 2012; DET Fallbrook 2012



Legend

Permanent Impact Area

Temporary Impact Area

Alternative 1 and 2

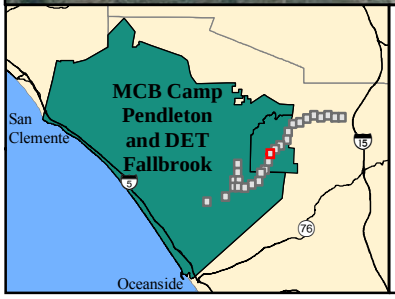
XYZ Plant Community Code

Figure C1-13
Plant Communities for Alternatives 1 and 2

0 200 400 Feet

0 100 200 Meters

Sources: San Diego County 2010; MCB Camp Pendleton 2012; DET Fallbrook 2012



Legend

Permanent Impact Area

Temporary Impact Area

Alternative 1 and 2

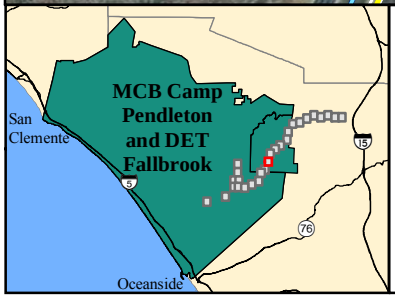
XYZ Plant Community Code

Figure C1-14
Plant Communities for Alternatives 1 and 2

0 200 400 Feet

0 100 200 Meters

Sources: San Diego County 2010;
MCB Camp Pendleton 2012; DET Fallbrook 2012



Legend

Permanent Impact Area

Temporary Impact Area

Alternative 1 and 2

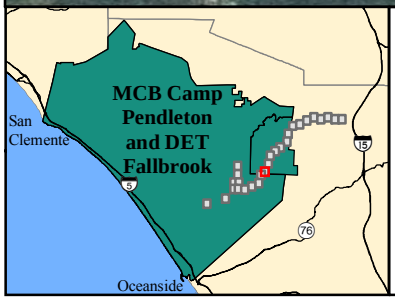
XYZ Plant Community Code

Figure C1-15
Plant Communities for Alternatives 1 and 2

0 200 400 Feet

0 100 200 Meters

Sources: San Diego County 2010; MCB Camp Pendleton 2012; DET Fallbrook 2012



Legend

Permanent Impact Area

Temporary Impact Area

Alternative 1 and 2

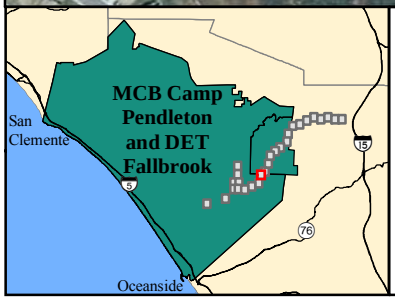
XYZ Plant Community Code

Figure C1-16
Plant Communities for Alternatives 1 and 2

0 200 400 Feet

0 100 200 Meters

Sources: San Diego County 2010; MCB Camp Pendleton 2012; DET Fallbrook 2012



Legend

Permanent Impact Area

Temporary Impact Area

Alternative 1 and 2

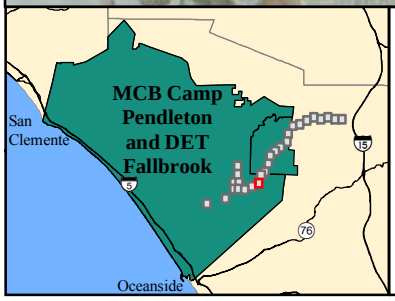
XYZ Plant Community Code

Figure C1-17
Plant Communities for Alternatives 1 and 2

0 200 400 Feet

0 100 200 Meters

Sources: San Diego County 2010; MCB Camp Pendleton 2012; DET Fallbrook 2012



Legend

Permanent Impact Area

Temporary Impact Area

Alternative 1 and 2

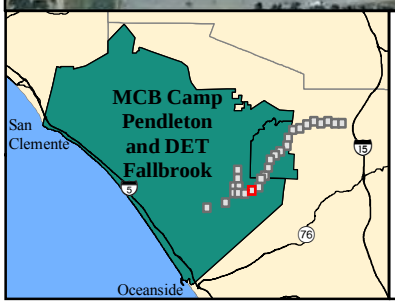
XYZ Plant Community Code

Figure C1-18
Plant Communities for Alternatives 1 and 2

0 200 400 Feet

0 100 200 Meters

Sources: San Diego County 2010; MCB Camp Pendleton 2012; DET Fallbrook 2012



Legend

Permanent Impact Area

Temporary Impact Area

Alternative 1 and 2

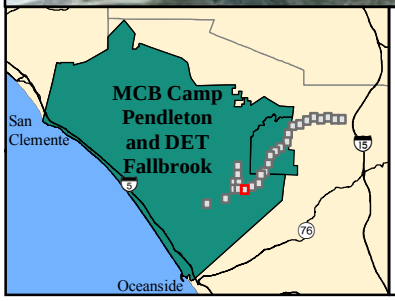
XYZ Plant Community Code

Figure C1-19
Plant Communities for Alternatives 1 and 2

0 200 400 Feet

0 100 200 Meters

Sources: San Diego County 2010; MCB Camp Pendleton 2012; DET Fallbrook 2012



Legend

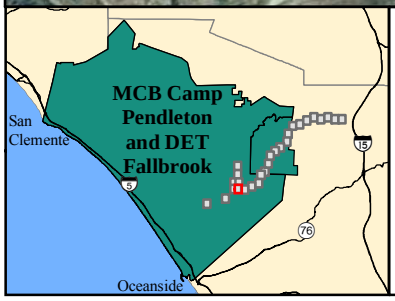
- Permanent Impact Area
- Temporary Impact Area
- Alternative 1 and 2
- Alternative 1
- Alternative 2

XYZ Plant Community Code

Figure C1-20
Plant Communities for Alternatives 1 and 2

0 200 400 Feet
0 100 200 Meters

Sources: San Diego County 2010; MCB Camp Pendleton 2012; DET Fallbrook 2012



Legend

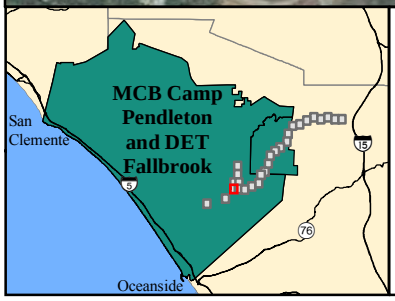
- Permanent Impact Area
- Temporary Impact Area
- Alternative 1 and 2
- Alternative 1
- Alternative 2

XYZ Plant Community Code

Figure C1-21
Plant Communities for Alternatives 1 and 2

0 200 400 Feet
0 100 200 Meters

Sources: San Diego County 2010; MCB Camp Pendleton 2012; DET Fallbrook 2012



Legend

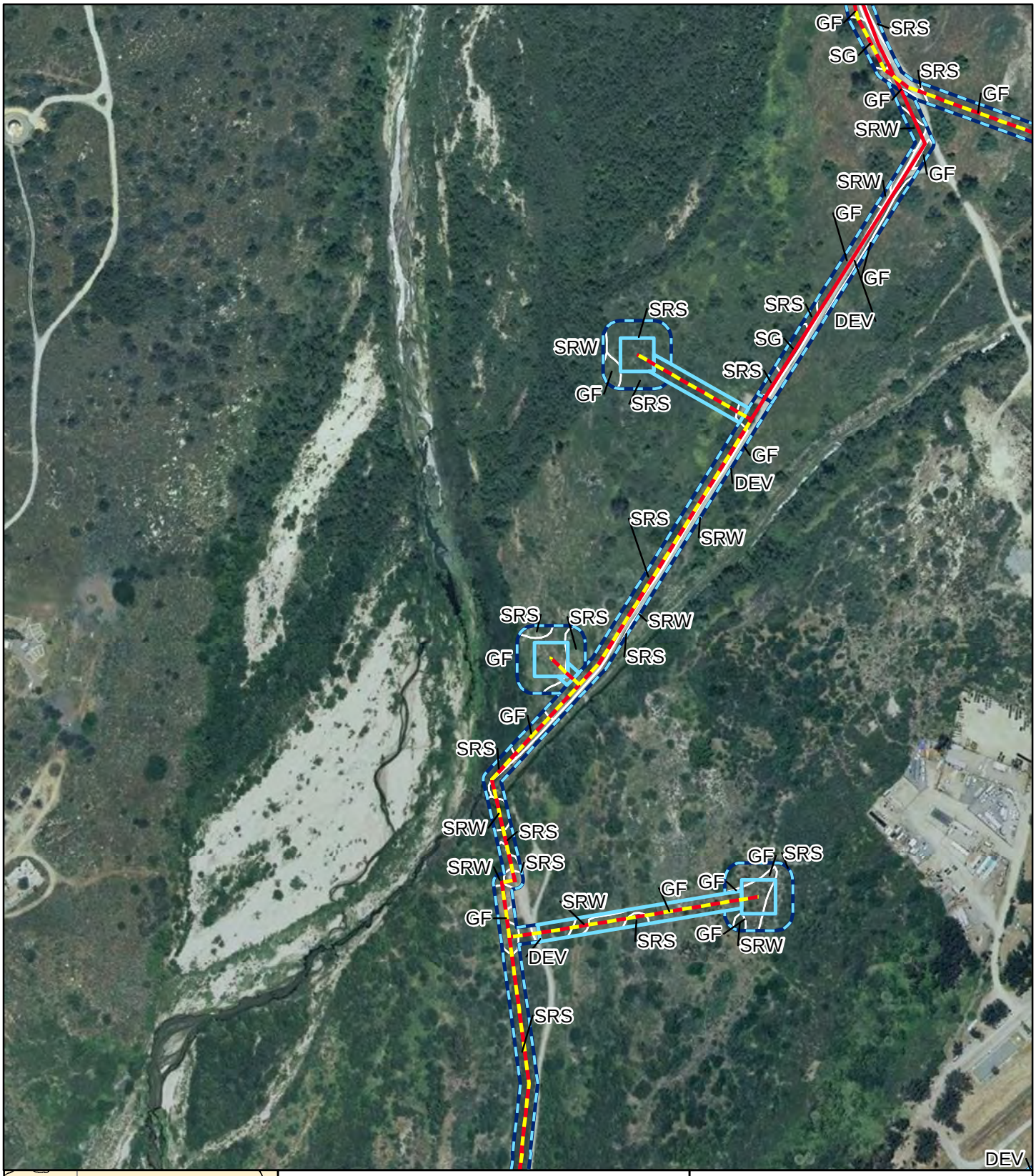
- Permanent Impact Area
- Temporary Impact Area
- Alternative 1 and 2
- Alternative 1
- Alternative 2

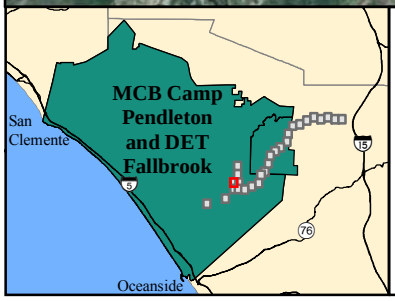
XYZ Plant Community Code

Figure C1-22
Plant Communities for Alternatives 1 and 2

0 200 400 Feet
0 100 200 Meters

Sources: San Diego County 2010; MCB Camp Pendleton 2012; DET Fallbrook 2012





Legend

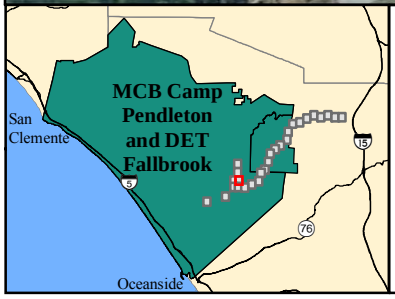
- Permanent Impact Area
- Temporary Impact Area
- Alternative 1 and 2
- Alternative 2

XYZ Plant Community Code

Figure C1-23
Plant Communities for Alternatives 1 and 2

0 200 400 Feet
0 100 200 Meters

Sources: San Diego County 2010; MCB Camp Pendleton 2012; DET Fallbrook 2012



Legend

- Permanent Impact Area
- Temporary Impact Area
- Alternative 1 and 2
- Alternative 1
- Alternative 2

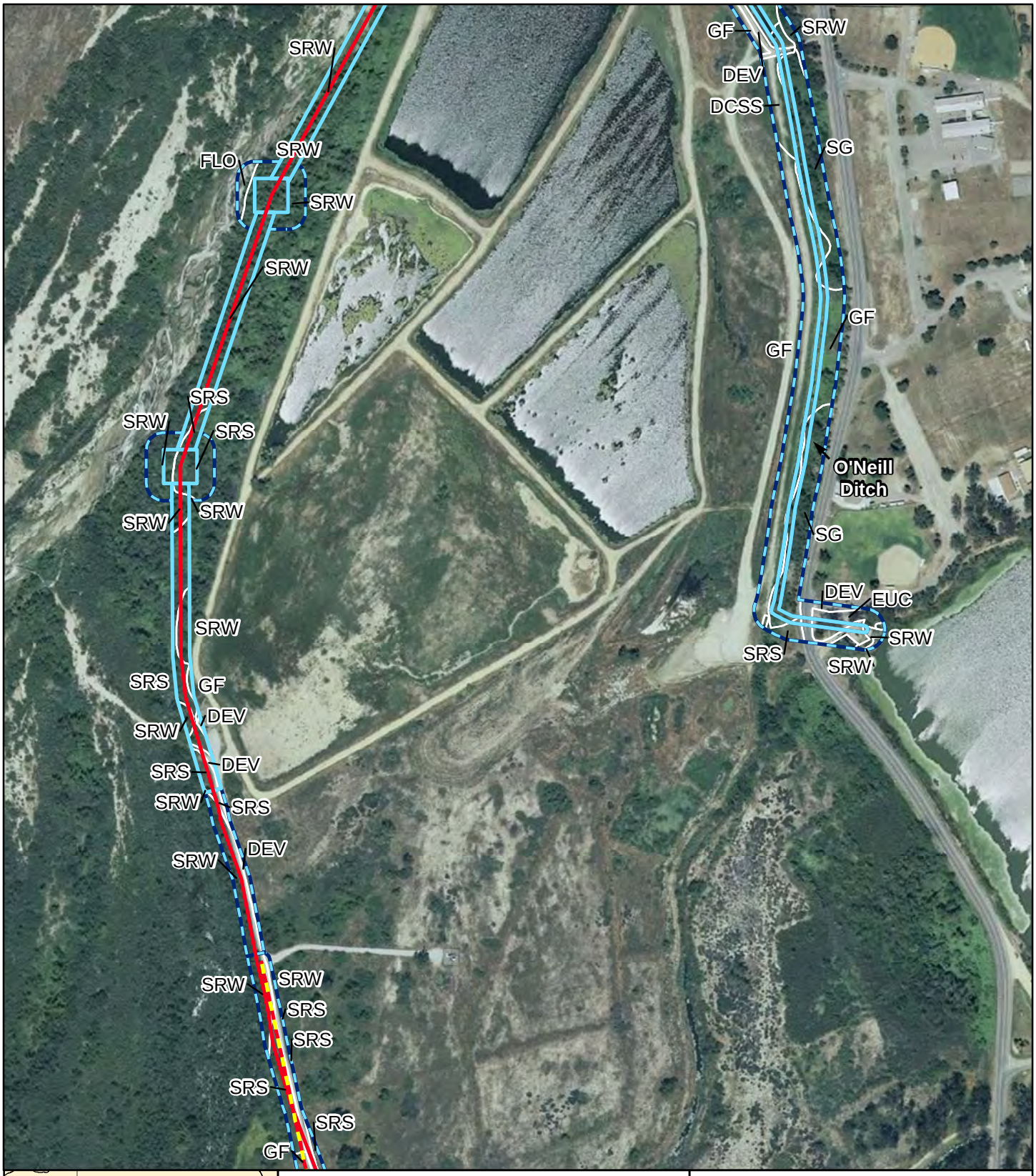
XYZ Plant Community Code

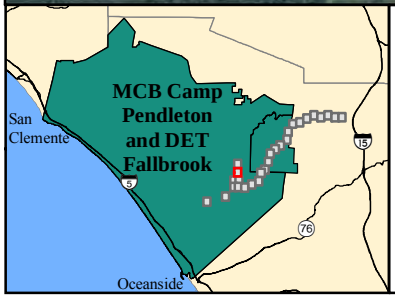
Figure C1-24
Plant Communities for Alternatives 1 and 2

0 200 400 Feet

0 100 200 Meters

Sources: San Diego County 2010; MCB Camp Pendleton 2012; DET Fallbrook 2012





Legend

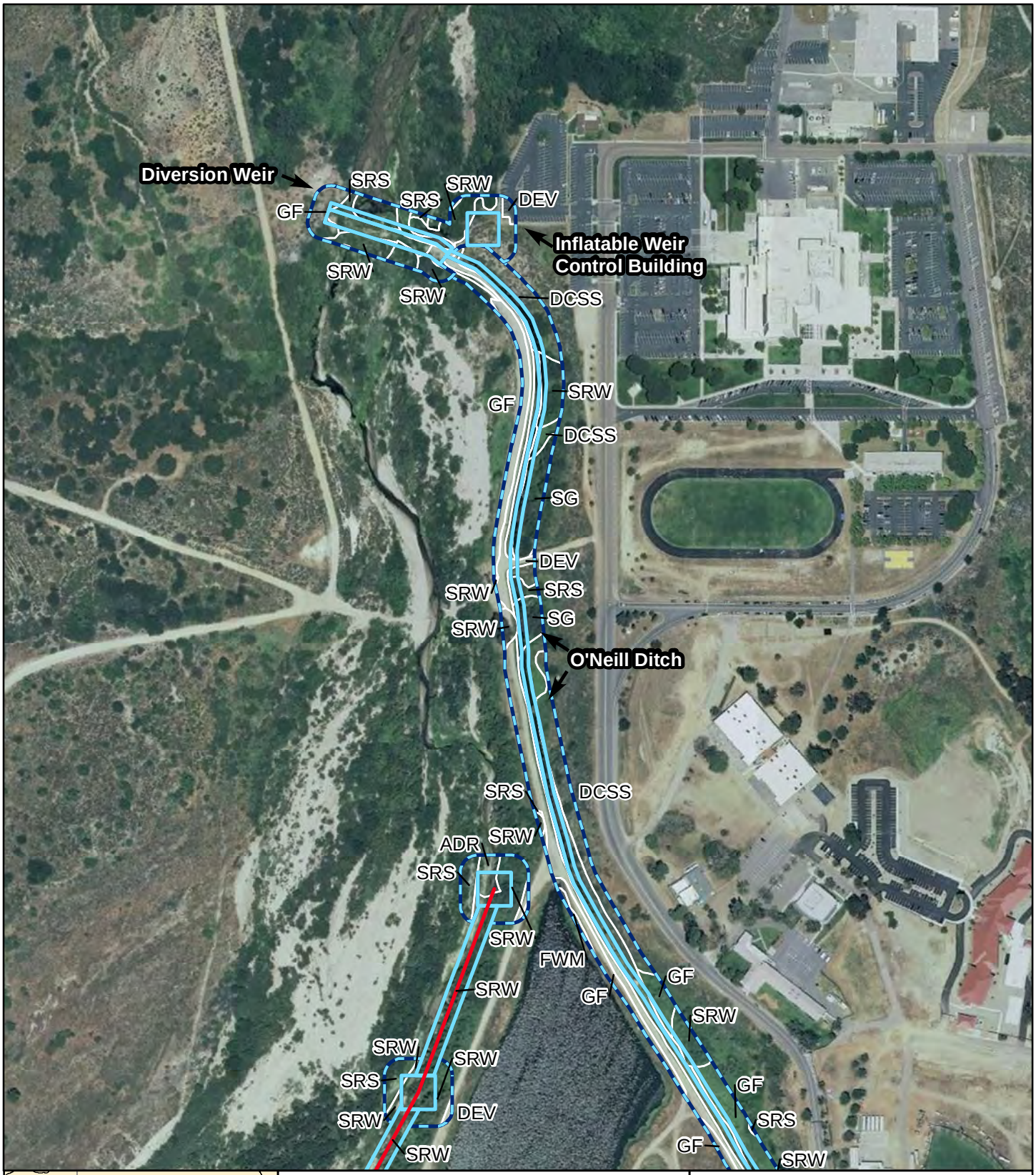
- Permanent Impact Area
- Temporary Impact Area
- Alternative 1 and 2
- Alternative 2

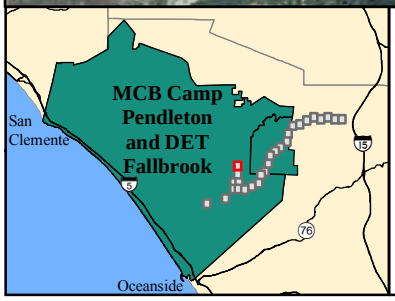
XYZ Plant Community Code

Figure C1-25
Plant Communities for Alternatives 1 and 2

0 200 400 Feet
0 100 200 Meters

Sources: San Diego County 2010; MCB Camp Pendleton 2012; DET Fallbrook 2012





Legend

Permanent Impact Area

Temporary Impact Area

Alternative 2

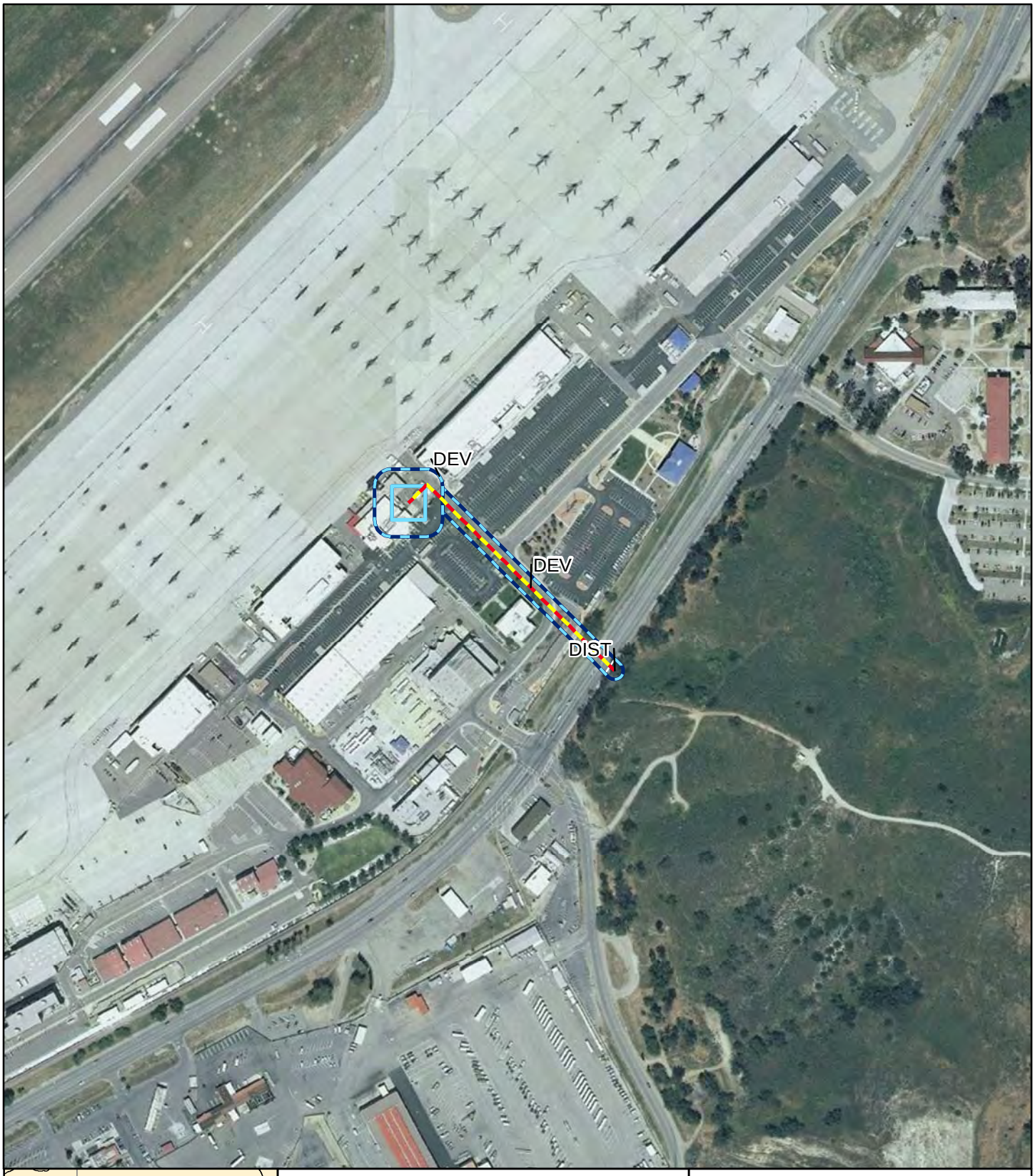
XYZ Plant Community Code

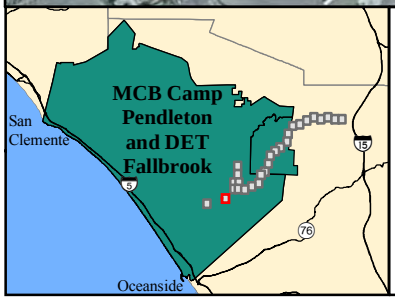
Figure C1-26
Plant Communities for
Alternatives 1 and 2

0 200 400 Feet

0 100 200 Meters

Sources: San Diego County 2010;
MCB Camp Pendleton 2012; DET Fallbrook 2012





Legend

Permanent Impact Area

Temporary Impact Area

Alternative 1 and 2

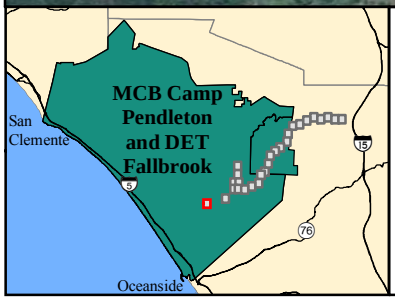
XYZ Plant Community Code

Figure C1-27
Plant Communities for Alternatives 1 and 2

0 200 400 Feet

0 100 200 Meters

Sources: San Diego County 2010; MCB Camp Pendleton 2012; DET Fallbrook 2012



Legend

Permanent Impact Area

Temporary Impact Area

Alternative 1 and 2

XYZ Plant Community Code

Figure C1-28
Plant Communities for Alternatives 1 and 2

0 200 400 Feet

0 100 200 Meters

Sources: San Diego County 2010; MCB Camp Pendleton 2012; DET Fallbrook 2012

Threatened, Endangered, and Sensitive Wildlife Species Figures

[This Page Intentionally Left Blank]

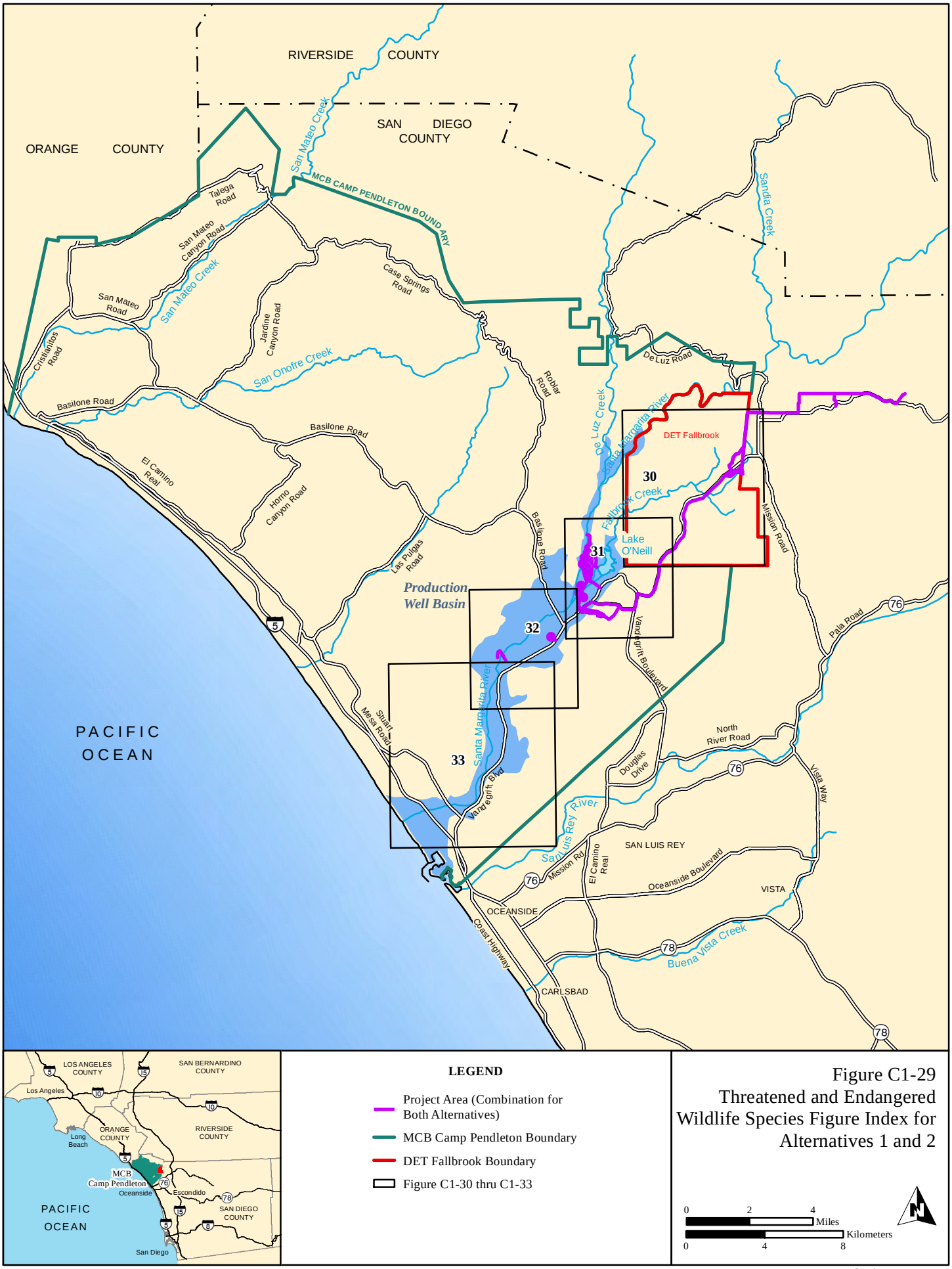


Figure C1-29
Threatened and Endangered Wildlife Species Figure Index for Alternatives 1 and 2

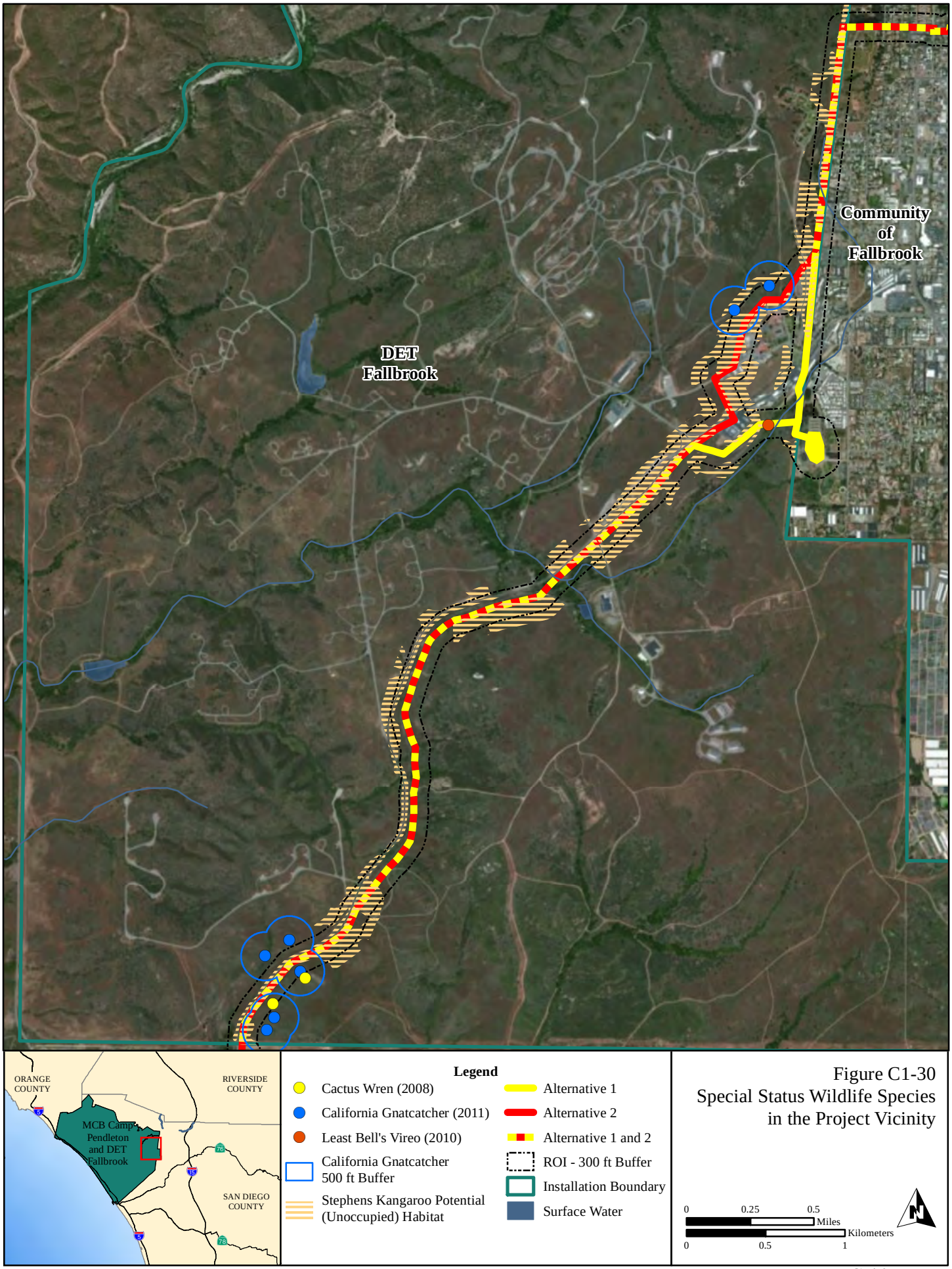


Figure C1-30
Special Status Wildlife Species
in the Project Vicinity

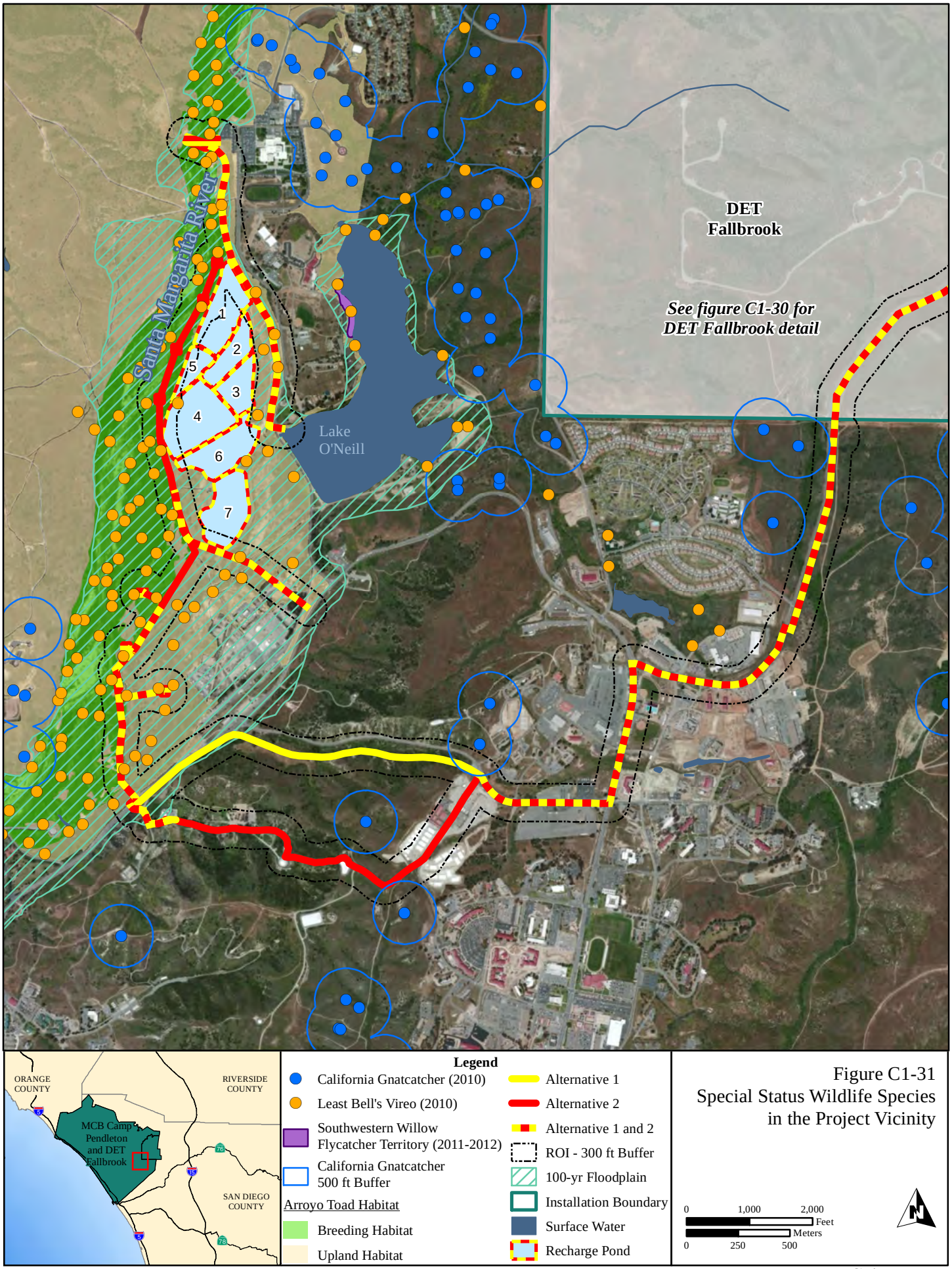


Figure C1-31
Special Status Wildlife Species
in the Project Vicinity

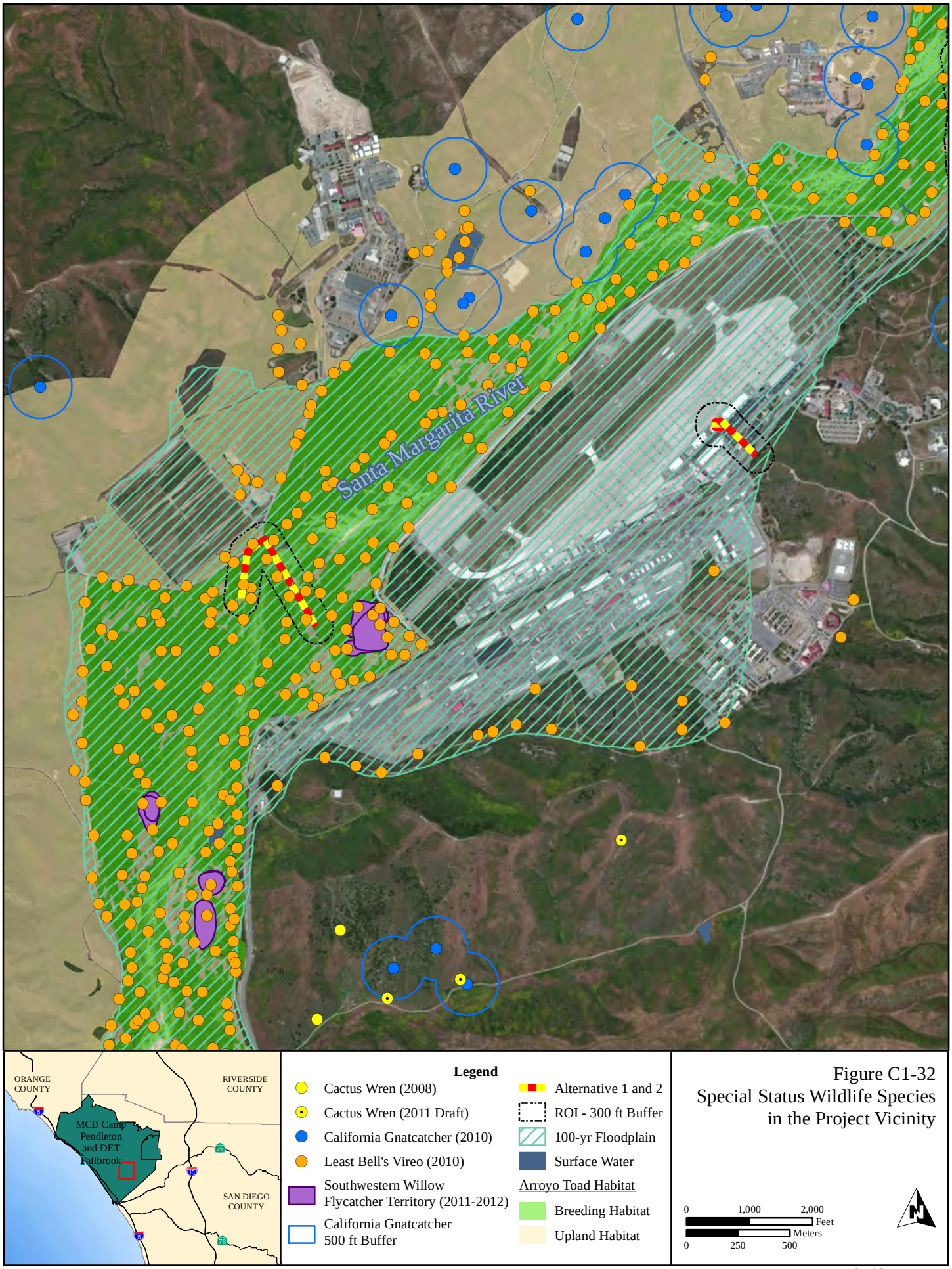


Figure C1-32
Special Status Wildlife Species in the Project Vicinity

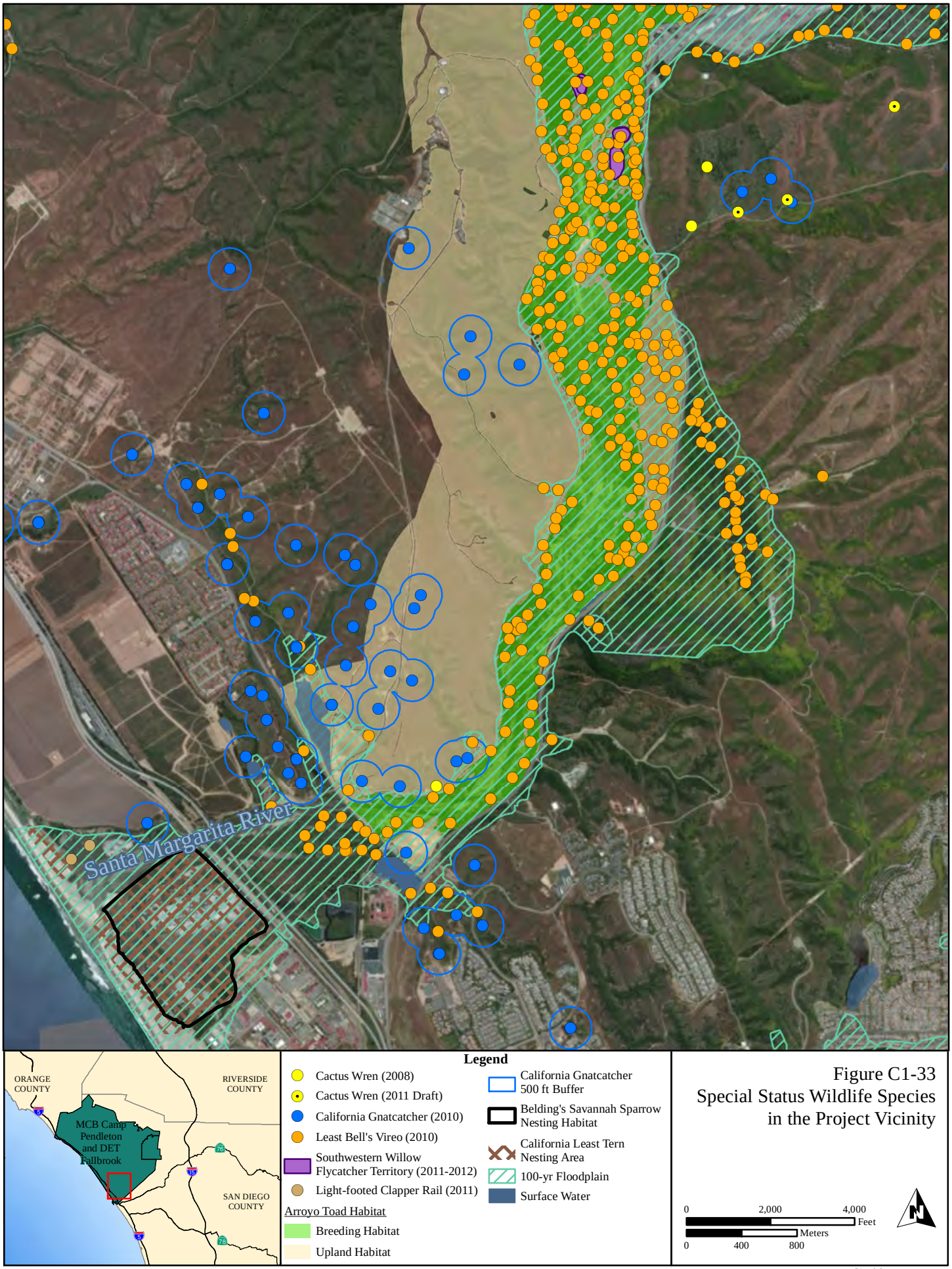


Figure C1-33
Special Status Wildlife Species in the Project Vicinity

[This Page Intentionally Left Blank]

Appendix C-2

OSMZ

[This Page Intentionally Left Blank]

Final Botanical Survey Report

Santa Margarita River Conjunctive Use Project

Open Space Management Zone
Fallbrook Public Utility District, California

Prepared by TEC Inc.
514 Via de la Valle, Suite 308
Solana Beach, CA 92075

August 2008

INTRODUCTION

This report documents the results of botanical surveys conducted between March and July, 2008, of a proposed 1,384-acre Open Space Management Zone (OSMZ) in Fallbrook, San Diego County, California. The designation of the OSMZ is proposed as part of the Santa Margarita River (SMR) Conjunctive Use Project (CUP) currently under review by the U.S. Bureau of Reclamation, Marine Corps Base Camp Pendleton, and the Fallbrook Public Utility District (FPUD). The OSMZ is owned by the FPUD and is at the site of the formerly proposed Fallbrook Dam and Reservoir. The OSMZ would be included in the CUP to help protect water quality and allow for passive recreation use. Mitigation, if required for other elements of the CUP, could also be incorporated into the OSMZ.

The scope of the botanical surveys was to conduct three complete surveys of the OSMZ, with surveys approximately six weeks apart in order to overlap the appropriate season(s) for detecting all potentially occurring rare plants. Federally and state-listed plant species, as well as California Native Plant Society (CNPS) list 1B through 4 species were searched for.

METHODOLOGY

TEC conducted database searches and a three-visit botanical inventory for the 1,384-acre OSMZ in accordance with *Guidelines for Conducting and Reporting Botanical Inventories for Federally listed, Proposed and Candidate Plants* (U.S. Fish and Wildlife Service 1996), *Guidelines for Assessing the Effects of Proposed Projects on Rare, Threatened, or Endangered Plants and Natural Communities* (California Department of Fish and Game 2000), and *Botanical Survey Guidelines of the California Native Plant Society* (CNPS) (CNPS 2001). Surveys were conducted at the rate of approximately 100 acres per person per day. Thus, it required 14 person-days for each of the three surveys (42 person-days total).

The 1,384-acre OSMZ is within the Fallbrook and Temecula quadrangles. TEC Inc. ordered and reviewed California Department of Fish and Game (CDFG) California Natural Diversity Database (CNDDB) data for rare, threatened, endangered, and sensitive animals, plants, and natural communities for the Fallbrook and Temecula quadrangles. San Diego County Association of Governments (SANDAG 1995) vegetation mapping was used to create vegetation maps of the OSMZ. These maps are provided as Figures 1 through 9 at the end of this report.

Plant surveys were conducted throughout the 1,384-acre OSMZ. However, some steep chaparral slopes and dense riparian areas were inaccessible and Urban/Developed areas were not surveyed. TEC and TEC-subcontractor biologists surveyed for all potentially occurring federally and state-listed and proposed species and CNPS list 1B through 4 species. List 1B species are rare throughout their range and occur primarily within California. List 2 species are rare in California, but more widespread outside the State. List 3 species appear to be rare but require more information to determine appropriate rank. List 4 species have restricted distribution within California. Biologists Carolyn Martus (independent consultant) and Margie Mulligan (San Diego Natural History Museum), along with Melissa Tu of TEC, conducted the surveys. Surveys were conducted from March through July 2008. The first survey was conducted from March 17 through April 4, the second survey was conducted from April 28 through May 16, and the third survey was conducted form June 9 through July 16, 2008.

RESULTS

At least 318 plant species, 237 of which are native, were documented within the OSMZ during the surveys. Appendix A includes the list of all plant species encountered. The majority of the OSMZ is native vegetation except for some avocado groves and houses that are within the edges of the footprint,

and a few roads that go though the OSMZ. There are heavily used dirt trails through the OSMZ especially along the SMR. People were observed fishing and people and dogs were observed swimming at the convergence of Sandia Creek and the SMR. The steep hillsides of the OSMZ are dominated by dense chaparral habitat with small patches of coastal sage scrub. Along Sandia Creek and the SMR are dense are of riparian forests dominated by willows (*Salix* sp.), sycamores (*Platanus racemosa)*, and cottonwoods (*Populus fremontii ssp. fremontii)*. Areas along the south side of the SMR are dominated by dense coast live oak woodland. Portions of the OSMZ near the Sandia Creek and SMR burned during the October 2003 wildfire and large sections of the northeastern section of the OSMZ burned during the October 2007 wildfire. The chaparral habitat which burned in 2003 is recovering well. The northeastern section which burned in 2007 was dominated by California poppies (*Eschscholzia californica)* and *Phacelia* species during the spring. Photographs of the OSMZ, filed by date, are contained on a separate CD.

Rare plant species observed during the plant surveys are shown in Table 1 and Figures 2 through 9. No state or federally listed plant species were found during the plant surveys; however, five species of CNPS listed species were documented. Appendix B includes California Natural Diversity Database (CNDDB) forms and photographic documentation of rare plant species. Each rare plant is discussed below.

Table 1. Rare Plants Documented in the OSMZ

Common Name	Scientific Name	Family	Federal/ State/CNPS Status*	Approximate Population Size	Location on Figures
Rainbow Manzanita	*Arctostaphylos rainbowensis*	Ericaceae	1B.1	341	Figures 2-6
Chaparral sand-verbena	*Abronia villosa* var. *aurita*	Nyctaginaceae	1B.1	927	Figures 4-7
Fish's Milkwort	*Polygala cornuta* var. *fishiae*	Polygalaceae	4.3	2,085	Figures 7-8
Ocellated Humboldt lily	*Lilium humboldtii* var. *ocellatum*	Liliaceae	4.2	3	Figure 6
Engelmann Oak	*Quercus engelmannii*	Fagaceae	4.2	Undetermined	Not mapped

* California Native Plant Society List (CNPS) List:

1B - Plants considered rare or endangered in California and elsewhere
2 - Plants considered rare or endangered in California but more common elsewhere.
3 - Plants for which more information is needed.
4 - Plants of limited distribution – a watch list.

CNPS Threat Codes

.1 - Seriously endangered in California (over 80% of occurrences threatened / high degree and immediacy of threat)
.2 – Fairly endangered in California (20-80% occurrences threatened)
.3 – Not very endangered in California (<20% of occurrences threatened or no current threats known)

Rainbow Manzanita (*Arctostaphylos rainbowensi*), a CNPS list 1B species, was found in chaparral habitat within the OSMZ (Figures 2-6, photo below). This species is found in chaparral habitat and is restricted to southwestern Riverside County, south of Pauba Valley, and northeastern San Diego County, north of the San Luis Rey River, between 300 and 600 meters (Keeley and Massihi 1994). The species also occurs on Camp Pendleton. The CDFG CNDDB forms listed historical records of Rainbow

Manzanita from the town of Rainbow, the Santa Rosa Plateau, and southeast of the SMR and Gavilan Mountain peak; however, there were not any listing of Rainbow Manzanita with the OSMZ (CDFG 2008). Three hundred forty one individuals of Rainbow Manzanita were documented during 2008 plant surveys in chaparral habitat on the steep slopes east and west of Sandia Creek and on the slopes north and south of the SMR (Figures 2-6). Some of areas of chaparral were too steep and thick to walk through so this species was identified through binocular scans of the hillside. It is likely that there are more small pockets of Rainbow Manzanita within the OSMZ. CNDDB forms for Rainbow Manzanita are included in Appendix B.

Chaparral Sand-Verbena (*Abronia villosa* var. *aurita)*, a CNPS list 1B.1 species, was found along sandy benches above Sandia Creek and the Santa Margarita River (SMR) (Figures 4-7, photo at right). The CDFG CNDDB forms listed a historical record of Chaparral Sand-Verbena in the SMR river ford north of Fallbrook from 1964 (CDFG 2008). Chaparral Sand-Verbena is typically found in chaparral habitat; however, within the OSMZ, Chaparral Sand-Verbena was found in sandy soil in the vicinity of the Sandia Creek and the SMR. This species was documented for the first time on Camp Pendleton during 2008, in an area of the floodplain of the SMR that may be impacted by the SMRCUP. It is reasonable to infer that the Camp Pendleton population was derived from the upstream populations within the OSMZ. Nine hundred twenty seven individuals of chaparral sand-verbena were documented during 2008 plant surveys (Figures 4-7). CNDDB forms for chaparral sand-verbena are included in Appendix B.

Fish's Milkwort (*Polygala cornuta* var. *fishiae*), a CNPS list 4.3 species, was found in coast live oak woodland south of the SMR (Figures 7-8, photo at left). Approximately 2,085 individuals were found. CNDDB forms for Fish's Milkwort are included in Appendix B.

Ocellated Humboldt lily (*Lilium humboldtii* var. *ocellatum*), a CNPS list 4.2 species, was found along the well used SMR trail in a coast live oak woodland (Figure 7, photo at right). Three individuals were observed in May and on the third survey on June 20, 2008 only two individuals were observed. This species is at risk of being collected. A CNDDB form for the ocellated Humboldt lily individuals is included in Appendix B.

Engelmann Oak (*Quercus engelmannii*), a CNPS list 4 species, was found along the north side of Sandia Creek road and at the top of a few small drainages near an avocado grove on the north side of the project area. Since Engelmann oak is relatively common in San Diego County and the CNDDB does not normally solicit information on list 4 species, no CNDDB form was prepared.

Interesting scrub oaks have been documented in the OSMZ. During 2008 plant surveys Torrey scrub oak (*Quercus* X*acutidens*) was encountered. Tom Chester has documented two scrub oak hybrid species in the area including scrub oak x Engelmann oak and Torrey oak x Engelmann oak (Chester 2003).

San Miguel savory (*Satureja chandleri*), a CNPS list 1B.2, species was documented in 1983 seven miles south of Temecula along Sandia Creek (CDFG 2008). No San Miguel savory was encountered during 2008 plant surveys.

CONCLUSIONS

Although no federally or state-listed endangered plant species were detected, the OSMZ contains native scrub and woodland plant communities that are of high quality and support a high diversity of native plant species as indicated by the plant list in Appendix A. Two CNPS list 1B (considered rare and endangered) species were found in fairly large numbers at multiple sites, reinforcing the conservation value of the OSMZ. The preservation of apparent source populations of Chaparral Sand-Verbena upstream of Camp Pendleton on the OSMZ could conceivably help to mitigate impacts, if they cannot be avoided, of the SMRCUP on the Camp Pendleton population of this species.

REFERENCES

CDFG. 2000. *Guidelines for Assessing the Effects of Proposed Projects on Rare, Threatened, or Endangered Plants and Natural Communities*

CDFG. 2008. Temecula and Fallbrook quadrangle CNDDB forms. March.

CNPS. 2001. *Botanical Survey Guidelines of the California Native Plant Society.*

CNPS. 2008. Inventory of Rare and Endangered Plants of California website. http://cnps.web.aplus.net/cgi-bin/inv/inventory.cgi

Chester, Tom. 2003 Santa Margarita Ecological Reserve: Preliminary Plant List by Trail. http://tchester.org/sd/plants/guides/smer/plant_list.html

Hickman, James C. 1993. *The Jepson Manual, Higher Plants of California*.

Keeley, J.E. and A. Massihi. 1994. *Arctostaphylos rainbowensis*, A New Burl-forming Manzanita from Northern San Diego County, California. Madrono 41(1): 1-12.

Lightner, James. 2006. *San Diego County Native Plants*.

Rebman J.R. and M.G. Simpson. 2006. *Checklist of the Vascular Plants of San Diego County, 4th Edition.*

SANDAG (San Diego County Association of Governments). 1995. San Diego region vegetation communities. GIS data layer. http://www.sandag.org/resources/maps_and_gis/gis_downloads/downloads/metadata/veg95doc.htm

U.S. Fish and Wildlife Service. 1996. *Guidelines for Conducting and Reporting Botanical Inventories for Federally listed, Proposed and Candidate Plants.*

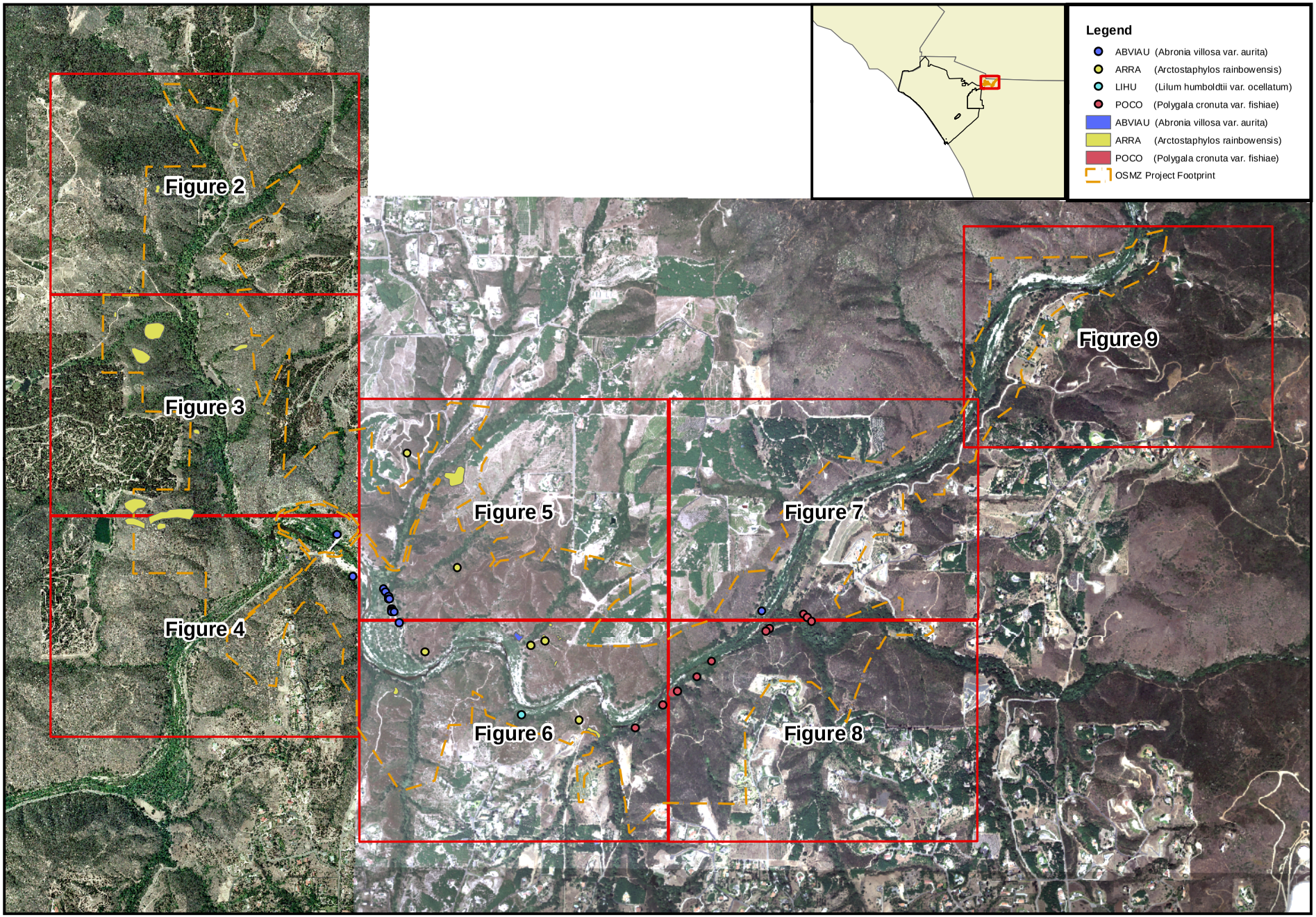
FIGURES: ATTACHED

APPENDICES

Appendix A: Plant List
Appendix B: CNDDB FORMS

PHOTOGRAPHS

Compiled on accompanying DVD



\\san-ishp\CacheRoot\CHO-CORE1\charlottesville\Solana\Projects\gis\Projects\4219-SMRCUP\OSMZ

Figure 1. OSMZ Overview for Plant Survey

2,100 1,050 0 2,100 Feet

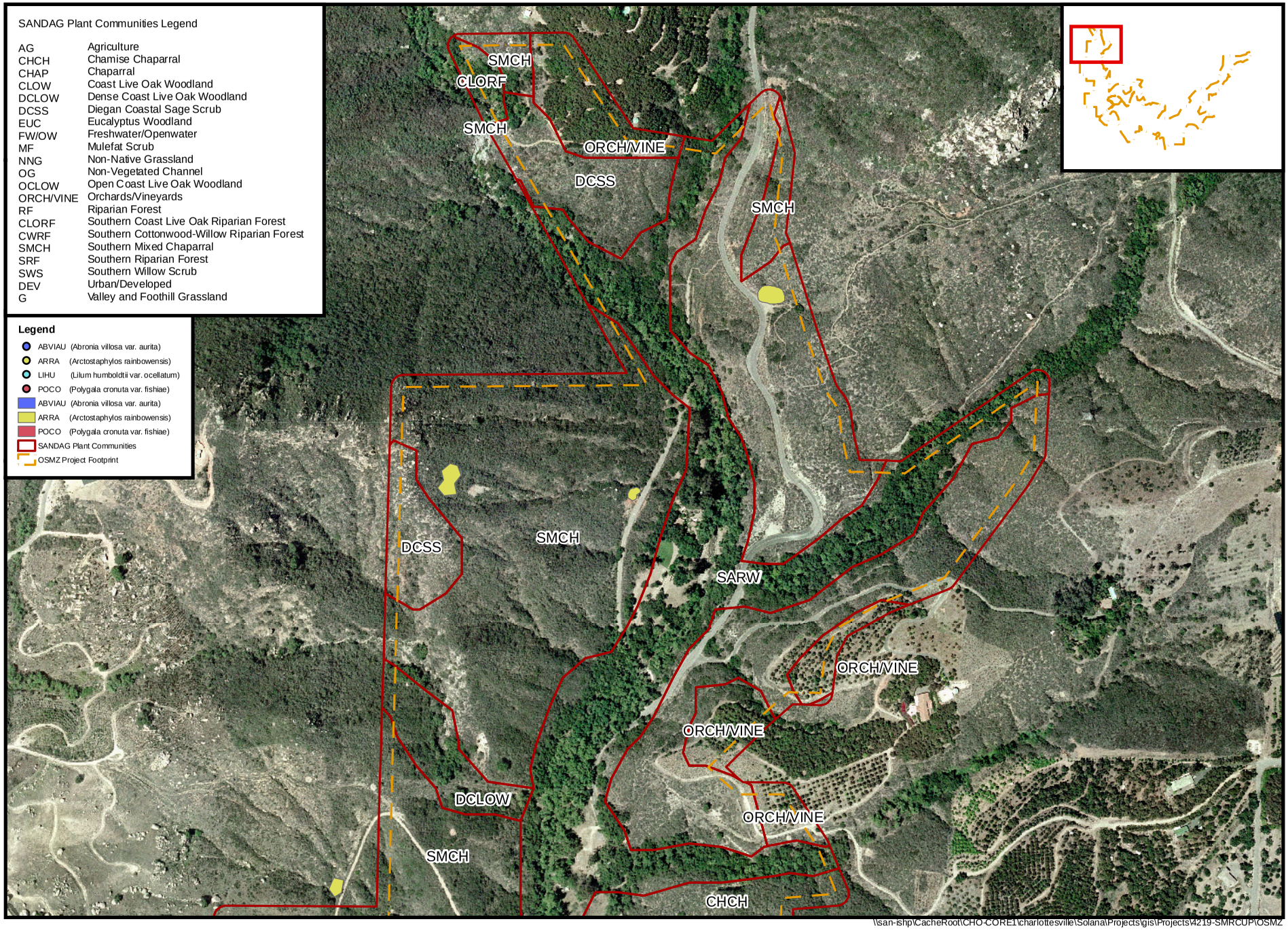


Figure 2. OSMZ Plant Survey

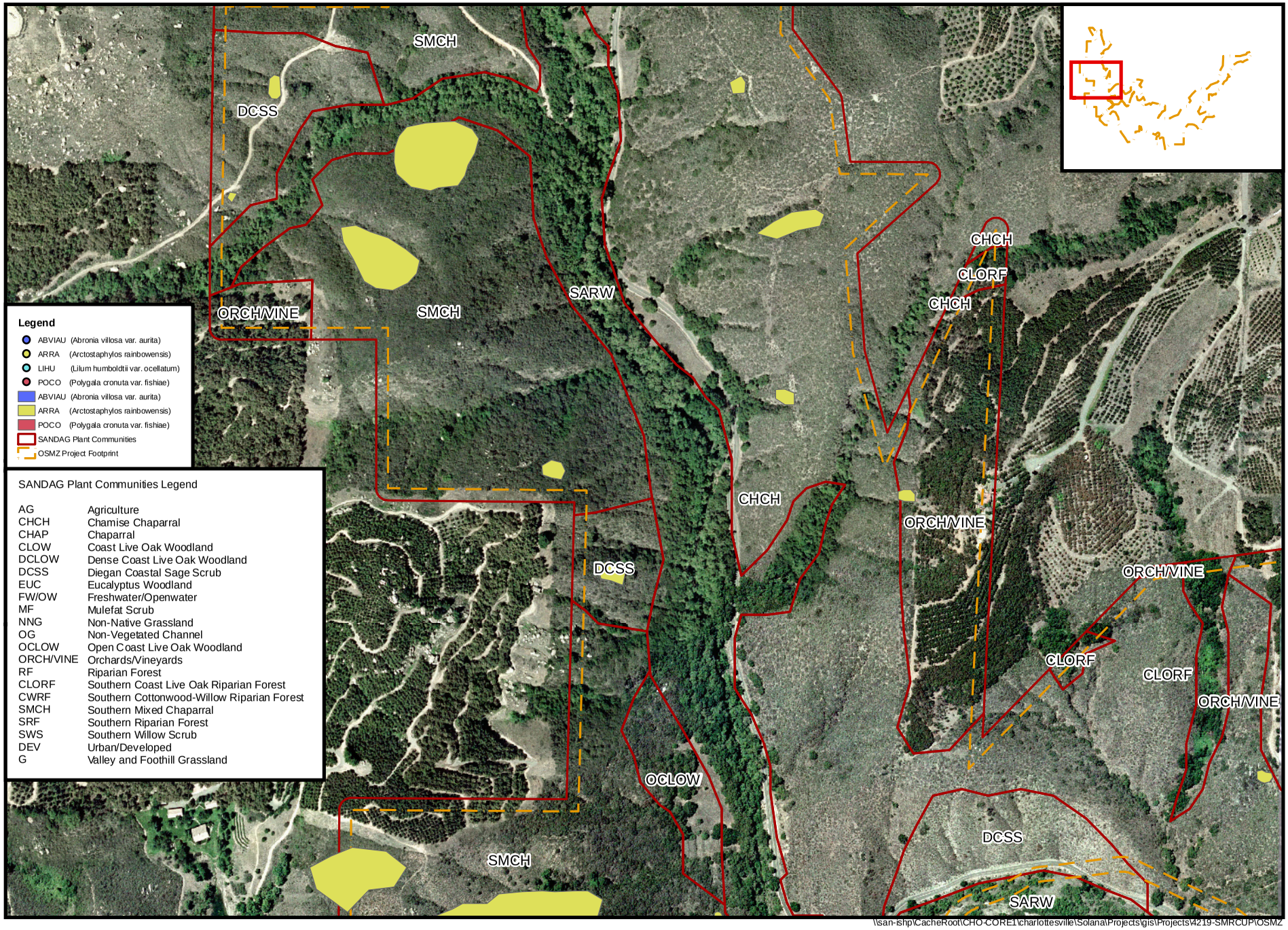


Figure 3. OSMZ Plant Survey

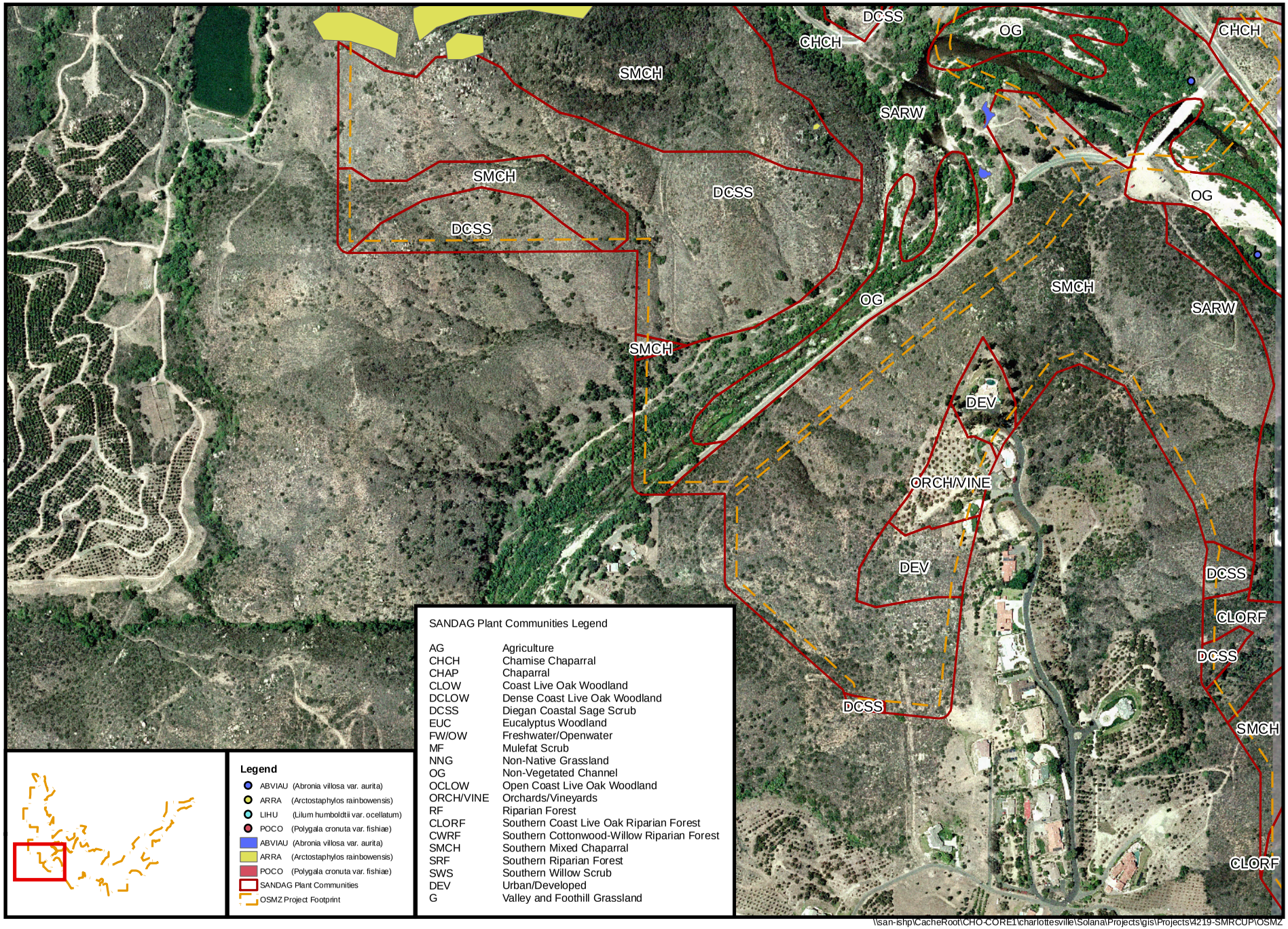
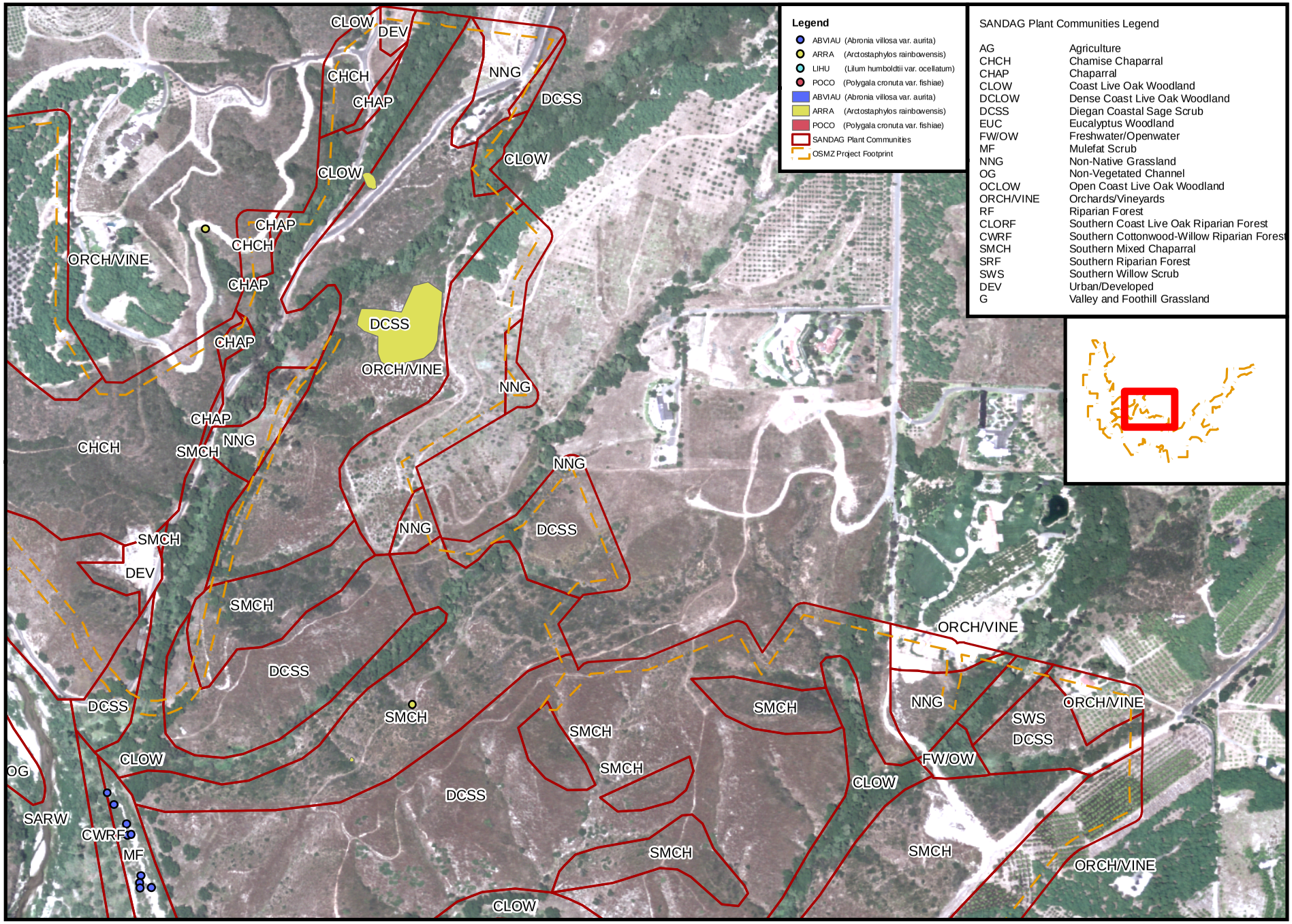


Figure 4. OSMZ Plant Survey



\\san-ishp\CacheRoot\CHO-CORE1\charlottesville\Solana\Projects\gis\Projects\4219-SMRCUP\OSMZ

Figure 5. OSMZ Plant Survey

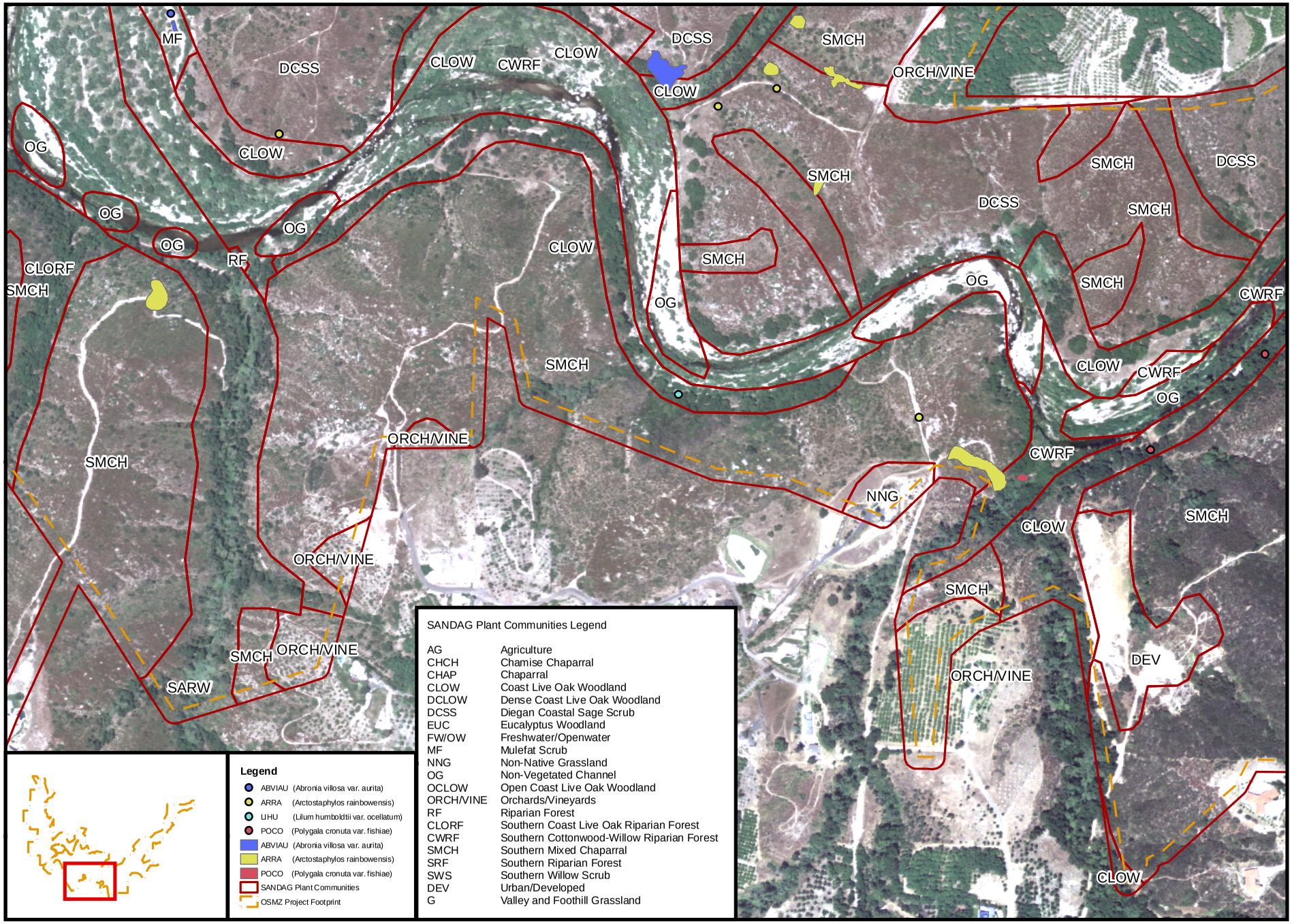


Figure 6. OSMZ Plant Survey

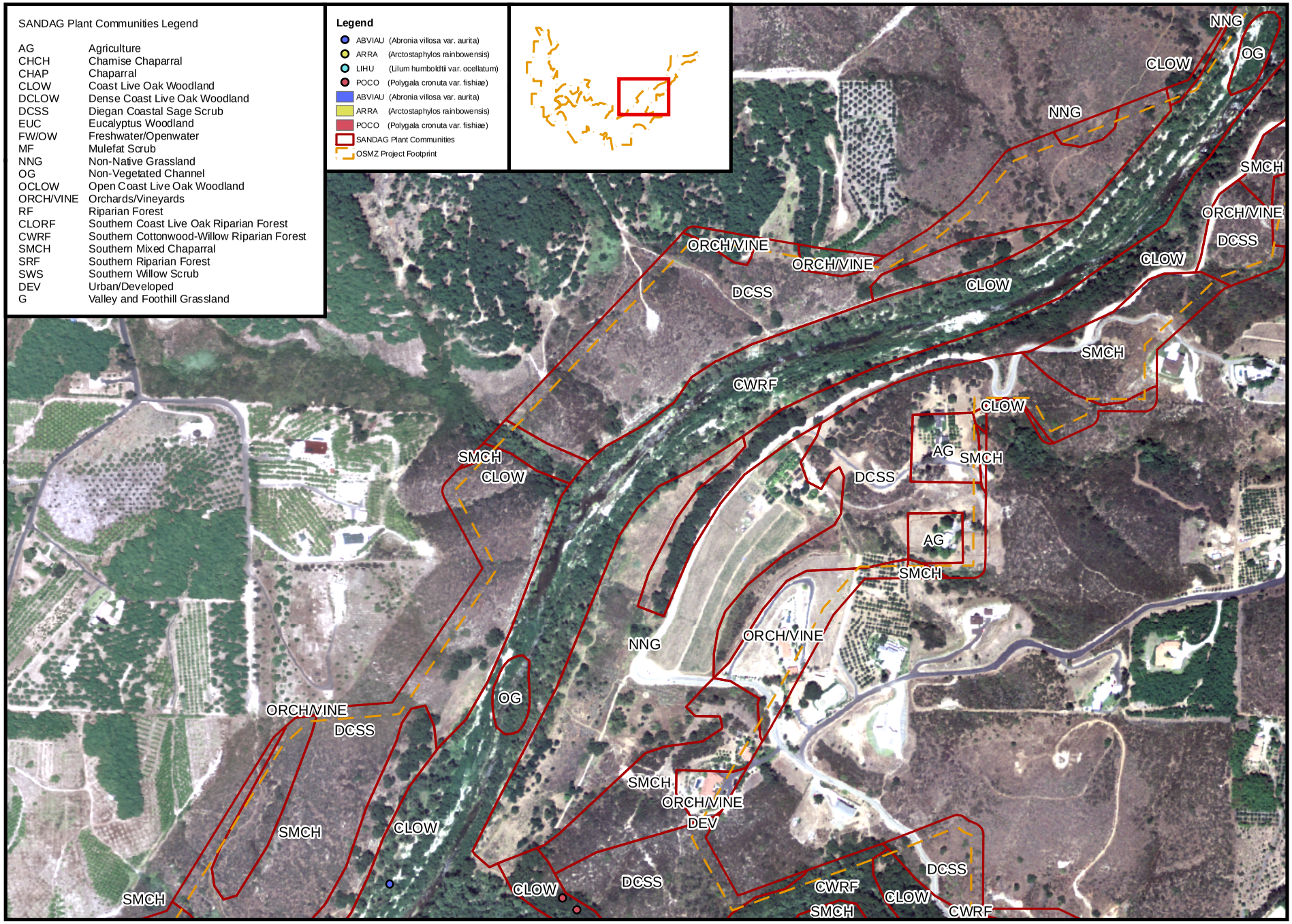


Figure 7. OSMZ Plant Survey

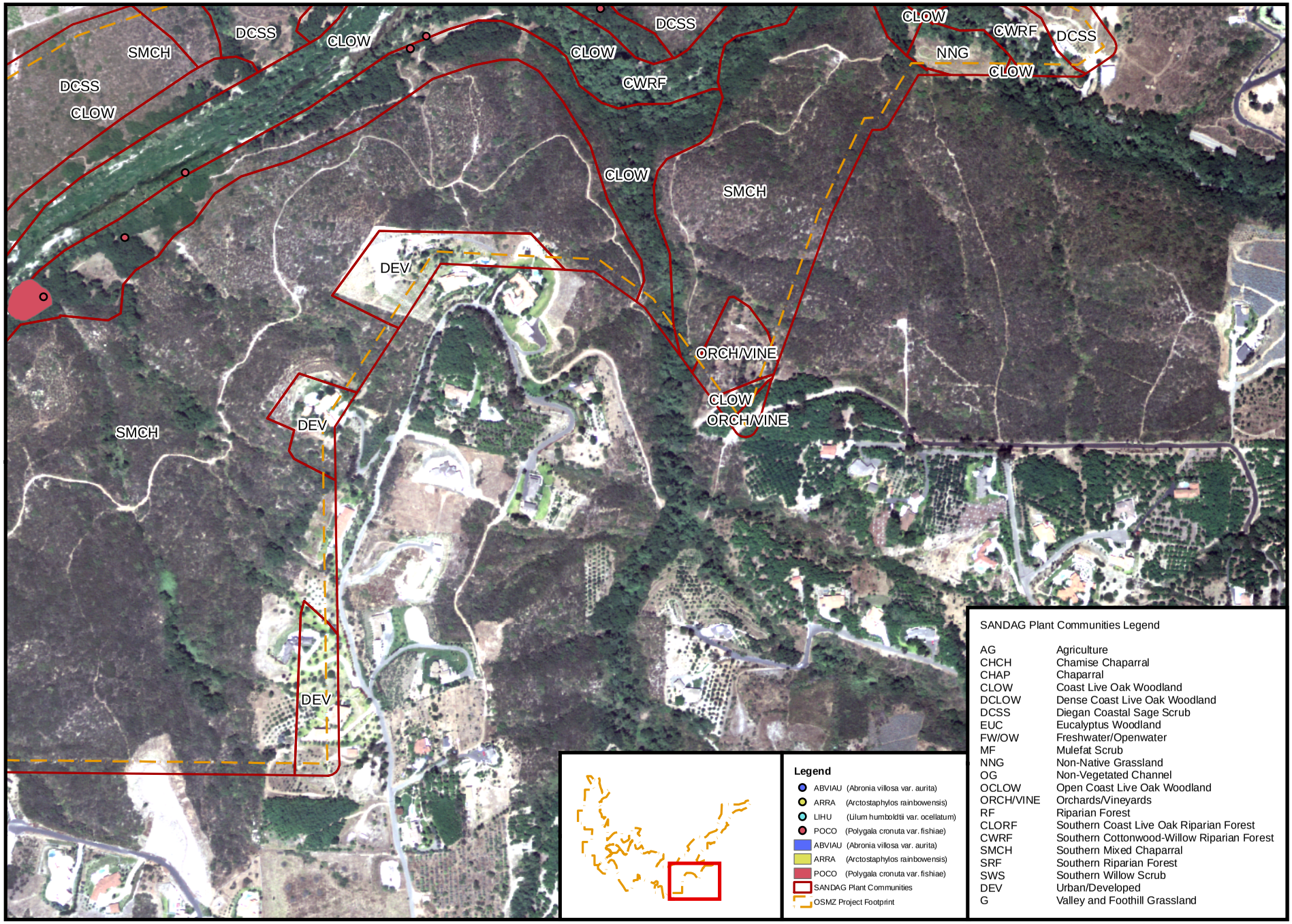


Figure 8. OSMZ Plant Survey

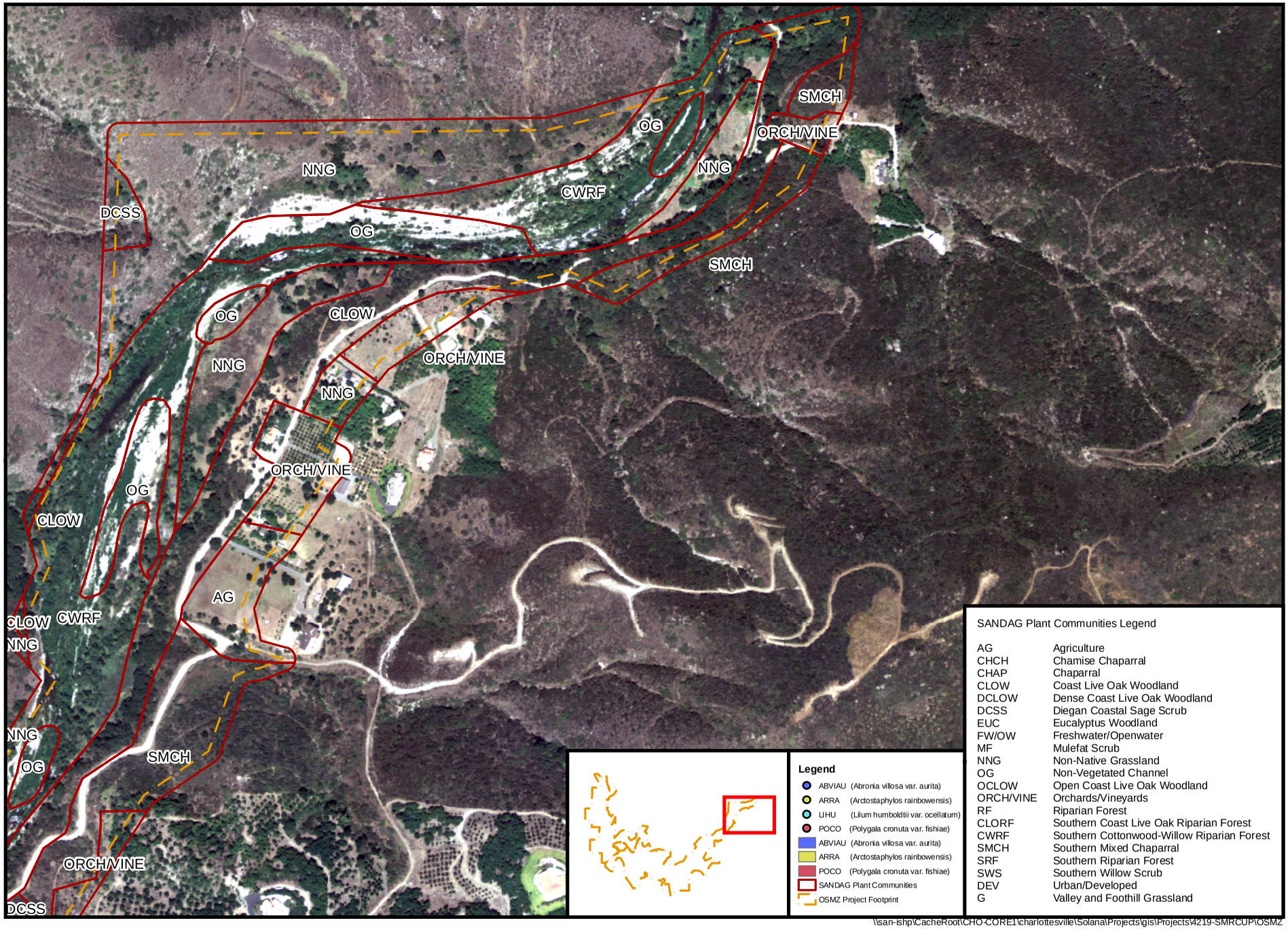


Figure 9. OSMZ Plant Survey

[This Page Intentionally Left Blank]

SMRCUP OSMZ Plant List

CommonName	Family	Genus	Species	InfraName	Native
Blue Elderberry	Adoxaceae	*Sambucus*	*mexicana*		Yes
Century Plant	Agavaceae	*Agave*	*americana*		No
Chaparral Candle	Agavaceae	*Hesperoyucca*	*whipplei*		Yes
Iceplant	Aizoaceae	*Carpobrotus*	*edulis*		No
Spearscale	Amaranthaceae	*Atriplex*	*prostrata*		Yes
Berlandier's Pit-Seed Goosefoot	Amaranthaceae	*Chenopodium*	*berlandieri*		Yes
California Goosefoot	Amaranthaceae	*Chenopodium*	*californicum*		Yes
Mexican Tea	Amaranthaceae	*Dysphania*	*ambrosioides*		No
Prickly Russian-Thistle, Tumbleweed	Amaranthaceae	*Salsola*	*tragus*		No
Laurel Sumac	Anacardiaceae	*Malosma*	*laurina*		Yes
Sugar Bush	Anacardiaceae	*Rhus*	*ovata*		Yes
Skunkbrush	Anacardiaceae	*Rhus*	*trilobata*		Yes
Pepper Tree	Anacardiaceae	*Schinus*	*molle*		No
Western Poison-Oak	Anacardiaceae	*Toxicodendron*	*diversilobum*		Yes
Bur Chervil	Apiaceae	*Anthriscus*	*caucalis*		No
Mock-Parsley	Apiaceae	*Apiastrum*	*angustifolium*		Yes
Common Celery	Apiaceae	*Apium*	*graveolens*		No
Common Poison Hemlock	Apiaceae	*Conium*	*maculatum*		No
Rattlesnake Weed	Apiaceae	*Daucus*	*pusillus*		Yes
Whorled Marsh Pennywort	Apiaceae	*Hydrocotyle*	*verticillata*		Yes
Sharp-Tooth Sanicle	Apiaceae	*Sanicula*	*arguta*		Yes
Pacific Sanicle	Apiaceae	*Sanicula*	*crassicaulis*		Yes
Climbing Milkweed	Apocynaceae	*Sarcostemma*	*cynanchoides*	ssp. *hartwegii*	Yes
Greater Periwinkle	Apocynaceae	*Vinca*	*major*		No
Least Duckweed	Araceae	*Lemna*	*minuta*		Yes
Canary Island Date Palm	Arecaceae	*Phoenix*	*canariensis*		No
Mexican fan palm	Arecaceae	*Washingtonia*	*robusta*		No
Scapellote	Asteraceae	*Acourtia*	*microcephala*		Yes
Annual Bur-Sage	Asteraceae	*Ambrosia*	*acanthicarpa*		Yes
Western Ragweed	Asteraceae	*Ambrosia*	*psilostachya*		Yes
Coastal Sagebrush	Asteraceae	*Artemisia*	*californica*		Yes
Douglas Mugwort	Asteraceae	*Artemisia*	*douglasiana*		Yes
Emory's Baccharis	Asteraceae	*Baccharis*	*emoryi*		Yes
Coyote Bush	Asteraceae	*Baccharis*	*pilularis*		Yes
Mule-Fat, Seep-Willow	Asteraceae	*Baccharis*	*salicifolia*		Yes
Rush Sweetbush	Asteraceae	*Bebbia*	*juncea*	var. *aspera*	Yes
California Brickellbush	Asteraceae	*Brickellia*	*californica*		Yes
Italian Thistle	Asteraceae	*Carduus*	*pycnocephalus*		No
Yellow Star-Thistle	Asteraceae	*Centaurea*	*solstitialis*		No
White Pincushion	Asteraceae	*Chaenactis*	*artemisiifolia*		Yes
Yellow Pincushion	Asteraceae	*Chaenactis*	*glabriuscula*	var. *glabriuscula*	Yes
Bull Thistle	Asteraceae	*Cirsium*	*vulgare*		No
Blessed Thistle	Asteraceae	*Cnicus*	*benedictus*		No
Common Sand-Aster	Asteraceae	*Corethrogyne*	*filaginifolia*	var. *filaginifolia*	Yes
Fascicled Tarweed	Asteraceae	*Deinandra*	*fasciculata*		Yes
Blue-Eye Cape-Marigold	Asteraceae	*Dimorphotheca*	*sinuata*		No
Boundary Goldenbush	Asteraceae	*Ericameria*	*brachylepis*		Yes
Leafy Daisy	Asteraceae	*Erigeron*	*foliosus*	var. *foliosus*	Yes
Long-Stem Golden-Yarrow	Asteraceae	*Eriophyllum*	*confertiflorum*	var. *confertiflorum*	Yes
Western Goldenrod	Asteraceae	*Euthamia*	*occidentalis*		Yes
Southern Sawtooth Goldenbush	Asteraceae	*Hazardia*	*squarrosa*	var. *grindelioides*	Yes
Crete Hedypnois	Asteraceae	*Hedypnois*	*cretica*		No
Western Sunflower	Asteraceae	*Helianthus*	*annuus*		Yes
Telegraph Weed	Asteraceae	*Heterotheca*	*grandiflora*		Yes
Smooth Cat's Ear	Asteraceae	*Hypochaeris*	*glabra*		No
Prickly Lettuce	Asteraceae	*Lactuca*	*serriola*		No
Southern Goldfields	Asteraceae	*Lasthenia*	*coronaria*		Yes
Tidy Tips	Asteraceae	*Layia*	*platyglossa*		Yes
Scale-Broom	Asteraceae	*Lepidospartum*	*squamatum*		Yes
Cud Aster	Asteraceae	*Lessingia*	*filaginifolia*	var. *filaginifolia*	Yes
Narrow-Leaf Filago	Asteraceae	*Logfia*	*gallica*		Yes
Osmadenia	Asteraceae	*Osmadenia*	*tenella*		Yes
Salt Marsh Fleabane	Asteraceae	*Pluchea*	*odorata*		Yes
Arrow Weed	Asteraceae	*Pluchea*	*sericea*		Yes
Odora	Asteraceae	*Porophyllum*	*gracile*		Yes
Fragrant Everlasting	Asteraceae	*Pseudognaphalium*	*beneolens*		Yes
Fragrant Cudweed	Asteraceae	*Pseudognaphalium*	*luteo-album*		No
White Everlasting	Asteraceae	*Pseudognaphalium*	*microcephalum*		Yes
Cotton-Batting Plant	Asteraceae	*Pseudognaphalium*	*stramineum*		Yes
Common Groundsel	Asteraceae	*Senecio*	*vulgaris*		No
Prickly Sow-Thistle	Asteraceae	*Sonchus*	*asper*	ssp. *asper*	No
Common Sow-Thistle	Asteraceae	*Sonchus*	*oleraceus*		No

SMRCUP OSMZ Plant List

CommonName	Family	Genus	Species	InfraName	Native
Deane's Small Wreath-Plant	Asteraceae	*Stephanomeria*	*exigua*	ssp. *deanei*	Yes
Silver Puffs	Asteraceae	*Uropappus*	*lindleyi*		Yes
Cocklebur	Asteraceae	*Xanthium*	*strumarium*		Yes
Alder	Betulaceae	*Alnus*	*rhombifolia*		Yes
Catalpa	Bignoniaceae	*Catalpa*	*spp.*		No
Cryptantha	Boraginaceae	*Cryptantha*	*clevelandii*	var. *florosa*	Yes
Cryptantha	Boraginaceae	*Cryptantha*	*clevelandii*	var. *clevelandii*	Yes
Nievitas Cryptantha	Boraginaceae	*Cryptantha*	*intermedia*		Yes
Prickly Cryptantha	Boraginaceae	*Cryptantha*	*muricata*		Yes
Slender Pectocarya	Boraginaceae	*Pectocarya*	*linearis*	ssp. f*erocula*	Yes
California Popcornflower	Boraginaceae	*Plagiobothrys*	*collinus*	var. *californicus*	Yes
Black Mustard	Brassicaceae	*Brassica*	*nigra*		No
Lesser Wart-Cress	Brassicaceae	*Coronopus*	*didymus*		No
Short-Pod Mustard	Brassicaceae	*Hirschfeldia*	*incana*		No
Wild Radish	Brassicaceae	*Raphanus*	*sativus*		No
Water-Cress	Brassicaceae	*Rorippa*	*nasturtium-aquaticum*		No
London Rocket	Brassicaceae	*Sisymbrium*	*irio*		No
Hare's-Ear Cabbage	Brassicaceae	*Sisymbrium*	*orientale*		No
Mesa Prickly Pear	Cactaceae	*Opuntia*	*xvaseyi*		Yes
Desert Prickly Pear	Cactaceae	*Opuntia*	*phaecantha*		Yes
Notch Fringepod	Brassicaceae	*Thysanocarpus*	*laciniatus*		Yes
Johnston's Honeysuckle	Caprifoliaceae	*Lonicera*	*subspicata*	var. *denudata*	Yes
Mouse-Ear Chickweed	Caryophyllaceae	*Cerastium*	*glomeratum*		No
Snapdragon Catchfly	Caryophyllaceae	*Silene*	*antirrhina*		Yes
Common Catchfly	Caryophyllaceae	*Silene*	*gallica*		No
Southern Pink	Caryophyllaceae	*Silene*	*laciniata*	ssp. *laciniata*	Yes
Common Chickweed	Caryophyllaceae	*Stellaria*	*media*		No
Peak Rush-Rose	Cistaceae	*Helianthemum*	*scoparium*		Yes
Southern California Morning-Glory	Convolvulaceae	*Calystegia*	*macrostegia*	ssp. *arida*	Yes
Chaparral Dodder	Convolvulaceae	*Cuscuta*	*californica*	var. *californica*	Yes
Dodder	Convolvulaceae	*Cuscuta*	*campestris*		Yes
Ladies' Fingers	Crassulaceae	*Dudleya*	*edulis*		Yes
Chalk Dudleya	Crassulaceae	*Dudleya*	*pulverulenta*		Yes
Calabazilla	Cucurbitaceae	*Cucurbita*	*foetidissima*		Yes
Manroot, Wild-Cucumber	Cucurbitaceae	*Marah*	*macrocarpus*	var. *macrocarpus*	Yes
Barbara's Sedge	Cyperaceae	*Carex*	*barbarae*		Yes
San Diego Sedge	Cyperaceae	*Carex*	*spissa*		Yes
Triangular-Fruit Sedge	Cyperaceae	*Carex*	*triquetra*		Yes
Tall Flatsedge	Cyperaceae	*Cyperus*	*eragrostis*		Yes
African Umbrella Plant	Cyperaceae	*Cyperus*	*involucratus*		No
Brown Umbrella-Sedge	Cyperaceae	*Cyperus*	*niger*		Yes
Fragrant Flatsedge	Cyperaceae	*Cyperus*	*odoratus*		Yes
Dombey's Spike-Rush	Cyperaceae	*Eleocharis*	*montevidensis*		Yes
Viscid Bulrush	Cyperaceae	*Schoenoplectus*	*acutus*	var. *occidentalis*	Yes
Olney's Bulrush	Cyperaceae	*Schoenoplectus*	*americanus*		Yes
Small-Fruit Bulrush	Cyperaceae	*Scirpus*	*microcarpus*		Yes
Durango Root	Datiscaceae	*Datisca*	*glomerata*		Yes
Western Bracken	Dennstaedtiaceae	*Pteridium*	*aquilinum*	var. *pubescens*	Yes
Coastal Wood Fern	Dryopteridaceae	*Dryopteris*	*arguta*		Yes
Common Horsetail	Equisetaceae	*Equisetum*	*arvense*		Yes
Common Scouring-Rush	Equisetaceae	*Equisetum*	*hyemale*	ssp. *affine*	Yes
Smooth Scouring-Rush	Equisetaceae	*Equisetum*	*laevigatum*		Yes
Rainbow Manzanita	Ericaceae	*Arctostaphylos*	*rainbowensis*		Yes
Mission Manzanita	Ericaceae	*Xylococcus*	*bicolor*		Yes
Small-Seed Sandmat	Euphorbiaceae	*Chamaesyce*	*polycarpa*		Yes
California Croton	Euphorbiaceae	*Croton*	*californicus*		Yes
Doveweed	Euphorbiaceae	*Croton*	*setigerus*		Yes
Chinese Caps	Euphorbiaceae	*Euphorbia*	*crenulata*		Yes
Petty Spurge	Euphorbiaceae	*Euphorbia*	*peplus*		No
Castor Bean	Euphorbiaceae	*Ricinus*	*communis*		No
Cootamundra Wattle	Fabaceae	*Acacia*	*baileyana*		No
False Indigo	Fabaceae	*Amorpha*	*fruticosa*		Yes
Leather Root	Fabaceae	*Hoita*	*macrostachya*		Yes
San Diego Sweet Pea	Fabaceae	*Lathyrus*	*vestitus*	var. *alefeldii*	Yes
Grab Lotus	Fabaceae	*Lotus*	*hamatus*		Yes
Heermann's Lotus	Fabaceae	*Lotus*	*heermannii*	var. *heermannii*	Yes
Alkali Lotus	Fabaceae	*Lotus*	*salsuginosus*	var. *salsuginosus*	Yes
Short-Wing Deerweed	Fabaceae	*Lotus*	*scoparius*	var. *brevialatus*	Yes
Bishop's/Strigose Lotus	Fabaceae	*Lotus*	*strigosus*		Yes
Miniature Lupine	Fabaceae	*Lupinus*	*bicolor*		Yes
Hall's Bush Lupine	Fabaceae	*Lupinus*	*excubitus*	var. *hallii*	Yes
Stinging Lupine	Fabaceae	*Lupinus*	*hirsutissimus*		Yes

SMRCUP OSMZ Plant List

CommonName	Family	Genus	Species	InfraName	Native
Arroyo Lupine	Fabaceae	*Lupinus*	*succulentus*		Yes
Collar Lupine	Fabaceae	*Lupinus*	*truncatus*		Yes
California Burclover	Fabaceae	*Medicago*	*polymorpha*		No
White Sweetclover	Fabaceae	*Melilotus*	*albus*		No
Indian Sweetclover	Fabaceae	*Melilotus*	*indicus*		No
Honey Mesquite	Fabaceae	*Prosopis*	*glandulosa*	var. *torreyana*	Yes
Tree Clover	Fabaceae	*Trifolium*	*ciliolatum*		Yes
Rose Clover	Fabaceae	*Trifolium*	*hirtum*		No
Valley Clover	Fabaceae	*Trifolium*	*willdenovii*		Yes
Winter Vetch	Fabaceae	*Vicia*	*villosa*	ssp. *villosa*	No
Coast Live Oak, Encina	Fagaceae	*Quercus*	*agrifolia*	var. *agrifolia*	Yes
Engelmann's/Mesa Blue Oak	Fagaceae	*Quercus*	*engelmannii*		Yes
Torrey's Scrub Oak	Fagaceae	*Quercus*	*X acutidens*		Yes
Canchalagua	Gentianaceae	*Centaurium*	*venustum*		Yes
Alkali Chalice	Gentianaceae	*Eustoma*	*exaltatum*		Yes
Long-Beak Filaree/Storksbill	Geraniaceae	*Erodium*	*botrys*		No
Red-Stem Filaree/Storksbill	Geraniaceae	*Erodium*	*cicutarium*		No
Cut-Leaf Geranium	Geraniaceae	*Geranium*	*dissectum*		No
White-Flower Currant	Grossulariaceae	*Ribes*	*indecorum*		Yes
Salt Heliotrope	Heliotropaceae	*Heliotropium*	*curassavicum*		Yes
Small-Flower Soap Plant	Hyacinthaceae	*Chloragalum*	*parviflorum*		Yes
Whispering Bells	Hydrophyllaceae	*Emmenanthe*	*penduliflora*	var. *penduliflora*	Yes
Common Eucrypta	Hydrophyllaceae	*Eucrypta*	*chrysanthemifolia*	var. *chrysanthemifolia*	Yes
Small-Flower Baby Blue Eyes	Hydrophyllaceae	*Nemophila*	*menziesii*	var. *integrifolia*	Yes
Caterpillar Phacelia	Hydrophyllaceae	*Phacelia*	*cicutaria*	var. *hispida*	Yes
Wild Canterbury-Bell	Hydrophyllaceae	*Phacelia*	*minor*		Yes
Phacelia	Hydrophyllaceae	*Phacelia*	*minor x P. parryi*		Yes
Branching Phacelia	Hydrophyllaceae	*Phacelia*	*ramosissima*	var. *latifolia*	Yes
Fiesta Flower	Hydrophyllaceae	*Pholistoma*	*auritum*	var. *auritum*	Yes
Blue-Eyed-Grass	Iridaceae	*Sisyrinchium*	*bellum*		Yes
Pecan	Juglandaceae	*Carya*	*illinoinensis*		No
Southern California Black Walnut	Juglandaceae	*Juglans*	*californica*	var. *californica*	Yes
Iris-Leaf Rush	Juncaceae	*Juncus*	*xiphioides*		Yes
Henbit	Lamiaceae	*Lamium*	*amplexicaule*		No
Horehound	Lamiaceae	*Marrubium*	*vulgare*		No
Mint	Lamiaceae	*Mentha*	*spp.*		No
White Sage	Lamiaceae	*Salvia*	*apiana*		Yes
Chia	Lamiaceae	*Salvia*	*columbariae*		Yes
Black Sage	Lamiaceae	*Salvia*	*mellifera*		Yes
Woolly Bluecurls	Lamiaceae	*Trichostema*	*lanatum*		Yes
Splendid Mariposa Lily	Liliaceae	*Calochortus*	*splendens*		Yes
Chaparral Bushmallow	Malvaceae	*Malacothamnus*	*fasciculatus*		Yes
Cheeseweed	Malvaceae	*Malva*	*parviflora*		No
Eucalyptus	Myrtaceae	*Eucalyptus*	*spp.*		No
Chaparral Sand-Verbena	Nyctaginaceae	*Abronia*	*villosa*	var. *aurita*	Yes
Coastal Wishbone Plant	Nyctaginaceae	*Mirabilis*	*laevis*	var. *crassifolia*	Yes
Olive	Oleaceae	*Olea*	*europaea*		No
California Sun Cup	Onagraceae	*Camissonia*	*bistorta*		Yes
False-Mustard	Onagraceae	*Camissonia*	*californica*		Yes
Canyon Godetia	Onagraceae	*Clarkia*	*epilobioides*		Yes
Four-Spot Clarkia	Onagraceae	*Clarkia*	*purpurea*	ssp. *quadrivulnera*	Yes
Canyon Clarkia	Onagraceae	*Clarkia*	*similis*		Yes
California Fuchsia	Onagraceae	*Epilobium*	*canum*	ssp. *canum*	Yes
Willow Herb	Onagraceae	*Epilobium*	*ciliatum*	ssp. *ciliatum*	Yes
Drummond's Gaura	Onagraceae	*Gaura*	*drummondii*		No
California Evening-Primrose	Onagraceae	*Oenothera*	*californica*		Yes
Great Marsh Evening-Primrose	Onagraceae	*Oenothera*	*elata*	ssp. *hirsutissima*	Yes
Purple Owl's-Clover	Orobanchaceae	*Castilleja*	*exserta*	ssp. *exserta*	Yes
Dark-Tip Bird's Beak	Orobanchaceae	*Cordylanthus*	*rigidus*	ssp. *setigerus*	Yes
California Wood-Sorrel	Oxalidaceae	*Oxalis*	*albicans*	ssp. *californica*	Yes
Bermuda-Buttercup	Oxalidaceae	*Oxalis*	*pes-caprae*		No
California Peony	Paeoniaceae	*Paeonia*	*californica*		Yes
Golden Ear-Drops	Papaveraceae	*Dicentra*	*chrysantha*		Yes
California Poppy	Papaveraceae	*Eschscholzia*	*californica*		Yes
Fire Poppy	Papaveraceae	*Papaver*	*californicum*		Yes
Cream Cups	Papaveraceae	*Platystemon*	*californicus*		Yes
Coast Monkey Flower	Phrymaceae	*Mimulus*	*aurantiacus*	var. *puniceus*	Yes
Slope Semiphore	Phrymaceae	*Mimulus*	*brevipes*		Yes
Scarlet Monkey Flower	Phrymaceae	*Mimulus*	*cardinalis*		Yes
Seep Monkey Flower	Phrymaceae	*Mimulus*	*guttatus*		Yes
Climbing Snapdragon	Plantaginaceae	*Antirrhinum*	*kelloggii*		Yes
Nuttall's Snapdragon	Plantaginaceae	*Antirrhinum*	*nuttallianum*	ssp. *nuttallianum*	Yes

SMRCUP OSMZ Plant List

CommonName	Family	Genus	Species	InfraName	Native
Chinese Houses	Plantaginaceae	*Collinsia*	*heterophylla*		Yes
Yellow Bush Penstemon	Plantaginaceae	*Keckiella*	*antirrhinoides*	var. *antirrhinoides*	Yes
Climbing Bush Penstemon	Plantaginaceae	*Keckiella*	*cordifolia*		Yes
Large Blue Toadflax	Plantaginaceae	*Linaria*	*canadensis*		Yes
Showy Penstemon	Plantaginaceae	*Penstemon*	*spectabilis*	var. *spectabilis*	Yes
Dot-Seed Plantain	Plantaginaceae	*Plantago*	*erecta*		Yes
English Plantain	Plantaginaceae	*Plantago*	*lanceolata*		No
Common Plantain	Plantaginaceae	*Plantago*	*major*		No
Water Speedwell	Plantaginaceae	*Veronica*	*anagallis-aquatica*		No
Western Sycamore	Platanaceae	*Platanus*	*racemosa*		Yes
Notch-Leaf Marsh-Rosemary	Plumbaginaceae	*Limonium*	*sinuatum*		No
Giant Stipa	Poaceae	*Achnatherum*	*coronatum*		Yes
Water Beardgrass	Poaceae	*Agrostis*	*viridis*		No
Giant Reed	Poaceae	*Arundo*	*donax*		No
Slender Wild Oat	Poaceae	*Avena*	*barbata*		No
Wild Oat	Poaceae	*Avena*	*fatua*		No
Ripgut Grass	Poaceae	*Bromus*	*diandrus*		No
Foxtail Chess, Red Brome	Poaceae	*Bromus*	*madritensis*	ssp. *rubens*	No
Pampas Grass	Poaceae	*Cortaderia*	*selloana*		No
Bermuda Grass	Poaceae	*Cynodon*	*dactylon*		No
Common Barnyard Grass	Poaceae	*Echinochloa*	*crus-galli*		No
Panic Veldt Grass	Poaceae	*Ehrharta*	*erecta*		No
Long-Flower Veldt Grass	Poaceae	*Ehrharta*	*longiflora*		No
Jepson's Blue Wildrye	Poaceae	*Elymus*	*glaucus*	ssp. *jepsonii*	Yes
Nit Grass	Poaceae	*Gastridium*	*ventricosum*		No
Glaucous Barley	Poaceae	*Hordeum*	*murinum*	ssp. *glaucum*	No
Golden-Top	Poaceae	*Lamarckia*	*aurea*		No
Mexican Sprangletop	Poaceae	*Leptochloa*	*fusca*	ssp. *uninervia*	Yes
Giant Wild-Rye	Poaceae	*Leymus*	*condensatus*		Yes
Beardless Wild-Rye	Poaceae	*Leymus*	*triticoides*		Yes
Coast Range Melic	Poaceae	*Melica*	*imperfecta*		Yes
Natal Grass	Poaceae	*Melinis*	*repens*	ssp. *repens*	No
Little-Seed Muhly	Poaceae	*Muhlenbergia*	*microsperma*		Yes
Foothill Needlegrass	Poaceae	*Nassella*	*lepida*		Yes
Purple Needlegrass	Poaceae	*Nassella*	*pulchra*		Yes
Common Knotgrass	Poaceae	*Paspalum*	*distichum*		Yes
African Fountain Grass	Poaceae	*Pennisetum*	*setaceum*		No
Smilo Grass	Poaceae	*Piptatherum*	*miliaceum*		No
Annual Beard Grass	Poaceae	*Polypogon*	*monspeliensis*		No
Mediterranean Schismus	Poaceae	*Schismus*	*barbatus*		No
Hairy Rat-Tail Fescue	Poaceae	*Vulpia*	*myuros*	var. *hirsuta*	No
Blue False-Gilia	Polemoniaceae	*Allophyllum*	*glutinosum*		Yes
Many-Flower Woolly-Star	Polemoniaceae	*Eriastrum*	*sapphirinum*	ssp. dasyanthum	Yes
Grassland Gilia	Polemoniaceae	*Gilia*	*angelensis*		Yes
Ball Gilia	Polemoniaceae	*Gilia*	*capitata*	ssp. *abrotanifolia*	Yes
Coast Baby-Star	Polemoniaceae	*Leptosiphon*	*parviflorus*		Yes
Fish's Milkwort	Polygalaceae	*Polygala*	*cornuta*	var. *fishiae*	Yes
Fringed Spineflower	Polygonaceae	*Chorizanthe*	*fimbriata*	var. *fimbriata*	Yes
Prostrate Spineflower	Polygonaceae	*Chorizanthe*	*procumbens*		Yes
Tall Buckwheat	Polygonaceae	*Eriogonum*	*elongatum*	var. *elongatum*	Yes
Inland California Buckwheat	Polygonaceae	*Eriogonum*	*fasciculatum*	var. *foliolosum*	Yes
Slender Buckwheat	Polygonaceae	*Eriogonum*	*gracile*		Yes
Willow Smartweed, Willow Weed	Polygonaceae	*Polygonum*	*lapathifolium*		Yes
Granny's Hairnet, G. C. P.	Polygonaceae	*Pterostegia*	*drymarioides*		Yes
Desert Rhubarb	Polygonaceae	*Rumex*	*hymenosepalus*		Yes
California Polypody	Polypodiaceae	*Polypodium*	*californicum*		Yes
Red Maids	Portulacaceae	*Calandrinia*	*ciliata*		Yes
Common Calyptridium	Portulacaceae	*Calyptridium*	*monandrum*		Yes
Mexican Miner's-Lettuce	Portulacaceae	*Claytonia*	*perfoliata*	ssp. *mexicana*	Yes
Scarlet Pimpernel	Primulaceae	*Anagallis*	*arvensis*		No
Padre's Shooting Star	Primulaceae	*Dodecatheon*	*clevelandii*	ssp. *clevelandii*	Yes
Maidenhair Fern	Pteridaceae	*Adiantum*	*capillus-veneris*		Yes
California Cotton Fern	Pteridaceae	*Cheilanthes*	*newberryi*		Yes
Coffee Fern	Pteridaceae	*Pellaea*	*andromedifolia*		Yes
Bird's Foot Cliff-Brake	Pteridaceae	*Pellaea*	*mucronata*	var. *mucronata*	Yes
Ropevine Clematis	Ranunculaceae	*Clematis*	*pauciflora*		Yes
Parry's Larkspur	Ranunculaceae	*Delphinium*	*parryi*	ssp. *parryi*	Yes
Smooth-Leaf Meadow-Rue	Ranunculaceae	*Thalictrum*	*fendleri*	var. *polycarpum*	Yes
Thick-Leaf-Lilac	Rhamnaceae	*Ceanothus*	*crassifolius*		Yes
Ramona-Lilac	Rhamnaceae	*Ceanothus*	*tomentosus*		Yes
Holly-Leaf Redberry	Rhamnaceae	*Rhamnus*	*ilicifolia*		Yes
Chamise	Rosaceae	*Adenostoma*	*fasciculatum*		Yes

SMRCUP OSMZ Plant List

CommonName	Family	Genus	Species	InfraName	Native
San Diego Mountain-Mahogany	Rosaceae	*Cercocarpus*	*minutiflorus*		Yes
Toyon, Christmas Berry	Rosaceae	*Heteromeles*	*arbutifolia*		Yes
Islay, Holly-Leaf Cherry	Rosaceae	*Prunus*	*ilicifolia*	ssp. *ilicifolia*	Yes
California Blackberry	Rosaceae	*Rubus*	*ursinus*		Yes
California Rose	Rosaceae	*Rosa*	*californica*		Yes
Narrow-Leaf Bedstraw	Rubiaceae	*Galium*	*angustifolium*	ssp. *angustifolium*	Yes
Common Bedstraw, Goose Grass	Rubiaceae	*Galium*	*aparine*		No
Western Cottonwood	Salicaceae	*Populus*	*fremontii*	ssp. *fremontii*	Yes
Narrow-Leaf Willow	Salicaceae	*Salix*	*exigua*		Yes
Black Willow	Salicaceae	*Salix*	*goodingii*		Yes
Red Willow	Salicaceae	*Salix*	*laevigata*		Yes
Arroyo Willow	Salicaceae	*Salix*	*lasiolepis*		Yes
Yerba Mansa	Saururaceae	*Anemopsis*	*californica*		Yes
Coast Jepsonia	Saxifragaceae	*Jepsonia*	*parryi*		Yes
Hill Star	Saxifragaceae	*Lithophragma*	*heterophyllum*		Yes
Scarlet Monkey Flower	Scrophulariaceae	*Mimulus*	*cardinalis*		Yes
Downy Monkey Flower	Scrophulariaceae	*Mimulus*	*pilosus*		Yes
Bigelow's Spike-Moss	Selaginellaceae	*Selaginella*	*bigelovii*		Yes
Western Jimson Weed	Solanaceae	*Datura*	*wrightii*		Yes
Tree Tobacco	Solanaceae	*Nicotiana*	*glauca*		No
Indian Tobacco	Solanaceae	*Nicotiana*	*quadrivalvis*		Yes
White Nightshade	Solanaceae	*Solanum*	*americanum*		Yes
Douglas's Nightshade	Solanaceae	*Solanum*	*douglasii*		Yes
Parish's Nightshade	Solanaceae	*Solanum*	*parishii*		Yes
Blue Dicks	Themidaceae	*Dichelostemma*	*capitatum*	ssp. *capitatum*	Yes
Broad-Leaf Cattail	Typhaceae	*Typha*	*latifolia*		Yes
Chinese Elm	Ulmaceae	*Ulmus*	*parvifolia*		Yes
California Pellitory	Urticaceae	*Parietaria*	*hespera*	var. *californica*	Yes
Hoary Nettle	Urticaceae	*Urtica*	*dioica*		Yes
Southern California Wild Grape	Vitaceae	*Vitis*	*girdiana*		Yes

[This Page Intentionally Left Blank]

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 06/16/2008

For Office Use Only

Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Abronia villosa var. aurita*

Common Name:

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 5 Subsequent Visit? ☐ yes ☑ no

Is this an existing NDDB occurrence? _____ Yes, Occ # ☐ no ☑ unk

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Carolyn Martus
Address: 3685 Harding St Carlsbad CA 92008

E-mail Address: c_martus@yahoo.com
Phone: 760-434-5033

Plant Information

Phenology: _____% vegetative 50 % flowering 50 % fruiting

Animal Information

# adults	# juveniles	# larvae	# egg masses	# unknown

☐ breeding ☐ wintering ☐ burrow site ☐ rookery ☐ nesting ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

County: San Diego Landowner / Mgr.: Fallbrook Public Utility District
Quad Name: _____ Elevation: _____
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo map & type): google earth
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ GPS Make & Model _____
DATUM: NAD27 ☐ NAD83 ☐ WGS84 ☐ Horizontal Accuracy _____ meters/feet
Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☐ *OR* Geographic (Latitude & Longitude) ☑
Coordinates: 33.41122 117.21732

Habitat Description *(plant communities, dominants, associates, substrates/soils, aspects/slope):*
Sandy flat bench adjacent to riparian area with Salix spp. and Quercus agrifolia, hillsides of chaparral

Other rare taxa seen at THIS site on THIS date:
(separate form preferred)

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☑ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use:

Visible disturbances:

Threats: Invasive plants, fire, off-leash dogs, humans, horses, project by FPUD the landowner

Comments:

Determination: *(check one or more and fill in blanks)*

☐ Keyed (cite reference): _____
☑ Compared with specimen housed at: SDNHM
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☐ Other: _____

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☑
Habitat	☐	☐	☑
Diagnostic feature	☐	☐	☑

May we obtain duplicates at our expense? yes ☑ no ☐

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 06/20/2008

For Office Use Only

Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Abronia villosa var aurita*

Common Name: Chaparral sand-verbena

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 83 Subsequent Visit? ☐ yes ☐ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☐ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Melissa Tu & Carolyn Martus
Address: TEC Inc
514 Via de la Valle Suite 308 San Diego, CA 92075
E-mail Address: mmtu@tecinc.com
Phone: (858) 509-3157

Plant Information

Phenology: _____% vegetative 50 % flowering 50 % fruiting

Animal Information

# adults	# juveniles	# larvae	# egg masses	# unknown

☐ breeding ☐ wintering ☐ burrow site ☐ rookery ☐ nesting ☐ other

Location Description ***(please attach map AND/OR fill out your choice of coordinates, below)***

County: San Diego Landowner / Mgr.: Fallbrook Public Utility District
Quad Name: Fallbrook Elevation: _____
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): GPS
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ GPS Make & Model Thales Mobile Mapper
DATUM: **NAD27** ☐ **NAD83** ☐ **WGS84** ☐ Horizontal Accuracy _____ meters/feet
Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☐ ***OR*** Geographic (Latitude & Longitude) ☑
Coordinates: 117°14'37.219"W 33°24'48.465"N
117°14'37.5"W 33°24'51.093"N 117°14'27.106"W 33°24'52.543"N

Habitat Description *(plant communities, dominants, associates, substrates/soils, aspects/slope):*
Sandy riparian bench along Sandia creek. Area dominated by non-native grasses.

Other rare taxa seen at THIS site on THIS date: Rainbow manzanita and Humboldt lily
(separate form preferred)

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☐ Good ☐ Fair ☑ Poor
Immediate AND surrounding land use: Recreation use
Visible disturbances: Non-native vegetation, vehicle tire tracks, horses, dogs, and people
Threats: Heavy trail use. (Vehicles, horses, dogs, and people)
Comments: Tire tracks through the edge of the Abronia population

Determination: *(check one or more, and fill in blanks)*
☑ Keyed (cite reference): Jepson Manual
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☐ Other: _____

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☑
Habitat	☐	☐	☐
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes ☐ no ☐

DFG/BDB/1747 Rev. 6/16/08

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 06/20/2008

For Office Use Only

Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Lilium humboldtii*

Common Name: Humboldt Lily

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 3 Subsequent Visit? ☐ yes ☐ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☐ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Melissa Tu & Carolyn Martus
Address: TEC Inc
514 Via de la Valle Suite 308 San Diego, CA 92075
E-mail Address: mmtu@tecinc.com
Phone: (858) 509-3157

Plant Information

Phenology: ____% vegetative 67 % flowering ____% fruiting

Animal Information

# adults	# juveniles	# larvae	# egg masses	# unknown

☐ breeding ☐ wintering ☐ burrow site ☐ rookery ☐ nesting ☐ other

Location Description ***(please attach map AND/OR fill out your choice of coordinates, below)***

County: San Diego Landowner / Mgr.: Fallbrook Public Utility District
Quad Name: Temecula Elevation: _____
T____ R____ Sec ____, ____ ¼ of ____¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): GPS
T____ R____ Sec ____, ____ ¼ of ____¼, Meridian: H☐ M☐ S☐ GPS Make & Model Thales Mobile Mapper
DATUM: **NAD27** ☐ **NAD83** ☐ **WGS84** ☑ Horizontal Accuracy _____ meters/feet
Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☐ ***OR*** Geographic (Latitude & Longitude) ☑
Coordinates: 117 13'49.63 33 24'22.01

Habitat Description *(plant communities, dominants, associates, substrates/soils, aspects/slope):*

Coast live oak woodland along the Santa Margarita River trail. Quercus agrifolia dominant in area. Immediate around the Humboldt lilies non native grasses and Italian thistle dominant.

Three Humboldt lily individuals observed on previous visit. On 6/20/08 only two individuals observed. One lily completely gone. One lily three blooms open and second lily four blooms open.

Other rare taxa seen at THIS site on THIS date: Rainbow manzanita and Chaparral sand verbena
(separate form preferred)

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☐ Good ☐ Fair ☑ Poor

Immediate AND surrounding land use: Recreation use- FPUD hiking trail

Visible disturbances: Non-native vegetation, horses, dogs, and people

Threats: Heavy trail use and possible collectors. (Horses, dogs, and people)

Comments:

Determination: *(check one or more, and fill in blanks)*

☐ Keyed (cite reference): _____
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☑ By another person (name): Jon Redman (SDNHM)
☐ Other: _____

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☑
Habitat	☐	☐	☑
Diagnostic feature	☐	☐	☑

May we obtain duplicates at our expense? yes ☑ no ☐

DFG/BDB/1747 Rev. 6/16/08

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 06/09/2008

For Office Use Only

Source Code _____ Quad Code _____
Elm Code _____ Occ. No _____
EO Index No _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Arctostaphylos rainbowensis*

Common Name:

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 20 Subsequent Visit? ☐ yes ☑ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☑ unk

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Carolyn Martus
Address: 3685 Harding St, Carlsbad CA 92008

E-mail Address: c_martus@yahoo.com
Phone: 760-434-5033

Plant Information

Phenology: 100 % vegetative ____ % flowering ____ % fruiting

Animal Information

adults ____ # juveniles ____ # larvae ____ # egg masses ____ # unknown ____

☐ breeding ☐ wintering ☐ burrow site ☐ rookery ☐ nesting ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

County: San Diego Landowner / Mgr: Fallbrook Public Utility District
Quad Name: _____ Elevation: _____

T____ R____ Sec ____, ____ ¼ of ____ ¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo map & type): google earth
T____ R____ Sec ____, ____ ¼ of ____ ¼, Meridian: H☐ M☐ S☐ GPS Make & Model _____

DATUM: NAD27 ☐ NAD83 ☐ WGS84 ☐ Horizontal Accuracy _____ meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☐ *OR* Geographic (Latitude & Longitude) ☐

Coordinates: N 33 24' 56 44 W 117 15' 08 96

Habitat Description *(plant communities, dominants, associates, substrates/soils, aspects/slope):*
Associated with Adenostemma fasciculatum and Malosma laurina

Other rare taxa seen at THIS site on THIS date:
(separate form preferred)

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☑ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use:

Visible disturbances:

Threats: Fire and invasive plants.

Comments:

Determination: *(check one or more, and fill in blanks)*

- ☑ Keyed (cite reference): revised key i got from SDNHM
- ☐ Compared with specimen housed at: _____
- ☐ Compared with photo / drawing in: _____
- ☐ By another person (name): _____
- ☐ Other: _____

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☐
Habitat	☐	☐	☐
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes ☐ no ☐

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 06/09/2008

For Office Use Only

Source Code _____ Quad Code _____
Elm Code _____ Occ No _____
EO Index No _____ Map Index No _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Arctostaphylos rainbowensis*

Common Name:

Species Found? ☑ Yes ☐ No _____ If not why?

Total No. Individuals 10 Subsequent Visit? ☐ yes ☑ no

Is this an existing NDDB occurrence? _____ Yes Occ # ☐ no ☑ unk

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Carolyn Martus
Address: 3685 Harding St, Carlsbad CA 92008
E-mail Address: c_martus@yahoo.com
Phone: 760-434-5033

Plant Information

Phenology: 100 % vegetative _____ % flowering _____ % fruiting

Animal Information

# adults	# juveniles	# larvae	# egg masses	# unknown

☐ breeding ☐ wintering ☐ burrow site ☐ rookery ☐ nesting ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

County: San Diego Landowner / Mgr: Fallbrook Public Utility District
Quad Name: _____ Elevation: _____
T____ R____ Sec ____, ____ ¼ of ____ ¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): google earth
T____ R____ Sec ____, ____ ¼ of ____ ¼, Meridian: H☐ M☐ S☐ GPS Make & Model _____
DATUM: NAD27 ☐ NAD83 ☐ WGS84 ☐ Horizontal Accuracy _____ meters/feet
Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☐ *OR* Geographic (Latitude & Longitude) ☐
Coordinates: N 33 24' 54 W 117 15' 09

Habitat Description *(plant communities, dominants associates, substrates/soils, aspects/slope)*:
Associated with Adenostemma fasciculatum and Malosma laurina

Other rare taxa seen at THIS site on THIS date:
(separate form preferred)

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☑ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use:

Visible disturbances:

Threats: Fire and invasive plants

Comments:

Determination: *(check one or more and fill in blanks)*

☑ Keyed (cite reference): revised key i got from SDNHM
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☐ Other: _____

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☐
Habitat	☐	☐	☐
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes ☐ no ☐

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 06/09/2008

For Office Use Only

Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Arctostaphylos rainbowensis*

Common Name:

Species Found? ☑ Yes ☐ No _____ If not why?

Total No. Individuals 3 Subsequent Visit? ☐ yes ☑ no

Is this an existing NDDB occurrence? _____ Yes Occ # ☐ no ☑ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Carolyn Martus
Address: 3685 Harding St, Carlsbad CA 92008

E-mail Address: c_martus@yahoo.com
Phone: 760-434-5033

Plant Information

Phenology: 100 % vegetative _____ % flowering _____ % fruiting

Animal Information

# adults	# juveniles	# larvae	# egg masses	# unknown

☐ breeding ☐ wintering ☐ burrow site ☐ rookery ☐ nesting ☐ other

Location Description ***(please attach map AND/OR fill out your choice of coordinates, below)***

County: San Diego Landowner / Mgr: Fallbrook Public Utility District
Quad Name: _____ Elevation: _____

T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐

Source of Coordinates (GPS, topo. map & type): google earth
GPS Make & Model _____
Horizontal Accuracy _____ meters/feet

DATUM: NAD27 ☐ NAD83 ☐ WGS84 ☐
Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☐ *OR* Geographic (Latitude & Longitude) ☐
Coordinates: N 33.41439 W 117.25134

Habitat Description *(plant communities, dominants, associates, substrates/soils, aspects/slope).*
Associated with Adenostemma fasciculatum and Malosma laurina

Other rare taxa seen at THIS site on THIS date:
(separate form preferred)

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☑ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use:

Visible disturbances:

Threats: Fire and invasive plants

Comments:

Determination: *(check one or more, and fill in blanks)*

- ☑ Keyed (cite reference): revised key i got from SDNHM
- ☐ Compared with specimen housed at: _____
- ☐ Compared with photo / drawing in: _____
- ☐ By another person (name): _____
- ☐ Other: _____

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☐
Habitat	☐	☐	☐
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes ☐ no ☐

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 06/09/2008

For Office Use Only

Source Code _____ Quad Code _____
Elm Code _____ Occ. No _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Arctostaphylos rainbowensis*

Common Name:

Species Found? ☑ Yes ☐ No _____ If not why?

Total No. Individuals 15 Subsequent Visit? ☐ yes ☑ no

Is this an existing NDDB occurrence? _____ Yes Occ. # ☐ no ☑ unk

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Carolyn Martus
Address: 3685 Harding St, Carlsbad CA 92008

E-mail Address: c_martus@yahoo.com
Phone: 760-434-5033

Plant Information

Phenology: 100 % vegetative ____ % flowering ____ % fruiting

Animal Information

# adults	# juveniles	# larvae	# egg masses	# unknown

☐ breeding ☐ wintering ☐ burrow site ☐ rookery ☐ nesting ☐ other

Location Description ***(please attach map AND/OR fill out your choice of coordinates, below)***

County: San Diego Landowner / Mgr: Fallbrook Public Utility District
Quad Name: _____ Elevation: _____

T____ R____ Sec ____, ____ ¼ of ____ ¼, Meridian: H☐ M☐ S☐
T____ R____ Sec ____, ____ ¼ of ____ ¼, Meridian: H☐ M☐ S☐

Source of Coordinates (GPS, topo map & type): google earth
GPS Make & Model _____
Horizontal Accuracy _____ meters/feet

DATUM: NAD27 ☐ NAD83 ☐ WGS84 ☐

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☐ *OR* Geographic (Latitude & Longitude) ☐

Coordinates: N 33 24' 54 62 W 117 15' 03 27

Habitat Description *(plant communities, dominants, associates, substrates/soils, aspects/slope)*
Associated with Adenostemma fasciculatum and Malosma laurina

Other rare taxa seen at THIS site on THIS date:
(separate form preferred)

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☑ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use:

Visible disturbances:

Threats: Fire and invasive plants

Comments:

Determination: *(check one or more, and fill in blanks)*

- ☑ Keyed (cite reference): revised key i got from SDNHM
- ☐ Compared with specimen housed at: _____
- ☐ Compared with photo / drawing in: _____
- ☐ By another person (name): _____
- ☐ Other: _____

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☐
Habitat	☐	☐	☐
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes ☐ no ☐

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 06/25/2008

For Office Use Only

Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Arctostaphylos rainbowensis*

Common Name:

Species Found? ☑ Yes ☐ No _____ If not why?

Total No. Individuals Subsequent Visit? ☐ yes ☑ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☑ unk

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Carolyn Martus
Address: 3685 Harding St Carlsbad CA 92008

E-mail Address: c_martus@yahoo.com
Phone: 760-434-5033

Plant Information

Phenology: 100 % vegetative ____ % flowering ____ % fruiting

Animal Information

# adults	# juveniles	# larvae	# egg masses	# unknown

☐ breeding ☐ wintering ☐ burrow site ☐ rookery ☐ nesting ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

County: San Diego Landowner / Mgr: Fallbrook Public Utility District
Quad Name: _____ Elevation: _____

T____ R____ Sec ____, ____ ¼ of ____ ¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): google earth
T____ R____ Sec ____, ____ ¼ of ____ ¼, Meridian: H☐ M☐ S☐ GPS Make & Model _____

DATUM: NAD27 ☐ NAD83 ☐ WGS84 ☐ Horizontal Accuracy _____ meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☐ *OR* Geographic (Latitude & Longitude) ☑

Coordinates: 33.42607 117.25264 # = 5; 33.42487/117.25340 #=5; 33.42335/117.25443 #=5; 33.424055/117252400 #=10; 33.423147/117.252856 #=10

Habitat Description *(plant communities, dominants, associates, substrates/soils, aspects/slope)*:
Chaparral, Adenostemma fasciculatum, Malosma laurina

Other rare taxa seen at THIS site on THIS date:
(separate form preferred)

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☑ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use:

Visible disturbances:

Threats: Invasive plants, fire, off-leash dogs, humans, horses, project by FPUD the landowner

Comments: Map will be mailed

Determination: *(check one or more, and fill in blanks)*

☐ Keyed (cite reference): _____
☑ Compared with specimen housed at: SDNHM
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☐ Other: _____

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☑
Habitat	☐	☐	☑
Diagnostic feature	☐	☐	☑

May we obtain duplicates at our expense? yes ☑ no ☐

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 06/25/2008

For Office Use Only

Source Code _____ Quad Code _____
Elm Code _____ Occ. No _____
EO Index No _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Arctostaphylos rainbowensis*

Common Name:

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals Subsequent Visit? ☐ yes ☑ no

Is this an existing NDDB occurrence? _____ Yes Occ. # ☐ no ☑ unk

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Carolyn Martus
Address: 3685 Harding St Carlsbad CA 92008

E-mail Address: c_martus@yahoo.com
Phone: 760-434-5033

Plant Information

Phenology: 100 % vegetative _____ % flowering _____ % fruiting

Animal Information

_____ # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

☐ breeding ☐ wintering ☐ burrow site ☐ rookery ☐ nesting ☐ other

Location Description ***(please attach map AND/OR fill out your choice of coordinates, below)***

County: San Diego Landowner / Mgr: Fallbrook Public Utility District
Quad Name: _____ Elevation: _____
T____ R____ Sec ____, ____ ¼ of ____ ¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): google earth
T____ R____ Sec ____, ____ ¼ of ____ ¼, Meridian: H☐ M☐ S☐ GPS Make & Model _____
DATUM: NAD27 ☐ NAD83 ☐ WGS84 ☐ Horizontal Accuracy _____ meters/feet
Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☐ *OR* Geographic (Latitude & Longitude) ☑
Coordinates: 33.42481 117.24716 # = 15; 33.42225/117.24679 #=20; 33.42134/117.24642 #=20

Habitat Description *(plant communities, dominants, associates, substrates/soils, aspects/slope)*:
Chaparral, Adenostemma fasciculatum, Malosma laurina

Other rare taxa seen at THIS site on THIS date:
(separate form preferred)

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☑ Good ☐ Fair ☐ Poor
Immediate AND surrounding land use:
Visible disturbances:
Threats: Invasive plants, fire, off-leash dogs, humans, horses, project by FPUD the landowner
Comments: Map will be mailed

Determination: *(check one or more, and fill in blanks)*
☐ Keyed (cite reference): _____
☑ Compared with specimen housed at: SDNHM
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☐ Other: _____

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☑
Habitat	☐	☐	☑
Diagnostic feature	☐	☐	☑

May we obtain duplicates at our expense? yes ☑ no ☐

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 06/30/2008

For Office Use Only

Source Code _____ Quad Code _____
Elm Code _____ Occ. No _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Arctostaphylos rainbowensis*

Common Name:

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 5 Subsequent Visit? ☐ yes ☑ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☑ unk

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Carolyn Martus
Address: 3685 Harding St Carlsbad CA 92008

E-mail Address: c_martus@yahoo.com
Phone: 760-434-5033

Plant Information

Phenology: 100 % vegetative ____ % flowering ____ % fruiting

Animal Information

# adults	# juveniles	# larvae	# egg masses	# unknown

☐ breeding ☐ wintering ☐ burrow site ☐ rookery ☐ nesting ☐ other

Location Description ***(please attach map AND/OR fill out your choice of coordinates, below)***

County: San Diego Landowner / Mgr : Fallbrook Public Utility District
Quad Name: _____ Elevation: _____
T____ R____ Sec ____, ____ ¼ of ____ ¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo map & type): google earth
T____ R____ Sec ____, ____ ¼ of ____ ¼, Meridian: H☐ M☐ S☐ GPS Make & Model _____
DATUM: NAD27 ☐ NAD83 ☐ WGS84 ☐ Horizontal Accuracy _____ meters/feet
Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☐ *OR* Geographic (Latitude & Longitude) ☑
Coordinates: 33 410363 117 228723

Habitat Description *(plant communities, dominants, associates, substrates/soils, aspects/slope)*:
Chaparral, Adenostemma fasciculatum, Malosma laurina

Other rare taxa seen at THIS site on THIS date:
(separate form preferred)

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☑ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use:

Visible disturbances:

Threats: Invasive plants, fire, off-leash dogs, humans, horses project by FPUD the landowner

Comments:

Determination: *(check one or more, and fill in blanks)*
- ☐ Keyed (cite reference): _____
- ☑ Compared with specimen housed at: SDNHM
- ☐ Compared with photo / drawing in: _____
- ☐ By another person (name): _____
- ☐ Other: _____

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☑
Habitat	☐	☐	☑
Diagnostic feature	☐	☐	☑

May we obtain duplicates at our expense? yes ☑ no ☐

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): See attached

For Office Use Only

Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: Arctostaphylos rainbowensis

Common Name:

Species Found? ☑ Yes ☐ No _____ If not why?

Total No Individuals 234 Subsequent Visit? ☐ yes ☐ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☑ unk.

Collection? If yes: ? Number SDNHM Museum / Herbarium

Reporter _____

Address Carolyn O. Martus
3685 Harding St
Carlsbad, CA 92008

E-mail Address: c_martus@yahoo.com

Phone: 760 434 5033

Plant Information

Phenology: 100 % vegetative ____ % flowering ____ % fruiting

Animal Information

# adults	# juveniles	# larvae	# egg masses	# unknown

☐ breeding ☐ wintering ☐ burrow site ☐ rookery ☐ nesting ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

See attached ID# 23-53

County: San Diego Landowner / Mgr.: Fallbrook Public Utility Distric

Quad Name: _____ Elevation: _____

T____ R____ Sec ____, ____ ¼ of ____ ¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo map & type): GPS

T____ R____ Sec ____, ____ ¼ of ____ ¼, Meridian: H☐ M☐ S☐ GPS Make & Model _____

DATUM: NAD27 ☐ NAD83 ☐ WGS84 ☑ Horizontal Accuracy Sub meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☐ *OR* Geographic (Latitude & Longitude) ☐

Coordinates:

Habitat Description *(plant communities, dominants, associates, substrates/soils, aspects/slope)*
Chaparral. Common in this area. Associated species include Malosma laurina, Quercus spp., Adenostemma fasciculatum,

Other rare taxa seen at THIS site on THIS date: (separate form preferred) Collection made and deposited at SDNHM don't know #

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☐ Good ☑ Fair ☐ Poor

Immediate AND surrounding land use:

Visible disturbances: Humans, horses, fire, weeds

Threats: Fire, weeds, humans, horses, off-leash dogs

Comments:

Determination: *(check one or more, and fill in blanks)*

☐ Keyed (cite reference): _____
☑ Compared with specimen housed at: SDNHM
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☐ Other: _____

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☑
Habitat	☐	☐	☑
Diagnostic feature	☐	☐	☑

May we obtain duplicates at our expense? yes ☑ no ☐

Id	SppType	TotalCount	Date (mddyyyy)	Xcoord	Ycoord
1	Abronia villosa var. aurita	1	6272008	-117.240938	33.414537
2	Abronia villosa var. aurita	1	6272008	-117.240938	33.414537
3	Abronia villosa var. aurita	5	6302008	-117.237818	33.410907
4	Abronia villosa var. aurita	23	6302008	-117.238272	33.411986
5	Abronia villosa var. aurita	1	6302008	-117.238180	33.411853
6	Abronia villosa var. aurita	25	6302008	-117.238007	33.411635
7	Abronia villosa var. aurita	10	6302008	-117.237996	33.411508
8	Abronia villosa var. aurita	24	6302008	-117.237940	33.411516
9	Abronia villosa var. aurita	5	6302008	-117.237807	33.411048
10	Abronia villosa var. aurita	1	6302008	-117.237821	33.410966
11	Abronia villosa var. aurita	5	6302008	-117.237818	33.410907
12	Abronia villosa var. aurita	5	6302008	-117.237662	33.410915
13	Abronia villosa var. aurita	5	6302008	-117.237393	33.410405
14	Abronia villosa var. aurita	23	6302008	-117.238272	33.411986
15	Abronia villosa var. aurita	25	6302008	-117.238007	33.411635
16	Abronia villosa var. aurita	10	6302008	-117.237996	33.411508
17	Abronia villosa var. aurita	24	6302008	-117.237940	33.411516
18	Abronia villosa var. aurita	5	6302008	-117.237807	33.411048
19	Abronia villosa var. aurita	1	6302008	-117.237821	33.410966
20	Abronia villosa var. aurita	5	6302008	-117.237662	33.410915
21	Abronia villosa var. aurita	5	6302008	-117.237393	33.410405
22	Abronia villosa var. aurita	1	6302008	-117.238180	33.411853
23	Arctostaphylos rainbowensis	2	6202008	-117.227198	33.405890
24	Arctostaphylos rainbowensis	28	6202008	-117.226367	33.405340
25	Arctostaphylos rainbowensis	31	6202008	-117.237545	33.407187
26	Arctostaphylos rainbowensis	10	6202008	-117.246867	33.432901
27	Arctostaphylos rainbowensis	5	6202008	-117.247386	33.415416
28	Arctostaphylos rainbowensis	8	6272008	-117.251217	33.430758
29	Arctostaphylos rainbowensis	5	6272008	-117.249686	33.420491
30	Arctostaphylos rainbowensis	3	6272008	-117.248879	33.419326
31	Arctostaphylos rainbowensis	3	6272008	-117.246036	33.413981
32	Arctostaphylos rainbowensis	3	6272008	-117.239977	33.417071
33	Arctostaphylos rainbowensis	1	6272008	-117.237015	33.418411
34	Arctostaphylos rainbowensis	1	6272008	-117.237015	33.418411
35	Arctostaphylos rainbowensis	10	6272008	-117.248712	33.430622
36	Arctostaphylos rainbowensis	10	6272008	-117.248712	33.430622
37	Arctostaphylos rainbowensis	10	6272008	-117.234742	33.418887
38	Arctostaphylos rainbowensis	15	6272008	-117.234793	33.418981
39	Arctostaphylos rainbowensis	10	6302008	-117.229248	33.409834
40	Arctostaphylos rainbowensis	3	6302008	-117.234965	33.412390
41	Arctostaphylos rainbowensis	10	6302008	-117.235506	33.415038
42	Arctostaphylos rainbowensis	10	6302008	-117.229248	33.409834
43	Arctostaphylos rainbowensis	3	6302008	-117.234965	33.412390
44	Arctostaphylos rainbowensis	15	6302008	-117.234283	33.417326
45	Arctostaphylos rainbowensis	2	6302008	-117.229164	33.409613
46	Arctostaphylos rainbowensis	1	6302008	-117.229959	33.409407
47	Arctostaphylos rainbowensis	3	6302008	-117.234142	33.413026
48	Arctostaphylos rainbowensis	1	6302008	-117.235907	33.409045
49	Arctostaphylos rainbowensis	2	6302008	-117.229164	33.409613
50	Arctostaphylos rainbowensis	1	6302008	-117.229959	33.409407
51	Arctostaphylos rainbowensis	3	6302008	-117.234142	33.413026
52	Arctostaphylos rainbowensis	1	6302008	-117.235907	33.409045
53	Arctostaphylos rainbowensis	25	7162008	-117.228575	33.408560
54	Polygala comuta var. fishiae	50	7092008	-117.214636	33.410977
55	Polygala comuta var. fishiae	100	7092008	-117.214442	33.410843
56	Polygala comuta var. fishiae	75	7092008	-117.216538	33.410309
57	Polygala comuta var. fishiae	250	7092008	-117.221903	33.407263
58	Polygala comuta var. fishiae	250	7092008	-117.221903	33.407263
59	Polygala comuta var. fishiae	200	7092008	-117.222980	33.406237
60	Polygala comuta var. fishiae	200	7092008	-117.222980	33.406237
61	Polygala comuta var. fishiae	1000	7092008	-117.225786	33.405216
62	Polygala comuta var. fishiae	1000	7092008	-117.225786	33.405216
63	Polygala comuta var. fishiae	5	7092008	-117.214183	33.410645
64	Polygala comuta var. fishiae	50	7092008	-117.214636	33.410977
65	Polygala comuta var. fishiae	100	7092008	-117.214442	33.410843
66	Polygala comuta var. fishiae	5	7092008	-117.214183	33.410645
67	Polygala comuta var. fishiae	75	7092008	-117.216538	33.410309
68	Polygala comuta var. fishiae	5	7092008	-117.216752	33.410166
69	Polygala comuta var. fishiae	25	7092008	-117.219788	33.408732
70	Polygala comuta var. fishiae	150	7092008	-117.220603	33.407986
71	Polygala comuta var. fishiae	25	7092008	-117.221693	33.407301
72	Polygala comuta var. fishiae	150	7092008	-117.222512	33.406648
73	Polygala comuta var. fishiae	50	7092008	-117.224053	33.405543
74	Polygala comuta var. fishiae	5	7092008	-117.216752	33.410166
75	Polygala comuta var. fishiae	150	7092008	-117.220603	33.407986
76	Polygala comuta var. fishiae	25	7092008	-117.221693	33.407301
77	Polygala comuta var. fishiae	150	7092008	-117.222512	33.406648
78	Polygala comuta var. fishiae	50	7092008	-117.224053	33.405543
79	Polygala comuta var. fishiae	25	7092008	-117.219788	33.408732

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 06/30/2008

For Office Use Only

Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Abronia villosa var aurita*

Common Name: Chaparral sand-verbena

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 279 Subsequent Visit? ☐ yes ☐ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☐ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Melissa Tu & Carolyn Martus
Address: TEC Inc
514 Via de la Valle Suite 308 San Diego, CA 92075
E-mail Address: mmtu@tecinc.com
Phone: (858) 509-3157

Plant Information

Phenology: _____% vegetative 50 % flowering 50 % fruiting

Animal Information

# adults	# juveniles	# larvae	# egg masses	# unknown

☐ breeding ☐ wintering ☐ burrow site ☐ rookery ☐ nesting ☐ other

Location Description ***(please attach map AND/OR fill out your choice of coordinates, below)***

County: San Diego Landowner / Mgr.: Fallbrook Public Utility District
Quad Name: Fallbrook & Temecula Elevation: _____
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): GPS
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ GPS Make & Model Thales Mobile Mapper
DATUM: **NAD27** ☐ **NAD83** ☐ **WGS84** ☐ Horizontal Accuracy _____ meters/feet
Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☐ ***OR*** Geographic (Latitude & Longitude) ☑
Coordinates: See attached excel spreadsheet ID 1-22

Habitat Description *(plant communities, dominants, associates, substrates/soils, aspects/slope):*
Sandy riparian edge along Santa Margarita River bordered by chaparral. Dominants included Baccharis salicifolia and Salix spp.

Other rare taxa seen at THIS site on THIS date: Rainbow manzanita
(separate form preferred)

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☐ Good ☑ Fair ☐ Poor
Immediate AND surrounding land use: Hiking trails and avocado groves
Visible disturbances: People, dogs, horses, fires, weeds
Threats: Fire, invasive plants, humans, horses and off leash dogs
Comments: Collection was made at SDNHM

Determination: *(check one or more, and fill in blanks)*
☐ Keyed (cite reference): _____
☑ Compared with specimen housed at: SDNHM
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☐ Other: _____

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☑
Habitat	☐	☐	☐
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes ☑ no ☐

DFG/BDB/1747 Rev. 6/16/08

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): See attached

For Office Use Only

Source Code _____ Quad Code _____
Elm Code _____ Occ. No _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: Polygala cornuta var. fishiae

Common Name:

Species Found? ☑ Yes ☐ No _____ If not why?

Total No. Individuals 2,085 Subsequent Visit? ☐ yes ☐ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☑ unk.

Collection? If yes: ? Number SDNHM Museum / Herbarium

Reporter: _____

Address: Carolyn O. Martus
3685 Harding St
Carlsbad, CA 92008

E-mail Address: _____

Phone: 760 434 5033 c_martus@yahoo.com

Plant Information

Phenology: _____% vegetative 55 % flowering 50 % fruiting

Animal Information

adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown _____

☐ breeding ☐ wintering ☐ burrow site ☐ rookery ☐ nesting ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

See attached 71-79 ID#

County: San Diego Landowner / Mgr: Fallbrook Public Utility District

Quad Name: _____ Elevation: _____

T____ R____ Sec ____, ____ ¼ of ____ ¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): GPS

T____ R____ Sec ____, ____ ¼ of ____ ¼, Meridian: H☐ M☐ S☐ GPS Make & Model ~~58~~

DATUM: NAD27 ☐ NAD83 ☐ WGS84 ☑ Horizontal Accuracy submeter meters/fee

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☐ *OR* Geographic (Latitude & Longitude) ☐

Coordinates: See attached ID# 71-79

Habitat Description *(plant communities, dominants, associates, substrates/soils, aspects/slope):*

Common component of oak (Quercus agrifolia) understory.

Other rare taxa seen at THIS site on THIS date:
(separate form preferred)

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☐ Good ☑ Fair ☐ Poor

Immediate AND surrounding land use:

Visible disturbances: Humans, horses, fire, weeds, off-leash dogs

Threats: Weeds, Fire, Humans, horses, off-leash dogs

Comments:

Determination: *(check one or more, and fill in blanks)*

☐ Keyed (cite reference): _____
☑ Compared with specimen housed at: SDNHM
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☐ Other: _____

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☑
Habitat	☐	☐	☑
Diagnostic feature	☐	☐	☑

May we obtain duplicates at our expense? yes ☑ no ☐

Appendix D

Record of Non-Applicability and Air Quality Data

[This Page Intentionally Left Blank]

UNITED STATES MARINE CORPS
MARINE CORPS INSTALLATIONS WEST-MARINE CORPS BASE
BOX 555010
CAMP PENDLETON, CALIFORNIA 92055-5010

5090
ENV/PLN

MEMORANDUM FOR THE RECORD

From: Commanding General
To: Director, Environmental Security

Subj: RECORD OF NON-APPLICABILITY (RONA) FOR NEPA xxxxxx; SANTA MARGARITA RIVER CONJUNCTIVE USE PROJECT, MCB CAMP PENDLETON, DET FALLBROOK, AND COMMUNITY OF FALLBROOK, CALIFORNIA

Ref: (a) U.S. Environmental Protection Agency, Determining Conformity of General Federal Actions to State or Federal Implementation Plans; Final Rule, published in the Federal Register on 30 November 1993 (40 CFR Parts 6, 51, and 93)
(b) U.S. Environmental Protection Agency, Revisions to the General Conformity Regulations; Final Rule, published in the Federal Register on 5 April 2010 (40 CFR Parts 51 and 93)
(c) OPNAVINST 5090.1C (Appendix F)

Encl: (1) Santa Margarita River Conjunctive Use Project Emissions Analysis for Clean Air Act Conformity Applicability

1. References (a), (b), and (c) provide implementing guidance for documenting Clean Air Act (CAA) Conformity Determination requirements. The General Conformity Rule applies to federal actions proposed within areas which are designated as either non-attainment or maintenance areas for a National Ambient Air Quality Standard (NAAQS) for any of the criteria pollutants.

2. The Proposed Action would occur within the San Diego Air Basin (SDAB) at DET Fallbrook and the community of Fallbrook, California, and the San Diego Air Basin (SDAB) portion of Marine Corps Base Camp Pendleton. This portion of the SDAB is currently in non-attainment of the 8-hour ozone (O_3) NAAQS and is a maintenance area for carbon monoxide (CO) NAAQS. The SDAB is in attainment of the NAAQS for all other criteria pollutants. Therefore, only project emissions of CO and O_3 (or its precursors, volatile organic compounds [VOCs] and oxides of

nitrogen [NO_x]) were analyzed for conformity rule applicability. The annual *de minimis* threshold levels for this region are 100 tons of VOC, NO_x, and CO. Federal actions may be exempt from conformity determinations if they do not exceed designated *de minimis* threshold levels.

3. An emissions analysis for the Santa Margarita River Conjunctive Use Project is presented in the enclosure. *De minimis* thresholds for applicable criteria pollutants would not be exceeded as a result of implementation of the Proposed Action and a formal Conformity Determination is not considered necessary.

4. To the best of my knowledge, the information presented in this RONA is correct and accurate, and I concur in the finding that implementation of the Proposed Action does not require a formal CAA Conformity Determination.

VINCENT A. COGLIANESE

Copy to:
File
ENV

Table A-1
Santa Margarita River Conjunctive Use Project
Construction Equipment Emissions

Improvements to Existing Facilities

Replacement of Existing Sheet Pile Diversion with Inflatable Diversion Structure (Alt1, Alt2)	Fuel	HP	Load Factor	Emission Factors, g/bhp-hr									No of Equipment	Hrs/day	Months	Emissions, lbs/day									Emissions, tons/year								
Equipment				CO	VOC	NOx	SOx	PM10	PM2.5	CO2	CH4	N2O				CO	VOC	NOx	SOx	PM10	PM2.5	CO2	CH4	N2O	CO	VOC	NOx	SOx	PM10	PM2.5	CO2	CH4	N2O
Tractors/Loaders/Backhoes	Diesel	108	55	4.07	1.19	7.16	0.007	0.654	0.582	568.3	0.108	0.680	2	8	2	8.53	2.49	15.00	0.01	1.37	1.22	1190.75	0.23	1.43	0.22	0.06	0.39	0.00	0.04	0.03	30.96	0.01	0.04
Dump Trucks	Diesel	479	57	1.82	0.57	5.55	0.006	0.295	0.263	568.3	0.051	0.527	2	8	2	17.53	5.49	53.45	0.06	2.84	2.53	5473.24	0.49	5.08	0.46	0.14	1.39	0.00	0.07	0.07	142.30	0.01	0.13
Bulldozers	Diesel	357	59	4.25	0.83	7.51	0.006	0.32	0.285	568.3	0.075	0.713	1	8	2	15.79	3.08	27.90	0.02	1.19	1.06	2111.18	0.28	2.65	0.41	0.08	0.73	0.00	0.03	0.03	54.89	0.01	0.07
Crane	Diesel	399	43	2.44	0.63	6.27	0.006	0.243	0.216	568.3	0.053	0.596	1	8	2	7.38	1.91	18.97	0.02	0.74	0.65	1719.67	0.16	1.80	0.19	0.05	0.49	0.00	0.02	0.02	44.71	0.00	0.05
Rough Terrain Forklift	Diesel	93	60	4.14	1.28	7.55	0.007	0.69	0.614	568.3	0.115	0.717	1	8	2	4.07	1.26	7.43	0.01	0.68	0.60	559.29	0.11	0.71	0.11	0.03	0.19	0.00	0.02	0.02	14.54	0.00	0.02
																53.30	**14.23**	**122.76**	**0.12**	**6.81**	**6.06**	**11054.13**	**1.27**	**11.66**	**1.39**	**0.37**	**3.19**	**0.00**	**0.18**	**0.16**	**287.41**	**0.03**	**0.30**

Improvements to O'Neill Ditch and Headgate (Alt1, Alt2)	Fuel	HP	Load Factor	Emission Factors, g/bhp-hr									No of Equipment	Hrs/day	Months	Emissions, lbs/day									Emissions, tons/year								
Equipment				CO	VOC	NOx	SOx	PM10	PM2.5	CO2	CH4	N2O				CO	VOC	NOx	SOx	PM10	PM2.5	CO2	CH4	N2O	CO	VOC	NOx	SOx	PM10	PM2.5	CO2	CH4	N2O
Excavator	Diesel	168	57	2.19	0.59	6.15	0.006	0.229	0.204	568.3	0.053	0.584	1	8	3	3.70	1.00	10.39	0.01	0.39	0.34	959.82	0.09	0.99	0.14	0.04	0.41	0.00	0.02	0.01	37.43	0.00	0.04
Tractors/Loaders/Backhoes	Diesel	108	55	4.07	1.19	7.16	0.007	0.654	0.582	568.3	0.108	0.680	2	8	3	8.53	2.49	15.00	0.01	1.37	1.22	1190.75	0.23	1.43	0.33	0.10	0.59	0.00	0.05	0.05	46.44	0.01	0.06
Bulldozers	Diesel	357	59	4.25	0.83	7.51	0.006	0.32	0.285	568.3	0.075	0.713	1	8	3	15.79	3.08	27.90	0.02	1.19	1.06	2111.18	0.28	2.65	0.62	0.12	1.09	0.00	0.05	0.04	82.34	0.01	0.10
																28.01	**6.57**	**53.29**	**0.05**	**2.95**	**2.62**	**4261.74**	**0.59**	**5.06**	**1.09**	**0.26**	**2.08**	**0.00**	**0.11**	**0.10**	**166.21**	**0.02**	**0.20**

Improvements to Recharge Ponds 1-7 (Alt1, Alt2)	Fuel	HP	Load Factor	Emission Factors, g/bhp-hr									No of Equipment	Hrs/day	Months	Emissions, lbs/day									Emissions, tons/year								
Equipment				CO	VOC	NOx	SOx	PM10	PM2.5	CO2	CH4	N2O				CO	VOC	NOx	SOx	PM10	PM2.5	CO2	CH4	N2O	CO	VOC	NOx	SOx	PM10	PM2.5	CO2	CH4	N2O
Excavator	Diesel	168	57	2.19	0.59	6.15	0.006	0.229	0.204	568.3	0.053	0.584	1	4	1	1.85	0.50	5.19	0.01	0.19	0.17	479.91	0.04	0.49	0.02	0.01	0.07	0.00	0.00	0.00	6.24	0.00	0.01
Tractors/Loaders/Backhoes	Diesel	108	55	4.07	1.19	7.16	0.007	0.654	0.582	568.3	0.108	0.680	1	4	1	2.13	0.62	3.75	0.00	0.34	0.30	297.69	0.06	0.36	0.03	0.01	0.05	0.00	0.00	0.00	3.87	0.00	0.00
																3.98	**1.12**	**8.94**	**0.01**	**0.54**	**0.48**	**777.60**	**0.10**	**0.85**	**0.05**	**0.01**	**0.12**	**0.00**	**0.01**	**0.01**	**10.11**	**0.00**	**0.01**

Proposed New Facilities

Production Wells and Collection System (Alt1, Alt2)	Fuel	HP	Load Factor	Emission Factors, g/bhp-hr									No of Equipment	Hrs/day	Months	Emissions, lbs/day									Emissions, tons/year								
Equipment				CO	VOC	NOx	SOx	PM10	PM2.5	CO2	CH4	N2O				CO	VOC	NOx	SOx	PM10	PM2.5	CO2	CH4	N2O	CO	VOC	NOx	SOx	PM10	PM2.5	CO2	CH4	N2O
Drill Rig	Diesel	291	75	3.16	0.7	6.71	0.006	0.271	0.241	568.3	0.063	0.637	1	8	1.5	12.16	2.69	25.83	0.02	1.04	0.93	2187.55	0.24	2.45	0.24	0.05	0.50	0.00	0.02	0.02	42.66	0.00	0.05
Tractors/Loaders/Backhoes	Diesel	108	55	4.07	1.19	7.16	0.007	0.654	0.582	568.3	0.108	0.680	2	8	1.5	8.53	2.49	15.00	0.01	1.37	1.22	1190.75	0.23	1.43	0.17	0.05	0.29	0.00	0.03	0.02	23.22	0.00	0.03
																20.69	**5.19**	**40.83**	**0.04**	**2.41**	**2.15**	**3378.30**	**0.47**	**3.88**	**0.40**	**0.10**	**0.80**	**0.00**	**0.05**	**0.04**	**65.88**	**0.01**	**0.08**

Gallery Wells and Collection System (Alt2)	Fuel	HP	Load Factor	Emission Factors, g/bhp-hr									No of Equipment	Hrs/day	Months	Emissions, lbs/day									Emissions, tons/year								
Equipment				CO	VOC	NOx	SOx	PM10	PM2.5	CO2	CH4	N2O				CO	VOC	NOx	SOx	PM10	PM2.5	CO2	CH4	N2O	CO	VOC	NOx	SOx	PM10	PM2.5	CO2	CH4	N2O
Drill Rig	Diesel	291	75	3.16	0.7	6.71	0.006	0.271	0.241	568.3	0.063	0.637	1	8	3	12.16	2.69	25.83	0.02	1.04	0.93	2187.55	0.24	2.45	0.47	0.11	1.01	0.00	0.04	0.04	85.31	0.01	0.10
Tractors/Loaders/Backhoes	Diesel	108	55	4.07	1.19	7.16	0.007	0.654	0.582	568.3	0.108	0.680	2	8	3	8.53	2.49	15.00	0.01	1.37	1.22	1190.75	0.23	1.43	0.33	0.10	0.59	0.00	0.05	0.05	46.44	0.01	0.06
Excavator	Diesel	168	57	2.19	0.59	6.15	0.006	0.229	0.204	568.3	0.053	0.584	1	8	3	3.70	1.00	10.39	0.01	0.39	0.34	959.82	0.09	0.99	0.14	0.04	0.41	0.00	0.02	0.01	37.43	0.00	0.04
																24.39	**6.18**	**51.22**	**0.05**	**2.80**	**2.49**	**4338.12**	**0.56**	**4.87**	**0.95**	**0.24**	**2.00**	**0.00**	**0.11**	**0.10**	**169.19**	**0.02**	**0.19**

Water Treatment Plant for FPUD (Alt1)	Fuel	HP	Load Factor	Emission Factors, g/bhp-hr									No of Equipment	Hrs/day	Months	Emissions, lbs/day									Emissions, tons/year								
Equipment				CO	VOC	NOx	SOx	PM10	PM2.5	CO2	CH4	N2O				CO	VOC	NOx	SOx	PM10	PM2.5	CO2	CH4	N2O	CO	VOC	NOx	SOx	PM10	PM2.5	CO2	CH4	N2O
Excavators	Diesel	168	57	2.19	0.59	6.15	0.006	0.229	0.204	568.3	0.053	0.584	2	8	6	7.40	1.99	20.77	0.02	0.77	0.69	1919.63	0.18	1.97	0.58	0.16	1.62	0.00	0.06	0.05	149.73	0.01	0.15
Backhoe	Diesel	108	55	4.07	1.19	7.16	0.007	0.654	0.582	568.3	0.108	0.680	2	8	6	8.53	2.49	15.00	0.01	1.37	1.22	1190.75	0.23	1.43	0.67	0.19	1.17	0.00	0.11	0.10	92.88	0.02	0.11
Loaders	Diesel	108	55	4.07	1.19	7.16	0.007	0.654	0.582	568.3	0.108	0.680	2	8	6	8.53	2.49	15.00	0.01	1.37	1.22	1190.75	0.23	1.43	0.67	0.19	1.17	0.00	0.11	0.10	92.88	0.02	0.11
Dump Trucks	Diesel	479	57	1.82	0.57	5.55	0.006	0.295	0.263	568.3	0.051	0.527	2	8	6	17.53	5.49	53.45	0.06	2.84	2.53	5473.24	0.49	5.08	1.37	0.43	4.17	0.00	0.22	0.20	426.91	0.04	0.40
Crane	Diesel	399	43	2.44	0.63	6.27	0.006	0.243	0.216	568.3	0.053	0.596	1	8	6	7.38	1.91	18.97	0.02	0.74	0.65	1719.67	0.16	1.80	0.58	0.15	1.48	0.00	0.06	0.05	134.13	0.01	0.14
Bobcat	Diesel	44	55	6.07	2.25	5.68	0.007	0.578	0.514	568.3	0.203	0.540	1	8	6	2.59	0.96	2.42	0.00	0.25	0.22	242.56	0.09	0.23	0.20	0.07	0.19	0.00	0.02	0.02	18.92	0.01	0.02
Compactor	Diesel	8	43	3.47	0.68	4.33	0.009	0.274	0.244	568.3	0.061	0.411	1	8	6	0.21	0.04	0.26	0.00	0.02	0.01	34.48	0.00	0.02	0.02	0.00	0.02	0.00	0.00	0.00	2.69	0.00	0.00
Compressor	Diesel	106	48	4.08	1.32	7.76	0.007	0.686	0.611	568.3	0.119	0.737	1	8	6	3.66	1.18	6.96	0.01	0.62	0.55	509.98	0.11	0.66	0.29	0.09	0.54	0.00	0.05	0.04	39.78	0.01	0.05
Welder	Diesel	45	45	6.72	2.86	6.06	0.007	0.662	0.589	568.3	0.258	0.576	1	8	6	2.40	1.02	2.16	0.00	0.24	0.21	202.97	0.09	0.21	0.19	0.08	0.17	0.00	0.02	0.02	15.83	0.01	0.02
Wackers	Diesel	16	38	2.35	0.71	4.64	0.007	0.274	0.244	568.3	0.064	0.441	1	8	6	0.25	0.08	0.50	0.00	0.03	0.03	60.94	0.01	0.05	0.02	0.01	0.04	0.00	0.00	0.00	4.75	0.00	0.00
Paver	Diesel	100	62	4.4	1.5	8.75	0.007	0.759	0.676	568.3	0.135	0.831	1	8	6	4.81	1.64	9.57	0.01	0.83	0.74	621.44	0.15	0.91	0.38	0.13	0.75	0.00	0.06	0.06	48.47	0.01	0.07
																63.29	**19.30**	**145.08**	**0.15**	**9.07**	**8.07**	**13166.41**	**1.73**	**13.78**	**4.94**	**1.51**	**11.32**	**0.01**	**0.71**	**0.63**	**1026.98**	**0.13**	**1.08**

Expand Existing Water Treatment Plant and New Surface WTP at Haybarn Canyon (Alt2)	Fuel	HP	Load Factor	Emission Factors, g/bhp-hr									No of Equipment	Hrs/day	Months	Emissions, lbs/day									Emissions, tons/year								
Equipment				CO	VOC	NOx	SOx	PM10	PM2.5	CO2	CH4	N2O				CO	VOC	NOx	SOx	PM10	PM2.5	CO2	CH4	N2O	CO	VOC	NOx	SOx	PM10	PM2.5	CO2	CH4	N2O
Excavators	Diesel	168	57	2.19	0.59	6.15	0.006	0.229	0.2038	568.3	0.053	0.584	2	8	6	7.40	1.99	20.77	0.02	0.77	0.69	1919.63	0.18	1.97	0.58	0.16	1.62	0.00	0.06	0.05	149.73	0.01	0.15
Backhoe	Diesel	108	55	4.07	1.19	7.16	0.007	0.654	0.5821	568.3	0.108	0.680	2	8	6	8.53	2.49	15.00	0.01	1.37	1.22	1190.75	0.23	1.43	0.67	0.19	1.17	0.00	0.11	0.10	92.88	0.02	0.11
Loaders	Diesel	108	55	4.07	1.19	7.16	0.007	0.654	0.5821	568.3	0.108	0.680	2	8	6	8.53	2.49	15.00	0.01	1.37	1.22	1190.75	0.23	1.43	0.67	0.19	1.17	0.00	0.11	0.10	92.88	0.02	0.11
Dump Trucks	Diesel	479	57	1.82	0.57	5.55	0.006	0.295	0.2626	568.3	0.051	0.527	2	8	6	17.53	5.49	53.45	0.06	2.84	2.53	5473.24	0.49	5.08	1.37	0.43	4.17	0.00	0.22	0.20	426.91	0.04	0.40
Crane	Diesel	399	43	2.44	0.63	6.27	0.006	0.243	0.2163	568.3	0.053	0.596	1	8	6	7.38	1.91	18.97	0.02	0.74	0.65	1719.67	0.16	1.80	0.58	0.15	1.48	0.00	0.06	0.05	134.13	0.01	0.14
Bobcat	Diesel	44	55	6.07	2.25	5.68	0.007	0.578	0.5144	568.3	0.203	0.540	1	8	6	2.59	0.96	2.42	0.00	0.25	0.22	242.56	0.09	0.23	0.20	0.07	0.19	0.00	0.02	0.02	18.92	0.01	0.02
Compactor	Diesel	8	43	3.47	0.68	4.33	0.009	0.274	0.2439	568.3	0.061	0.411	1	8	6	0.21	0.04	0.26	0.00	0.02	0.01	34.48	0.00	0.02	0.02	0.00	0.02	0.00	0.00	0.00	2.69	0.00	0.00
Compressor	Diesel	106	48	4.08	1.32	7.76	0.007	0.686	0.6105	568.3	0.119	0.737	1	8	6	3.66	1.18	6.96	0.01	0.62	0.55	509.98	0.11	0.66	0.29	0.09	0.54	0.00	0.05	0.04	39.78	0.01	0.05
Welder	Diesel	45	45	6.72	2.86	6.06	0.007	0.662	0.5892	568.3	0.258	0.576	1	8	6	2.40	1.02	2.16	0.00	0.24	0.21	202.97	0.09	0.21	0.19	0.08	0.17	0.00	0.02	0.02	15.83	0.01	0.02
Wackers	Diesel	16	38	2.35	0.71	4.64	0.007	0.274	0.2439	568.3	0.064	0.441	1	8	6	0.25	0.08	0.50	0.00	0.03	0.03	60.94	0.01	0.05	0.02	0.01	0.04	0.00	0.00	0.00	4.75	0.00	0.00
Paver	Diesel	100	62	4.4	1.5	8.75	0.007	0.759	0.6755	568.3	0.135	0.831	1	8	6	4.81	1.64	9.57	0.01	0.83	0.74	621.44	0.15	0.91	0.38	0.13	0.75	0.00	0.06	0.06	48.47	0.01	0.07
																63.29	**19.30**	**145.08**	**0.15**	**9.07**	**8.07**	**13166.41**	**1.73**	**13.78**	**4.94**	**1.51**	**11.32**	**0.01**	**0.71**	**0.63**	**1026.98**	**0.13**	**1.08**

Water Conveyance/Distribution System to Red Mountain Reservoir (Alt1)	Fuel	HP	Load Factor	Emission Factors, g/bhp-hr									No of Equipment	Hrs/day	Months	Emissions, lbs/day									Emissions, tons/year								
Equipment				CO	VOC	NOx	SOx	PM10	PM2.5	CO2	CH4	N2O				CO	VOC	NOx	SOx	PM10	PM2.5	CO2	CH4	N2O	CO	VOC	NOx	SOx	PM10	PM2.5	CO2	CH4	N2O
Rough Terrain Forklift	Diesel	93	60	4.14	1.28	7.55	0.007	0.69	0.614	568.3	0.115	0.717	2	8	3	8.15	2.52	14.86	0.01	1.36	1.21	1118.58	0.23	1.41	0.32	0.10	0.58	0.00	0.05	0.05	43.62	0.01	0.06
Excavators	Diesel	168	57	2.19	0.59	6.15	0.006	0.229	0.204	568.3	0.053	0.584	4	8	3	14.79	3.99	41.55	0.04	1.55	1.38	3839.27	0.36	3.95	0.58	0.16	1.62	0.00	0.06	0.05	149.73	0.01	0.15
Trencher	Diesel	63	75	4.35	1.47	8.72	0.007	0.734	0.653	568.3	0.133	0.828	1	8	3	3.63	1.23	7.27	0.01	0.61	0.54	473.59	0.11	0.69	0.14	0.05	0.28	0.00	0.02	0.02	18.47	0.00	0.03
Compactor	Diesel	8	43	3.47	0.68	4.33	0.009	0.274	0.244	568.3	0.061	0.411	2	8	3	0.42	0.08	0.53	0.00	0.03	0.03	68.96	0.01	0.05	0.02	0.00	0.02	0.00	0.00	0.00	2.69	0.00	0.00
Backhoe	Diesel	108	55	4.07	1.19	7.16	0.007	0.654	0.582	568.3	0.108	0.680	1	8	2	4.26	1.25	7.50	0.01	0.69	0.61	595.38	0.11	0.71	0.11	0.03	0.20	0.00	0.02	0.02	15.48	0.00	0.02
Loaders	Diesel	108	55	4.07	1.19	7.16	0.007	0.654	0.582	568.3	0.108	0.680	1	8	2	4.26	1.25	7.50	0.01	0.69	0.61	595.38	0.11	0.71	0.11	0.03	0.20	0.00	0.02	0.02	15.48	0.00	0.02
Dump Trucks	Diesel	479	57	1.82	0.57	5.55	0.006	0.295	0.263	568.3	0.051	0.527	1	8	2	8.76	2.74	26.73	0.03	1.42	1.26	2736.62	0.25	2.54	0.23	0.07	0.69	0.00	0.04	0.03	71.15	0.01	0.07
Crane	Diesel	399	43	2.44	0.63	6.27	0.006	0.243	0.216	568.3	0.053	0.596	1	8	2	7.38	1.91	18.97	0.02	0.74	0.65	1719.67	0.16	1.80	0.19	0.05	0.49	0.00	0.02	0.02	44.71	0.00	0.05
Paver	Diesel	100	62	4.4	1.5	8.75	0.007	0.759	0.676	568.3	0.135	0.831	1	8	2	4.81	1.64	9.57	0.01	0.83	0.74	621.44	0.15	0.91	0.13	0.04	0.25	0.00	0.02	0.02	16.16	0.00	0.02
																56.48	**16.60**	**134.47**	**0.13**	**7.91**	**7.04**	**11768.88**	**1.48**	**12.77**	**1.82**	**0.53**	**4.33**	**0.00**	**0.25**	**0.22**	**377.50**	**0.05**	**0.41**

Water Conveyance/Distribution System to Gheen Zone (Alt2)	Fuel	HP	Load Factor	Emission Factors, g/bhp-hr									No of Equipment	Hrs/day	Months	Emissions, lbs/day									Emissions, tons/year								
Equipment				CO	VOC	NOx	SOx	PM10	PM2.5	CO2	CH4	N2O				CO	VOC	NOx	SOx	PM10	PM2.5	CO2	CH4	N2O	CO	VOC	NOx	SOx	PM10	PM2.5	CO2	CH4	N2O
Rough Terrain Forklift	Diesel	93	60	4.14	1.28	7.55	0.007	0.69	0.614	568.3	0.115	0.717	2	8	3	8.15	2.52	14.86	0.01	1.36	1.21	1118.58	0.23	1.41	0.32	0.10	0.58	0.00	0.05	0.05	43.62	0.01	0.06
Excavators	Diesel	168	57	2.19	0.59	6.15	0.006	0.229	0.204	568.3	0.053	0.584	4	8	3	14.79	3.99	41.55	0.04	1.55	1.38	3839.27	0.36	3.95	0.58	0.16	1.62	0.00	0.06	0.05	149.73	0.01	0.15
Trencher	Diesel	63	75	4.35	1.47	8.72	0.007	0.734	0.653	568.3	0.133	0.828	1	8	3	3.63	1.23	7.27	0.01	0.61	0.54	473.59	0.11	0.69	0.14	0.05	0.28	0.00	0.02	0.02	18.47	0.00	0.03
Compactor	Diesel	8	43	3.47	0.68	4.33	0.009	0.274	0.244	568.3	0.061	0.411	2	8	3	0.42	0.08	0.53	0.00	0.03	0.03	68.96	0.01	0.05	0.02	0.00	0.02	0.00	0.00	0.00	2.69	0.00	0.00
Backhoe	Diesel	108	55	4.07	1.19	7.16	0.007	0.654	0.582	568.3	0.108	0.680	1	8	2	4.26	1.25	7.50	0.01	0.69	0.61	595.38	0.11	0.71	0.11	0.03	0.20	0.00	0.02	0.02	15.48	0.00	0.02
Loaders	Diesel	108	55	4.07	1.19	7.16	0.007	0.654	0.582	568.3	0.108	0.680	1	8	2	4.26	1.25	7.50	0.01	0.69	0.61	595.38	0.11	0.71	0.11	0.03	0.20	0.00	0.02	0.02	15.48	0.00	0.02
Dump Trucks	Diesel	479	57	1.82	0.57	5.55	0.006	0.295	0.263	568.3	0.051	0.527	1	8	2	8.76	2.74	26.73	0.03	1.42	1.26	2736.62	0.25	2.54	0.23	0.07	0.69	0.00	0.04	0.03	71.15	0.01	0.07
Crane	Diesel	399	43	2.44	0.63	6.27	0.006	0.243	0.216	568.3	0.053	0.596	1	8	2	7.38	1.91	18.97	0.02	0.74	0.65	1719.67	0.16	1.80	0.19	0.05	0.49	0.00	0.02	0.02	44.71	0.00	0.05
Paver	Diesel	100	62	4.4	1.5	8.75	0.007	0.759	0.676	568.3	0.135	0.831	1	8	2	4.81	1.64	9.57	0.01	0.83	0.74	621.44	0.15	0.91	0.13	0.04	0.25	0.00	0.02	0.02	16.16	0.00	0.02
																56.48	**16.60**	**134.47**	**0.13**	**7.91**	**7.04**	**11768.88**	**1.48**	**12.77**	**1.82**	**0.53**	**4.33**	**0.00**	**0.25**	**0.22**	**377.50**	**0.05**	**0.41**

Alternative Totals

Table A-2
Santa Margarita River Conjunctive Use Project
Construction Truck Emissions

Vehicle Class	No. of Trucks Per Construction Phase	Speed (mph)	VMT (mi/vehicle-day)	CO Running Exhaust (g/mi)	NO_X Running Exhaust (g/mi)	VOC Running Exhaust (g/mi)	SOx Running Exhaust (g/mi)	PM10 Running Exhaust (g/mi)	PM10 Tire Wear (g/mi)	PM10 Brake Wear (g/mi)	PM2.5 Running Exhaust (g/mi)	PM2.5 Tire Wear (g/mi)	PM2.5 Brake Wear (g/mi)	CO2 Running Exhaust (g/mi)	CH4 Running Exhaust (g/mi)
Heavy-duty truck	15	27	40	6.303	17.209	1.262	0.019	0.713	0.036	0.028	0.656	0.009	0.012	1992.7	0.059

Emissions, lbs/day							
CO	NOx	VOCs	SOx	PM10	PM2.5	CO2	CH4
8.34	**22.76**	**1.67**	**0.03**	**1.03**	**0.90**	**2635.9**	**0.08**

Emissions, tons/year							
CO	NOx	VOCs	SOx	PM10	PM2.5	CO2	CH4
1.04	**2.85**	**0.21**	**0.00**	**0.13**	**0.11**	**329.48**	**0.01**

Emission Factors from EMFAC2007, Year 2009, 60 F, 27 mph

Unpaved Road Emissions		PM10	PM2.5
E = k(s/12)^a(W/3)^b	k	1.5	0.15
Assume s = 8.5	a	0.9	0.9
Assume W = 10	b	0.45	0.45
Assume 5 miles of travel per vehicle per day			
Emission Factor		1.8906	0.1891
Control Efficiency		61%	61%
Emissions, lbs/day		55.30	5.53
Emissions, tons/year		6.91	0.69

Table A-3
Santa Margarita River Conjunctive Use Project
Worker Vehicle Emissions

Construction Phase	Vehicle Class	No. of Workers Per Construction Phase	Speed (mph)	VMT (mi/vehicle-day)	CO Running Exhaust (g/mi)	CO Start-Up (g/start)[a]	NO_X Running Exhaust (g/mi)	NO_X Start-Up (g/start)[a]	VOCs Running Exhaust (g/mi)	VOCs Start-Up (g/start)[a]	VOCs Hot-Soak (g/trip)	VOCs Resting Loss (g/hr)	VOCs Running Evaporative (g/mi)	VOCs Diurnal Evaporative (g/hr)	SOx Running Exhaust (g/mi)	SOx Start-Up (g/start)[a]	PM10 Running Exhaust (g/mi)	PM10 Start-Up (g/start)[a]	PM10 Tire Wear (g/mi)	PM10 Brake Wear (g/mi)	PM2.5 Running Exhaust (g/mi)	PM2.5 Start-Up (g/start)[a]	PM2.5 Tire Wear (g/mi)	PM2.5 Brake Wear (g/mi)	CO2 Running Exhaust (g/mi)	CO2 Start-Up (g/start)[a]	CH4 Running Exhaust (g/mi)	CH4 Start-Up (g/start)[a]
All	Light-duty truck, catalyst	50	33	40	2.924	11.289	0.284	0.56	0.055	0.816	0.183	0.024	0.047	0.054	0.004	0.002	0.013	0.016	0.008	0.013	0.011	0.014	0.002	0.005	399.538	203.967	0.027	0.046

Assume startup after 8 hours
Assume 45 minutes run
2009 Emission Factors

Emissions, lbs/day								
CO	NOx	VOCs	SOx	PM10	PM2.5	CO2	CH4
14.14	1.31	0.65	0.02	0.15	0.08	1784.15	0.12

Emissions, tons/year							
CO	NOx	VOCs	SOx	PM10	PM2.5	CO2	CH4
1.77	0.16	0.08	0.00	0.02	0.01	223.02	0.02
						26.76	0.0019

Table A-4
Santa Margarita River Conjunctive Use Project
Operational Maintenance Activities
Heavy Equipment Emissions

Operational Maintenance Activities

Maintenance Recharge Ponds 1-7 (Alt1, Alt2)	**Fuel**	**HP**	**Load Factor**	**Emission Factors, g/bhp-hr**									**No of Equipment**	**Hrs/day**	**Months**	**Emissions, lbs/day**									**Emissions, tons/year**								
Equipment				**CO**	**VOC**	**NOx**	**SOx**	**PM10**	**PM2.5**	**CO2**	**CH4**	**N2O**				**CO**	**VOC**	**NOx**	**SOx**	**PM10**	**PM2.5**	**CO2**	**CH4**	**N2O**	**CO**	**VOC**	**NOx**	**SOx**	**PM10**	**PM2.5**	**CO2**	**CH4**	**N2O**
Excavator	Diesel	168	57	2.19	0.59	6.15	0.006	0.229	0.204	568.3	0.053	0.584	1	4	1	1.85	0.50	5.19	0.01	0.19	0.17	479.91	0.04	0.49	0.02	0.01	0.07	0.00	0.00	0.00	6.24	0.00	0.01
Tractors/Loaders/Backhoes	Diesel	108	55	4.07	1.19	7.16	0.007	0.654	0.582	568.3	0.108	0.680	1	4	1	2.13	0.62	3.75	0.00	0.34	0.30	297.69	0.06	0.36	0.03	0.01	0.05	0.00	0.00	0.00	3.87	0.00	0.00
																3.98	**1.12**	**8.94**	**0.01**	**0.54**	**0.48**	**777.60**	**0.10**	**0.85**	**0.05**	**0.01**	**0.12**	**0.00**	**0.01**	**0.01**	**10.11**	**0.00**	**0.01**

Table A-5
Santa Margarita River Conjunctive Use Project
Operational Maintenance Truck Emissions

Vehicle Class	No. of Trucks Per Construction Phase	Speed (mph)	VMT (mi/vehicle day)	CO Running Exhaust (g/mi)	NO_X Running Exhaust (g/mi)	VOC Running Exhaust (g/mi)	SOx Running Exhaust (g/mi)	PM10 Running Exhaust (g/mi)	PM10 Tire Wear (g/mi)	PM10 Brake Wear (g/mi)	PM2.5 Running Exhaust (g/mi)	PM2.5 Tire Wear (g/mi)	PM2.5 Brake Wear (g/mi)	CO2 Running Exhaust (g/mi)	CH4 Running Exhaust (g/mi)	Emissions, lbs/day CO	NOx	VOCs	SOx	PM10	PM2.5	CO2	CH4
Heavy-duty truck	15	27	40	6.303	17.209	1.262	0.019	0.713	0.036	0.028	0.656	0.009	0.012	1992.669	0.059	**8.34**	**22.76**	**1.67**	**0.03**	**1.03**	**0.90**	**2635.86**	**0.08**

Emissions, tons/year							
CO	NOx	VOCs	SOx	PM10	PM2.5	CO2	CH4
0.13	**0.34**	**0.03**	**0.00**	**0.02**	**0.01**	**39.54**	**0.00**

Emission Factors from EMFAC2007, Year 2009, 60 F, 27 mph

Unpaved Road Emissions		PM10	PM2.5
E = k(s/12)^a(W/3)^b	k	1.5	0.15
Assume s = 8.5	a	0.9	0.9
Assume W = 10	b	0.45	0.45
Assume 5 miles of travel per vehicle per day			
Emission Factor		1.890604	0.18906
Control Efficiency		61%	61%
Emissions, lbs/day		55.30017	5.530017
Emissions, tons/year		0.829503	0.08295

Table A-6
Santa Margarita River Conjunctive Use Project
Operational Worker Vehicle Emissions

Construction Phase	Vehicle Class	No. of Workers Per Construction Phase	Speed (mph)	VMT (mi/vehicle-day)	CO Running Exhaust (g/mi)	CO Start-Up (g/start)[a]	NO_X Running Exhaust (g/mi)	NO_X Start-Up (g/start)[a]	VOCs Running Exhaust (g/mi)	VOCs Start-Up (g/start)[a]	VOCs Hot-Soak (g/trip)	VOCs Resting Loss (g/hr)	VOCs Running Evaporative (g/mi)	VOCs Diurnal Evaporative (g/hr)	SOx Running Exhaust (g/mi)	SOx Start-Up (g/start)[a]	PM10 Running Exhaust (g/mi)	PM10 Start-Up (g/start)[a]	PM10 Tire Wear (g/mi)	PM10 Brake Wear (g/mi)	PM2.5 Running Exhaust (g/mi)	PM2.5 Start-Up (g/start)[a]	PM2.5 Tire Wear (g/mi)	PM2.5 Brake Wear (g/mi)	CO2 Running Exhaust (g/mi)	CO2 Start-Up (g/start)[a]	CH4 Running Exhaust (g/mi)	CH4 Start-Up (g/start)[a]	Emissions, lbs/day CO	NOx	VOCs	SOx	PM10	PM2.5	CO2	CH4
Maintenance	Light-duty truck, catalyst	50	33	40	2.924	11.289	0.284	0.56	0.055	0.816	0.183	0.024	0.047	0.054	0.004	0.002	0.013	0.016	0.008	0.013	0.011	0.014	0.002	0.005	399.538	203.967	0.027	0.046	14.14	1.31	0.65	0.02	0.15	0.08	1784.15	0.12

Assume startup after 8 hours
Assume 45 minutes run time
2009 Emission Factors from

Emissions, tons/year CO	NOx	VOCs	SOx	PM10	PM2.5	CO2	CH4
0.21	0.02	0.01	0.00	0.00	0.00	26.76	0.00

Appendix E

Agency Correspondence

[This Page Intentionally Left Blank]

OFFICE OF HISTORIC PRESERVATION
DEPARTMENT OF PARKS AND RECREATION
1725 23rd Street, Suite 100
SACRAMENTO, CA 95816-7100
(916) 445-7000 Fax: (916) 445-7053
calshpo@parks.ca.gov
www.ohp.parks.ca.gov

September 19, 2013

Reply in Reference To: USMC_2013_0322_001

Danielle Page
Head, Cultural Resource Management Branch
Assistant Chief of Staff, Environmental Security
United States Marine Corps
Box 555010
Camp Pendleton, CA 92055-5010

Re: Santa Margarita River Conjunctive Use Project (your 5090, ENV/CRS, February 13, 2013)

Dear Ms. Page:

Thank you for requesting my comments on the above cited undertaking in accordance with Section 106 of the *National Historic Preservation Act of 1966* (16 U.S.C. 470f), as amended, and its implementing regulation found at 36 CFR Part 800. The Santa Margarita River Conjunctive Use Project (SMR CUP) is a joint effort involving the Marine Corps Base Camp Pendleton (MCB Camp Pendleton), Bureau of Reclamation (BUR), and Fallbrook Public Utilities District (FPUD).

The purposes of the SMR CUP are to help meet the water demands of FPUD and MCB Camp Pendleton, to reduce dependence on imported water while maintaining watershed resources, and to improve water supply reliability by managing the yield of the lower Santa Margarita River basin, and perfecting the water rights permits that were assigned to the BUR in 1974. The SMR CUP includes some or all of the following components, which are configured differently for Action Alternatives 1 and Action Alternatives 2:

(1) Replacement of the existing diversion structure on the SMR;
(2) Improvements to O'Neill Ditch and headgate;
(3) Improvements to existing storage and recharge ponds;
(4) Installation of new production wells, gallery wells, and associated collection system infrastructure;
(5) Construction or expansion of water treatment facilities;
(6) Construction of pumping plants and a bi-directional pipeline; and
(7) Establishment of an open space management zone (OSMZ).

Action Alternatives 1 and 2 have the same general construction methods. New facilities associated with the project would be located in roadways, existing rights-of-way, and other disturbed areas as much as possible to minimize impacts to cultural resources. The direct impact areas for proposed new facilities (e.g., pump stations, groundwater production wells, and treatment facilities) would include the following: a 30-feet perimeter for parking/facility access, a fence surrounding the facility at the edge of the 30-feet perimeter, and 10-feet wide firebreak outside and surrounding the fence line. Construction related activities and temporary disturbance may also occur within a 50-feet wide buffer around these areas. During construction, existing roads would be used to provide access from public streets to staging areas, laydown and storage areas, and work zones. The staging, laydown, and storage areas

would include heavy use recreation areas with a high percentage of bare ground, areas that are currently paved or otherwise disturbed, and road shoulders.

A pedestrian survey of the SMR CUP area was conducted by ASM Affiliates during January 21-30, 2009 and they also conducted a Phase I cultural resources survey of the area in March of 2009. ASM personnel also conducted an investigation of the historic Martin Reservoir at that time. A second survey was conducted by ASM on March 21, 2012 to address changes in the design of the SMR CUP. The survey work completed by ASM personnel covered the locations identified for both SMR CUP action alternatives. The ASM surveys covered a total of 766 acres of the SMR Basin from the Marine Corps Air Station to O'Neill Lake, a 0.34 mile by 100 feet linear stretch of the OSMZ, and the historic Martin Reservoir near the City of Fallbrook. The surveys resulted in the identification of 27 cultural resources within the SMR CUP area, and those resources are summarized in Enclosure 1.

Of the 27 cultural resources identified by MCB Camp Pendleton, it has determined that seven (7) are eligible for listing on the National Register of Historic Places (NRHP), while the remaining 20 are ineligible for listing. After applying the criteria of adverse effect for the SMR CUP, MCB Camp Pendleton has imposed the following conditions to ensure that the proposed undertaking will not directly or indirectly alter the qualifying characteristics of the seven (7) eligible cultural resources (i.e., CA-SDI-10156/12599H, CA-SDI-4421, CA-SDI-12577, CA-SDI-13938, CA-SDI-13985, CA-SDI-13991, and CA-SDI-14005H [segment B]):

1. Avoidance of all historic properties identified within the APE;

2. Archaeological and Native American monitoring of all ground disturbing activities within the APE near historic properties, archaeological sites, or for any drilling or trenching operations within the SMR floodplain;

3. The development of an archaeological monitoring and discovery plan for the SMR CUP;

4. The development of a monitoring and discovery plan (reviewed and approved by the Cultural Resources Section) that will be implemented through a contract independent from the construction contract to ensure that ground disturbing activities within vicinity of any identified cultural resource are properly monitored;

5. Establish a 50 foot buffer of all NRHP eligible resources by a qualified archaeologist and Native American monitor to ensure that the proposed undertaking will not directly or indirectly alter the qualifying characteristics of any NRHP-eligible property;

6. The qualified archaeologist and Native American monitor will be approved by the Cultural Resources Section two weeks prior to the start of ground disturbing activities;

7. The qualified archaeologist is to contact the Cultural Resources Section one week prior to the start of ground disturbing activities; and

8. The submittal of a monitoring report upon completion of the project for review and approval by the Cultural Resources Section, prior to submittal of that report with the California SHPO.

With the imposed conditions listed above, MCB Camp Pendleton has determined that a finding of "No Adverse Effect" for the SMR CUP is appropriate, subject to 36 CFR 800.5(b). MCB Camp Pendleton also requested us to concur with or comment on the following determinations:

1. The following two sites are considered to be eligible for listing on the NRHP (pending completion of a formal evaluation) – CA-SDI-4421 and CA-SDI-13991;

2. The following nine sites have been determined to be ineligible for listing on the NRHP: CA-SDI-10157, CA-SDI-12628, CA-SDI-13942H, CA-SDI-13984, CA-SDI-13987, CA-SDI-13990, CA-SDI-15126, CA-SDI-14381, and Martin Reservoir.

3. For CA-SDI-10158, the Southern portion of Locus G2 has been determined to a non-contributing element of that site.

After reviewing your letter of March 13, 2013, I have the following comments:

1) In your letter, you state that you believe CA-SDI-4421 and CA-SDI-13991 to be eligible for listing on the NRHP pending completion of a formal evaluation. I recommend that you treat both sites as being eligible for the purposes of the SMR CUP and ensure that those sites are not affected, either directly or indirectly, by activities associated with the proposed undertaking;

2) I concur with your determination that the nine sites identified above are ineligible for listing on the NRHP;

3) I concur with your determination that for CA-SDI-10158, the Southern portion of Locus G2 is a non-contributing element of that site;

4) A report detailing the monitoring results will be provided to this office upon the conclusion of construction related ground disturbance. I look forward to receiving that report.

5) In your letter, you stated that you are consulting with six federally and one non-federally recognized tribal governments, and has notified the public through contacts with the San Diego Archaeological Society in regards to the proposed undertaking.

6) If you agree to assume eligibility for the purposes of this undertaking for CA-SDI-4421 and CA-SDI-13991, and conduct the proposed undertaking in accordance with the conditions described above, then I concur that pursuant to 36 CFR Part 800.5(b), a Finding of No Adverse Effect is appropriate for the SMR CUP; and

7) Please be advised that under certain circumstances, such as an unanticipated discovery or a change in project description, you may have future responsibilities for this proposed undertaking under 36 CFR Part 800.

Thank you for seeking my comments and considering historic properties as part of your project planning. If you have any questions or concerns, please contact either of the following members of my staff: Ed Carroll at (916) 445-7006 or at e-mail at Ed.Carroll@parks.ca.gov or Duane Marti at (916) 445-7030 or at email at Duane.Marti@parks.ca.gov.

Sincerely,

Carol Roland-Nawi, Ph.D.

Carol Roland-Nawi, Ph.D.
State Historic Preservation Officer

Cultural Resources Located Within the SMR CUP area

Site Identification	Description of Resource	USMC's determination of eligibility for NRHP	OHP's comments and/or concurrence
CP SMR CUP 1	A historic culvert that is part of a water conveyance system associated with the percolation ponds just west of Lake O'Neill. Culvert is approximately 30 feet long, 0.18 feet wide, and with a maximum height of 17 feet. The culvert is constructed with cinder blocks and two drainage pipes of heavy corrugated metal	Ineligible	Concurred with determination of ineligible on 09/14/2010 (USMC100224A).
CP SMR CUP 2	A historic culvert that is part of a water conveyance system associated with the percolation ponds just west of Lake O'Neill. Culvert is approximately 13 feet by 18 feet, with a height of 7 feet. The culvert is constructed with cinder blocks and a single 3-feet diameter pipe of heavy corrugated metal.	Ineligible	Concurred with determination of ineligible on 09/14/2010 (USMC100224A).
CP SMR CUP 3	A historic culvert that is part of a water conveyance system associated with the percolation ponds just west of Lake O'Neill. Culvert is approximately 60 feet by 10 feet, with a height of 9 feet. The north and south ends of the culvert features a corrugated metal pipe extending into the canal.	Ineligible	Concurred with determination of ineligible on 09/14/2010 (USMC100224A).
CP SMR CUP 4 (O'Neill Ditch)	A historic culvert that is part of a water conveyance system associated with the percolation ponds just west of Lake O'Neill. The culvert is a 1.4 kilometer long earthen ditch that extended from CP SMR CUP 2 southward to the Lake O'Neill Dam. The ditch varies between 4 and 6 meters in width and is approximately 2 meters deep.	Ineligible	Concurred with determination of ineligible on 09/14/2010 (USMC100224A).
CA-SDI-4421	Located along the Santa Margarita River (SMR), the site was recorded originally in 1975 as a bedrock milling site and consisted of a cluster of flat bedrock outcrops with 38 mortars, 20 basins, and 2 isolated slicks. The site was revisited in 1995, but was inaccessible because it was inundated by the SMR. Revisited on March 30, 2011 and it was noted that the bedrock milling had been affected by erosion associated with the rise and fall of the SMR.	The site has not been evaluated formally for NRHP eligibility. USMC considers the site to be eligible pending completion of a formal evaluation.	In the current letter, USMC requested OHP to comment on the status of the site.

Site Identification	Description of Resource	USMC's determination of eligibility for NRHP	OHP's comments and/or concurrence
CA-SDI-10157	Located on the SMR flood plain, the site was recorded in 1984 as a sparse shell scatter that may be associated with the historic village of *Topomai* (CA-SDI-10156/12599). The site is 70 meters by 30 meters and consists of *chione* and *donax* shell. No additional artifacts were found within the site area. The site was tested in 1995 and only a small amount of surface artifacts were found and no subsurface features or deposits were encountered during the test excavations.	Based on the results of the testing, it was determined to be ineligible.	In the current letter, USMC requested OHP to concur with the determination of ineligible.
CA-SDI-10156 and CA-SDI-12599H	This site is located on the SMR floodplain, approximately 2.2 kilometers southwest of O'Neill Lake. It consists of both the prehistoric/ethnohistoric Luiseño village of *Topomai* (CA-SDI-10156) and the historic Santa Margarita Ranch Complex (CA-SDI-12599H).	Eligible	Concurred with determination of eligible on 04/22/2010 (USMC100209B).
CA-SDI-12570	The site is located on a terrace edge on the north side of the SMR and west of a seasonal drainage. Site was recorded originally in 1992 as a very small temporary camp. Site was revisited in 1995, but could not be relocated. Site was revisited in 2001 and identified as a low-density flake scatter. Site was tested in 2009, and based on the testing; it was determined to be ineligible.	Ineligible	Concurred with determination of ineligible on 04/22/2010 (USMC100209B).
CA-SDI-12571	The site is located on a small knoll approximately 800 meters west of the SMR. The site was recorded originally in 1992 and described as an artifact scatter containing a core, a unifacial cobble tool, 3 pieces of debitage, and fire affected rock (FAR). It was noted that a road traversed the site and minor grading had resulted possibly in the destruction and displacement of portions of the site. In 2009 and 2011, the site was revisited and the surveyors were unable to locate any of the previously identified artifacts in the site area.	Ineligible	Concurred with determination of ineligible on 04/22/2010 (USMC100209B).

Site Identification	Description of Resource	USMC's determination of eligibility for NRHP	OHP's comments and/or concurrence
CA-SDI-12577	The site is located on the northeast side of the Ysidora Basin on a low graded area. The site was recorded originally in 1992 as a dense artifact scatter with a disturbed, but intact subsurface component. It was tested in 1995 and based on the artifacts recovered and radiocarbon dating, determined to be an Early Archaic site.	Eligible	Concurred with determination of eligible on 03/03/1997 (USMC961217A).
CA-SDI-12628	a) The site is located on the margin of an alluvial flood plain north a road and immediately south of the SMR. The site was recorded originally in 1992 as a large shell midden with a small amount of cultural material, possibly representing a habitation site. Was tested in 1995 and three loci (A, B, and C) were identified. Site was determined to be eligible. b) Site was tested and excavated again in 1998 and 2002 in support of two subsequent projects. While the site was originally evaluated to be eligible, subsequent impacts to the site through subsequent construction activities have disturbed and damaged it, resulting in a lack of integrity and research potential. USMC now believes that the site is ineligible.	a) Eligible b) Ineligible	a) Concurred with determination of eligible on 03/03/1997 (USMC961217A). b) In the current letter, USMC requested OHP to concur with the determination of ineligible.
CA-SDI-13938	The site is located on an alluvial floodplain 50 meters west of the SMR. The site was recorded originally in 1995 as an artifact scatter containing flaked stone artifacts, groundstone implements, FAR, and one *argopecten* shell. During the 2009 survey by ASM, a larger scatter of shell (approximately 10-20 pieces) were identified in the site area, but none of the lithic artifacts recorded in 1995 were relocated. Site was determined to be eligible.	Eligible	Concurred with determination of eligible on 04/22/2010 (USMC100209B).
CA-SDI-13941H	The site is located on a terrace 40 meters south of a chapel along the eastern portion of the Chappo cantonment area. The site contains a historic water trough made of poured concrete and was recorded in 1995. The trough measures 20 feet by 60 inches by 16 inches and has an inscription of "No. 9 June 22 35" on its eastern side. In 2001, trough was	Ineligible	Concurred with determination of ineligible on 04/22/2010 (USMC100209B).

Site Identification	Description of Resource	USMC's determination of eligibility for NRHP	OHP's comments and/or concurrence
	revisited by ASM, who noted similarities between it and others used at MCB Camp Pendleton as laundry facilities.		
CA-SDI-13942H	This site is located on a dirt road 50 meters south of a concrete building at the western end of the Chappo area. The site was recorded in 1995 and described as a sparse historic trash scatter. The site measures 10 meters by 25 meters, and includes metal, ceramics, and glass artifacts. Site was tested in 2010 with 7 shovel scrapes and 14 shovel test pits, which resulted in recovery of no additional cultural resources. Subsequent road maintenance activities have disturbed the site.	Ineligible	In the current letter, USMC requested OHP to concur with the determination of ineligible.
CA-SDI-13981H	The O'Neill Dam which is located at the southwestern end of Lake O'Neill. The dam was recorded originally in 1995 and is 1,400 feet by 40 feet with a height of 10 feet. The dam was originally built in 1883, but it has been altered and refurbished multiple times, compromising its historic integrity.	Ineligible	Concurred with determination of ineligible on 04/22/2010 (USMC100209B).
CA-SDI-13984	The site is located on a terrace approximately 110 meters east of the SMR. It was recorded originally in 1995 and described as a bedrock milling site consisting of 4 slicks, 4 mortars, and 1 unknown triangular shaped milling feature with 2 pestles. The site was tested in 2005 by e2M with 8 shovel test pits. No artifacts were recovered.	Ineligible	In the current letter, USMC requested OHP to concur with the determination of ineligible.
CA-SDI-13985	The site is located on a terrace above and approximately 140 meters east of the SMR. It was recorded originally in 1995 and described as a bedrock milling site consisting of 6 milling features within a cluster of bedrock outcrops. The milling features contained 15 milling surfaces, including mortars, basins, slicks, and cupules.	Eligible	Concurred with determination of eligible on 04/22/2010 (USMC100209B).
CA-SDI-13987	The site is located in the flood plain on the north side of SMR, approximately 400 meters south of one road and 600 meters of the intersection of two other roads. The site was recorded originally in 1995 and described as a low density artifact scatter measuring 50 meters by 140 meters. Two	Ineligible	In the current letter, USMC requested OHP to concur with the determination of ineligible.

Site Identification	Description of Resource	USMC's determination of eligibility for NRHP	OHP's comments and/or concurrence
	core/hammerstones, 2 ceramic sherds, 1 metate fragment, 7 flakes, a sawed bone, and FAR were identified. The site was tested in 1997 with 10 shovel test pits. Only five prehistoric pieces of debitage were located, while historic materials, including 102 pieces of cow bones were located. It was concluded that the site was a redeposition of eroded material from upstream, and no substantial intact deposits were located and no diagnostic artifacts were recovered.		
CA-SDI-13990	The site is located directly below a high terrace in the SMR flood plain. The site was recorded originally in 1995 and described as a sparse artifact scatter that included 3 manos, 3 mano fragments, 3 metavolcanic flakes, a chalcedony flake, and several groundstone fragments. It was noted that the site had been disturbed by grading and maintenance activities associated with a dirt road that traversed the site. The site was tested in 2008 with 33 shovel test pits. No cultural material was recovered either on the surface or from the STPs.	Ineligible	In the current letter, USMC requested OHP to concur with the determination of ineligible.
CA-SDI-13991	The site is located on the highest terrace within the SMR floodplain and is traversed by a road. The site was recorded originally in 1995 and described as a sparse lithic scatter measuring 40 meters by 25 meters. Artifacts included 1 metate fragment, 1 mano fragment, 1 core tool, 1 hammerstone, 1 flake, and 20 pieces of FAR.	The site has not been evaluated formally for NRHP eligibility. USMC considers the site to be eligible pending completion of a formal evaluation.	In the current letter, USMC requested OHP to comment on the status of the site.
CA-SDI-13996H	The site is located on a terrace above the SMR, immediately west of a road. The site was recorded originally in 1995 and described as a scatter of historic debris, including glass, ceramics, metal, brick, and concrete. The site measures 80 meters by 40 meters, and maybe be associated with a wooden fence corners 20 meters south of the site, and some concrete slabs, which may have been the remains of a building foundation.	Ineligible	Concurred with determination of ineligible on 04/22/2010 (USMC100209B).

Site Identification	Description of Resource	USMC's determination of eligibility for NRHP	OHP's comments and/or concurrence
CA-SDI-14060	The site is located between a road and CA-SDI-14005H on the east bank of the SMR. The site was recorded originally in 1995 and described as 175 meters by 105 meters lithic scatter with a moderately dense midden of *donax, choine, and argopecten* shells. The site was tested in 1995 with 8 shovel tests pits and 3 test excavation units, which recovered only a sparse amount of marine shell and faunal material mixed with historic debris. Analysis of the soil matrix indicated that the entire excavated portion of the site was entirely composed on artificial fill, and the small amount of sparsely distributed cultural material was determined to be secondary deposits. In 1999 during archaeological monitoring for a construction project, FAR was discovered in the site area. The site was again tested in 1999 with 11 mechanical trenches, 14 shovel test pits, and 3 test excavation units. The testing recovered low density deposits of lithic debitage, shell, and intrusive historic materials.	Ineligible After the testing in 1999, it was determined that the previous ineligibility determination was still valid.	Concurred with determination of ineligible on 03/03/1997 (USMC961217A).
CA-SDI-15126	The site is located on a berm within the SMR basin on the north side of a road approximately 200 meters northeast of CA-SDI-12628 (described earlier in this enclosure). The site was recorded originally in 1992 as a lithic scatter measuring 10 meters by 30 meters. The site was tested with 4 shovel test pits, 4 test excavation units, and 3 mechanical trenches, which recovered a moderate density of *donax*, scallop, and freshwater mussel shell, lithic debitage, and flaked stone tool fragments.	Ineligible	In the current letter, USMC requested OHP to concur with the determination of ineligible.
CA-SDI-10158	The site is located 175 meters south of an ammunition bunker and is traversed by Maverick Road. The site measures 370 meters by 150 meters, and was recorded originally in 1996 and described as a temporary prehistoric camp or habilitation site. The site is composed of 8 loci (Locus A, B, C, D, E, F, G1, and G2). Each locus contains a variety of milling features including grinding	Southern portion of Locus G2 is a non-contributing element of CA-SDI-10158.	In the current letter, USMC requested OHP to comment on the status of the southern portion of Locus G2.

Site Identification	Description of Resource	USMC's determination of eligibility for NRHP	OHP's comments and/or concurrence
	slicks, mortars, proto-mortar, and basins. Artifacts found associated with the milling features included flakes, debitage, mano fragments, and metate fragments. The site was determined to be eligible in 2006, but that determination was never reviewed by OHP. The southern portion of Locus G2 would be affected by the SMR CUP. The southern portion of Locus G2 was tested in 2006 to determine if it contributed to the eligibility of the overall site. On the surface, only a small portion (approximately 20 meters by 10 meters) appeared to be intact. Twenty four shovel test pits and 3 test excavation units were excavated, which recovered 53 chipped stone flakes and debitage, 4 shell fragments, a piece of charcoal, and various metal and glass bottle fragments. Due to a lack of diagnostic artifacts and the observed low site integrity of the southern portion of Locus G2, it was determined that the southern portion of Locus G2 was a non-contributing element of CA-SDI-10158		
CA-SDI-14005H	The site is a portion of the Atchison, Topeka, and Santa Fe Railroad. It was recorded originally in 1995 and evaluated for eligibility in 1997. It was determined that the site was eligible under Criteria A, B, and D.	Eligible	Concurred with determination of eligible on 03/03/1997 (USMC961217A).
CA-SDI-14381	The site is located on either side of Ammunition Road near Building 442 at Naval Weapons Station Seal Beach, Fallbrook Annex. The side was recorded originally in 1996 and described as a temporary prehistoric camp or habitation site that measured 60 meters by 150 meters. The site is composed of two loci (Locus A and B) with millstone features and associated lithic scatters. At the time of the initial survey, Locus A and B contained 8 mano fragments, 2 hammerstones, 3 flakes, 5 pieces of debitage, a discoidal gaming piece, and an obsidian desert side-notched projectile point. The site was tested in 2006 and it was noted that the condition of the site had deteriorated,	Ineligible	In the current letter, USMC requested OHP to concur with the determination of ineligible.

Site Identification	Description of Resource	USMC's determination of eligibility for NRHP	OHP's comments and/or concurrence
	particularly around Locus A, due to erosion and flooding from a nearby arroyo. Seventeen shovel test pits and 2 test excavation units were excavated, resulting in 3 flakes and 1 piece of debitage. As a result of the low site integrity and lack of diagnostic artifacts, the site was determined to be ineligible.		
Martin Reservoir	The Martin Reservoir was constructed for the FPUD as a Public Works Administration project between February and June 1939. It is a poured-concrete structure with an approximate height of 13 feet and a diameter of 120 feet. The reservoir has a cover supported by wooden truss framing that extends from the top of the concrete tank to the rooftop cover and around the circumference of the tank. A ventilating mesh covers the wooden truss framing, and two pipes exist at the southern end of the reservoir. Located along the northern side of the reservoir is a 17 feet by 11 feet wooden lean-to shed that was a later addition. The reservoir was evaluated in 2009 and it was determined that it was not eligible under any of the four criteria.	Ineligible	In the current letter, USMC requested OHP to concur with the determination of ineligible.

Summary of eligibility determinations

ELIGIBLE (**seven** sites) The following **five** sites have been determined eligible by USMC and previously OHP has reviewed and concurred with those determinations: CA-SDI-10156/12599H, CA-SDI-12577, CA-SDI-13938, CA-SDI-13985, and CA-SDI-14005H. The following **two** sites have been considered to be eligible by USMC (pending completion of a formal evaluation) and in the current letter they have requested OHP to comment on those considerations: CA-SDI-4421 and CA-SDI-13991.
INELIGIBLE (**twenty** sites) The following **ten** sites have been determined ineligible by USMC and previously OHP has reviewed and concurred with those determinations: CP SMR CUP 1, CP SMR CUP 2, CP SMR CUP 3, CP SMR CUP 4 (O'Neill Ditch), CA-SDI-12570, CA-SDI-12571, CA-SDI-13941H, CA-SDI-13981H, CA-SDI-13996H, and CA-SDI-14060,

The following **nine** sites have been determined ineligible by USMC and in the current letter they have requested OHP to concur with those determinations: CA-SDI-10157, CA-SDI-12628, CA-SDI-13942H, CA-SDI-13984, CA-SDI-13987, CA-SDI-13990, CA-SDI-15126, CA-SDI-14381, and Martin Reservoir.

The following **one** site has been determined by USMC to be a non-contributing element of CA-SDI-10158 and in the current letter they have requested OHP to comment on that determination: CA-SDI-10158 (Southern portion of Locus G2).