

Appendix C

Biological Resources Information

C.1 Survey Methodologies

APPENDIX C-1 – SURVEY METHODOLOGIES

Botanical Surveys

Focused botanical field surveys were conducted by Aspen periodically from May 2007 to June 2012. The entire Vegetation Study Area was surveyed by walking “meandering transects” (Nelson, 1987) throughout accessible portions of the Vegetation Study Area with particular attention given to areas of suitable habitat for sensitive plant species. All plant species observed were identified in the field or collected for later identification. Plants were identified using keys, descriptions, and illustrations in Hickman (1993), Munz (1974), applicable volumes of the Flora of North America (1993+), and other regional references. In conformance with CDFG (2009), surveys were (a) floristic in nature, (b) consistent with conservation ethics, (c) systematically covered all habitat types on the sites, and (d) well documented, by a Biological Resources Technical Report (Aspen, 2012) and by voucher specimens to be deposited at Rancho Santa Ana Botanic Garden. Surveys were completed during multiple years and at all locations that would be subject to proposed sediment removal activities.

Limitations. Botanical surveys were floristic in nature and conducted during a time of year when a broad assemblage of the flora in the region would be represented. However, some plant species, even under ideal survey conditions, remain inconspicuous or dormant. As a result, it is possible that some species may not have been identified during the survey.

Vegetation Mapping

Vegetation maps were prepared by drawing vegetation boundaries onto high-resolution aerial images in the field, then digitizing these polygons into Geographic Information Systems (GIS). The maps were then ground-truthed in the field to verify vegetation community types. Mapping was done electronically using ArcGIS (Version 10) and a 22-inch diagonal flat screen monitor with aerial photos with an accuracy of one foot. Most boundaries shown on the maps are accurate within approximately three feet; however, boundaries between some vegetation types are less precise due to difficulties in interpreting aerial imagery and accessing stands of vegetation.

Vegetation descriptions and names are based on Sawyer et al. (2009) and have been defined at least to the alliance level, and in some cases to the association level. Some of the vegetation in the Vegetation Study Area does not match the names and descriptions in Sawyer et al. (2009). Therefore, descriptive vegetation community names have been adapted in the same style. In addition, each vegetation type has been referenced to *Preliminary Descriptions of the Terrestrial Natural Communities of California* (Holland, 1986) and to applicable sections of *A Guide to Wildlife Habitats of California* (Mayer and Laudenslayer, 1988), whenever possible.

Limitations. The vegetation composition in the Project Area has varied during the course of the studies. Large aggregations of willow and cottonwood trees present in the Reservoir prior to 2011 have been lost through inundation and now occur in lower densities along the margin of the Reservoir. In addition, vegetation densities in southern California riparian systems vary over time, depending on flood scouring events (Faber et al., 1989; Holland and Keil, 1995). Vegetation communities can also overlap in certain characteristics, and over time, may shift from one community type to another. Note also that all vegetation maps and descriptions are subject to imprecision resulting from several sources, including:

- Vegetation types typically intergrade on the landscape, without precise boundaries. In some cases, vegetation boundaries are distinct, often resulting from events such as wildfire or flood. These

boundaries may become much less apparent after years of post-disturbance succession. Therefore, mapped boundaries represent best professional judgment, but should not be interpreted as literal delineations between sharply defined vegetation types.

- Natural vegetation tends to exist in general recognizable types, but also may vary over time and geographic region. Written descriptions cannot reflect all local or regional variation. Many stands of natural vegetation do not fit strictly into any named type. Therefore, a mapped unit is given the best name available in the classification, but this name does not imply that the vegetation unambiguously matches written descriptions.
- Vegetation tends to be patchy. Small patches of one named type are often included within larger stands mapped as units of another type. For these surveys, the minimum mapping unit was approximately three feet. Smaller inclusions are described in the text, but are not visible on the maps.
- Photo interpretation of some types may be difficult. Accuracy of a vegetation map will vary depending on the level of ground-truthing efforts.

Wildlife Surveys

Common wildlife. Wildlife species were detected during field surveys (diurnal and nocturnal) by sight, calls, tracks, scat, or other diagnostic clues (e.g., bones, feathers, prey remains). In addition to species actually observed, expected wildlife usage of the site was determined according to known habitat preferences of regional wildlife species and knowledge of their relative distributions in the area. Reconnaissance-level surveys for common wildlife were performed by methodically walking the perimeter of the Reservoir (where accessible), the adjacent foothills, and areas upstream and downstream from the Reservoir. Surveys were conducted at an average pace of approximately one mile per hour and biologists halted approximately every 150 feet to listen for wildlife, or whenever necessary to identify species or record data.

Invertebrates. Biologists searched for terrestrial insects and other invertebrates on flowers and leaves, under loose bark on trees, and under stones and logs on the ground throughout the Study Area. Butterflies and other aerial species were noted when observed. Larger aquatic invertebrates were sampled during aquatic surveys within the Study Area (see methodology below). Randomly selected areas within appropriate microhabitats (e.g., leaf litter, underneath felled logs, etc.) were hand raked or visually inspected to determine the presence or absence of gastropods.

Fish. Surveys were performed by methodically walking active portions of Littlerock Creek from just south of Rocky Point to the upstream extent of the Study Area. All areas where standing or flowing water was present were visually inspected. Visual observations for presence of fish were conducted in portions of the channel where water was relatively shallow (<1 foot) and clear (majority of survey area). Dip nets with 1/8-inch mesh were utilized to probe under and around boulders. In areas with water deeper than one foot, block netting with 1/8-inch mesh was installed along the downstream sections. Using 1/8-inch-mesh netting, biologists then seined each section from the upstream extent of the deeper water downstream towards the block netting, and documented all fish present within the area. Biologists also conducted informal creel census surveys to assess the fish assemblage in the reservoir by interviewing anglers and observing their catch. This yielded useful information on the most common fish caught by shore anglers.

Amphibians. Surveys were performed by methodically walking the western perimeter of the Reservoir (including pooled areas west of the main access road) and within the Littlerock Creek channel upstream of Rocky Point and downstream of the dam. Surveys were also conducted by boat along the eastern

shore and within the small tributary drainages that feed the Reservoir from the west. Diurnal and nocturnal surveys were conducted during the time of year and at ambient temperatures when amphibians would be active. Visual observations were made to confirm the presence or absence of tadpoles and adults in ephemeral pools or slow moving areas of the active channel of Littlerock Creek, in the Reservoir, and in storm water basins that border the Reservoir.

Arroyo toad (focused surveys). Arroyo toads are known from Littlerock Creek and designated critical habitat for this species has been identified above Rocky Point. Multiple focused surveys for arroyo toad were performed by methodically walking the western perimeter of the Reservoir (including pooled areas west of the main access road), within the Littlerock Creek channel upstream of Rocky Point and downstream of the dam, the small tributaries that flow into the Reservoir, and within the lower portion of Santiago Creek. Surveys were conducted during the day to search for egg masses, tadpoles or metamorphs, and at night to observe foraging toads and to listen for reproductive calls.

The focus of the arroyo toad surveys was to maintain a baseline of the distribution of animals in the Project Area and to evaluate if this species is moving into the Reservoir or adjacent recreation areas. To date Aspen has not detected this species below Rocky Point however it is likely this species can be periodically found in this area. Protocol surveys for this species were conducted at Rocky Point in 2015.

Reptiles. Surveys for reptiles were performed by methodically walking through the Study Area and visually inspecting microhabitat sites (e.g., basking sites, rock outcrops, leaf litter, woodpiles, etc.). Focused reptile surveys were conducted during daylight hours when ambient temperatures were such that reptiles would be active (i.e., between 75 and 95 degrees Fahrenheit), and at night concurrent with the amphibian surveys. All refugia sites searched were returned to their original state after inspection.

Desert Tortoise (Protocol Surveys). Protocol surveys for this species were conducted at the 47th Street disposal site on April 26, 2014. No sign of this species was detected.

Common birds (focused non-protocol surveys). Surveys for birds were conducted during calm winds between dawn and 11:00 a.m. and at dusk. Bird species were identified by sight and sound. Particular attention was given to the riparian corridor below the dam and the large cottonwood and willow trees that occur along the margin of the Reservoir. The adjacent uplands were also searched.

Bald and golden eagles (focused non-protocol surveys). Focused surveys for bald and golden eagles included an inspection of the Reservoir, adjacent uplands, mountains, and major lakes and reservoirs in the region. This included surveys of Lake Palmdale, Bouquet Reservoir, and Lake Elizabeth. Searches for bald eagle, a species known as an occasional winter visitor at the Reservoir, were also conducted during routine bird and wildlife surveys.

Least Bell's vireo (focused protocol surveys). Focused or protocol surveys for the federally and state-listed endangered least Bell's vireo (*Vireo bellii pusillus*) were conducted annually in the spring and summer from 2010 to 2012. Protocol-level surveys for the least Bell's vireo were conducted in conformance with USFWS Least Bell's Vireo Survey Guidelines (USFWS, 2001). Protocol surveys were conducted no less than ten days apart, between dawn and 11:00 a.m., within all portions of the Study Area containing suitable riparian habitat and within adjacent habitat suitable for foraging. Surveys were conducted by slowly walking along and through riparian habitats within the study area at an average pace of approximately 1.2 miles per hour. While visually searching for and listening for songs, scolds, and calls. Additional, non-protocol surveys included monthly surveys in 2012 to monitor existing bird use downstream of the Reservoir.

Terrestrial mammals. Surveys for terrestrial mammals were conducted in the Study Area within specific areas containing suitable microhabitats. Special attention was given to areas that may be affected by sediment removal activities and in which the vegetation and soil structure was conducive to habitation by small mammals, such as the upland stream terraces and adjacent uplands. Biologists recorded all animal observations and visually searched for animal signs (e.g., scat, footprints, fur, burrows, etc.).

Mohave Ground Squirrel Habitat Assessment. A habitat assessment for this species were conducted at the 47th Street disposal site in April 2015 by Phoenix Biological Consulting. No sign of this species was detected. . The site visit consisted of walking the perimeter of the site boundary and several transects within the site to determine the suitability for MGS habitat. The biologist (Ryan Young) recorded soil texture, dominant shrubs & annuals, habitat types, sign of mammal types present and surrounding habitat. The dominant shrubs consisted of California juniper (*Juniperus californica*), Joshua tree (*Yucca brevifolia*) and Mormon tea (*Ephedra nevadensis*). Small mammal burrows are present but it is assumed that these burrows are from antelope ground squirrels (*Ammospermophilus leucurus*). The results of the site visit and CNDDDB analysis suggest that the site is not suitable for MGS. This assertion is based on the following criteria:

- Presence of California ground squirrels (*Spermophilus beecheyi*).
- The site is outside the southern edge of the known range.
- There are no recent MGS records near the project site (Figure A; CNDDDB, 2015).
- The dominant plants on site are not considered suitable MGS forage plants (Figure B).
- The site is relatively isolated from potential occupied habitat to the north.

Bats. Monitoring for bat calls was conducted using a SongMeter™ SM2 acoustic monitoring and data logging recorder fitted with an SMX-US omnidirectional microphone sensitive to frequencies over 150 kilohertz. Recorded bat calls were analyzed using Song Scope Bioacoustics Software. To enhance identification accuracy, Song Scope files identified to individual bat species were split into individual electronic wave files, which were scrubbed to separate bat echolocation calls from noise and digitally adjusted for microphone frequency response, in order to confirm the species identification using Sonobat. Bat monitoring was conducted at a single location adjacent to the creek for two 24-hour periods and set to passively record bat calls between 1900 and 0600 hours on 17–18 May and 17–18 June 2012. Bat calls were also actively detected and recorded using a portable Echo Meter EM3 during nocturnal surveys.

Limitations. The focus of wildlife surveys was to determine the presence of special-status wildlife species and the potential for habitat to support these species within the Study Area. It is acknowledged that some wildlife species with a nocturnal pattern of activity or species that are otherwise difficult to detect may not have been identified during the survey.