Appendix A

DRAFT Littlerock Reservoir Sediment Removal Project
Biological Resources Report

Draft
Biological Resources Technical Report

Littlerock Reservoir Sediment Removal Project

Prepared for:
Palmdale Water District

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Executive Summary

This report provides a summary of the biological resources known or expected to occur at the Littlerock Reservoir (Reservoir). Biological information was collected through field investigations (i.e., reconnaissance, protocol, and focused surveys); review of existing on-line and published literature; consultation with local biologists and regional experts; and coordination with regulatory staff including the United States Fish and Wildlife Service (USFWS), California Department of Fish and Game (CDFG), and USDA Forest Service (Forest Service). Field surveys were conducted between 2007 and 2012 and augment existing surveys conducted by the Forest Service to monitor the metapopulation of the Federally Endangered arroyo toad (*Anaryxus* (*Bufo*) *californicus*), which breeds immediately upstream of the Reservoir.

Special status species including federally or State endangered, threatened, State Species of Special Concern, or Forest Service Sensitive are known to occur in the region and were identified during surveys of the Reservoir. Some of the sensitive species detected at or near the Reservoir include:

- Short-joint beavertail cactus, a CRPR List 1B.1/FSS;
- Johnston's monkeyflower, a CRPR List 4.3;
- Lemmon's syntrichopappus, a CRPR List 4.3/FSW;
- Arroyo toad, Federally Endangered), and State Species of Special Concern;
- Least Bell's vireo, a State and Federal Endangered Species;
- Bald eagle, a State Endangered and fully Protected Species and FSS;
- Silvery legless lizard, a State Species of Special Concern and FSS;
- San Diego coast horned lizard, a State Species of Special Concern and FSS;
- Southwestern pond turtle, a State Species of Special Concern and FSS; and
- Two-striped garter snake, a State Species of Special Concern and FSS.

Most of these species were observed in areas adjacent to or near the Reservoir such as above Rocky Point or below the dam. However, some species including the arroyo toad, southwestern pond turtle, and two-striped garter snakes were observed within the Reservoir. Table 4-1 (Known and Potential Occurrence of Special-Status Plant Taxa within the Study Area) and Table 4-2 (Known and Potential Occurrence of Special-Status Wildlife within the Study Area) contains the complete list of all sensitive plants and wildlife that were detected or have the potential to occur in the project area.

1. Introduction/Regional Setting

The Littlerock Reservoir (Reservoir) is located approximately three miles southwest of the community of Littlerock, within the boundaries of the Santa Clara Mojave Rivers Ranger District in the Angeles National Forest (ANF) (Figure 1). The Palmdale Water District (PWD) operates the Reservoir as a local surface water impoundment, and water is conveyed from the reservoir to Palmdale Lake. Inflow into the Reservoir is seasonal and varies widely depending on annual precipitation and snowmelt. Littlerock Dam, constructed in 1924, was originally built to provide a source of irrigation for downstream agricultural activities. With the construction of the California Aqueduct, which started in 1960, the Reservoir became a back-up water source for the communities it served.

Figure 1

Project Location

In addition to providing drinking water, the Reservoir supports a variety of recreational opportunities including boating, fishing, and swimming. When the reservoir is drained, typically at the end of summer and pursuant to the expected water needs of the PWD, dry portions of the Reservoir support recreational off highway vehicle (OHV) travel.

From a regional standpoint, the Reservoir is located in the Antelope Valley at the transition of the southern border of the Mojave Desert and the northeastern foothills of the San Gabriel Mountains. The Reservoir and proposed access roads are surrounded by National Forest lands with portions bordered by small private in-holdings, rural residences, and privately-held natural lands. This area is located in a broad transition zone between the Mojave Desert and the Transverse Ranges which supports a variety of native and introduced plants and wildlife. Though varied floristic influences exist in the Antelope Valley and surrounding foothills, this region has been subject to a historic land uses such as farming, grazing, recreation, water diversion (i.e., the Littlerock Reservoir and the California Aqueduct), and infrastructure development (i.e., the construction of residential and commercial properties, military land uses including Edwards Air Force Base, Interstate 14, and Highway 138).

1.1 Report Overview

The report describes the existing environmental conditions and biological resources (with special emphasis on special-status plant and wildlife species, wildlife corridors, and sensitive habitats) that occur or have the potential to occur at or near the Reservoir.

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2. Methodologies

Data regarding biological resources that have the potential to occur in the project area were obtained through literature review and field investigation. Aspen Environmental Group (Aspen) conducted biological resource assessments within and adjacent to the Project site between 2007 and 2012. Data methodologies included:

- reconnaissance-level surveys for common species;
- weed and vegetation mapping;
- focused surveys for sensitive plant and wildlife; and
- protocol surveys for listed song birds.

For the purposes of this report, the Project Area is defined as the Reservoir and all day use areas, including roads and recreational areas (Figure 2). The Project Area includes a portion of Littlerock Creek extending approximately 1,000 feet upstream from Rocky Point.

Surveys were also conducted across a much broader geographic range to better characterize the biological resources that occur or have the potential to be present in the vicinity of the Project Area. This area is defined as the project Study Area and includes all portions of the Project Area and a buffer that extends 0.25 miles upstream from Rocky Point (including a portion of Santiago Creek), and approximately one mile downstream of the Littlerock dam (Study Area). Most wildlife surveys included the entire Study Area; however vegetation mapping was limited to a subset of the Study Area extending approximately 500 feet from the Project Area (Vegetation Study Area). Figure 2 defines the limits of the Project Area, Study Area and Vegetation Study Area.

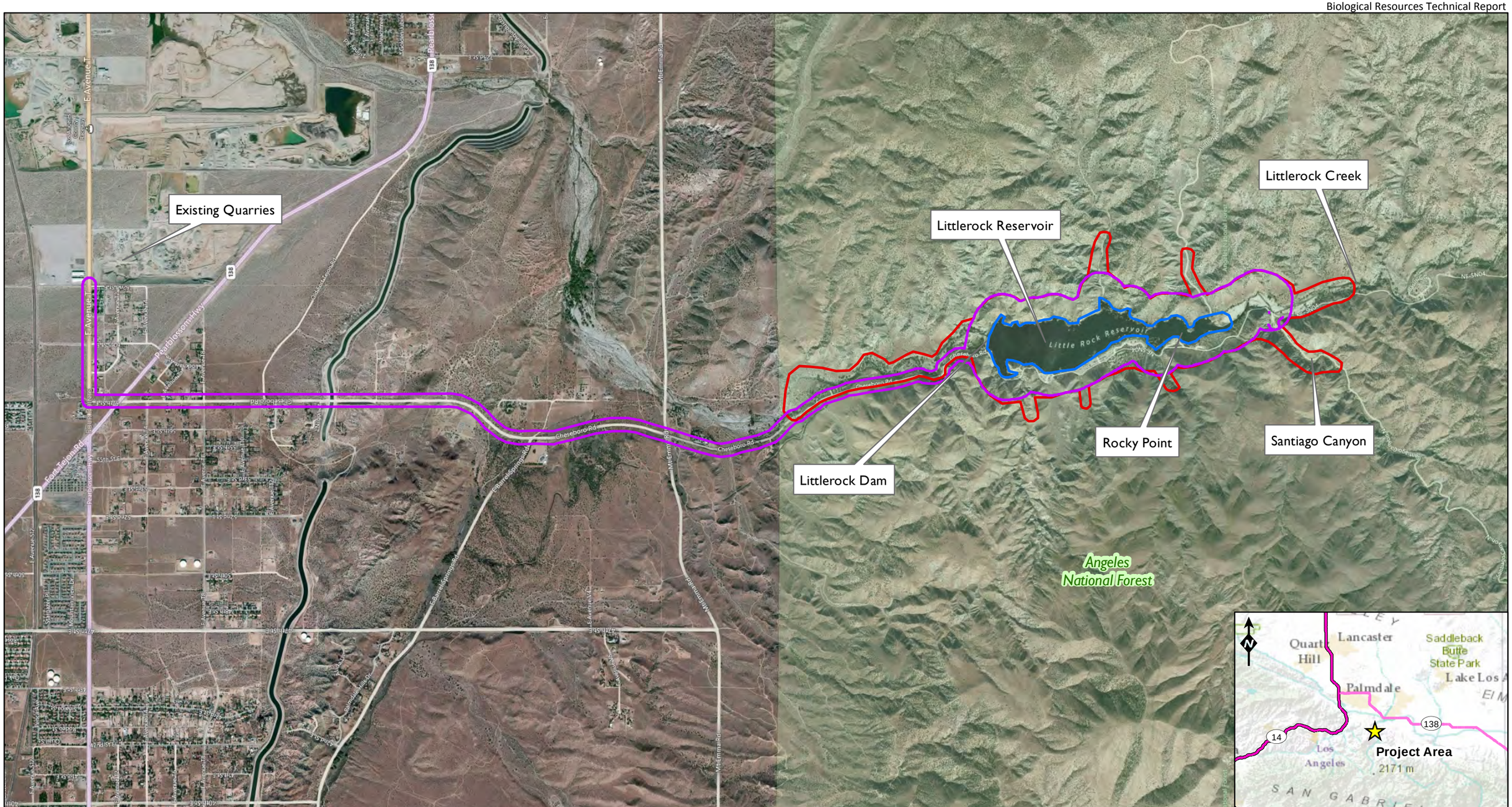
2.1 Literature Review

Sensitive biological resources known to occur in the region or potentially present were identified through a review of existing literature sources including a USGS topographic maps, aerial photography, and the CDFG California Natural Diversity Data Base (CNDDB) (2012). The Project site is located within the U.S. Geological Survey's (USGS) Pacifico Mountain, California 7.5' topographic quadrangle. The following eight adjacent quadrangles were also included in the database search due to their proximity to the Study Area:

- Chilao Flat
- Condor Peak
- Acton
- Ritter Ridge
- Palmdale
- Littlerock
- Juniper Hills
- Waterman Mountain

Additional data regarding the potential occurrence of special-status species and policies relating to these sensitive natural resources were gathered from the following sources:

- Special Animals List (CDFG, 2011b);
- State and federally listed endangered and threatened animals of California (CDFG, 2011c);
- California Wildlife Habitat Relationships (CDFG, 2008);
- Inventory of Rare and Endangered Vascular Plants of California (CNPS, 2011);
- Angeles National Forest Land Management Plan (USFS 2005);
- Pacific Southwest Region Regional Forester's Sensitive Species List (USFS 2001);
- Consortium of California Herbaria;
- Biological Assessment for the Littlerock Dam and Reservoir Sediment Control Plan (PCR 2001);
- Antelope Valley Areawide General Plan;
- County of Los Angeles Significant Ecological Areas; and
- Aerial photographs of Littlerock Reservoir and surrounding areas (from October 2012, December 2011, July 2011, June 2009, July 2008, March 2006, February 2006, December 2005, November 2005, July 2003, June 2002, May 2002, June 1994, and May 1994).



Aspen Environmental Group

0 0.5 1 Miles

Project Area
Study Area
Vegetation Study Area

OWNERSHIP
USFS

Figure 2

Study, Vegetation, and Project Areas

2.2 Agency Coordination and Consultation

Agency coordination has been ongoing and includes biological resource staff from the Angeles National Forest (ANF), CDFG, and the USFWS. Biological resource data including the use and distribution of sensitive wildlife, including arroyo toads, on the project site has also been obtained from interviews and site visit experts on arroyo toad ecology including Ruben Ramirez, Larry Hunt, and William Haas.

2.3 Biological Surveys and Habitat Assessments

Biological resource investigations including surveys and habitat assessments have been conducted in the Study Area between 2007 and 2012 to support the operation of the existing facility. The surveys were conducted by experienced biologists familiar with the resources expected to occur in the region and were completed at times and conditions when wildlife species were active and when plants were flowering. However, it is acknowledged that some wildlife species and/or individuals may have been difficult to detect due to their elusive behavior, cryptic morphology, or limited distribution in the project area. Similarly, some plants flower for a limited period of time or do not flower during periods of low rainfall. It is possible that some species of rare plants were overlooked or missed during the surveys; however these plants would be expected to occur in areas not subject to Reservoir operations or maintenance activities.

Surveys of the project site were conducted year round in order to evaluate seasonal use of the site and to note wintering bird use. Field personnel included Chris Huntley, Jared Varonin, Cindy Hitchcock, Justin Wood, Tracy Valentovich, Jennifer Lancaster, Lynn Stafford, Larry Hunt, and William Haas. Table 2-1 includes a list of the surveys conducted and a brief summary of their results. Specific protocols, assessments and survey results are described below.

Table 2-1. Summary of Surveys Conducted at the Littlerock Reservoir

Target Species	Survey Type	Date	Comments
Rare Plants and Vegetation	Focused Pedestrian Survey	16 May 2007 23 May 2010 7 Jul 2011 20 and 30 May 2012 6 June 2012	Three special-status plants, Johnston's monkeyflower (*Mimulus johnstoni*), short-joint beavertail (*Opuntia basilaris var. brachyclada*), and Lemmon's syntrichopappus (*Syntrichopappus lemmonii*) were detected within the Vegetation Study Area. However, all occurrences were outside of the Project Area. All vegetation types were mapped in the Vegetation Study Area (which included areas along the proposed haul routes).
Gastropods and Fish	Focused Pedestrian Survey of Micro-Habitats, Hand Raking Seining/Dip Netting/Visual Observations	1 - 3 June 2011 13 January 2012	Sensitive gastropods were not detected in the Study Area. Several species of non-native fish detected. Sensitive fish were not observed in the Study Area.
Amphibians and Reptiles	Acoustic, Focused Pedestrian, Inspections of Microhabitats	16 May 2007 24 September 2007 5, 14 and 18 May 2010 1 - 3 June 2011 12 July 2012	One sensitive amphibian, the arroyo toad, was commonly detected within the Study Area above Rocky Point. The species has not been observed below the dam or within the Reservoir area below Rocky Point. The species was not observed in the small tributary drainages that feed the reservoir. Common amphibians were routinely observed at the Reservoir and along the stream terraces. Western toad was observed on access roads and in upland areas.

Target Species	Survey Type	Date	Comments
			Several sensitive reptiles were observed in the Study Area, including California legless lizard, coastal whiptail, coast horned lizard and southwestern pond turtle.
Terrestrial Mammals	Reconnaissance-Level Surveys; Visual Surveys; Review of Scat, Tracks, Sign, Middens and Burrows	16 May 2007 5 and 14 May 2010 1 - 3 June 2011 13 January 2012 12 July 2012	Sensitive mammals (with the exception of bats, see below) were not detected in the Study Area. However the area is expected to support a number of rare or protected species including bighorn sheep, American badgers, and possibly ringtail.
Bats	Visual and Acoustic (SongMeter™ SM2 and Wildlife Acoustics EM3)	17-18 May 2012 17-18 July 2012	Several species of bats were detected at the Reservoir including the pallid bat and western small-footed myotis were detected within the Project area.
Least Bell's Vireo	Focused (Non-Protocol) Pedestrian Surveys and Protocol Surveys	22 -23 July 2010 29 April 2011 10 and 19 May 2011 1,10 and 21 June 2011 1 and 12 July 2011 16 February 2012 18 April 2012 18 May 2012	Least bell's vireo was detected in the Study Area immediately downstream of Littlerock dam. The birds fledged young in 2011 but did not appear to do so in 2012.
Birds	Focused Pedestrian and Acoustic	14 May 2010 22-23 July 2010 1 - 3 June 2011 12 - 13 July 2012 15 December 2011 18 January 2012 16 February 2012 18 April 2012 18 May 2012 12 July 2012 18 July 2012 30 August 2011 13 January 2012	Eighty-five species of birds were detected in the Study Area including a variety of special status species. Bald eagle is known as an occasional winter visitor.

2.3.1 Survey Methods

Common Wildlife

Wildlife species were detected during field surveys (diurnal and nocturnal) by sight, calls, tracks, scat, or other diagnostic clues (i.e., 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 above and below the Reservoir. Surveys were conducted at an average pace of approximately 1.5 km/hr and halted approximately every 50 meters to listen for wildlife or whenever necessary to identify or record data.

Rare Plants

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 this report 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. Table 3-2 (Plant Species Observed Within the Vegetation Study Area) contains a list of all the plant species identified during the surveys. Figure 3 identifies the listed plant species known to occur within the vicinity of the Vegetation Study Area.

Vegetation Mapping

Vegetation maps were prepared by drawing tentative vegetation type boundaries onto high-resolution aerial images in the field, then digitizing these polygons into GIS. The maps were then ground-truthed in the field to verify vegetation community types and clarify uncertainties. 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 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, 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 by Holland (1986) and to particular applicable sections of A Guide to Wildlife Habitats of California (Holland, 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 with time dependent upon the date of most recent flood scouring events (Faber et al., 1989; Holland and Keil, 1995). Vegetation communities also overlap in most characteristics, and over time, will shift from one community type to another. Note also that all vegetation maps and descriptions are subject to imprecision resulting from several sources, including:

- In some case, vegetation boundaries result from distinct events, such as wildfire or flooding. But, vegetation types usually tend to intergrade on the landscape, without precise boundaries among them. Even distinct boundaries caused by fire or flood can be disguised after years of post-disturbance succession. Mapped boundaries represent best professional judgment, but usually 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 (perhaps most) stands of natural vegetation do not strictly fit 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 this report the minimum mapping unit was approximately three feet, and smaller inclusions are described in the text but are not visible on the maps.
- Photo interpretation of some types may be difficult and accuracy of a vegetation map will vary depending on ground-truthing efforts.

Invertebrates

Terrestrial insects and other invertebrates were searched for on flowers and leaves, under loose bark 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 captured/sampled during aquatic surveys within the Study Area (see methodology below). Randomly selected areas within appropriate micro habitats (i.e., leaf litter, underneath felled logs, etc.) were hand raked or visually inspected to determine the presence/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 (Figure 2). All areas where standing or flowing water was present were visually inspected. In portions of the channel where water was relatively shallow (<1 foot) and clear (majority of survey area), visual observations were performed for the presence of fish. Dip nets with 1/8" mesh were utilized to probe under and around boulders. In areas that exhibited waters deeper than 1 foot, 1/8" mesh block netting was installed along the downstream sections. Biologists, using 1/8" mesh seine netting, 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 fishermen.

Amphibians

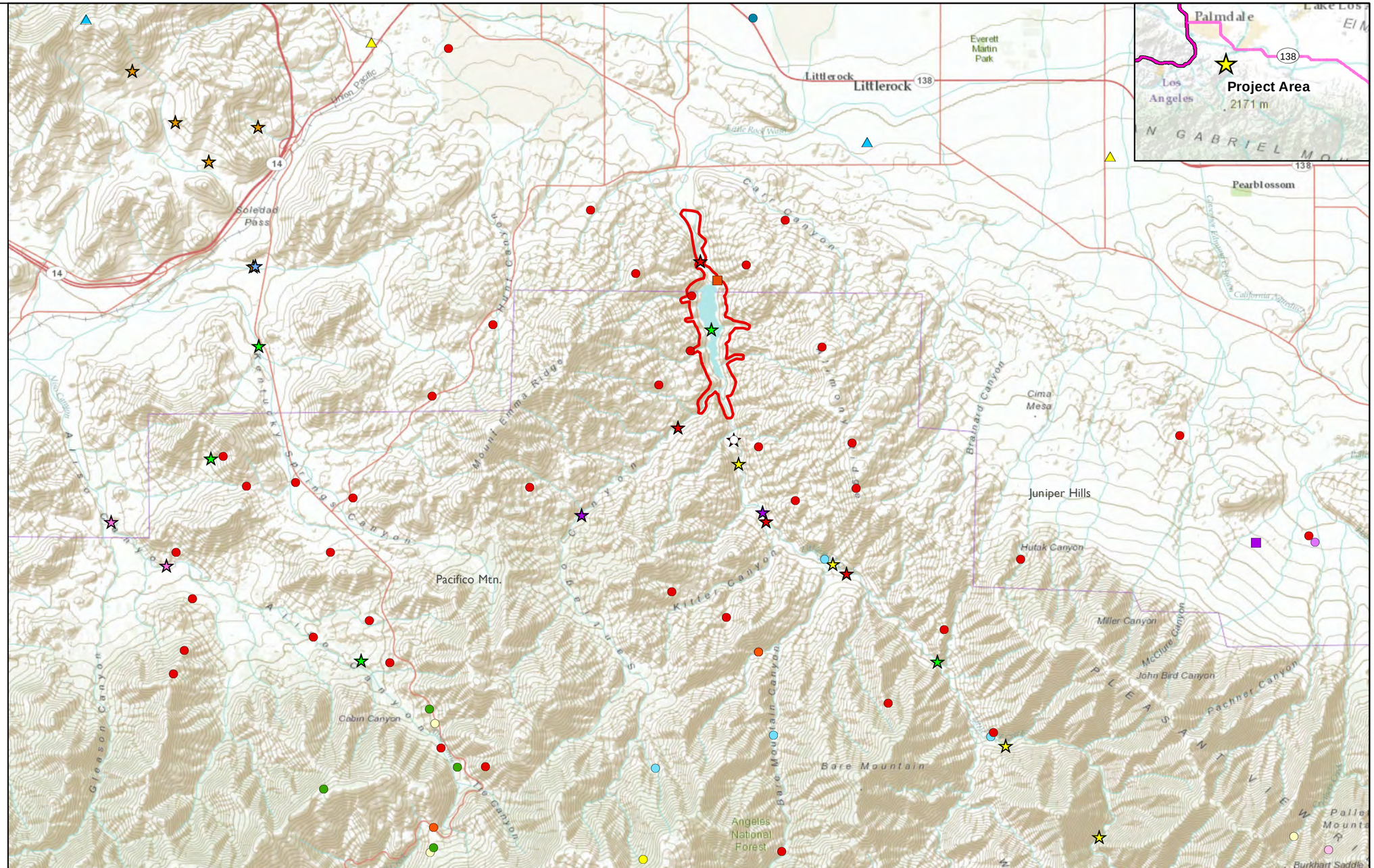
Surveys were performed by methodically walking the western perimeter of the Reservoir (including pooled areas west of the main access road) and within the Littlerock Creek channel upstream of Rocky Point and downstream of the dam. Surveys were also conducted by boat along the eastern shore and within the small tributary drainages that feed the Reservoir from the west. Diurnal and nocturnal surveys were conducted during the time of year and at temperatures when amphibians would be active. Visual observations were made to confirm the presence/absence of tadpoles and/or adults in ephemeral pools or slow moving areas of the active channel of Littlerock Creek, the Reservoir, and storm water basins that border the reservoir.

Focused Surveys – Arroyo Toad

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 observe foraging toads and to listen for reproductive calls.

Common Name

- Le Conte's thrasher
- Loggerhead shrike
- Greata's aster
- Mt. Gleason paintbrush
- Palmer's mariposa-lily
- San Gabriel linanthus
- San Gabriel manzanita
- Lemon lily
- Sagebrush loeflingia
- Short-joint beavertail
- White pygmy-poppy
- Woolly mountain-parsley
- Pallid San Diego pocket mouse
- Yuma myotis
- Arroyo toad
- California red-legged frog
- Coast horned lizard
- Rosy boa
- Sierra Madre yellow-legged frog
- Silvery (California) legless lizard
- Two-striped garter snake



Aspen Environmental Group

N

0 1 2 Miles

StudyArea

Figure 3

CNDDB Sensitive Species

Arroyo toads are known to occur on Littlerock Creek and portions of the area have been closed to recreation for the protection of the existing population. 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.

Reptiles

Surveys for reptiles were performed by methodically walking the Study Area and visually inspecting micro-habitat sites (i.e., basking sites, rock outcrops, leaf litter, wood piles etc.). Focused reptile surveys were conducted during daylight hours when temperatures were such that reptiles would be active (i.e., between 75 – 95°F) and at night concurrent with the amphibian surveys. All refugia sites searched were returned to their original state after inspection.

Birds

Focused (Non-Protocol) Surveys –Common Birds

Surveys for birds were conducted between dawn and 11:00 a.m., and at dusk during calm non-windy conditions. 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. Specific protocols for sensitive birds are described further below.

Focused (Non-Protocol) Surveys –Bald and Golden Eagles

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 eagles, a species known as an occasional winter visitor at the Reservoir, were also completed during routine bird and wildlife surveys.

Focused (Protocol) Surveys – Least Bell's Vireo

Focused or protocol surveys for the federally and State endangered least Bell's vireo (*Vireo bellii pusillus*) were conducted annually in the spring/summer from 2010 – 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 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 2 km/hr. while visually searching for and listening for songs, scolds, and calls. Non-protocol surveys included monthly surveys in 2012 to monitor existing bird use below the Reservoir.

Terrestrial Mammals

Surveys for terrestrial mammals were conducted in the Study Area and within specific areas containing suitable micro-habitat. 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. In addition, woodrat middens were searched for both in upland and riparian habitats near the existing Reservoir and parking areas. Biologists recorded all animal observations and visually searched for animal signs (i.e., scat, footprints, fur, burrows, etc.).

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 150kHz. 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 compensated for microphone frequency response in order to confirm the identity 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/recorded using a portable Echo Meter EM3 during nocturnal surveys.

3. Existing Conditions

3.1 Local Setting

The Project Area is located in a recreational use area, surrounded by natural lands of the San Gabriel Mountains within the ANF. The upstream portion of the Project Area and the southern extent of the Study Area are located in the northern limit of the Lower Littlerock Creek Critical Biological Zone of the ANF which is currently closed to the public in order to protect designated critical habitat for the federally endangered arroyo toad. From a regional standpoint, the San Gabriel Mountains contain a variety of geographical landforms and vegetation communities that support numerous sensitive biological resources. These mountains are characterized by steep, rugged terrain and deep canyons, as well as numerous creeks, streams, and rivers. The ANF extends across most of the San Gabriel Mountains, and constitutes a regionally rare expanse of wild land habitat.

The 2005 Forest Plan indicates the ANF is home to approximately nine native species of fish, 18 amphibians, 61 reptiles, 299 birds, 104 mammals, 2,900 vascular plants and an unknown number of species of invertebrate animals and non-vascular plants. Some of these species are endemic to the ANF, and some have special status as federally listed threatened, endangered, proposed, candidate, or Forest Sensitive Species. Littlerock Creek is home to several sensitive biological resources including the arroyo toad, two-striped garter snake, southwestern pond turtle, and a variety of rare birds.

3.1.1 Vegetation Communities

The Project Area can be broadly defined to include Chesebro Road, the Reservoir area including the existing parking and recreational facilities, Rocky Point (the location of a proposed grade control structure); and Littlerock Creek south and north of the Reservoir. Access to the Reservoir from the community of Littlerock is provided from Chesebro Road. Vegetation in this area includes a broad assemblage of native and disturbed communities. Creosote bush scrub, Joshua tree woodland, rabbit bush scrub and ruderal vegetation border the road south of Mount Emma Road. Small ranches, horse properties, a dog kennel, and a small network of dirt roads are present in this area. South of Mount Emma Road, the vegetation transitions from more traditional desert scrub communities to areas dominated by California buckwheat scrub, Mormon tea scrub and big sagebrush scrub habitat. Littlerock Creek, located at the bottom of the eastern slope, is dominated by a mosaic of native and non-native woodlands, riparian scrub, and sandy wash. Near the toe of the Dam, the riparian areas of Littlerock Creek support a mixture of arroyo willow thickets, open water and sandy wash habitats.

California buckwheat scrub, California juniper woodland, and singleleaf pinyon woodland dominate the habitat on the slopes and in the foothills surrounding the Reservoir. At the Reservoir the presence of vegetation is affected by a variety of factors including the seasonal fluctuations in water surface elevations that occur as a result of inflow and water deliveries. Because of this, and the lack of soil development on most of the shore, the reservoir area is primarily devoid of vegetation. The exception is the large patches of riparian vegetation that border the margins of the Reservoir and vegetation that becomes seasonally established as the Reservoir recedes.

The shoreline is composed of eroded slopes, sand, and small rock, and fines. Large trees including Fremont cottonwood and willows occur intermittingly across the western and northern portions of the Reservoir. Recreational areas border the Reservoir and include a boat ramp, small dock, and parking areas. Small residences, a cafe, and picnic areas border the Reservoir. Native vegetation occurs intermittingly within this area along parking medians and roadways. In most locations, recreational facilities abut natural lands both within the riparian corridor, Reservoir and uplands.

Eleven types of vegetation were mapped within the Vegetation Study Area. They were classified using names and descriptions in Sawyer et al. (2009). Non-native woodland and ruderal vegetation were also mapped but do not match vegetation described in Sawyer et al. (2009). Three additional un-vegetated cover types were mapped: developed, sandy wash, and open water. Table 3-1 lists the vegetation and cover types identified within the Project Area. Figures 4A and 4B illustrate the vegetation and cover types that occur in the Vegetation Study Area, Project Area, and along the proposed haul roads. Vegetation and cover types are described further below. Appendix A contains representative photographs of the project Area.

Table 3-1. Summary of Vegetation and Cover Types

Vegetation Community		Type	Total Acres		Percentage of Total Acreage (%)	
Sawyer, Keeler-Wolf, and Evens (2009) Vegetation Classification	*Holland (1986) Vegetation Classification*		Vegetation Study Area	Project Area	Vegetation Study Area	Project Area
Arroyo willow thickets	Southern willow scrub	Riparian	5.57	0.00	1.14	0.00
Big Sagebrush Scrub	Big sagebrush scrub	Upland	15.67	0.09	3.21	0.09
California Buckwheat Scrub	Mojave mixed woody scrub	Upland	100.30	0.69	20.54	0.70
California Juniper Woodland	Mojavean juniper woodland and scrub	Upland	55.16	0.43	11.29	0.43
Cattail Marsh	Freshwater marsh	Riparian	2.97	2.95	0.61	2.97
Creosote bush scrub**	Mojave creosote bush scrub	Upland	4.52	0.00	0.93	0.00
Fremont Cottonwood Forest	Southern cottonwood-willow riparian forest Mojave riparian forest	Riparian	25.51	16.21	5.22	16.33
Joshua tree woodland**	Joshua tree woodland	Upland	5.27	0.00	1.08	0.00
Mormon Tea Scrub	Mojave mixed woody scrub Great Basin mixed scrub	Upland	21.87	0.08	4.48	0.08
Rubber rabbitbrush scrub**	Rabbitbrush scrub	Upland	11.21	0.00	2.30	0.00
Singleleaf Pinyon Pine Woodland	Mojavean pinyon woodland	Upland	67.04	1.58	13.73	1.59
Other Cover Types*						
Developed		--	65.80	0.14	6.26	0.14
Non-native woodland**		Upland	4.08	0.00	0.00	0.00
Open Water		--	77.70	74.65	24.10	75.19
Ruderal**		--	13.97	0.00	0.00	0.00
Sandy Wash		--	11.78	2.46	1.42	2.48
Total		--	488.42	99.28		

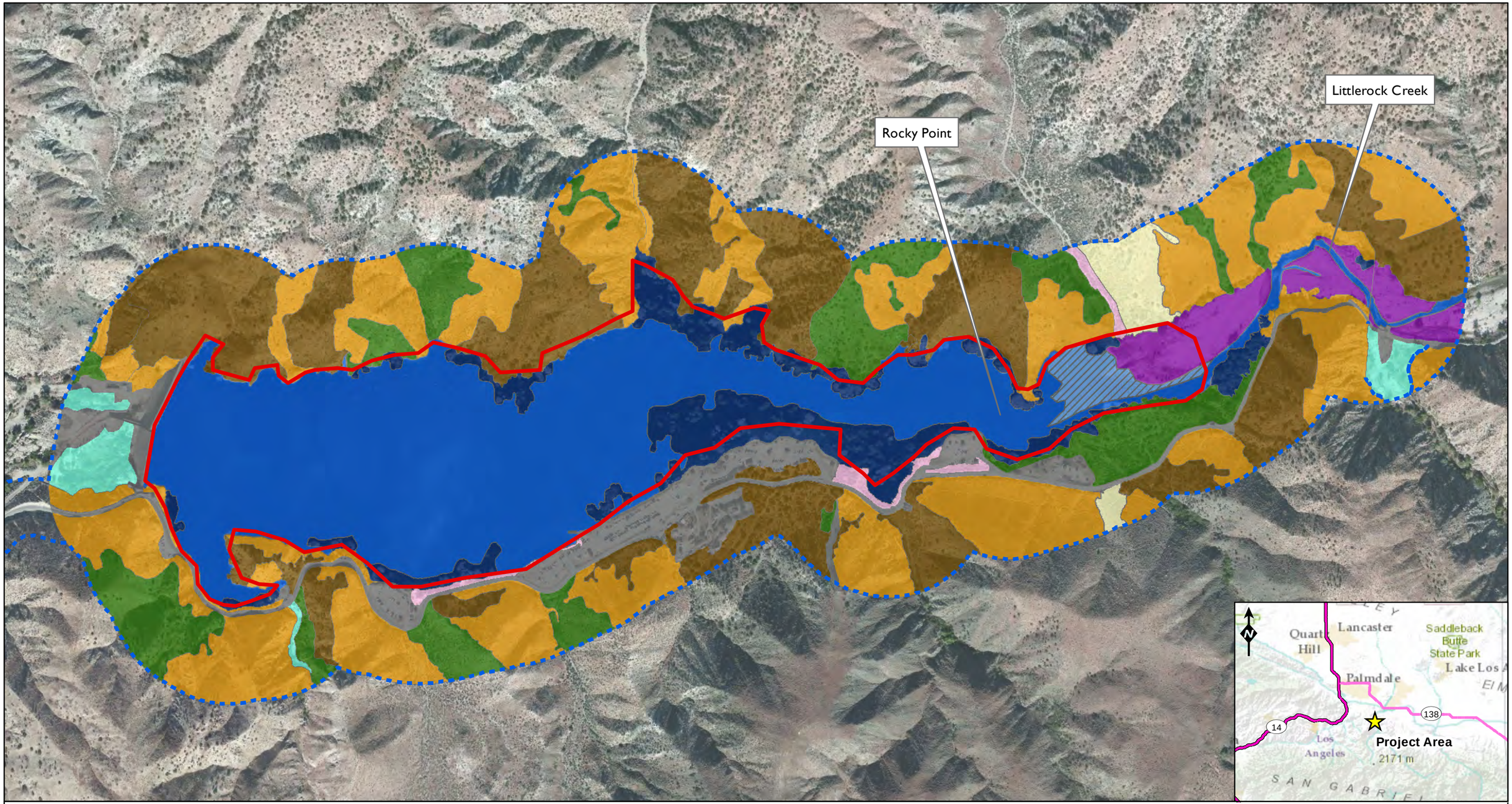
Vegetation Community		Type	Total Acres		Percentage of Total Acreage (%)	
Sawyer, Keeler-Wolf, and Evens (2009) Vegetation Classification	*Holland (1986) Vegetation Classification*		Vegetation Study Area	Project Area	Vegetation Study Area	Project Area
These communities/land covers are not defined in Sawyer et al. (2009) and Holland (1986) but are included in this table for acreage calculation purposes. ** Observations of these communities were limited to areas along the haul route north of the Reservoir. Communities in **bold** type are considered sensitive by the CDFG.						

Riparian Vegetation Types

Much of the natural riparian vegetation in California has been lost or degraded due to a variety of factors, including land use conversions to agricultural, urban, and recreational uses; channelization for flood control; sand and gravel mining; groundwater pumping; water impoundments; and various other alterations. Faber et al. (1989) estimated that as much as 95 to 97 percent of riparian habitats have been lost in southwestern California.

Riparian habitats are biologically productive and diverse, and are the exclusive habitat for several special-status wildlife species. Many of these species are wholly dependent on riparian habitats throughout the entirety of their life cycles, while others may utilize these habitats during certain seasons or life history phases. For example, numerous amphibian species breed in aquatic habitats but spend most of their lives in upland areas.
In an otherwise arid landscape, primary productivity in riparian habitats is high due to year-round soil moisture. High plant productivity leads to increased habitat structural diversity and increased food, availability for herbivorous animals, and in turn, predatory animals (reviewed by Faber et al., 1989). Insect productivity is also exhibited at relatively higher levels in riparian systems. During warmer months large numbers of insects provide a prey base for a diverse breeding bird fauna. Structural diversity is also much more evident in riparian systems than those of most regional uplands. Riparian woodlands tend to have multiple-layered herb, shrub, and tree canopies, whereas most upland communities are relatively simple-structured. This diverse vertical habitat structure supports a greater diversity of nesting and foraging sites for birds. Similarly, riparian communities support a broader diversity of mammals due to higher biological productivity, denning site availability, thermal cover, and greater access to water.

Fremont cottonwood forest (*Populus fremontii* Forest Alliance). Fremont cottonwood forest is the most mature riparian vegetation in the Vegetation Study Area. It is found at the margin of the reservoir and along Littlerock Creek above and below the reservoir. In the Vegetation Study Area it is dominated by Fremont cottonwood (*Populus fremontii*) with western sycamore (*Platanus racemosa*), black willow (*Salix goodingii*), and arroyo willow (*Salix lasiolepis*). In the upper elevations of the Vegetation Study Area this vegetation best matches southern cottonwood-willow riparian forest as described by Holland (1986) while in the lower elevations of the Vegetation Study Area it best matches the description of Mojave riparian forest (Holland 1986). Southern cottonwood-willow riparian forest and Mojave riparian forest are both recognized as sensitive communities by the California Department of Fish and Game (CDFG; 2010). During surveys conducted in 2012 it was noted that many of the mature cottonwoods and willows that occur along the margins of the reservoir, mapped within Fremont cottonwood forest, were dead or dying (Figure 5). An unknown number of the dead trees were observed to have been felled and left in place. While the exact cause of the dead trees is unknown, it can likely be attributed to extended periods of inundation.



Aspen Environmental Group

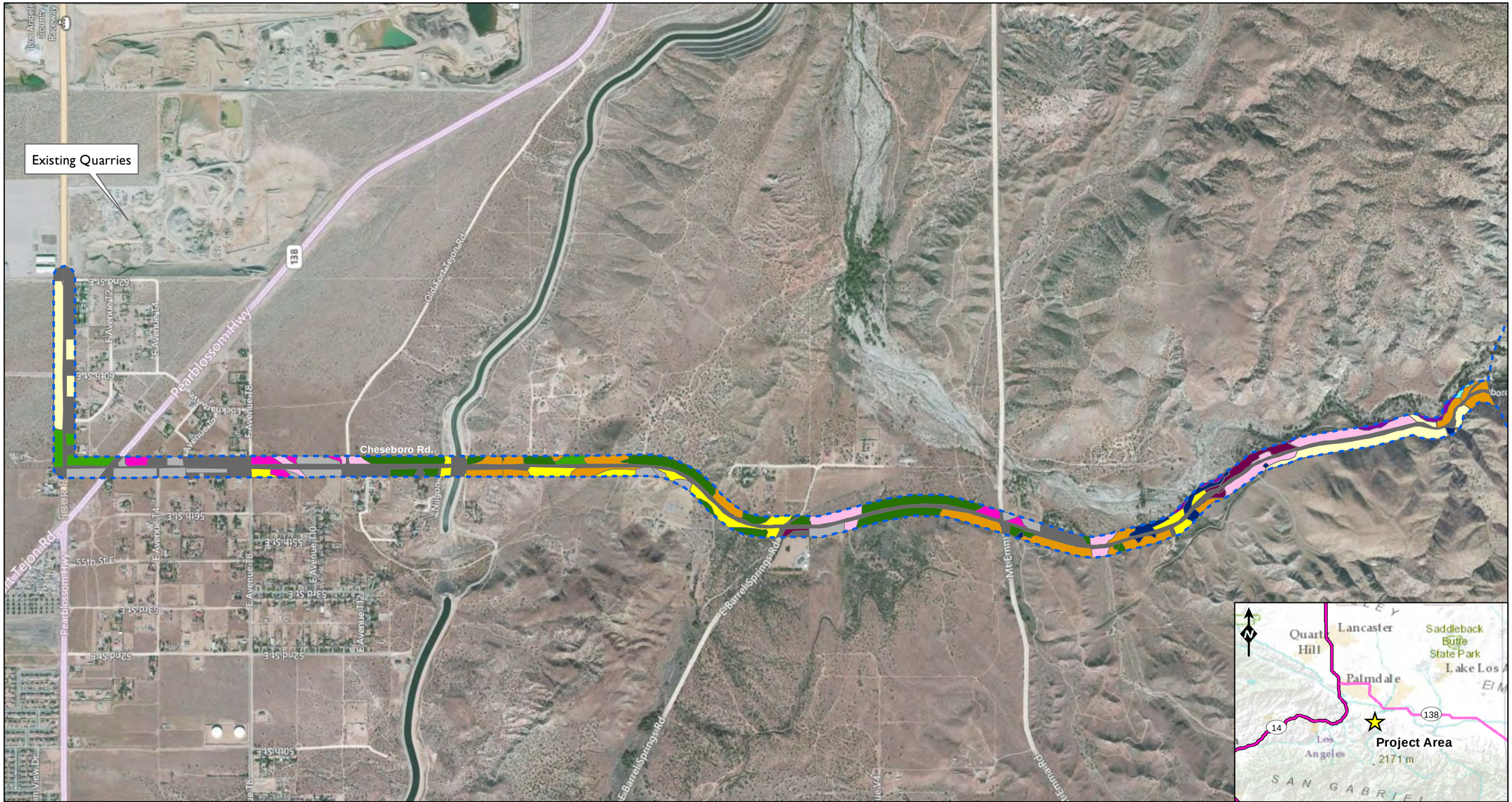
Miles
0 0.1 0.2

Vegetation Study Area
Project Area

Vegetation/Cover Type
- Arroyo willow thickets
- Big sagebrush scrub
- California buckwheat scrub
- California juniper woodland
- Cattail marshes
- Developed
- Fremont cottonwood forest
- Mormon tea scrub
- Open water
- Sandy wash
- Singleleaf pinyon woodland

Figure 4a

Vegetation Surrounding Littlerock Reservoir



Aspen Environmental Group

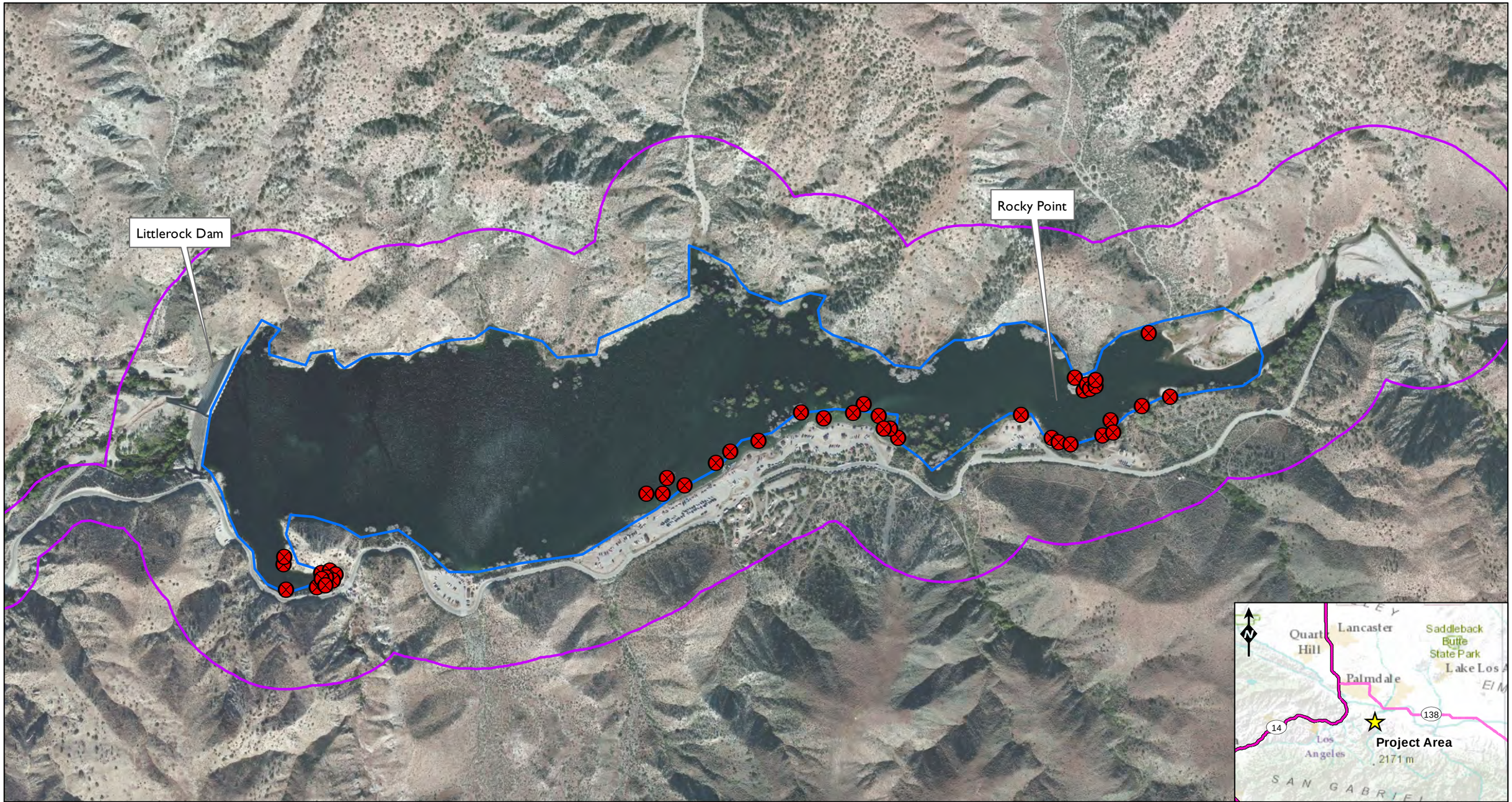
Miles
0 0.25 0.5

Vegetation Type

- Arroyo willow thickets
- Big sagebrush scrub
- California buckwheat scrub
- California juniper woodland
- Creosote bush scrub
- Developed
- Fremont cottonwood forest
- Joshua tree woodland
- Mormon tea scrub
- Non-native woodland
- Rubber rabbitbrush scrub
- Ruderal
- Sandy wash
- Vegetation Study Area

Figure 4b

Vegetation Along Cheseboro Road



Aspen Environmental Group

0 500 1,000 Feet

Dead or Cut-Down Cottonwood Tree
Vegetation Study Area
Project Area

Figure 5

Observation of Recent Cottonwood Mortality

Arroyo willow thickets (*Salix lasiolepis* Shrubland Alliance). Arroyo willow thickets are lower in stature and are typically less mature than cottonwood forests. Arroyo willow thickets tend to establish in recently scoured portions of the floodplain that have available ground water and open soil. Given enough time between disturbances this vegetation may develop into Fremont cottonwood forest. In the Vegetation Study Area arroyo willow thickets are dominated by arroyo willow, black willow, red willow (*Salix laevigata*) with an understory of riparian shrubs and herbaceous perennials. They match descriptions of southern willow scrub in Holland (1986). Arroyo willow thickets also match the description of Southern Riparian Scrub which is recognized as a sensitive community by CDFG (2010).

Cattail marshes [*Typha* (*angustofolia, domingensis, latifolia*) Herbaceous Alliance]. Cattail marsh is abundant at the upstream margin of the reservoir near Littlerock Creek. This community also periodically becomes established at Rocky Point. Broad leaved cattail (*Typha latifolia*) is present along with many other native and non-native wetland plants including rabbits foot grass (*Polypogon monspeliensis*), rushes (*Juncus* spp.), monkey flowers (*Mimulus* spp.), young willows (*Salix* spp.), young saltcedar (*Tamarix ramosissima*), and sweet clovers (*Melilotus* spp.). Given enough time between scouring floods and changes in the water level of the reservoir this vegetation will quickly develop into arroyo willow thickets. This vegetation best matches freshwater marsh as described by Holland (1986).

Upland Vegetation Types

In contrast to riparian and wetland plant species that are adapted to seasonally flooded or periodically saturated soils, upland plant communities consist of plant species that are adapted to dryer conditions and typically require only seasonal precipitation to obtain adequate water resources for growth and reproduction. In the Vegetation Study Area most of the upland plant communities are located in the foothills to the east and west of the Reservoir and adjacent to the haul road.

Big sagebrush (*Artemisia tridentata* Shrubland Alliance). Big sagebrush is uncommon and confined to mature alluvial benches and roadsides in the Vegetation Study Area. It is dominated by big sagebrush (*Artemisia tridentata*) with other plants such as rubber rabbitbrush (*Ericameria nauseosa*), desert bitterbrush (*Purshia glandulosa*), and hairy yerba santa (*Eriodictyon trichocalyx*). It best matches big sagebrush scrub as described by Holland (1986). Big sagebrush intergrades with other types of vegetation such as California juniper woodland, Mormon tea scrub, and rubber rabbitbrush scrub in the Vegetation Study Area. This alliance is not recognized by CDFG as sensitive (2010).

California buckwheat scrub (*Eriogonum fasciculatum* Shrubland Alliance). California buckwheat scrub is common within the Vegetation Study Area primarily on south-facing slopes adjacent to the reservoir and haul road. It is dominated by California buckwheat (*Eriogonum fasciculatum* var. *polifolium*) with other species such as Acton's encelia (*Encelia actoni*), narrowleaf goldenbush (*Ericameria linearifolia*), and Mormon tea (*Ephedra viridis*). California buckwheat scrub partially matches the description of Mojave mixed woody scrub as described in Holland (1986). This vegetation community is not recognized by CDFG as sensitive (2010).

California juniper woodland (*Juniperus californica* Woodland Alliance). California juniper woodland is found at several locations within the Vegetation Study Area. It is characterized by California juniper (*Juniperus californica*) which typically grows with an understory of species similar to those listed in California buckwheat scrub (above) and Mormon tea scrub (below). It best matches descriptions of Mojavean juniper woodland and scrub in Holland (1986). California juniper woodland tends to intergrade with singleleaf pinyon woodland (below) in the Vegetation Study Area. California juniper woodland is not recognized by CDFG as sensitive (2010).

Creosote bush scrub (*Larrea tridentata* Shrubland Alliance). Creosote bush scrub is the most characteristic vegetation of the California deserts and is dominated by creosote bush (*Larrea tridentata*). Other shrub species present in smaller numbers include desert box thorns (*Lycium* spp.), Acton's encelia, and beavertail cactus. Ground cover among the shrubs is fairly open in most of the area, largely dominated by native bunchgrasses and other herbs. This vegetation matches descriptions of Mojave creosote bush scrub in Holland (1986). Creosote bush scrub is not recognized by CDFG as sensitive (2010).

Joshua tree woodland (Yucca brevifolia Woodland Alliance). Joshua trees (*Yucca brevidifolia*) are found at scattered locations throughout the Vegetation Study Area but only the larger, intact patches are separated from adjacent vegetation and mapped. With the exception of the Joshua trees, these woodlands match the description of California juniper woodland (above). This vegetation matches Joshua tree woodland as described by Holland (1986). This vegetation is not recognized by CDFG as sensitive (2010).

Mormon tea scrub (*Ephedra viridis* Shrubland Alliance). This vegetation is similar in composition to California buckwheat scrub but the dominant species are Mormon tea and desert bitterbrush. Within the Vegetation Study Area it is isolated to a few steep north-facing slopes on the west side of the reservoir. It partially matches the description of Mojave mixed woody scrub and Great Basin mixed scrub in Holland (1986). Mormon tea scrub is not recognized by CDFG as sensitive (2010).

Non-native woodland. This vegetation is composed primarily of non-native trees that have been planted for ornamental value and does not match any named vegetation in Sawyer et al. (2009) or Holland (1986). Non-native woodlands are present at several areas within the Vegetation Study Area primarily along the haul routes. The largest non-native woodland in the Vegetation Study Area is near the reservoir entrance station where planted trees are persisting and in some cases reproducing. Non-native trees observed include black locust (*Robinia pseudoacacia*), silk tree (*Albizia julibrissin*), cypresses (*Cupressus* spp.), saltcedar and various pines (*Pinus* spp.). Non-native shrubs such as rosemary (*Rosmarinus officinali*) and oleander (*Nerium oleander*) were also observed. Non-native woodlands are not recognized by CDFG as sensitive (2010).

Rubber rabbitbrush scrub (*Ericameria nauseosa* Shrubland Alliance). This vegetation is characterized by the presence of rubber rabbitbrush. In the Vegetation Study Area it was observed in a few isolated canyon bottoms and roadsides near the Reservoir and at several locations along the haul road. It is similar in species composition to big sagebrush (above) but is dominated by rubber rabbitbrush. It matches descriptions of rabbitbrush scrub in Holland (1986). Rubber rabbitbrush scrub is not recognized by CDFG as sensitive (2010).

Singleleaf pinyon woodland (*Pinus monophylla* Woodland Alliance). Singleleaf pinyon woodland is common within the Vegetation Study Area on slopes surrounding the Reservoir. Singleleaf pinyon pine (*P.monophylla*) is the dominant species with California juniper, desert bitterbrush, and Joshua trees also present. Understory species are similar to those described in California buckwheat scrub (above). This vegetation best matches Mojavean pinyon woodland described in Holland (1986). Singleleaf pinyon woodland is not recognized by CDFG as sensitive (2010).

Ruderal. Ruderal vegetation is characteristic of heavily disturbed sites such as roadsides, graded lands, or former agricultural lands. Ruderal areas typically have little overall vegetation cover, and what vegetation is present is dominated by non-native weeds, "weedy" native species, and escaped ornamental species. Ruderal species identified in the Vegetation Study Area include summer mustard

(*Hirshfeldia incana*), cheat grass (*Bromus tectorum*), Mediterranean grass (*Schismus barbatus*) and pineapple weed (*Chamomilla suaveolens*). This vegetation is not recognized by CDFG as sensitive (2010).

Non-vegetation Cover Types

Developed. There are numerous developed areas within the Vegetation Study Area including roads, parking lots, residential areas, and adjacent cleared areas. These areas are typical devoid of vegetation or support scattered ornamental species.

Sandy wash. This cover type is found in dry stream channels that have recently been scoured by floods. This cover type typically supports low densities of plant cover; however in the absence of scouring flows or inundation these areas may develop more complex vegetation communities.

Open water. The operation of the Reservoir includes seasonal fluctuations in the water surface elevations. Typically the Reservoir is at capacity after winter precipitation. Water levels generally are maintained through the summer and gradually lowered to the dead pool elevation after Labor Day. The change in the water surface elevations greatly affects the type and composition of vegetation that can occur at the Reservoir. When the water recedes, large areas of barren sand and mud are exposed. This habitat is un-vegetated due to seasonal inundation; however riparian vegetation, weeds and herbaceous plants quickly become established along the margins of the creek. Herbaceous vegetation observed near Rocky Point included native and non-native species such as rabbitsfoot grass, willow herb (*Epilobium ciliatum*), salt heliotrope (*Heliotropium curassavicum*), bracted verbena (*Verbena bracteata*), and pineapple weed.

3.1.2 Common Plant Species Observed

Surveys resulted in the documentation of 266 species of native and non-native vascular plants within the Vegetation Study Area. Non-vascular plants, including lichens and bryophytes, were not identified during the surveys. Table 3-2, below, presents a list of all plants observed within the Vegetation Study Area.

Table 3-2. Plant Species Observed Within the Vegetation Study Area

Latin Name	Common Name	Abundance	Voucher
VASCULAR PLANTS			
FILICALES	FERN FAMILIES (SEVERAL INCLUDED TOGETHER)		
Marsilea vestita	Hairy cloverfern	Scarce	4,342
CUPRESSACEAE	CYPRESS FAMILY		
Cupressus sp.	Unid. cypress	Uncommon	
Juniperus californica	California juniper	Common	
EPHEDRACEAE	EPHEDRA FAMILY		
Ephedra nevadensis (?)	Desert tea	Uncommon	
Ephedra viridis	Green ephedra	Occasional	
PINACEAE	PINE FAMILY		
* *Pinus sp.*	Unid. ornamental	Uncommon	
Pinus monophylla	Pinyon pine	Common	
ANACARDIACEAE	CASHEW FAMILY		
Toxicodendron diversilobum	Poison oak	Uncommon	
APIACEAE	CELERY FAMILY		
* *Conium maculatum*	Poison hemlock	Uncommon	

Latin Name	Common Name	Abundance	Voucher
APOCYNACEAE	DOGBANE FAMILY		
* *Nerium oleander*	Ornamental oleander	Uncommon	
ASCLEPIADACEAE	MILKWEED FAMILY		
Asclepias fascicularis	Narrow-leaved milkweed	Uncommon	
ASTERACEAE	ASTER FAMILY		
Acamptopappus sphaerocephalus	Desert goldenhead	Uncommon	4,757
Ambrosia acanthicarpa	Annual sandbur	Occasional	
Artemisia douglasiana	Douglas mugwort	Occasional	
Artemisia dracunculus	Tarragon	Occasional	
Artemisia ludoviciana	Western mugwort	Occasional	
Artemisia tridentata	Great Basin sagebrush	Common	
Baccharis salicifolia	Mulefat	Occasional	
Brickellia californica	Calif. brickellbush	Uncommon	
Calycoseris parryi	Yellow tackstem	Scarce	1,571
* *Centaurea melitensis*	Tocalote	Uncommon	
Chaenactis glabriscula	Yellow pincushion	Uncommon	1,597
Chaenactis steveioides	Broad-flowered pincushion	Occasional	1,567
* *Chamomilla suaveolens*	Pineapple weed	Uncommon	1,580
(Matricaria matricarioides)			
Chrysothamnus nauseosus	Common rabbitbrush	Occasional	
Cirsium occidentale	California thistle	Scarce	4,759
var. californicum (?)			
* *Cirsium vulgare*	Bull thistle	Uncommon	
* *Conyza bonariensis*	Flax-leaved horseweed	Uncommon	
Conyza canadensis	Horseweed	Uncommon	
Coreopsis bigelovii	Bigelow coreopsis	Uncommon	1,599
Encelia actoni	Acton brittlebush	Occasional	
Ericameria cooperi	Cooper goldenbush	Uncommon	1,625
Ericameria linearifolia	Narrowleaf goldenbush	Uncommon	
Eriophyllum confertiflorum	Golden yarrow	Uncommon	
Eriophyllum wallacei	Wallace's woolly daisy	Uncommon	
Gnaphalium canescens	Perennial cudweed	Uncommon	
* *Gnaphalium luteo-album*	Pearly everlasting	Scarce	
Gnaphalium palustre	Meadow everlasting	Uncommon	1,568B
Gnaphalium stramenium	Cotton batting	Uncommon	4,782
Gutierrezia sarothrae	Common matchweed	Occasional	
Heterotheca grandiflora	Telegraph weed	Uncommon	
Hymenoclea salsola	Cheesebush	Uncommon	1,646
* *Lactuca serriola*	Prickly lettuce	Scarce	
Lasthenia californica	California goldfields	Uncommon	
Layia glandulosa	White tidy tips	Uncommon	1,588
Lepidospartum squamatum	Scalebroom	Occasional	
Lessingia filaginifolia	Chaparral aster	Occasional	
(Corethrogyne filaginifolia)			
Microseris lindleyi (M. linearifolia,	Silver puffs	Uncommon	1,631
Uropappus lindleyi)			
Nicolletia occidentalis	Hole-in-the-sand plant	Scarce	4,773

Latin Name	Common Name	Abundance	Voucher
Rafinesquia californica	Calif. chicory	Uncommon	
Senecio flaccidus v. douglasii	Sand-wash butterweed	Uncommon	4,766
* *Sonchus asper*	Prickly sow-thistle	Occasional	
* *Sonchus oleraceus*	Common sow thistle	Uncommon	
Stephanomeria exigua	Wreath plant	Uncommon	
Stephanomeria pauciflora	Wire-lettuce	Uncommon	
Stephanomeria virgata	Wreath plant	Uncommon	
Stylocline gnaphalioides	Everlasting nest-straw	Scarce	
Stylocline psilocarphoides	Perk's nest-straw	Scarce	1,618
Syntrichopappus fremontii	Freemont's syntrchopappus	Uncommon	1,622
** *Syntrichopappus lemmonii*	Lemmon's syntrichopappus	Scarce	1,563
Tetradymia comosa	Hairy horsebrush	Uncommon	
Tetradymia spinosa (?)	Cottonthorn	Uncommon	1,645
Xanthium strumarium	Cocklebur	Uncommon	
Xylorhiza tortifolia	Mojave aster	Scarce	
(Machaeranthera tortifolia)			
BETULACEAE	BIRCH FAMILY		
Alnus rhombifolia	White alder	Uncommon	
BORAGINACEAE	BORAGE FAMILY		
Amsinckia tessellata	Checker fiddleneck	Occasional	
Cryptantha barbigera	Bearded cryptantha	Uncommon	1,568A
Cryptantha circumscissa	Cushion cryptantha	Uncommon	1,628
Cryptantha decipiens	Gravelbar cryptantha	Scarce	1,587B
Cryptantha muricata	Prickly cryptantha	Occasional	1,587A
Cryptantha nevadensis var. *rigida*	Nevada cryptantha	Uncommon	1,644
Cryptantha oxygona	Sharpnut cryptantha	Uncommon	1,603
Cryptantha pterocarya	Winged cryptantha	Scarce	1,592
Heliotropium curassavicum	Salt heliotrope	Occasional	
Pectocarya linearis	Comb-bur	Uncommon	1,649
Pectocarya setosa	Comb-bur	Uncommon	
Plagiobothrys arizonicus	Arizona popcornflower	Uncommon	1,574
BRASSICACEAE	MUSTARD FAMILY		
Arabis pulchra	Beautiful rock-cress	Uncommon	
* *Brassica geniculata*	Short-pod mustard	Uncommon	
(Hirschfeldia incana)			
Descurainia pinnata	Tansy mustard	Scarce	1,569
Descurainia sophia	Flixweed, tansy mustard	Uncommon	1,593
Lepidium fremontii	Fremont pepper-grass	Uncommon	
Rorippa curvisiliqua (?)	Western yellow-cress	Scarce	4,761
Rorippa nasturtium-aquaticum	Water-cress	Uncommon	
Rorippa sphaerocarpa (?)	Round fruited yellow-cress	Scarce	4,785
* *Sisymbrium officinale*	Hedge mustard	Uncommon	
* *Sisymbrium irio*	London rocket	Uncommon	
Stanleya pinnata	Prince's plume	Uncommon	
Thysanocarpus lacinatus	Fringe-pod	Uncommon	1,586

Latin Name	Common Name	Abundance	Voucher
CACTACEAE	CACTUS FAMILY		
* *Opuntia basilaris*	Short-jointed beavertail cactus	Scarce	4,775
var. brachyclada			
Opuntia basilaris var. basilaris	Common beavertail cactus	Occasional	
Opuntia echinocarpa	Silver cholla	Uncommon	
CAMPANULACEAE	BELLFLOWER FAMILY		
Nemacladus longiflorus	Long flowered thread plant	Scarce	1,623A
var. *breviflorus*			
Nemacladus sigmoideus	Small flowered thread plant	Scarce	1,623B
CARYOPHYLLACEAE	CARNATION FAMILY		
Minuartia douglasii	Douglas sandwort	Scarce	1,564
CHENOPODIACEAE	GOOSEFOOT FAMILY		
Atriplex canescens	Four-winged saltbush	Occasional	
* *Chenopodium album (?)*	Common goosefoot	Uncommon	
Chenopodium berlandieri	Pit seed goosefoot	Uncommon	
* *Chenopodium botrys*	Jerusalem oak goosefoot	Uncommon	4,333
Chenopodium californicum	California goosefoot	Uncommon	
* *Chenopodium murale*	Nettle-leaved goosefoot	Uncommon	
Grayia spinosa	Spiny hop-sage	Occasional	1,583
* *Salsola tragus*	Russian thistle, tumbleweed	Uncommon	
CRASSULACEAE	STONECROP FAMILY		
Dudleya lanceolata	Lance-leaved dudleya	Uncommon	1,590
CUCURBITACEAE	CUCUMBER FAMILY		
Marah fabacea	California man-root	Scarce	1,619
CUSCUTACEAE	DODDER FAMILY		
Cuscuta sp.	Unid. witch's hair	Uncommon	
DATISCACEAE	DATISCA FAMILY		
Datisca glomerata	Durango root	Scarce	4,343
ERICACEAE	MANZANITA FAMILY		
Arctostaphylos glauca	Bigberry manzaniga	Uncommon	1,582
EUPHORBIACEAE	SPURGE FAMILY		
Chamaesyce albomarginata	Rattlesnake spurge	Occasional	
(Euphorbia albomarginata)			
FABACEAE	PEA FAMILY		
* *Albizia julibrissin*	Silktree	Uncommon	
Astragalus didymocarpus	Dwarf locoweed	Scarce	1,626
Lotus humistriatus	Hill lotus	Scarce	1,632
Lotus scoparius	Deerweed	Uncommon	
Lotus strigosus	Strigose lotus	Uncommon	1,620
Lupinus bicolor	Miniature lupine	Uncommon	
Lupinus concinnus	Sand lupine	Uncommon	
Lupinus sparsiflorus	Coulter lupine	Uncommon	1,594
* *Melilotus alba*	White sweet-clover	Occasional	
* *Parkinsonia aculeata*	Mexican palo verde	Scarce	4,788
* *Robinia pseudoacacia*	Black locust	Uncommon	
Trifolium microcephalum	Maiden clover	Scarce	4,777
Trifolium willdenovii	Valley clover	Uncommon	4,776

Latin Name	Common Name	Abundance	Voucher
Trifolium sp.	Unid. clover	Scarce	4,764
GENTIANACEAE	GENTIAN FAMILY		
Centaurium exaltatum	Desert centaury	Uncommon	4,338
GERANIACEAE	GERANIUM FAMILY		
* *Erodium cicutarium*	Red-stemmed filaree	Uncommon	
HYDROPHYLLACEAE	WATERLEAF FAMILY		
Emmenanthe penduliflora	Whispering bells	Uncommon	
Eridictyon trichocalyx	Yerba santa	Occasional	1,610
Eucrypta chrysanthemifolia	Common eucrypta	Uncommon	
Nemophila menziesii	Baby blue-eyes	Uncommon	
Phacelia cryptantha	Limestone phacelia	Uncommon	1,566
Phacelia distans	Common phacelia	Occasional	
Phacelia imbricata	Broad-sepaled phacelia	Uncommon	1,589
Phacelia longipes	Longstalk phacelia	Uncommon	1,595
Pholistoma membranaceum	White fiesta-flower	Scarce	1,575
Turricula parryi	Poodle bush	Occasional	4,758
LAMIACEAE	MINT FAMILY		
Salazaria mexicana	Bladder sage, paper bag bush	Occasional	1,641
Salvia columbariae	Chia	Occasional	
Salvia dorrii (S. carnosa)	Blue desert sage	Occasional	1,562
Stachys albens	White hedge-nettle	Uncommon	4,786
Stachys ajugoides (incl. S. rigida)	Hedge nettle	Scarce	
LOASACEAE	STICK-LEAF FAMILY		
Mentzelia veatchiana	Veatch's stick-leaf	Uncommon	1,600
MELIACEAE	MAHOGANY FAMILY		
* *Melia azedarach*	China berry	Uncommon	
NYCTAGINACEAE	FOUR O'CLOCK FAMILY		
Mirabilis laevis	Desert wishbone bush	Uncommon	
OLEACEAE	OLIVE FAMILY		
Forestiera pubescens	Desert olive	Uncommon	
ONAGRACEAE	EVENING PRIMROSE FAMILY		
Camissonia boothii	Shredding evening primrose	Uncommon	4,779
ssp. *decorticans*			
Camissonia campestris (?)	Field evening primrose	Uncommon	1,621
Camissonia pallida	Pale suncup	Scarce	1,647
Epilobium brachycarpum	Summer cottonweed	Uncommon	
(E. paniculatum)			
Epilobium canum	California fuchsia	Uncommon	
(Zauschnaria californica)			
Epilobium ciliatum	Willow-herb	Occasional	
Epilobium densiflorum (?)	Dense-flowere willow-herb	Scarce	4,334
Oenothera californica	California evening primrose	Uncommon	
OROBANCHACEAE	BROOMRAPE FAMILY		
Orobanche californica ssp. feudgei	California broomrape	Uncommon	1,605
PAPAVERACEAE	POPPY FAMILY		
Eschscholzia californica	Calif. poppy	Uncommon	
Eschscholzia minutiflora	Small-flowered poppy	Scarce	1,624

Latin Name	Common Name	Abundance	Voucher
Platystemon californicus	Cream cups	Scarce	1,635
PLATANACEAE	SYCAMORE FAMILY		
Platanus racemosa	California sycamore	Uncommon	
POLEMONIACEAE	PHLOX FAMILY		
Eriastrum densifolium	Perennial woolly-star	Uncommon	4,767
ssp. densifolium			
Eriastrum sapphirinum	Sapphire woollystar	Uncommon	1,613
Gilia brecciarum	Nevada gilia	Scarce	1,638
Gilia splendens	Splendid gilia	Uncommon	1,596
Gilia sp.	Unid. gilia	Scarce	1,601
Leptodactylon californicum	California prickly-phlox	Scarce	
Linanthus aureus	Golden linanthus	Scarce	1,642
Linanthus bigelovii	Biglow's linanthus	Uncommon	1,636
Linanthus parryae	Parry's linanthus	Uncommon	1,627
Loeseliastrum matthewsii	Desert calico	Scarce	1,648
POLYGONACEAE	BUCKWHEAT FAMILY		
Centrostegia thurberi	Thurber spineflower	Uncommon	1,584
(Chorizanther thurberi)			
Chorizanthe brevicornu	Brittle spine-flower	Uncommon	
Chorizanthe staticoides	Turkish rugging	Occasional	1,617
Chorizanthe watsonii	Watson spineflower	Uncommon	
Chorizanthe xanti var. *xanti*	Riverside spineflower	Uncommon	1,629
Eriogonum cithariforme var. *agninum*	Cithara buckwheat	Uncommon	1,570
Eriogonum elongatum	Wand buckwheat	Uncommon	
Eriogonum pusillum	Puny buckwheat	Uncommon	1,581
Eriogonum spp.	2 or more unidentified annuals		
* *Polygonum arenastrum*	Common knotweed	Occasional	
(P. aviculare)			
Polygonum lapathifolium	Willow smartweed	Occasional	
PORTULACACEAE	PURSLANE FAMILY		
Calyptridium monandrum	Common calyptridium	Uncommon	
Claytonia parviflora	Miner's lettuce	Uncommon	1,606
* *Portulaca oleracea*	Common purslane	Uncommon	
RANUNCULACEAE	BUTTERCUP FAMILY		
Delphinium parishii	Parish larkspur	Uncommon	1,561
ROSACEAE	ROSE FAMILY		
Purshia glandulosa	Desert bitterbrush	Occasional	
RUBIACEAE	COFFEE FAMILY		
Galium angustifolium	Bedstraw	Uncommon	
* *Galium aparine*	Goose grass	Uncommon	
SALICACEAE	WILLOW FAMILY		
Populus fremontii	Fremont cottonwood	Common	
Salix exigua	Sandbar willow	Occasional	
Salix goodingii	Black willow	Occasional	
Salix laevigata	Red willow	Occasional	
Salix lasiolepis	Arroyo willow	Occasional	

Latin Name	Common Name	Abundance	Voucher
SAURACEAE	LIZARD TAIL FAMILY		
Anemopsis californica	Yerba mansa	Uncommon	
SCROPHULARIACEAE	SNAPDRAGON FAMILY		
Castilleja linariifolia	Desert paintbrush	Scarce	
Castilleja minor ssp. spiralis	Lesser paintbrush	Uncommon	4,336
Collinsia callosa	Desert collinsia	Scarce	1,565
Mimulus cardinalis	Scarlet monkeyflower	Occasional	
Mimulus floribundus	Showy monkeyflower	Uncommon	4,337
Mimulus guttatus	Seep monkeyflower	Occasional	
* *Mimulus johnstonii*	Johnston's monkeyflower	Scarce	1,572
Mimulus moschatus	Musk monkeyflower	Uncommon	4,335
Mimulus parishii	Parish's monkey-flower	Scarce	4,770
Mimulus pilosus	Downy monkey-flower	Uncommon	
Penstemon centranthifolius	Scarlet bugler	Uncommon	
* *Verbascum virgatum*	Wand muellin	Occasional	4,765
Veronica americana	American brooklime	Scarce	
* *Veronica anagallis-aquatica (?)*	Water speedwell	Uncommon	
SIMAROUBACEAE	QUASSIA FAMILY		
* *Ailanthus altissima*	Tree of heaven	Scarce	
SOLANACEAE	NIGHTSHADE FAMILY		
Datura wrightii (D. meteloides)	Jimsonweed	Occasional	
Lycium andersonii	Anderson thornbush	Uncommon	
Lycium cooperi	Peach desert thorn	Uncommon	
* *Nicotiana glauca*	Tree tobacco	Uncommon	
* *Solanum elaeagnifolium*	Silver-leaf nightshade	Uncommon	4,789
TAMARICACEAE	TAMARISK FAMILY		
Tamarix ramosissima	Mediterranean tamarisk	Occasional	
URTICACEAE	NETTLE FAMILY		
Urtica dioica ssp. holosericea	Stinging nettle	Uncommon	
VERBENACEAE	VERVAIN FAMILY		
Verbena bracteata	Bracted verbena	Occasional	4,762
Verbena lasiostachys	Western verbena	Uncommon	
VISCACEAE	MISTLETOE FAMILY		
Phoradendron densum	Leafy juniper mistletoe	Uncommon	
Phoradendron macrophyllum	Mistletoe (on sycamore or	Uncommon	
ZYGOPHYLLACEAE	CALTROP FAMILY		
Larrea tridentata	Creosote bush	Common	
* *Tribulus terrestris*	Puncture vine	Uncommon	
CYPERACEAE	SEDGE FAMILY		
Carex alma (?)	Sturdy sedge	Uncommon	4,339
Carex fracta (?)	Fragile-sheathed sedge	Uncommon	4,781
Carex praegracilis	Clustered field-sedge	Occasional	
Carex senta (?)	Rough sedge	Uncommon	4,340
* *Cyperus difformis (?)*	Variable flatsedge	Scarce	4,769
Cyperus eragrostis	Tall umbrella sedge	Uncommon	
Eleocharis parishii	Parish spike-sedge	Uncommon	4,770
Scirpus microcarpus	Small-fruited bulrush	Uncommon	

	Latin Name	Common Name	Abundance	Voucher
	JUNCACEAE	RUSH FAMILY		
	Juncus sp. (1 or more unid. spp.)			4,344
	Juncus arcticus (incl. vars.	Wire-grass	Uncommon	
	balticus and mexicanus)			
	Juncus bufonius	Toad rush	Occasional	
	Juncus macrophyllus	Long-leaved rush	Uncommon	1,585
	Juncus rugulosus	Wrinkled rush	Uncommon	4,345
	Juncus tiehmii	Nevada rush	Uncommon	4,331
	Juncus xiphioides	Iris-leaved rush	Occasional	4,346
	LILIACEAE	LILY FAMILY		
	Allium fimbriatum var. fimbriatum	Fringed onion	Scarce	1639
	Bloomeria crocea	Golden stars	Scarce	
	Calochortus kennedyi	Kennedy's mariposa lily	Scarce	1,643
	Dichelostemma capitata	Wild hyacinth, bluedicks	Uncommon	
	(Brodiaea pulchella)			
	Yucca brevifolia	Joshua tree	Occasional	
	Yucca whipplei	Chaparral yucca	Occasional	
	(Hesperoyucca whipplei)			
	POACEAE	GRASS FAMILY		
	Agrostis exarata	Western bentgrass	Occasional	4,787
*	*Agrostis viridis (A. semiverticillata)*	Water bentgrass	Uncommon	
*	*Avena fatua*	Wild oat	Scarce	
*	*Bromus diandrus*	Ripgut brome	Occasional	
*	*Bromus hordeaceus (B. mollis)*	Soft chess	Uncommon	
*	*Bromus madritensis*	Red brome	Occasional	
	ssp. rubens (B. rubens)			
*	*Bromus tectorum*	Cheat grass	Occasional	
*	*Cynodon dactylon*	Bermuda grass	Uncommon	
	Distichlis spicata	Saltgrass	Uncommon	
	Elymus elymoides	Bottlebrush squirreltail	Uncommon	
	(Sitanion hystrix v. hystrix)			
*	*Hordeum murinum*	Hare barley	Uncommon	
*	*Leptochloa uninervia*	Sprangletop	Uncommon	4,768
	Melica imperfecta	Common melic	Uncommon	
*	*Stipa milaceum (Piptatherum m.)*	Smilo grass	Uncommon	
*	*Poa annua*	Annual bluegrass	Uncommon	
*	*Poa pratensis*	Kentucky bluegrass	Occasional	
	Poa secunda	Nodding bluegrass	Occasional	
*	*Polypogon monspeliensis*	Rabbitfoot grass	Occasional	
*	*Schismus barbatus*	Mediterranean schismus	Occasional	
	Stipa hymenoides (Oryzopsis	Indian ricegrass	Uncommon	
	hymenoides, Achnatherum hymenoides)			
	Stipa speciosa	Desert needlegrass	Uncommon	
	(Achnatherum speciosum)			
	Vulpia microstachys	Annual fescue	Uncommon	1,602
	(Festuca microstachys, F. reflexa, F. pacifica, F. confusa)			
*	*Vulpia myuros (Festuca myuros,*	Annual fescue	Uncommon	

Latin Name	Common Name	Abundance	Voucher
F. megalura)			
TYPHACEAE	CATTAIL FAMILY		
Typha domingensis	Slender cattail	Uncommon	
Typha latifolia	Broad-leaved cattail	Occasional	
ZANNICHELLIACEAE	HORNED PONDWEED FAMILY		4,341
Zannichellia palustris	Horned pondweed	Scarce	

Alien species are indicated by asterisk, special status species indicated by two asterisks. This list includes only species observed within the Vegetation Study Area. Others may have been overlooked or unidentifiable due to season. Plants were identified using keys, descriptions, and illustrations in Abrams (1923-1951), Hickman (1993), and Munz (1974). Taxonomy and nomenclature generally follow Hickman. Vouchers, indicated by Justin Wood's collection numbers, will be deposited at Rancho Santa Ana Botanic Garden.

3.1.3 Noxious and Invasive Weeds

The term "noxious weeds" includes all plants formally designated by the Secretary of Agriculture or other responsible State official. These species usually possess one or more of the following characteristics: "aggressive and difficult to manage, poisonous, toxic, parasitic, a carrier or host of serious insects or disease, and being non-native or new to or not common to the United States or parts thereof" (USDA, 1995). Several noxious weeds already exist within the Vegetation Study Area (including the preferred haul routes). Some of these species occur in well-established populations and appear to be associated with historic disturbance.

Surveys within the Study Area identified 51 nonnative plant species. Several of these are considered noxious weeds by the Cal-IPC. Table 3-3 lists the noxious and invasive plant species that were identified during the surveys. Figure 6 graphically depicts the location of each species in relation to the Reservoir and/or haul route. Appendix B provides additional information on the life history characteristics, threat level, and currently recognized methods for their control or eradication.

Table 3-3. Noxious and Invasive Plant Species Identified in the Vegetation Study Area

Scientific Name	Common Name	Threat Level*
Centaurea melitensis	Tocalote	Moderate
Hirschfeldia incana (Brassica geniculata)	Short-pod mustard	Moderate
Nicotiana glauca	Tree tobacco	Moderate
Parkinsonia aculeata	Jerusalem thorn	Evaluated Not Listed
Polypogon monspeliensis	Rabbitsfoot grass	Limited
Solanum elaeagnifolium	White horsenettle	Evaluated Not Listed
Stipa miliacea	Smilo grass	N/A
Tamarix sp.	Tamarisk	High
Verbascum virgatum	Wand mullein	N/A

* Source: Cal-IPC, 2012

3.1.4 Soils

Soil characterization is an important component of any analysis for biological resources because soils often play a pivotal role in the habitat requirements of a variety of special-status plant and wildlife species. It is not uncommon for soil composition and/or texture to define exclusive habitat qualities for many of these species. Several special-status plants require unique soil characteristics in order to set

seed, germinate, and grow. Additionally, many special-status reptiles and mammals require suitable soil qualities, such as texture and friability, to construct and maintain adequate burrows. Table 3-4 lists the soils occurring in the Study Area. Figure 7 illustrates the locations of these soil types within the Study Area. However, soil maps are broad in scale and are not used for site specific analysis.

Table 3-4. Soil Units Occurring in the Study Area

Map Unit Symbol	Map Unit Name	Description	Acres Within Study Area	% Total Within Study Area
21	Riverwash	An excessively drained soil that occurs in alluvial flats; generally occurs from 1,800 – 4,800 feet in elevation; parent material consists of alluvium; frequently flooded; extremely stony coarse sand (0-60”).	55.15	12.13
711	Trigo family, dry-Lithic Xerorthents, warm complex, 50 to 80 percent slopes	A somewhat excessively drained soil that occurs in the; generally occurs from 3,200 to 6,400 feet in elevation; parent material consists of residuum weathered from granodiorite; not prone to frequent flooding; sandy loam (0 – 20”), weathered bedrock (20 – 24”).	213.31	46.91
766	Water	Open Water	186.27	40.96
		Total	454.73	

Source: NRCS, 2012

3.1.5 Jurisdictional Waters/Wetlands

A jurisdictional delineation of State and or federal waters/wetlands was not conducted as part of the surveys presented in this report. Results of the comprehensive delineation will be presented in a separate report. Initial review indicates that the Reservoir and Littlerock Creek would be considered “waters of the United States” and would be subject to the jurisdiction of the USACE, the CDFG and the RWQCB.

3.2 Common Wildlife

Littlerock Creek provides a diverse set of habitats that support a variety of wildlife species. These habitat types contribute to the diversity and abundance of wildlife in the region as they provide for permanent and migratory residency, foraging, and breeding behaviors. In addition, the creek bed and adjacent uplands provide breeding and refugia for a number of wildlife species. The habitat with the greatest intrinsic value to wildlife is the riparian community. The Project Area is also extensively used by recreationists including families, day users, boaters, and anglers. In the fall, portions of the site are opened for OHV use. The disturbance caused by these recreational activities may limit the daytime use of the Project Area by some species of wildlife and degrade the value for wildlife that enters the Reservoir area. Nonetheless common and sensitive wildlife were detected at or near the Study Area. Appendix C provides a list of all the wildlife detected in the project area.

Invertebrates

Habitat conditions in the Study Area provide a suite of microhabitat conditions for a wide variety of terrestrial and aquatic insects, crustaceans, and other invertebrates. This includes swift running portions of Littlerock Creek with cobble and rocks, thick leaf litter, and pools of slow-moving or still water. Like in all ecological systems, invertebrates play a crucial role in a number of biological processes. They serve as the primary or secondary food source for a variety of fish, bird, reptile, and mammal predators; they provide important pollination vectors for numerous plant species; they act as efficient components in

Aspen Environmental Group

0 0.5 1 Miles

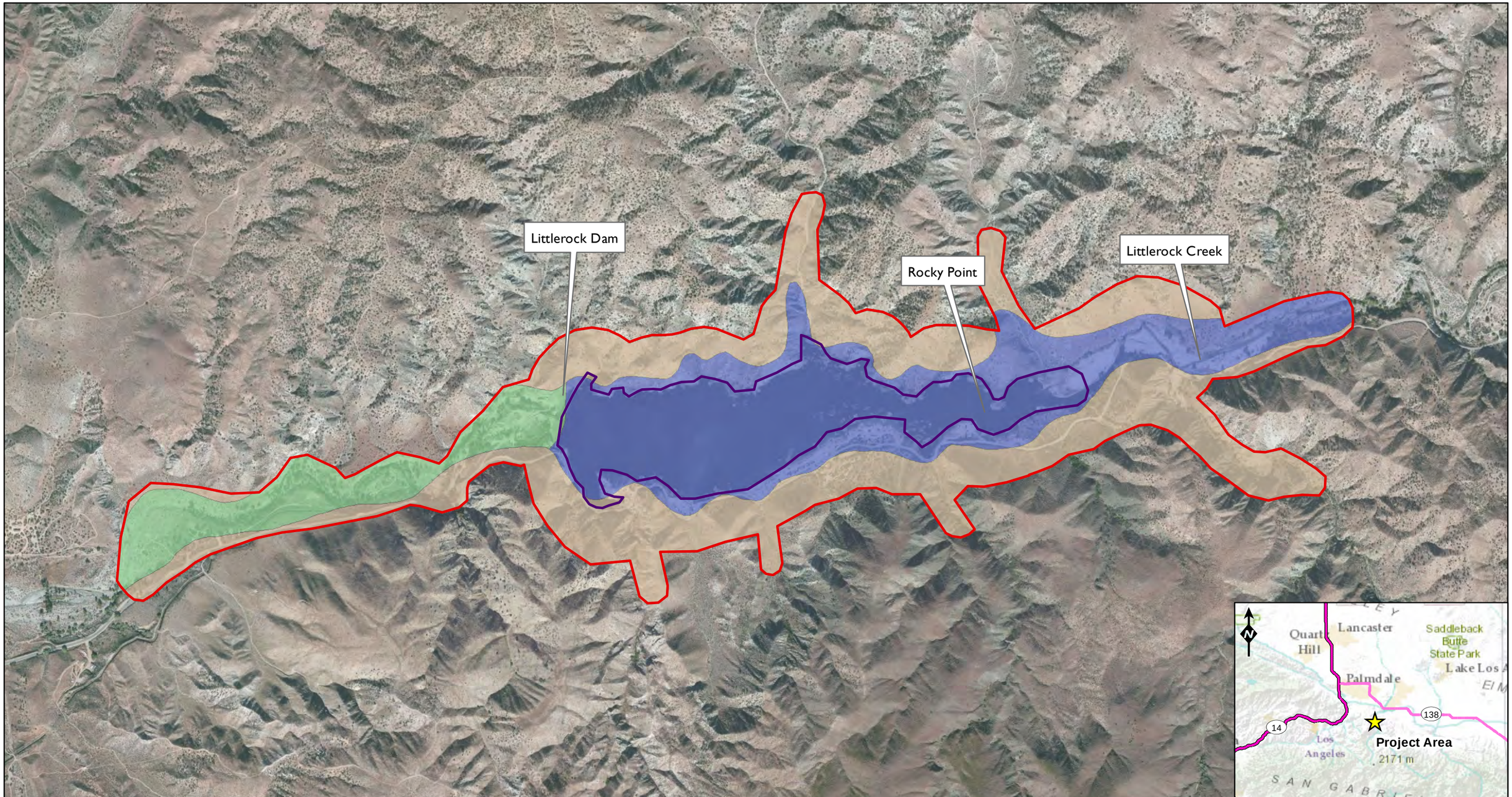
Weeds: Individuals
- Tocalote
- Short-pod mustard
- Tree tobacco
- Jerusalem thorn
- Russian thistle
- White horsenettle
- Smilo grass
- Wand mullein

Weeds: Patches
- Rabbitsfoot grass
- Tamarisk
- Wand mullein

- Project Area
- Vegetation Study Area

Figure 6

Noxious and Invasive Weeds in Vegetation Study Area



Aspen Environmental Group

0 0.2 0.4 Miles

Project Area
StudyArea

Soil Type
21 - River Wash
711 - Trigo family, dry-Lithic Xerorthents, warm complex, 50 to 80 percent slopes
766 - Water

Figure 7

Soils Types

controlling pest populations; and, they support the naturally occurring maintenance of an area by consuming detritus and contributing to necessary soil nutrients. General surveys of the Study Area detected a wide variety of Anisoptera (dragonflies) Zygoptera (damselflies), Hemiptera (true bugs), Coleoptera (beetles), Diptera (flies), Pleocoptera (stone flies), Lepidoptera (moths and butterflies), Hymenoptera (wasps, bees and ants), and Trichoptera (caddis flies).

Both non-native Argentine ants (*Linepithema humile*, formerly *Iridomyrmex humile*) and native harvester ants (*Pogonomyrmex californicus*) were detected in the Study Area. Harvester ants were commonly observed in upland habitats to the east and west of the Reservoir. Stream invertebrates were common and included a variety of aquatic larvae such as damselflies, dragonfly larvae, and water bugs (i.e., toe biters [family Belostomatidae]). These aggressive insects prey on other insects, small fish, and amphibians.

Fish

Flows in the lower portion of Littlerock Creek are primarily ephemeral and do not support year-round habitat for fish. The Reservoir does support perennial water that fluctuates depending on annual rainfall and water releases. Habitat conditions in Littlerock Creek within the Study Area include overhanging vegetation, deep pools, and sections with short runs and riffles. Substrate conditions vary by location but Littlerock Creek contains areas supporting silty sands, gravel, cobble and boulder-dominated zones. Macro algae communities are present during portions of the year within localized areas and include duck and pond weed and mat-forming algae. The Reservoir, when full, is approximately 100 feet deep and supports an abundance of riparian tree species that provide structure used by a variety of fish species. Shallows and coves are present around portions of the Reservoir and provide habitat for species tolerant of warmer waters (i.e., Sunfish). Reservoir and creek temperatures vary by season and are a function of depth, location, and snow pack in the upper watershed.

Native fish were not detected during the surveys. Bluegill (*Lepomis macrochirus*) and largemouth bass (*Micropterus salmoides*) were the most common non-native species detected and were found to occur in the Reservoir and portions of Littlerock creek above Rocky Point. Rainbow trout (*Oncorhyncus mykiss*) and brown trout (*Salmo trutta*) are known to occur in the Reservoir and the Littlerock Creek Watershed. However, due to potential negative effects on arroyo toad populations, a court order in 2009 required the cessation of all CDFG stocking activities at the Reservoir. As with many reservoirs/streams in California, a variety of nonnative and/or invasive fish were routinely detected during the surveys. Although not detected during the surveys the watershed is known to support other exotic species including green sunfish (*Lepomis cyanellus*), pumpkinseed sunfish (*Lepomis gibbosus*), common carp (*Cyprinus carpio*), channel catfish (*Ictalurus punctatus*), and bullhead (*Ameiurus* Sp.).

Amphibians

Amphibians often require a source of standing or flowing water to complete their life cycle. However, some terrestrial species can survive in drier areas by remaining in moist environments found beneath leaf litter and fallen logs, or by burrowing into the soil. Conditions within the Study Area generally provide year-round habitat for a variety of amphibian species. When flowing, Littlerock Creek can provide small pools, shallow rills and runs, and deep wide slow-moving water supporting several native and nonnative species. The southern extents of the Reservoir provide a year-round water source within coves and shallows that are capable of supporting amphibian species. However, the presence of predatory fish likely decreases the numbers of amphibians that occur along the margins of the lake. Additionally, small pools and/or depressions located on the west side of the main access road were

found to support breeding populations of amphibians. Observations of amphibians were also recorded along the western edges of the main entrance road to the recreational area below the dam.

Adjacent upland habitat and existing riparian vegetation provide ample foraging opportunities. Amphibians that were observed during surveys include the California tree frog (*Pseudacris cadaverina*), Baja California chorus frog (*Pseudacris hypochondriaca*), and the nonnative bullfrog (*Lithobates catesbeiana*). Western (California) toad (*Anaxyrus boreas* [*halophilus*]) adults and egg masses were also observed. Upland areas adjacent to the Reservoir have the potential to support populations of western spadefoot toad (*Spea hammondii*). Although not detected in the Study Area, both newts and salamanders are well documented in the region. These species are highly cryptic and often difficult to detect. Downed logs, bark, and other woody material in various stages of decay (often referred to as coarse woody debris) provide shelter and feeding sites for a variety of wildlife, including amphibians and reptiles (Maser and Trappe, 1984; Aubry et al., 1988). Within the Study Area these features are generally found within the Reservoir itself or the Littlerock Creek channel. Many amphibians are often excluded by exotic fish and amphibian species which are common within the Study Area.

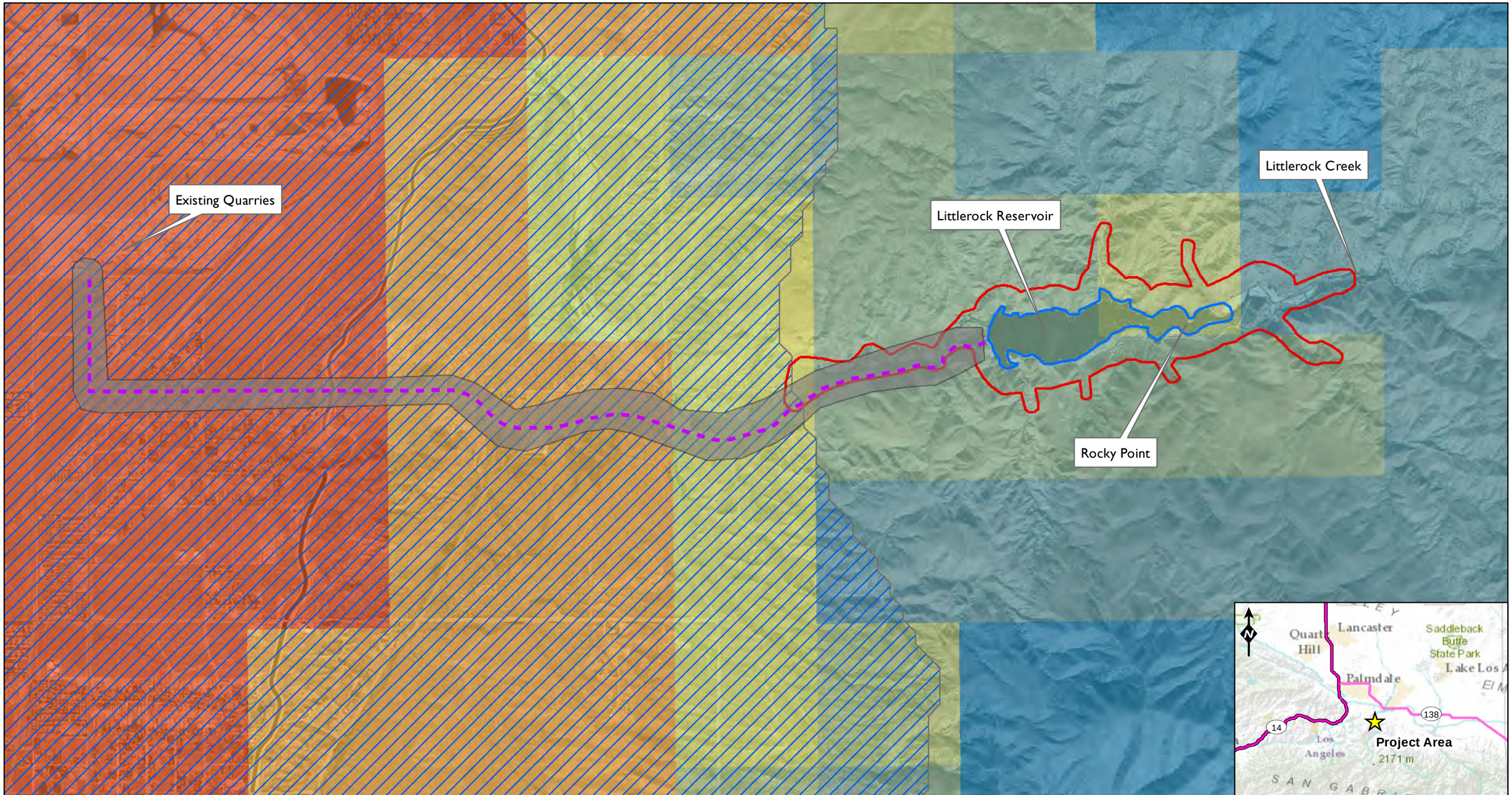
Reptiles

The number and type of reptile species that may occur at a given site is related to a number of biotic and abiotic features. These include the diversity of plant communities, substrate, soil type, and presence of refugia such as rock piles, boulders, and native debris. Reptiles were commonly observed in the Study Area, in both disturbed and natural areas. Western fence lizard (*Sceloporus occidentalis*), desert spiny lizard (*Sceloporus magister*), sagebrush lizard (*Sceloporus graciosus*), southern alligator lizard (*elgaria multicarinata*), and side blotch lizard (*Uta stansburiana*) were observed whenever weather conditions were favorable and were broadly distributed within the uplands and along the edge of riparian habitats.

The Study Area also supports a variety of snakes. Southwestern threadsnake (*Rena humilis humilis*), San Diego gopher snake (*Pituophis catenifer annectens*), San Diego nightsnake (*Hypsiglena ochrorhyncha klauberi*), patch-nosed snake (*Salvadora hexalepis*), striped racer (*Masticophis lateralis*), red racer (*Coluber flagellum piceus*), California lyersnake (*Trimorphodon lyrophanes*), long-nosed snake (*Rhinocheilus lecontei*), ring-neck snake (*Diadophis punctatus*), California kingsnake (*Lampropeltis getula californiae*), and Southern pacific rattlesnake (*Crotalus helleri*) were observed within the Study Area.

Although not observed, several other common reptiles likely occur in the Study Area. Most reptile species, even if present in an area, are difficult to detect because they are cryptic and their life history characteristics (i.e., foraging and thermoregulatory behavior) limit their ability to be observed during most surveys. Further, many species are only active within relatively narrow thermal limits, avoiding both cold and hot conditions, and most take refuge in microhabitats that are not directly visible to the casual observer, such as rodent burrows, in crevices, under rocks and boards, and in dense vegetation where they are protected from unsuitable environmental conditions and predators (USACE and CDFG, 2010). In some cases they are only observed when flushed from their refugia.

Desert tortoise (*Gopherus agassizii*), although not detected nor expected to occur within the Study Area, may occur along portions of the preferred haul route and pockets of suitable habitat were observed (refer to Figure 4b). Suitability mapping for desert tortoise in the vicinity of the haul route ranges from moderate to high moving in a northerly direction along Chesebro Road from the entrance to the Reservoir (refer to Figure 8).



Aspen Environmental Group

0 0.5 1 Miles

Potential Haul Route
Desert Tortoise Habitat Assessment Area
Project Area
Study Area
CDFG Desert Tortoise Species Range

USGS Desert Tortoise Habitat Model *
0 - 0.1 (Lowest Quality)
0.1 - 0.2
0.2 - 0.3
0.3 - 0.4
0.4 - 0.5
0.5 - 0.6
0.6 - 0.7
0.7 - 0.8
0.8 - 0.9
0.9 - 1 (Highest Quality)

* Map reflects modeled habitat only.

Figure 8

USGS Modeled Desert Tortoise Habitat

Birds

Eighty-five species of common and sensitive birds were identified in the Study Area during surveys completed between 2010 and 2012. It is possible that many other birds use the site either as wintering habitat, seasonal breeding, or as occasional migrants. Special-status species are further discussed in Section 4.4.

The diversity of birds at this location is a function of the presence of perennial water and the wide variation in plant communities that provide habitat for a number of different groups of birds. For example, shore birds and other more aquatic species were commonly detected within the Reservoir and along Littlerock Creek. In a few locations both upstream of the Reservoir and downstream of the dam the presence of small rock weirs have resulted in the formation of large pools where shore birds and ducks prey on insects and/or small fish. Mallard duck (*Anas platyrhynchos*), American coot (*Fulica americana*), green heron (*Butoroides virescens*), and ruddy duck (*Oxyura jamaicensis*) were commonly observed, often feeding, within the surveyed areas. Great blue heron (*Ardea Herodias*), a CDFG Special Animal, was also observed within the Study Area.

Various common song birds were detected within the Study Area and were closely associated or dependent on the riparian vegetation that borders portions of the Reservoir and is present along the Littlerock Creek Channel downstream of the dam structure. Riparian systems are frequently considered one of the most productive forms of wildlife habitat in North America. Many bird species are wholly, or at least partially, dependent on riparian plant communities for breeding and foraging (Warner et.al., 1984). Some of the detected species included song sparrow (*Melospiza melodia*), ash-throated flycatcher (*Myiarchus cinerascens*), Bewick's wren (*Thryomanes bewickii*), cliff swallow (*Petrochelidon pyrrhonota*), house finch (*Carpodacus mexicanus*), yellow-rumped warbler (*Setophaga coronata*), warbling vireo (*Vireo gilvus*), and lesser goldfinch (*Carduelis psaltria*).

Bird use of the upland areas east and west of the Reservoir and adjacent to Littlerock Creek was common and included a variety of song birds, raptors, vultures, and game birds. Western king bird (*Tyrranus verticalis*), spotted towhee (*Pipilo maculatus*), oak titmouse (*Baeolophus inornatus*), mourning dove (*Zenaida macroura*), and California quail (*Callipepla californica*), were fairly common. Rock wren (*Salpinctes obsoletus*), California towhee (*Melozone crissalis*), and mountain quail (*Oreortyx pictus*) were also observed. Common ravens (*Corvus corax*) were observed nesting in several locations along the nearly vertical rock faces of the northeastern perimeter of the Reservoir. Several lesser nighthawk (*Chordeiles acutipennis*), a ground nesting species, were detected near the Reservoir and in Littlerock Creek above and below the dam.

Several raptors including red-tailed hawk (*Buteo jamicensis*), great horned owl (*Bubo virginianus*), western screech owl (*Otus kennicottii*), and American kestrel (*Falco sparverius*) were observed either soaring over the site (red-tailed hawks) or foraging for small birds in the Study Area (great horned owl and kestrel).

Although not detected during surveys described in this report, a review of available online eBird (Cornell, 2012) data (includes observations by C. Yorke) reports observations of northern shoveler (*Anas clypeata*), Say's phoebe (*Sayornis saya*), western bluebird (*Sialia mexicana*), double-crested cormorant (*Phalacrocorax auritus*), red-breasted sapsucker (*Sphyrapicus ruber*), ladder-backed woodpecker (*Picoides scalaris*), ruby-crowned kinglet (*Regulus calendula*), hermit thrush (*Catharus guttatus*), and white-crowned sparrow (*Zonotrichia leucophrys*) at the Reservoir. Cooper's hawk (*Accipiter cooperii*), a

CDFG Watch List species, was also reported at the Reservoir from eBird data. All special-status birds are discussed further in Section 5.4.

Mammals

The distribution of mammals in the Study Area is associated with the presence of such factors as access to perennial water, topographical and structural components (i.e., rock piles, vegetation, and stream terraces) that provide for cover and support prey base; and the presence of suitable soils for fossorial mammals (i.e., sandy areas in the upper portions of the Reservoir when water levels are low).

Small mammals or their sign were commonly observed during most of the surveys. These included California ground squirrel (*Spermophilus beecheyi*), desert shrew (*Notiosorex crawfordi*), California vole (*Microtus californicus*), deer mouse (*Peromyscus maniculatus*), Botta's pocket gopher (*Thomomys bottae*), black-tailed jackrabbit (*Lepus californicus*), and desert cottontail (*Sylvilagus audubonii*).

Mid-size mammals including raccoon (*Procyon lotor*), long-tailed weasel (*Mustela frenata*), bobcat (*Felis rufus*), mountain lion (*Puma concolor*), mule deer (*Odocoileus hemionus*), gray fox (*Urocyon cinereoargenteus*), and coyote (*Canis latrans*) were detected. While not deteceted during surveys striped skunk (*Mephitis mephitis*) have the potential to occur within the Study Area. Because Littlerock and Santiago Creeks provide a large continuous corridor through the Angeles National Forest, far-ranging species like black bear (*Ursus americanus*) appear to frequent the Study Area.

Bats were commonly detected in the Study Area and forage over most of the Study Area where prey species such as small insects, moths, and other invertebrates occur. Many bats tend to concentrate foraging activities in riparian and wetland habitats where insect abundance is high (CDFG, 2000). Common bats detected in the Study Area, using both visual searches (utilizing a Echo Meter EM3) and a Sonobat system, included the canyon bat (*Parastrellus hesperus*), greater bonneted bat (*Eumops perotis*), Mexican free-tailed bat (*Tadarida brasiliensis*), and big brown bat (*Eptesicus fuscus*). Special-status bats (discussed further in Section 4.4 below) detected within the Study Area include pallid bat (*Antrozous pallidus*), Yuma myotis (*Myotis yumanensis*), and western small-footed myotis (*Myotis ciliolabrum*). Although not detected, it is likely that fringed myotis (*Myotis thysanodes*) and long-legged myotis (*Myotis volans*) occur within or adjacent to the Study Area.

4. Sensitive Vegetation Communities and Habitat

Sensitive vegetation communities are defined by CDFG as those "...communities that are of limited distribution statewide or within a county or region and are often vulnerable to environmental effects of projects" (2009). The literature review and vegetation mapping determined that two sensitive vegetation communities, southern cottonwood-willow riparian forest and Mojave riparian forest, are known to occur within or in the vicinity of the Vegetation Study Area (CDFG, 2012). Subsequent field surveys determined that areas mapped within the Vegetation Study Area as Fremont cottonwood forest, using the Sawyer, Keeler-Wolf vegetation classification system, (Figure 9) generally meets the habitat requirements of southern cottonwood-willow riparian forest and Mojave riparian forest.

Designated Critical Habitat

Literature review conducted prior to conducting field surveys determined that designated and/or mapped critical habitat occurs within the Study Area for the arroyo toad (USFWS, 2011). The most recent critical habitat was designated on February 9, 2011 and is part of the Littlerock Creek Basin which

is designated as Unit 21 (50 CFR Part 17). Refer to Figure 9 for a graphical depiction of the arroyo toad critical habitat within the Study Area.

5. Special-Status Species

The information presented above, combined with field observations taken during recent surveys conducted by Aspen was used to generate a list of sensitive vegetation communities and special-status plant and animal taxa that either occur or may have the potential to occur within the Study Area and/or adjacent habitats. For the purposes of this report, special-status taxa are defined as plants or animals that:

- Have been designated as either rare, threatened, or endangered by CDFG or the USFWS, and are protected under either the California or Federal ESAs;
- Are candidate species being considered or proposed for listing under these same acts;
- Are considered Species of Special Concern by the CDFG;
- Are ranked as CRPR 1, 2, 3 or 4 plant species;
- Are listed as Forest Sensitive Species by Angeles National Forest;
- Are fully protected by the California Fish and Game Code, Sections 3511, 4700, 5050, or 5515; or
- Are of expressed concern to resource/regulatory agencies, or local jurisdictions.

5.1 Special-Status Plants

Table 5-1 lists special-status plants, including federally and State listed, CRPR 1 – 4, and Forest Service Sensitive Species that may occur in or near the Study Area. A record search using the CNDDB, the CNPS Online Inventory, and the Consortium of California Herbaria (CCH) was performed for special-status plant taxa and botanical surveys were conducted within the Study Area. Figure 10 illustrates the known locations of special-status plants occurring in or near the Study Area (CDFG, 2012). The record search and consultation with local experts identified a total of 24 special-status plant taxa that have been documented within the general region of the Study Area. Each of these taxa was assessed for its potential to occur within the study area based on the following criteria:

- Present: Taxa were observed within the Study Area during recent botanical surveys or population has been acknowledged by CDFG, USFWS, or local experts.
- High: Both a documented recent record (within 10 years) exists of the taxa within the Study Area or immediate vicinity (approximately 5 miles) and the environmental conditions (including soil type) associated with taxa present within the Study Area.
- Moderate: Both a documented recent record (within 10 years) exists of the taxa within the Study Area or the immediate vicinity (approximately 5 miles) and the environmental conditions associated with taxa presence are marginal and/or limited within the Study Area or the Study Area is located within the known current distribution of the taxa and the environmental conditions (including soil type) associated with taxa presence occur within the Study Area.
- Low: A historical record (over 10 years) exists of the taxa within the Study Area or general vicinity (approximately 10 miles) and the environmental conditions (including soil type) associated with taxa presence are marginal and/or limited within the Study Area.

Three special-status plants, Johnston's monkeyflower (*Mimulus johnstoni*), short-joint beavertail (*Opuntia basilaris var. brachyclada*), and Lemmon's syntrichopappus (*Syntrichopappus lemmonii*) were detected within the Vegetation Study Area during the botanical surveys conducted from 2010 – 2012; however, it should be noted that all occurrences of these species were outside of the Project Area. Based on an evaluation of current habitat conditions and the results of surveys in the Vegetation Study Area, Table 5-1 presents an assessment for occurrence potential for the remaining 21 taxa known from the general region. Species accounts for taxa that are present are located in Section 4.3.1. Those species having a low, moderate or high potential or are unlikely to occur are discussed further in Appendix D.

Plants Documented to Occur

Johnston's monkeyflower (Mimulus johnstoni)

Status: Johnston's monkeyflower has a CRPR 4.3. This species is not federally or State listed as threatened or endangered.

General Distribution: Endemic to California, Johnston's monkeyflower is known only from the San Gabriel and San Bernardino Mountains, at elevations of 4,000 to 7,000 feet.

Distribution in the Study Area: This species has been observed within the Vegetation Study Area, just downstream of Littlerock Dam on a steep sandy slope, but has not been observed within the Project Area.

Habitat and Habitat Associations: Johnston's monkeyflower occurs on gravelly, disturbed, or rocky slopes within Joshua tree woodland, lower and upper montane coniferous forest, and pinyon and juniper woodland communities.

Natural History: Johnston's monkeyflower is an annual herb that blooms from May through August.

Threats: This species may be threatened by recreational activities and development.

Short-joint beavertail (Opuntia basilaris var. brachyclada)

Status: Short-jointed beavertail has a CRPR 1B.2 and is designated as a U.S. Forest Service Sensitive species. This species is not federally or State listed as threatened or endangered.

General Distribution: It occurs along the desert-facing slopes and extends into cismontane nearby passes in Los Angeles and San Bernardino Counties, in the Liebre Mountains, San Gabriel Mountains, and western San Bernardino Mountains, roughly from the Newhall area to the Mojave Forks area. Its elevational range is approximately 1,400 to 6,500 feet.

Distribution in the Study Area: This variety was observed at two locations within the Vegetation Study Area just outside of the Project Area.

Habitat and Habitat Associations: Short-tailed beavertail is generally found in desert shrub lands, pinyon or juniper woodlands, Joshua tree woodlands, or desert transition chaparral.

Natural History: Short-jointed beavertail is a low cactus with grayish green stems and no spines or tubercles. It is a variety of the common beavertail cactus (*O. basilaris*), distinguished by the stem joints which are relatively short and conspicuously cylindrical rather than flattened. Short-jointed beavertail generally flowers in May or June, but can be identified year-around by its stem shape.

Threats: This species is threatened by urbanization, mining, horticultural collecting, grazing, and vehicles (CNPS, 2012).

Lemmon's syntrichopappus (Syntrichopappus lemmonii)

Status: Lemmon's syntrichopappus has a CRPR 4.3, and is a U.S. Forest Service Watch List species. This species is not federally or State listed as threatened or endangered.

General Distribution: Lemmon's syntrichopappus occurs in Kern, Los Angeles, Monterey, Riverside, and San Bernardino counties within an elevation range of 1,640 to 6,000 ft.

Distribution in the Study Area: This species was detected within the Vegetation Study Area, just downstream of the dam. It was growing on a steep talus slope adjacent to the haul road. It was not detected within the Project Area.

Habitat and Habitat Associations: Chaparral, Joshua tree woodland, and pinyon and juniper woodlands within sandy or gravelly soils.

Natural History: Lemmon's syntrichopappus is an annual herb in the sunflower family (Asteraceae) that blooms in April and May.

Threats: Possible threats include non-native plants, vehicles, and wind energy development (CNPS, 2012).

Table 5-1. Known and Potential Occurrence of Special-Status Plant Taxa within the Study Area

Name	Status	Habitat	Potential for Occurrence
Federal or State Endangered or Threatened Species			
Chorizanthe parryi var. fernandina San Fernando Valley spineflower	CRPR 1B.1, SE, FC, FSS	Sandy places, gen in coastal or desert shrublands; historically from San Fernando Valley, adjacent foothills, and coastal Orange Co.; now known only in E Ventura & W LA Cos; Elev. 490-4,000 ft.; May-June.	Low: The project area is outside of the historic range of the species. Suitable habitat is, however, present.
Forest Service Sensitive and CRPR Species			
Androsace elongata ssp. acuta California androsace	CRPR 4.2, FSW	Coastal scrub, chaparral, cismontane woodland, meadows and seeps, and valley and foothill grassland habitats. Elev. 492 to 3,936 ft. March to June.	Moderate: There are several populations on the foothill desert slopes of the San Gabriel and Liebre Mountains. Suitable habitat is present.
Anomobryum julaceum Slender silver moss	CRPR 2.2	Non-vascular moss that grows on mesic soils and rocks along creeks in broadleaf and coniferous forests. Elev. 300 to 3,000 ft. Year-around.	Low: This species is represented in southern California from a single collection made from the high elevations of the San Gabriel Mtns. Suitable habitat is present in the project area.
Arctostaphylos gabrielensis San Gabriel manzanita	CRPR 1B.2, FSS	Large shrub that grows on rocky chaparral habitats; endemic to San Gabriel Mtns near Mill Creek Summit, Elev .5,000 ft.; March.	Low: This species is known from the upper watershed but the project area is below the elevation range for this species. It has a low potential to disperse into the project area from the upper watershed.
Calochortus palmeri var. palmeri Palmer's mariposa lily	CRPR 1B.2, FSS	Wet meadows and seeps in lower montane coniferous forest and chaparral habitats. Elev. 3,281-7,841 ft. May-July.	Moderate: This species was not observed during recent surveys but is known from the general area.

Name	Status	Habitat	Potential for Occurrence
Calochortus plummerae Plummer's mariposa lily	CRPR 1B.2, FSS	Granitic rock outcrops or rocky soils of granitic origin, in lower montane coniferous forest, cismontane woodland, coastal scrub, valley and foothill grassland, and chaparral habitats. Elev. 328-5,577 ft. May-July	Low: The project is just outside of the known geographic range for this species but suitable habitat is present within the project area.
Calochortus striatus Alkali mariposa lily	CRPR 1B.2, FSS	Alkaline soils, in floodplains and springs in chaparral, chenopod scrub, and Mojavean desert scrub. Elev. 230-5,232 ft. April-June.	Low*: The species is known from alkaline soils in the Mojave Desert. Poor quality habitat was observed at the northern end of the haul roads but it is not expected in the project area.
Calystegia piersonii Pierson's morning-glory	CRPR 4.2	Shrublands and lower elev. forests; below about 5000 ft. elev.; northern San Gabriel Mts., Liebre Mts., and adjacent Mojave Desert. May-June.	Moderate: This species was not observed during recent surveys but is known from the general area.
Canbya candida Pygmy poppy	CRPR 4.2, FSS	Joshua tree woodland, Mojavean desert scrub, or pinyon and juniper woodland habitats with gravelly, granitic, or sandy soils. Elev. 1,968-4,790 ft. March-June.	High: Suitable habitat is preset within the Vegetation Study Area and numerous historic records are known from the area.
Castilleja gleasonii Mt. Gleason Indian paintbrush	CRPR 1B.2, SR, FSS	Rocky places within lower montane coniferous forest and pinyon and juniper woodland communities. Elev. 2,700-7,120. May-June.	Moderate: This species is known from higher elevation of the San Gabriel Mtns but several collections from lower elevations have been made. Suitable habitat is present.
Castilleja plagiotoma Mojave Indian paintbrush	CRPR 4.3, FSS	Great Basin scrub, Joshua tree woodland, lower montane coniferous forest, and pinyon and juniper woodland habitats. Elev. 984-8,200 ft. April-June.	High: This species was not detected during recent surveys but suitable habitat is present within the Vegetation Study Area and it is known from the general vicinity.
Imperata brevifolia California satintail	CRPR 2.1	Meadows and seeps within chaparral, coastal scrub, and Mojavean desert scrub communities. Elev. below 4,000 ft. September-May.	Low: Suitable habitat is present within the Vegetation Study Area but it was not detected during recent surveys and is not known from the area.
Lilium humboldtii ssp. ocellatum Ocellated Humboldt lily	CRPR 4.2, FSW	Riparian woodland openings within chaparral, cismontane woodland, coastal scrub, and lower montane coniferous forest communities; generally on gravelly soils within gullies. Elev. below 6,000 ft. March-July.	Low: This species is known from deep shaded canyons throughout the San Gabriel Mtns but it was not detected during recent surveys and is not known from the area.
Lilium parryi Lemon lily	CRPR 1B.2, FSS	Meadows and seeps within lower and upper montane coniferous forests communities. Elev. 4,000-9,000 ft. July-August.	Low: Known from the upper reaches of the drainage but the project area is below the elevation range for this species and the project area lacks suitable habitats.
Linanthus concinnus San Gabriel linanthus	CRPR 1B.2, FSS	Dry rocky slopes within chaparral and montane coniferous forest communities. Elev. 5,000-9,200 ft. May-July.	Unlikely: Known from higher elevation areas of the San Gabriel Mtns, the project area is well below the elevation range of the species.
Loeflingia squarrosa var. artemisiarum Sagebrush loeflingia	CRPR 2.2	Sandy soils (dunes) in Great Basin scrub and Sonoran desert scrub. Elev. 2,200-5,300 ft. April-May	Low*: The species is known from very few locations in the vicinity of alkali flats to the north of the project area. Poor quality habitat was observed at the northern end of the haul roads but it is not expected in the project area.
Lupinus peirsonii Peirson's lupine	CRPR 1B.3, FSS	Gravelly or rocky slopes within Joshua tree woodland, lower and upper montane coniferous forest, and pinyon and juniper woodland communities. Elev. 3,200-8,200 ft. April-May.	Low: This species is not known to from the project vicinity but it is known from the upper reaches of the watershed, could be present within the vegetation study area as a wash-down waif species.

Name	Status	Habitat	Potential for Occurrence
Malacothamnus davidsonii Davidson's bush-mallow	CRPR 1B.2	Chaparral, cismontane woodland, coastal scrub, and riparian woodland. Elev. 300-2,500 ft. June-January.	Low: Very few records of this species within the general vicinity of the project area.
Mimulus johnstoni Johnston's monkeyflower	CRPR 4.3	Gravelly or rocky slopes within Joshua tree woodland, lower and upper montane coniferous forest, and pinyon and juniper woodland communities. Elev. 4,000 0-6,000 ft. April-May.	Present*: Observed within the Vegetation Study Area, just downstream of Littlerock Dam on a steep sandy slope, not observed within the project area.
Nemacladus secundiflorus var. robbinsonii Robbins' nemacladus	CRPR 1B.2	Openings in chaparral and foothill grasslands; Elev. 875-4250 ft.; April-June.	Unlikely: The subspecies is known from a single locations in the San Gabriel Mtns, east of the Project Area. No suitable habitat is present.
Opuntia basilaris var. brachyclada Short-joint beavertail	CRPR 1B.2, FSS	Open chaparral, juniper woodland, or similar woodland communities. Elev. 1,394-5,900 ft. April-June.	Present: This variety was observed at two locations within the Vegetation Study Area just outside of the project area.
Oreonana vestitia Woolly mountain-parsley	CRPR 1B.3, FSS	Ridge tops and on rocky soils such as dry gravel or talus in lower and upper montane coniferous forest and subalpine coniferous forest at elevations of 6,500–11,500 feet.	Unlikely. This species is not known from the project vicinity and the project area is well below the elevation range of this species.
Orobanche valida ssp. valida Rock Creek broomrape	CRPR 1B.2, FSS	Granitic soils within chaparral and pinyon and juniper Woodland communities. Elev. 4,000-7,000 ft. May-July.	Unlikely: This species is not known from the project vicinity and the project area is below the elevation range of this species.
Stylocline masonii Mason's neststraw	CRPR 1B.1	Ephemeral annual; sandy washes, saltbush shrubland, pinyon-juniper woodland, etc., western Central Valley (Monterey Co. south to Kern Co.) and Soledad Cyn. wash in LA Co., below about 4,000 ft. elev.; March-April	Low: This species is not known from the project vicinity but suitable habitat is present.
Symphytotrichum greatae Greata's aster	CRPR 1B.3	Woodlands, chaparral, lower montane forests; around springs or mesic sites, Elev.1,000 – 6,600 ft.; San Gabriel Mts. and Liebre Mts. August-October.	Low: This species is known from the upper watershed and although the habitat in the project area is not ideal, it has some potential to occur.
Syntrichopappus lemmonii Lemmon's syntrichopappus	CRPR 4.3, FSW	Chaparral, Joshua tree woodland, and pinyon and juniper woodlands within sandy or gravelly soils. Elev. 1,640-6,004 ft. April-May.	Present*: This species was detected within the vegetation study area, just downstream of the dam. It was growing on a steep talus slope adjacent to the haul road. It was not detected within the Project Area.

SE – California-listed Endangered
ST – California-listed Threatened
SR – California-listed Rare
FSS – USDA Forest Service Sensitive Species
FSW – USDA Forest Service Watch List

CRPR 1B – Rare or endangered in California and elsewhere
CRPR 2 – Rare or endangered in California, more common elsewhere
CRPR 3 – More information needed (Review List)
CRPR 4 – Limited Distribution (Watch List)
0.1 = Seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat)
0.2 = Fairly threatened in California (20-80% occurrences threatened)
0.3 = Not very threatened in California (<20% of occurrences threatened or no current threats known

*= likelihood with an asterisk is based only on habitat adjacent to the haul roads and not within the project area.

5.2 Special-Status Wildlife

Special-status taxa include those listed as threatened or endangered under the federal or California Endangered Species Acts, taxa proposed for listing, Species of Special Concern, and other taxa which have been identified by the USFWS and/or CDFG, and Forest Service Sensitive species. Figure 11 illustrates the known locations of special-status wildlife occurring within or near the Study Area (CDFG, 2011a). The specific habitat requirements and the locations of known occurrences of each special-status wildlife taxa were the principal criteria used for inclusion in the list of taxa potentially occurring within the Study Area. There are currently 87 special-status wildlife taxa that have been documented within the general region of the Study Area. Each of the 87 taxa was assessed for its potential to occur within the Study Area based on the following criteria:

- Present: Taxa (or sign) were observed in the Study Area or in the same watershed (aquatic taxa only) during the most recent surveys, or a population has been acknowledged by CDFG, USFWS, or local experts.
- High: Habitat (including soils) for the taxa occurs on site and a known occurrence occurs within the Study Area or adjacent areas (within 5 miles of the site) within the past 20 years; however, these taxa were not detected during the most recent surveys.
- Moderate: Habitat (including soils) for the taxa occurs on site and a known regional record occurs within the database search, but not within 5 miles of the site or within the past 20 years; or, a known occurrence occurs within 5 miles of the site and within the past 20 years and marginal or limited amounts of habitat occurs on site; or, the taxa's range includes the geographic area and suitable habitat exists.
- Low: Limited habitat for the taxa occurs on site and no known occurrences were found within the database search and the taxa's range includes the geographic area.

A total of twenty taxa were either observed or assumed to be present within, or immediately adjacent to the Study Area. The remaining 68 taxa were determined to have a low, moderate or high potential to occur in the Study Area based on existing recorded occurrences, known geographic range, and/or the presence of suitable habitat. Table 5-2 summarizes the special-status wildlife taxa known to regionally occur and their potential for occurrence in the Study Area. Species accounts for sensitive species either observed or with the potential to occur in the Study Area are included in Appendix D. Some of the sensitive species detected in the project area are described below (see section 4.4.1 for additional information on sensitive species detected in the Study Area).

Sensitive fish or invertebrates were not detected in the Study Area. Arroyo toad (*Anaxyrus californicus*), federally listed as endangered and a CDFG Species of Special Concern, was the only sensitive amphibian detected within Littlerock Creek. This species was detected just upstream of Rocky Point and was routinely observed during the surveys.

A number of sensitive reptiles were observed in the project Study Area. A single coast horned lizard (*Phrynosoma blainvillii*), a CDFG Species of Special Concern and a Forest Sensitive Species, was observed in a sandy drainage adjacent to the main access road to the Reservoir. Coastal whiptail (*Aspidoscelis tigris*), a CDFG Special Animal, was observed along the fringes of the riparian areas just below the dam. Southwestern pond turtles (*Actinemys marmorata*) and Two-striped garter snake (*Thamnophis hammondi*), both CDFG Species of Special Concern and Forest Sensitive Species, were observed within aquatic habitat both above and below the dam.

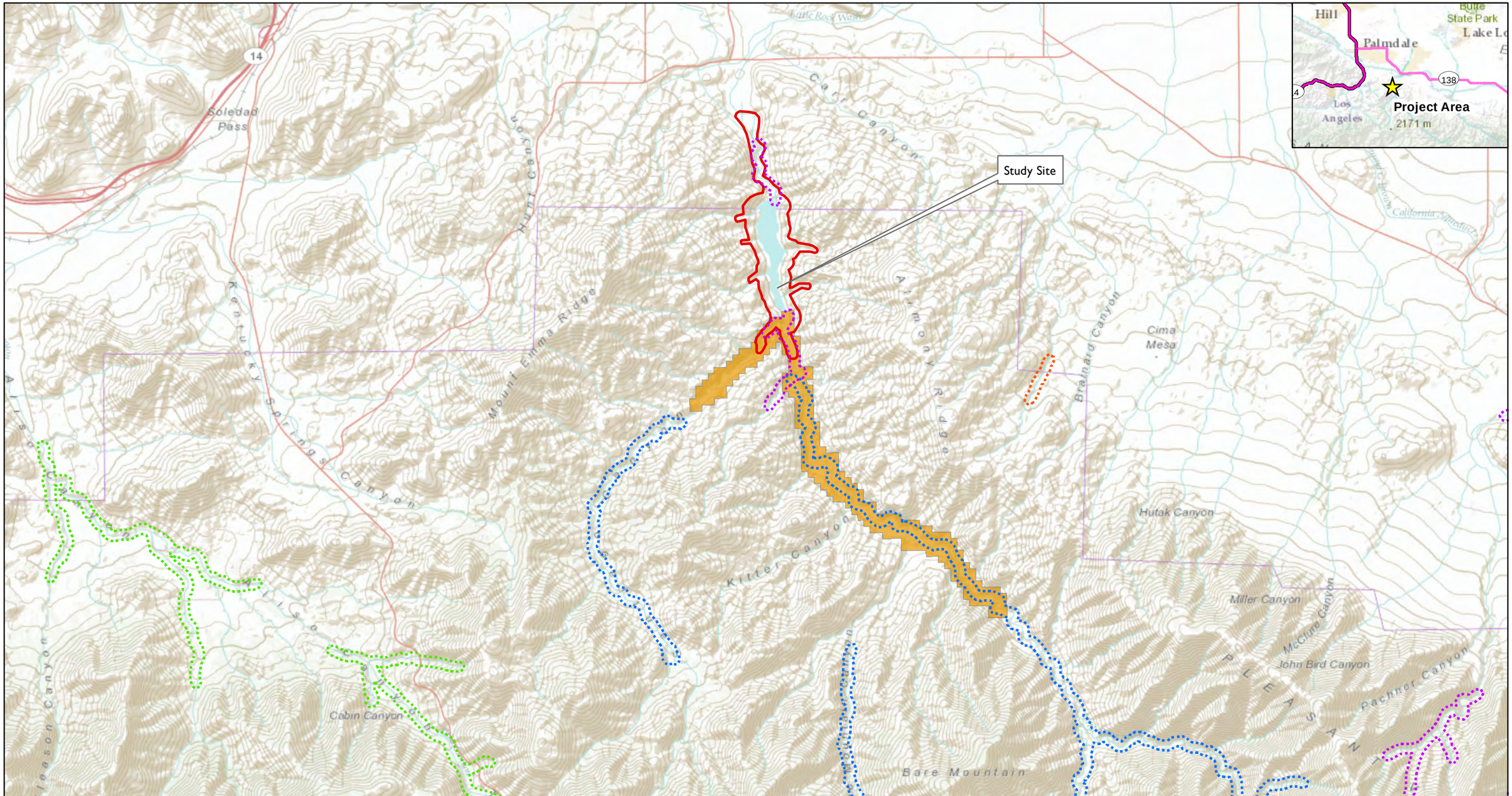
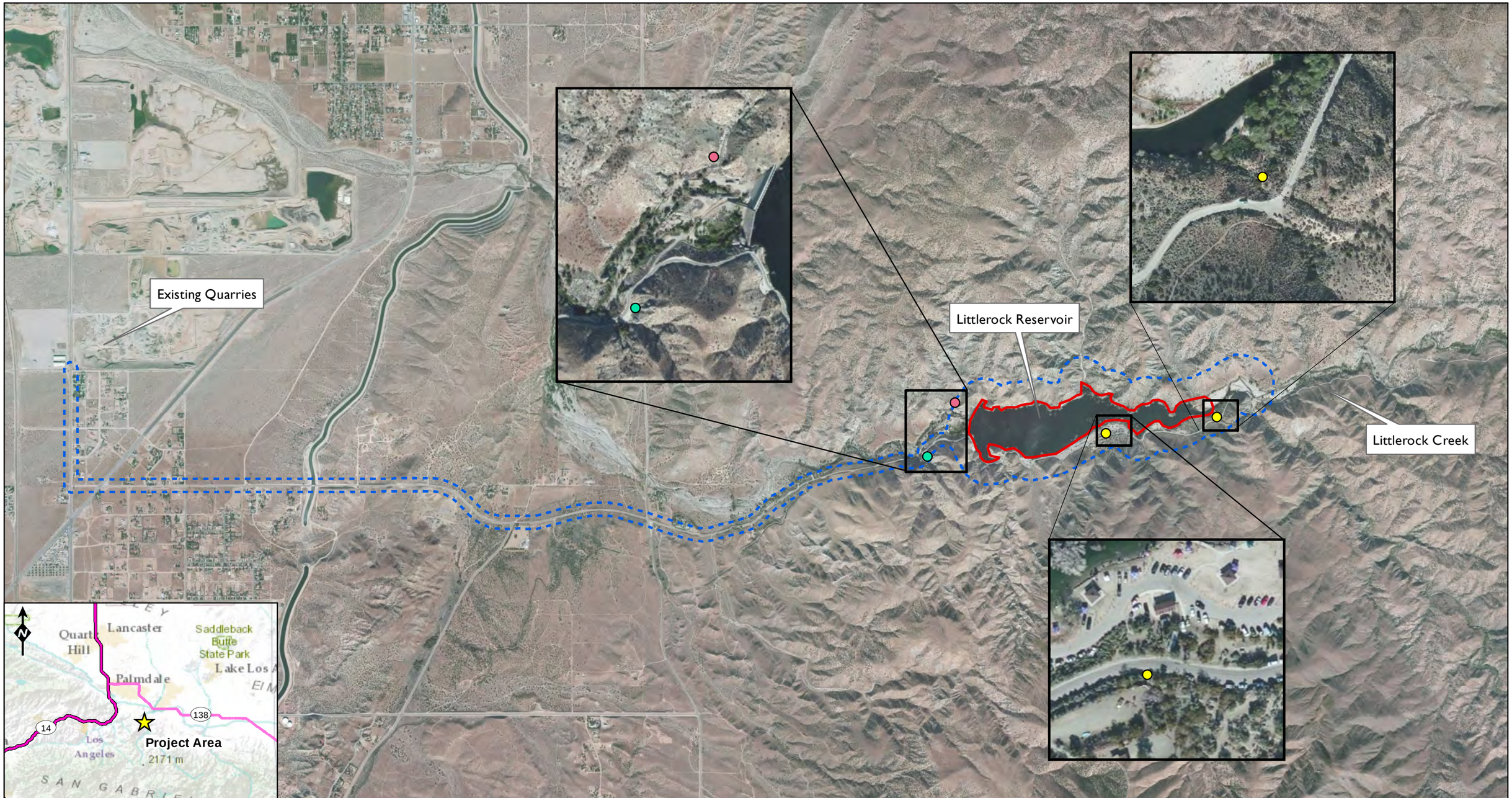


Figure 9

Sensitive Communities and Arroyo Toad Critical Habitat



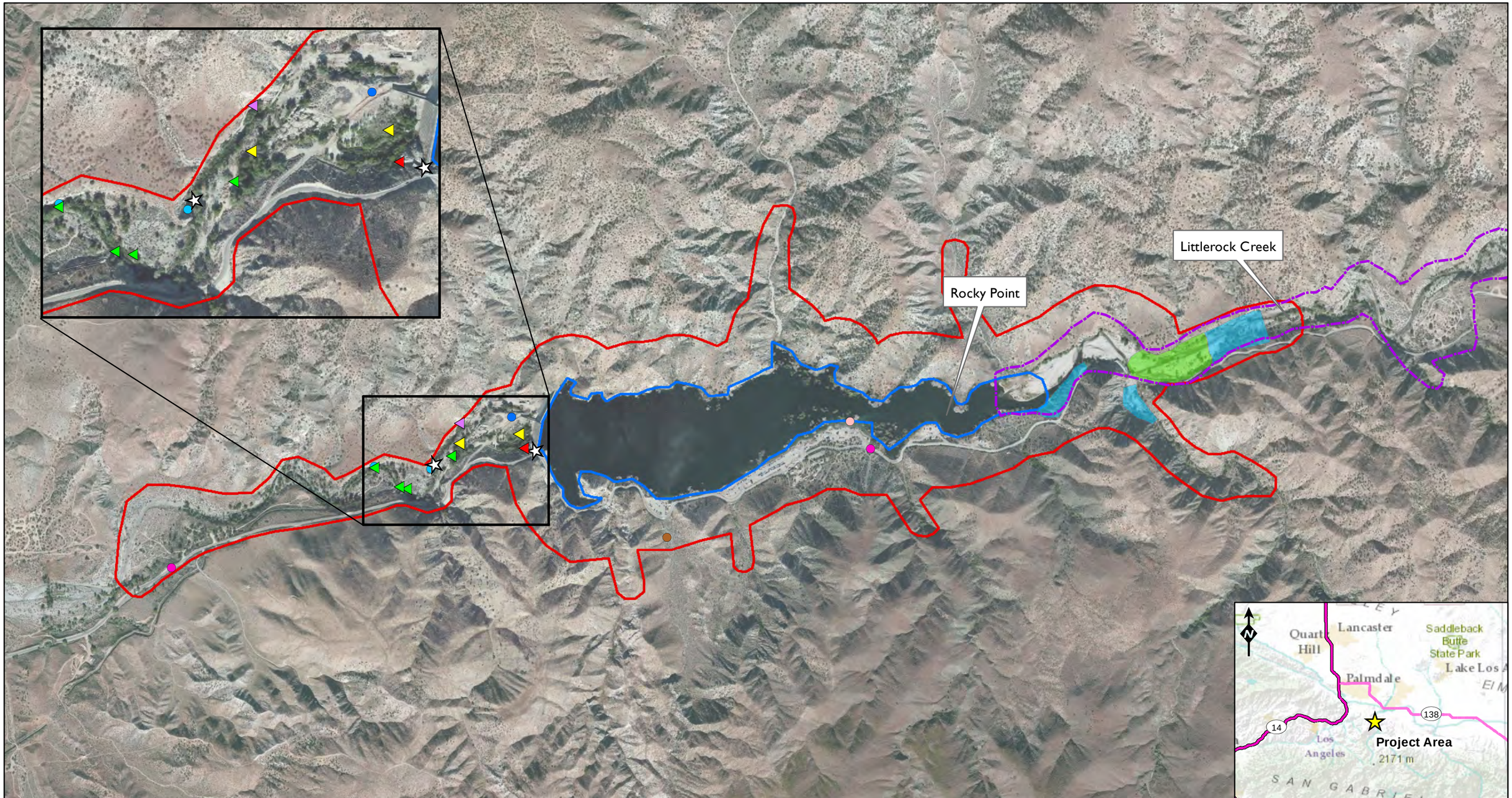
Aspen Environmental Group

Miles
0 0.5 1

Johnston's monkeyflower
Short-joint beavertail
Lemmon's syntrichopappus
Project Area
Vegetation Study Area

Figure 10

Sensitive Plants in Project Vicinity



Aspen Environmental Group

0 0.25 0.5 Miles

Birds Observed
- Least Bell's vireo
- Rufous-crowned sparrow
- Summer tanager
- Yellow warbler

Arroyo Toads Observed
- Toads calling, 2011
- Toads found, 2010
- Arroyo toads found by Ramirez, 2001

Reptiles Observed
- California legless lizard
- Coast horned lizard
- Patch-nosed snake
- Southwestern pond turtle
- Two-striped garter snake

- Bat Observation Locations
- Project Area
- Study Area

Figure 11

Sensitive Wildlife

Table 5-2. Known and Potential Occurrence of Special-Status Wildlife within the Study Area

Taxa		Status	Habitat Type	Comments	Occurrence Potential
Scientific Name	Common Name				
INVERTEBRATES					
Helminthoglypta traskii	Trask shoulderband snail	SA	Terrestrial; southern California endemic known from Ventura, Los Angeles, Orange, and San Diego Counties; prefers coastal sage scrub and chaparral.	There are no known recent records for this species in the Study Area or within a 20 mile radius of the Study Area; the Study Area is located within the known geographic distribution for this species (Magney, 2005); suitable habitat is limited within the Study Area.	Moderate
Plebulina emigdionis	San Emigdio blue butterfly	SA	Often near streambeds, washes, or alkaline areas. Associated with four-wing saltbush (*Atriplex canescens*) and quail brush (*Atriplex lentiformis*). [USACE and CDFG, 2010]	There are no known recent records for this species in the Study Area. The Study Area is located within the known geographic distribution for this species. Suitable habitat occurs within limited portions of the Study Area.	Low
FISH					
Catostomus santaanae	Santa Ana sucker	FT, CSC, FSS	Typically inhabits small, shallow streams and rivers less than 23 feet (7 meters) wide where water temperature is generally below 72 º F (22 º C), and where currents range from swift to sluggish (USFWS, 2000)	This species has not been documented within the Study Area. The presence of introduced game fish likely precludes this species presence and the Study Area is located outside of the known geographic distribution for this species. The closest known record of this species is from the Santa Clara River approximately 11 – 12 miles to the west of the Study Area.	Not likely to occur
Gasterosteus aculeatus williamsoni	Unarmored threespine stickleback	FE, SE, CFP, FSS	Slow-moving and backwater areas of coastal and inland streams.	This species has not been documented within the Study Area. The presence of introduced game fish likely precludes this species presence and the Study Area is located outside of the known geographic distribution for this species. The closest known record of this species is from the Santa Clara River approximately 12 – 13 miles to the west of the Study Area.	Not likely to occur
Gila orcuttii	Arroyo chub	CSC, FSS	Los Angeles Basin southern coastal streams; slow water stream sections with mud or sand bottoms; feeds heavily on aquatic vegetation and associated invertebrates.	There are no known recent records for this species in the Study Area. The presence of introduced game fish likely precludes this species presence and the Study Area is not located within the known geographic distribution for this species. The nearest known recorded occurrence of this species is over 15 miles to the southeast in the San Gabriel River.	Not likely to occur
Rhinicthys osculus ssp. 3	Santa Ana speckled dace	CSC, FSS	Inhabit various stream and channel types, small springs, brooks, and pools in intermittent streams and perennial rivers.	There are no known recent records for this species in the Study Area. The presence of introduced game fish likely precludes this species presence and he Study Area is not located within the known geographic distribution for this species. The closest known record of this species is from the Big Tujunga Creek approximately 13 – 15 miles to the west of the Study Area..	Not likely to occur
AMPHIBIANS					
Anaxyrus californicus	Arroyo toad	FE, CSC	Semi-arid regions near washes or intermittent streams, including valley-foothill and desert riparian, desert wash; rivers with sandy banks, willows, cottonwoods, and/or sycamores.	This species has been documented within the Study Area. More specifically, arroyo toads have been recorded from Rocky Point (at the Reservoir) and upstream within Littlerock Creek past the confluence with Santiago Creek. Arroyo toads have also been detected within Santiago Creek.	Present

Taxa		Status	Habitat Type	Comments	Occurrence Potential
Scientific Name	Common Name				
Batrachoseps gabrieli	San Gabriel Mountains slender salamander	FSS	Known only from 13 sites within forest communities of the San Gabriel Mountains. Primarily inhabits talus and large rocks, logs, and bark during periods of surface activity.	Not known to occur in Study Area but could potentially utilize Littlerock Creek and adjacent riparian areas. The Study Area is outside of the known range of this species but it is known from the portions of the San Gabriel Mountains to the south of the Study Area.	Low
Ensatina eschscholtzii croceater	Yellow-blotched salamander	CSC, FSS	Litter and debris of oak woodland, pine dominated open woodland, and fir dominated open forest.	Although suitable habitat occurs within portions of the Study Area, it is well outside the known range of this subspecies. .	Not likely to occur
Rana boylii	Foothill yellow-legged frog	CSC, FSS	Inhabits shallow, small to medium-sized, rocky streams, from sea level to about 6,365 feet.	Although suitable habitat occurs within portions of the Study Area, it is outside the known range of this subspecies. .	Not likely to occur
Rana draytonii	California red-legged frog	FT, CSC	Lowlands and foothills in or near permanent sources of deep water with dense, shrubby or emergent riparian vegetation; requires 11-20 weeks of permanent water for larval development; must have access to aestivation habitat.	Although suitable habitat occurs within portions of the Study Area, it is outside the known range of this subspecies. .	Not likely to occur
Rana muscosa	Sierra Madre (=mountain) yellow-legged frog	FE, CSC, FSS	Prefers partly shaded, shallow streams with a rocky substrate; requires a minimum of 15 weeks of permanent water for metamorphosis.	The largest known population of this species occurs within the upper portions of the Littlerock Creek watershed. Pockets of suitable habitat may occur when flows and/or pools are present within Littlerock Creek; this species has not been detected within the Study Area.	Low
Spea hammondii	Western spadefoot	CSC	Occurs in numerous habitat types, primarily in grasslands but can be found in valley-foothill hardwood woodlands, sage scrubs, chaparral where pooled/ponded water, supporting typically clay-rich soils, remains through early spring (April/May); in some areas, vernal pools, stock ponds, and road pools are essential for breeding, egg-laying, and larval development.	There are no known records for this species in the Study Area within a 15 mile radius. The Study Area is located just outside the known geographic distribution for this species. Pockets of suitable habitat occur within the Study Area.	Low
Taricha torosa torosa	Coast Range newt	CSC	Historically distributed in coastal drainages from central Mendocino County in the North Coast Ranges, south to Boulder Creek, San Diego County. Breeds in ponds, reservoirs, streams; terrestrial individuals occupy various adjacent upland habitats, including grasslands, woodlands, forests.	Suitable habitat occurs onsite. Nearest recorded occurrence is approximately 14.5 miles southeast of the Study Area in the west fork of Bear Creek.	Moderate

Taxa		Status	Habitat Type	Comments	Occurrence Potential
Scientific Name	Common Name				
REPTILES					
Anniella pulchra pulchra	Silvery (=California) legless lizard	CSC, FSS	Sandy or loose loamy soils under sparse vegetation; soil moisture is essential; prefer soils with high moisture content.	This species was detected within the Study Area under a small woodpile, adjacent to the Reservoir, during surveys conducted in 2012.	Present
Aspidoscelis tigris stejnegeri	Coastal whiptail	SA	Found in deserts and semi-arid areas with sparse vegetation and open areas; also found in woodland and riparian habitats; substrates may be firm soil, sandy, or rocky.	This species was documented within the Study Area during surveys conducted in 2012. The Study Area is located within the known geographic distribution for this species; suitable habitat occurs throughout the Study Area.	Present
Charina bottae umbratica	Southern rubber boa	ST, FSS	Occurs in conifer forests near streams and meadows. Known to occur in the Transverse Range, San Bernardino Mountains, and thought to be extirpated from the San Gabriel Mountains.	Thought to be extirpated from the San Gabriel Mountains, but focused surveys have not been conducted. Suitable habitat does not occur in the Study Area.	Not likely to occur
Charina trivirgata roseofusca	Coastal rosy boa	SA, FSS	Fairly dense vegetation and rocky habitat within desert and chaparral from the coast to Mojave and Colorado deserts.	Suitable habitat is present within the Study Area outside the perimeter of the Reservoir. This species was reported approximately 6 miles west of the Study Area in June 2009 along a transmission line corridor.	Moderate
Diadophis punctatus modestus	San Bernardino ringneck snake	FSS	Canyons with rocky outcrops or rocky talus slopes in conifer forest or chaparral habitats.	Suitable habit occurs within the Study Area; however, there are no known reports of this species within or adjacent to the Study Area.	Moderate
Emys marmorata	Western pond turtle	CSC, FSS	Inhabits permanent or nearly permanent bodies of water in various habitat types; requires basking sites such as partially submerged logs, vegetation mats, or open mud banks.	This species was observed within the Study Area (above and below the Reservoir) during surveys conducted in 2012. The Study Area is located within the known geographic distribution for this species.	Present
Gopherus agassizii	Desert tortoise	FT, ST	Inhabits semi-arid grasslands, gravelly desert washes, canyon bottoms and rocky hillsides. Associated plant species includes creosote bush, Joshua tree, cheese bush, saltbush, grasses, and cacti.	The Study Area lies outside of the known range of this species; portions of the identified haul routes however do occur within the range and have suitable habitat.	Moderate**
Lampropeltis zonata parvirubra	San Bernardino mountain kingsnake	CSC, FSS	Inhabits canyons with low to moderate tree canopy, with rock outcrops or talus, frequently in association with big cone spruce and chaparral vegetation at lower elevations.	While suitable habitat occurs within the Study Area it is outside of the known geographic distribution for this species.	Moderate
Phrynosoma coronatum blainvillii	Coast/San Diego horned lizard	CSC, FSS	A variety of habitats, including coastal sage scrub, chaparral, oak woodland, riparian woodland, and coniferous forest. Friable, sandy soils in areas with an abundant prey base of native ants are key habitat components.	This species was documented within a sandy drainage, adjacent to the main access road through the Reservoir, during surveys conducted in 2012. The Study Area is located within the known geographic distribution for this species; suitable habitat occurs in portions of the Study Area.	Present

Taxa		Status	Habitat Type	Comments	Occurrence Potential
Scientific Name	Common Name				
Thamnophis hammondii	Two-striped garter snake	CSC, FSS	Highly aquatic; found in or near permanent fresh water; often along streams with rocky beds and riparian growth.	This species was documented within the Study Area downstream of the dam and upstream of Rocky Point. Surveys conducted in 2012. The Study Area is located within the known geographic distribution for this species; suitable habitat occurs throughout the Study Area.	Present
BIRDS					
Accipiter cooperii (nesting)	Cooper's hawk	WL	Woodland, chiefly of open, interrupted, or marginal type; nest sites mainly in riparian growths of deciduous trees.	The eBird online database documents sightings of this species at the Reservoir and the CNDDB reports a historic occurrence approximately 8 miles northwest of the Study Area. These sightings however to not indicate if the individuals were foraging, passing through or nesting. Suitable habitat is present within the riparian areas of the Reservoir perimeter and Littlerock Creek.	Present (non-nesting)
Accipiter gentilis (nesting)	Northern goshawk	CSC, FSS	Nests in old-growth stands of conifer and conifer/hardwood forests.	Suitable nesting habitat for this species does not occur within the Study Area and is highly fragmented within the Angeles National Forest.	Not likely to occur
Accipiter striatus (nesting)	Sharp-shinned hawk	WL	Prefers, but not restricted to riparian habitats; breeds in ponderosa pine, black oak, riparian deciduous, mixed conifer, and Jeffrey pine habitats; requires north-facing slopes with perches.	This species was observed within the Study area during surveys conducted n 2010 as was presumed to be overwintering. No nesting activity was observed.	Present
Agelaius tricolor (nesting colony)	Tricolored blackbird	CSC, BCC	Highly colonial species; requires open water, protected nesting substrate, and foraging areas with insect prey within a few kilometers of colony.	There are no known recent records for this species in the Study Area; the Study Area is located within the known geographic range for this species; suitable breeding and foraging habitat occurs, depending on water levels, within the upper extents of the Reservoir (changes year to year). Nearest recorded occurrence is approximately seven miles northwest of the Study Area in Lake Palmdale.	Moderate
Aimophila ruficeps canescens	Southern California rufous-crowned sparrow	WL	Resident in southern California coastal sage scrub and sparse mixed chaparral; frequents relatively steep, often rocky hillsides with grass and forb patches.	This species was observed within the Study Area during surveys conducted in 2012; breeding was confirmed within the Study Area.	Present
Amphispiza belli bellie	Bell's sage sparrow	WL	Found in shrubby habitats including coastal sage scrub and chaparral, primarily of the chamise type.	There are no known records for this species in the Study Area; suitable habitat is present within the Study Area outside of the Reservoir footprint. Nearest recorded occurrence, from 2005, is approximately 13 miles northwest of the Study Area.	Moderate
Aquila chrysaetos	Golden eagle	CFP	Forages in open grasslands, desert scrub and agricultural fields. Nests on ledges on cliff faces, rock outcrops and occasionally in large trees.	There are no known records for this species within the Study Area; limited suitable nesting habitat for this species occurs within the Study Area but does occur on portions of the ANF. Suitable foraging habitat is present within Study Area.	Moderate (nesting)/High (foraging)

Taxa		Status	Habitat Type	Comments	Occurrence Potential
Scientific Name	Common Name				
Ardea herodias (rookery sites)	Great blue heron	SA	Rookery sites typically occur in groves of large trees within proximity to aquatic foraging areas of streams, wetlands, and grasslands.	This species was documented in the Study Area during surveys conducted in 2012. The Study Area is located within the known geographic distribution for this species; limited suitable rookery habitat occurs within the eastern portions of the Study Area within and adjacent to the Reservoir, suitable foraging habitat occurs throughout the Study Area.	Present (No rookery observed)
Asio flammeus (nesting)	Short-eared owl	CSC	Usually occurs in open areas with few trees, such as grasslands, prairies, dunes, meadows, agricultural fields, emergent wetlands; requires dense vegetation for cover.	There are no known recent records for this species in the Study Area; suitable habitat is not present within the Study Area. Limited suitable habitat may be present along the proposed haul routes.	Low**
Asio otus	Long-eared owl	CSC	Breeds in thickly vegetated desert washes and oases, montane coniferous forests and in riparian and pinyon-juniper woodlands. Requires adjacent open habitats for foraging.	Suitable habit occurs within the Study Area; however, there are no known reports of this species within or adjacent to the Study Area. This species is known to occur on portions of the ANF to the southwest of the Study Area	Moderate
Athene cunicularia (burrowing sites & some wintering sites)	Burrowing owl	BCC, CSC	Open, dry perennial or annual grasslands, deserts, and scrublands characterized by low-growing vegetation; subterranean nester, dependent upon burrowing mammals, particularly California ground squirrels.	There are no known records for this species in the Study Area; nearest CNDDB record for this species occurs approximately 10 miles to the northwest. While suitable habitat for this species does not occur within the Study Area it does occur along portions of the proposed haul routes.	Moderate**
Buteo regalis	Ferruginous hawk	WL	Forages in grasslands and agricultural fields.	There are no known records for this species in the Study Area; nearest CNDDB record for this species occurs approximately 10 miles to the northwest. This species is a known winter resident in the Antelope Valley. Limited foraging habitat is present within the Study Area.	Moderate
Buteo swainsoni (nesting)	Swainson's hawk	ST, BCC, FSS	Breeds in stands with few trees in juniper-sage flats, riparian areas, and oak savannahs.	Limited suitable nesting habitat is present within the Study Area; there are no known records for this species within the Study Area. This species may migrate through the Study Area during the winter.	Moderate (winter migrant)
Calypte costae	Costa's hummingbird	SA	Primarily occurs in desert wash, edges of desert riparian and valley-foothill riparian, coastal scrub, desert scrub, low-elevation chaparral.	This species was documented during surveys within the Study Area in 2012. Suitable habitat is present within the Study Area.	Present
Carduelis lawrencei (nesting)	Lawrence's goldfinch	BCC, SA	Nests in open oak or other arid woodland and chaparral near water; nearby herbaceous habitats used for foraging; closely associated with oaks.	This species was documented during surveys within the Study Area in February 2012 although the breeding status of the individuals was not confirmed.	Present
Chaetura vauxi vauxi (nesting)	Vaux's swift	CSC	Breeds in coniferous and mixed coniferous forests; requires large-diameter, hollow trees for breeding and roosting; forages in areas of open water where insect prey congregates.	This species was documented during surveys within the Study Area in May 2012 although the breeding status of the individuals was not confirmed.	Present

Taxa		Status	Habitat Type	Comments	Occurrence Potential
Scientific Name	Common Name				
Charadrius montanus	Mountain plover	FC, CSC	Winters in short grasslands and agricultural fields. Breeds in short-grass prairies outside of California.	Suitable habitat is not present within the Study Area; there are no known records for this species in the Study Area.	Not likely to occur
Circus cyaneus (nesting)	Northern harrier	CSC	Prefer open country, grasslands, steppes, wetlands, meadows, agriculture fields; roost and nest on ground in shrubby vegetation often at edge of marshes.	There are no known recent records for this species in the Study Area; the Study Area is located within the known geographic range for this species; suitable breeding and foraging habitat occurs within the Study Area.	Moderate
Coccyzus americanus occidentalis (nesting)	Western yellow-billed cuckoo	FC, SE, FSS	Nests along the broad, lower flood-bottoms of larger river systems; also nests in riparian forests and riparian jungles of willow often mixed with cottonwoods, with an understory of blackberry, nettles, or wild grape (USACE and CDFG, 2010).	There are no known records for this species in the Study Area; there are no CNDDB records for this species within a 15 mile radius of the Study Area; the Study Area is located within the known geographic distribution for this species; extremely limited breeding and foraging habitat occurs in the Study Area.	Low
Dendroica petechia brewsteri (nesting)	Yellow warbler	CSC	Riparian plant associations; prefers willows, cottonwoods, aspens, sycamores, and alders for nesting and foraging.	This species was documented within the Study Area during surveys conducted in 2012 and was noted as a potential breeding resident; the Study Area is located within the known geographic distribution for this species; suitable breeding and foraging habitat occurs in the Study Area.	Present
Elanus leucurus (nesting)	White-tailed kite	CFP	Typically nests at lower elevations in riparian trees, including oaks, willows, and cottonwoods; forages over open country.	There are no known records for this species in the Study Area or surrounding areas. The Study Area is located within the known geographic distribution for this species; limited breeding and foraging habitat occurs in the Study Area.	Low
Empidonax traillii extimus (nesting)	Southwestern willow flycatcher	FE, SE	Riparian woodlands in southern California.	There are no known records for this species in the Study Area or surrounding areas. The Study Area is located within the known geographic distribution for this species; suitable breeding habitat is not present within the Study Area as this species prefers riparian areas of greater density than are present. Suitable foraging habitat occurs throughout the Study Area.	Moderate (Migrants)
Eremophila alpestris actia	California horned lark	WL	Occurs in open habitats, forages in bare dirt in short and/or sparse grassland and areas of scattered shrubs.	There are no known records for this species in the Study Area; there are no CNDDB records for this species within a 15 mile radius of the Study Area. Limited breeding and foraging habitat occurs in the Study Area.	Low
Falco columbarius (non-breeding/ wintering)	Merlin	WL	Wide-variety of habitats including marshes, deserts, seacoasts, open woodlands, fields.	There are no known records for this species in the Study Area or surrounding areas; This species is a winter resident that does not breed in California; the Study Area is located within the known geographic winter distribution for this species; suitable foraging habitat occurs throughout the Study Area.	Moderate
Falco mexicanus (nesting)	Prairie falcon	BCC, WL	Rare in southern California; nests along cliff faces or rocky outcrops; forages over open spaces, agricultural fields.	There are no known records for this species in the Study Area. The CNDDB reports one historic occurrence approximately 10 miles to the west of the Study Area. Marginal (at best) nesting habitat occurs within the Study Area; suitable foraging habitat occurs throughout the Study Area.	Low

Taxa		Status	Habitat Type	Comments	Occurrence Potential
Scientific Name	Common Name				
Falco peregrinus anatum	American peregrine falcon	BCC, CFP	Occurs in various open habitats, especially where suitable nesting cliffs present.	There are no known recent records for this species in the Study Area; the Study Area is located within the known geographic range for this species; suitable breeding habitat does not occur within but may be present in areas adjacent to the Study Area; foraging habitat occurs throughout the Study Area.	Low
Gymnogyps californianus	California condor	FE, SE, CFP	Nests in caves, crevices, behind rock slabs, or on large ledges on high sandstone cliffs; requires vast expanses of open savannah, grasslands, and foothill chaparral with cliffs, large trees and snags for roosting and nesting.	There are no known records for this species in the Study Area although they have been observed flying over the San Gabriel Mountains. Suitable breeding and foraging habitat is not present within the Study Area.	Low
Haliaeetus leucocephalus (nesting)	Bald eagle	SE, CFP, FSS	Nests on large trees in the vicinity of large lakes, reservoirs and rivers. Wintering birds are most often found near large concentrations of waterfowl or fish.	Although not documented nesting within the Study Area this species has been observed foraging within the extents of the Reservoir during surveys conducted in 2011.	Present (non-nesting)
Icteria virens (nesting)	Yellow-breasted chat	CSC	Inhabits riparian thickets of willow and other brushy tangles near water courses; nests in low, dense riparian vegetation; nests and forages within 10 feet of ground.	There are no known recent records for this species in the Study Area; the Study Area is located within the known geographic range for this species; limited breeding and foraging habitat occurs in the Study Area.	Moderate
Lanius ludovicianus (nesting)	Loggerhead shrike	BCC, CSC	Broken woodland, savannah, pinyon-juniper woodland, Joshua tree woodland, riparian woodland, desert oases, scrub, and washes; prefers open country for hunting with perches for scanning and fairly dense shrubs and brush for nesting.	Although not documented within the Study Area an occurrence of this species is reported from the CNDDB approximately 2.5 miles east of the Study Area. Suitable foraging and breeding habitat occurs within the Study Area.	High
Numenius americanus	Long-billed curlew	WL	Generally nest in short grasses including grass prairies or agricultural fields and move to denser grasslands after young have fledged. Winter at the coast and in Mexico.	There are no known recent records for this species in the Study Area; There are a variety of eBird records for this species approximately 20 miles to the north within the Lancaster Area. Suitable habitat occurs within portions of the Study Area.	Low
Pandion haliaetus	Osprey	WL	Forages and nests along rivers, lakes, and reservoirs.	There are no known recent records for this species in the Study Area however, this generally coastal species, is known from the San Gabriel Mountains. Suitable foraging habitat occurs within and adjacent to the Reservoir.	Low
Piranga rubra	Summer tanager	CSC	Breeds in mature, desert riparian habitats dominated by cottonwood and willow.	This species was documented during surveys within the Study Area in May and July 2012 although the breeding status of the individuals was not confirmed.	Present

Taxa		Status	Habitat Type	Comments	Occurrence Potential
Scientific Name	Common Name				
Polioptila californica californica	Coastal California gnatcatcher	FT, CSC, BCC	Various sage scrub communities, often dominated by California sage and buckwheat; generally avoids nesting in areas with a slope of greater than 40%, and typically less than 820 feet in elevation (USACE and CDFG, 2010).	There are no known records for this species in the Study Area or surrounding areas; the Study Area is located within the known geographic distribution for this species. Suitable habitat for this species does not occur within the Study Area.	Not likely to occur
Pyrocephalus rubinus	Vermilion flycatcher	CSC	Nests in desert riparian and landscaped cottonwoods and other trees in developed areas including golf courses; often near agricultural or grassland areas.	There are no known recent records for this species in the Study Area; There is a 2010 eBird record for this species approximately 7 miles to the northwest at Lake Palmdale. Suitable habitat occurs within portions of the Study Area.	Moderate
Riparia riparia (nesting)	Bank swallow	ST	Colonial nester; nests primarily in riparian and other lowland habitats west of the desert; requires vertical banks/cliffs with fine-textured/sandy soils near streams, rivers, lakes, or the ocean to dig a nesting hole (USACE and CDFG, 2010).	There are no known recent records for this species in the Study Area; There are numerous eBird records for this species approximately 20 miles to the northwest near the City of Lancaster. Suitable habitat occurs within portions of the Study Area.	Low
Selasphorus sasin	Allen's hummingbird	SA	Most commonly breeds in coastal scrub, valley-foothill hardwood, and valley-foothill riparian habitats; occurs in a variety of woodland and scrub habitat as a migrant.	There are no known recent records for this species in the Study Area. There are several eBird records for this species approximately 5 miles to the northwest and 10 miles to the east. Suitable habitat occurs throughout the Study Area.	Moderate
Spinus lawrencei	Lawrence's goldfinch	SA	Breeds in a variety of habitats throughout its range in southern California, including mixed conifer-oak forest, blue oak savannah, pinyon-juniper woodland, chaparral, riparian woodland, and desert oases.	This species was observed within the Reservoir and within the southern extent of the Study Area in 2012. Suitable habitat occurs within portions of the Study Area.	Present
Strix occidentalis occidentalis	California spotted owl	CSC, BCC, FSS	In Southern California occupies montane hardwood and montane hardwood/conifer forests with dense, multi-layered canopies.	There are no known records for this species in the Study Area or surrounding areas. Suitable habitat does not occur within the Study Area.	Not likely to occur
Toxostoma bendirei	Bendire's thrasher	CSC	Prefers desert habitats with tall vegetation comprised of cholla cactus, creosote bush and yucca. Also found in juniper woodland.	There are no known recent records for this species in the Study Area; the Study Area is located outside the known geographic range for this species. Limited suitable habitat is present within the Study Area.	Not likely to occur.
Toxostoma lecontei	Le Conte's thrasher	CSC	Sparse desert scrub such as creosote bush, Joshua tree, and saltbush scrubs, or sandy-soiled cholla-dominated vegetation. Nests in dense, spiny shrubs or densely branched cactus in desert wash habitat.	There are no known records for this species in the Study Area. The CNDDB reports occurrences of this species approximately 5 miles northeast of the Study Area. Suitable habitat occurs within portions of the Study Area.	Moderate

Taxa		Status	Habitat Type	Comments	Occurrence Potential
Scientific Name	Common Name				
Vireo bellii pusillus (nesting)	Least Bell's vireo	FE, SE, BCC	Summer resident of southern California in low riparian habitats in vicinity of water or dry river bottoms; found below 2000 ft; nests placed along margins of bushes or on twigs projecting into pathways, usually willow, mesquite, baccharis.	This species was detected during surveys conducted below the dam in 2010, 2011 and 2012. Suitable habitat occurs within the northern extent of the Study Area.	Present
MAMMALS					
Antrozous pallidus	Pallid bat	CSC, FSS	Desert, grassland, shrubland, woodland, forest; most common in open, dry habitats with rocky areas for roosting; very sensitive to disturbance of roosting sites.	There are no known recent records for this species in the Study Area; the Study Area is located within the known geographic range for this species. Nearest CNDDB for this record is approximately 12 miles west of the Study Area. Suitable habitat occurs throughout the Study Area.	Present
Bassariscus astutus	Ringtail cat	CFP	Occurs in chaparral, coastal sage scrub, riparian scrub, oak woodlands, and riparian woodlands in proximity to permanent water.	There are no known recent records for this species in the Study Area; the Study Area is located within the known geographic range for this species and it is known to occur within sections of the San Gabriel Mountains. Suitable habitat is present within portions of the Study Area.	Low
Chaetodipus fallax pallidus	Pallid San Diego pocket mouse	CSC	Prefers to inhabit desert wash, desert scrub, desert succulent scrub and/or pinyon-juniper woodland.	There are no known recent records for this species in the Study Area; the Study Area is located within the known geographic range for this species. Nearest CNDDB for this record is approximately 7 miles to the southeast of the Study Area. Suitable habitat occurs within portions of the Study Area.	Low
Corynorhinus townsendii	Townsend's big-eared bat	CSC, FSS	Coastal conifer and broadleaved forests, oak and conifer woodlands, arid grasslands and deserts, and high-elevation forests and meadows. Primarily roosts in caves and abandoned mines, but may roost in buildings, bridges, rock crevices, and hollow trees in many habitat types.	There are no known recent records for this species in the Study Area; the Study Area is located within the known geographic range for this species. Roosting and foraging habitat occur within portions of the Study Area.	Moderate
Dipodomys merriami parvus	San Bernardino kangaroo rat	FE, CSC	Generally found in alluvial scrub vegetation on sandy loam substrates found in alluvial fans and/or flood plains. Needs early to intermediate seral stage vegetation. (CDFG, XX)	There are no known recent records for this species in the Study Area. The nearest CNDDB record is approximately 10 miles northeast of the Study Area. Suitable habitat is not present within the Study Area.	Not likely to occur
Euderma maculatum	Spotted bat	CSC	Occupies a wide variety of habitats from arid deserts and grasslands, to mixed conifer forests; feeds over water and along washes; needs rock crevices in cliffs or caves for roosting (USACE and CDFG, 2010).	There are no known recent records for this species in the Study Area; the Study Area is located within the known geographic range for this species; potential breeding and suitable foraging habitat occurs within portions of the Study Area.	Moderate

Taxa		Status	Habitat Type	Comments	Occurrence Potential
Scientific Name	Common Name				
Eumops perotis californicus	Western mastiff bat	CSC	Many open, semi-arid to arid habitats, including coniferous and deciduous woodland, coastal scrub, grassland, chaparral; roosts in crevices in cliff faces, high buildings, trees, tunnels.	There are no known recent records for this species in the Study Area; the Study Area is located within the known geographic range for this species; potential breeding and suitable foraging habitat occurs within portions of the Study Area.	Moderate
Lasiurus blossevillii	Western red bat	CSC, FSS	Primarily roosts in mature riparian forest but also found in upland forests, woodlands, and orchards	There are no known recent records for this species in the Study Area; the Study Area is located within the known geographic range for this species; potential breeding and suitable foraging habitat occurs within portions of the Study Area.	Moderate
Lasiurus cinereus	Hoary bat	SA	Prefers deciduous and coniferous woodlands; primarily roosts in tree foliage.	There are no known recent records for this species in the Study Area; the Study Area is located within the known geographic range for this species; potential breeding and suitable foraging habitat occurs within portions of the Study Area.	Moderate
Macrotus californicus	California leaf-nosed bat	CSC	Prefers caves, mines and rock shelters in Sonoran desert scrub.	There are no known recent records for this species in the Study Area; the Study Area is located outside the known geographic range for this species; potential breeding and suitable foraging habitat occurs within portions of the Study Area.	Low
Myotis ciliolabrum	Western small-footed myotis	SA	Occurs in a wide variety of arid upland habitats at elevations ranging from sea level to 2,700 meters (8,860 feet); day roosts include rock crevices, caves, tunnels and mines, and, sometimes, buildings and abandoned swallow nests. [CDFG, 2010]	There are no known recent records for this species in the Study Area; the Study Area is located within the known geographic range for this species; potential breeding and suitable foraging habitat occurs within portions of the Study Area.	Moderate
Myotis thysanodes	Fringed myotis	SA	Occurs in a wide variety of habitats. Optimal habitats include pinyon–juniper, valley foothill hardwood and hardwood-conifer woodlands. Forms maternity colonies and roosts in caves, mines, buildings and crevices. [USACE and CDFG, 2010]	There are no known recent records for this species in the Study Area; the Study Area is located within the known geographic range for this species; potential breeding and suitable foraging habitat occurs within portions of the Study Area.	Moderate
Myotis volans	Long-legged myotis	SA	Generally found along forest edges with good sun exposere. Breeds in tree cavities, under loose bark, rock creivces, cliffs and buildings. Forage over ponds, streams and forest clearings (Batcon, 2012).	There are no known recent records for this species in the Study Area; the Study Area is located within the known geographic range for this species; potential breeding and suitable foraging habitat occurs within portions of the Study Area.	Low
Myotis yumanensis	Yuma myotis	SA	Inhabits open forests and woodlands with sources of water. Species is closely tied to bodies of water, over which it feeds. Forms maternity colonies in caves, mines, buildings, or crevices. [USACE and CDFG, 2010]	This species was detected within the Study Area during surveys conducted in 2012. Suitable foraging and breeding habitat occurs within portions of the Study Area.	Present

Taxa		Status	Habitat Type	Comments	Occurrence Potential
Scientific Name	Common Name				
Neotamias speciosus speciosus	Lodgepole chipmunk		Occurs in isolated populations in the Southern California mountains in open-canopy forests and mixed-conifer from 6000 – 10,350 feet in elevation (SIBR, 2012)	There are no known recent records for this species in the Study Area; the Study Area is located outside the known geographic range for this species and is well below the preferred elevation of this species. The CNDDB reports a historic occurrence of this species approximately 10 miles southeast of the Study Area.	Not likely to occur
Onychomys torridus Ramona	Southern grasshopper mouse		Occurs primarily in grassland and sparse coastal sage scrub habitats.	There are no known recent records for this species in the Study Area; the Study Area is located within the known geographic range for this species; Suitable habitat occurs within limited portions of the Study Area.	Low
Ovis Canadensis nelson	Nelson's (San Gabriel Mountains) bighorn sheep	FSS	Inhabits open, rocky, steep areas with access to water and herbaceous vegetation. Populations currently managed in the Sheep management area of the San Gabriel Mountains.	This species has been observed at the Reservoir by Forest Service staff (Chris Huntley, personal communication, 10 September 2012). The Study Area is located within the known geographic distribution for this species; suitable habitat occurs within portions of the Study Area.	Present
Perognathus alticolus alticolus	White-eared pocket mouse	CSC, FSS	Known only from a series of allopatric populations in arid yellow pine communities in the vicinity of Little Bear Valley and Strawberry Peak, San Bernardino Mountains, San Bernardino County. This species is likely to be found among Sagebrush and other shrubs in open, Ponderosa Pine forests and Pinyon-Juniper woodlands and in Sagebrush covered areas on the northern slopes and Big Bear Basin of the San Bernardino Mountains.	There are no known recent records for this species in the Study Area; the Study Area is located outside the known geographic range for this species.	Not likely to occur
Perognathus longimembris brevinasus	Los Angeles pocket mouse	CSC, FSS	Found in open ground of fine sandy composition; prefers fine, sandy soils and may utilize these soil types for burrowing; may be restricted to lower elevation grassland and coastal sage scrub.	There are no known recent records for this species in the Study Area; the Study Area is located outside the known geographic range for this species.	Not likely to occur
Perognathus alticolus inexpectatus	Tehachapi pocket mouse	CSC, FSS	Occurs in a diversity of habitats including, Joshua tree woodland, pinyon-juniper woodland, oak savanna, and native and non-native grasslands. Burrows in friable, sandy soil.	There are no known recent records for this species in the Study Area; the Study Area is located outside the known geographic range for this species. This species is however known to occur on the east slopes of the San Gabriel Mountains. Suitable habitat is present within the Study Area.	Low
Spermophilus mohavensis	Mohave ground squirrel	ST	Occurs in the Mojave Desert in desert scrub and Joshua tree woodlands with winterfat (*Krascheninnikovia lanata*) and spiny hopsage (*Grayia spinosa*).	While this species has not been documented within the Study Area it is known to occur north and east of the Study Area. Although not expected to occur in the Study Area it may occur along the proposed haul routes north of the Study Area.	High**

Taxa		Status	Habitat Type	Comments	Occurrence Potential
Scientific Name	Common Name				
Taxidea taxus	American badger	CSC	Most abundant in drier open stages of most shrub, forest, and herbaceous habitats with friable soils; require sufficient food source, friable soils, and open, uncultivated ground; prey on burrowing rodents.	There are no known records for this species in the Study Area; the Study Area is located within the known geographic distribution for this species; suitable habitat occurs within portions of the Study Area.	Low

Federal Rankings:
FE = Federally Endangered
FT = Federally Threatened
FC = Federal Candidate for Listing
BCC = USFWS Bird of Conservation Concern
FSS = Forest Sensitive Species

State Rankings:
SE= State Endangered
ST = State Threatened
CFP = California Fully Protected
CPF = California Protected Fur-bearer
SA = CDFG Special Animal
WL = CDFG Watch List
CSC = California Species of Special Concern

* Although these species have the some potential to occur or are present within the Study Area they will likely be limited or occasional or sporadic use of the Project Area.

** The occurrence potential for these species is limited to the proposed haul routes only. Suitable habitat for the indicated species is not present within the Project Area.

Six special-status song birds were detected within riparian areas of the Study Area and included least Bell's vireo (*Vireo bellii pusillus*), Lawrence's goldfinch (*Spinus lawrencei*), Vaux's swift (*Chaetura vauxi*), Southern California rufous-crowned sparrow (*Aimophila ruficeps canescens*), summer tanager (*Piranga rubra cooperi*), and yellow warbler (*Setophaga petechia*). Special-status species are discussed further in Section 4.4. Several exotic species including the brown-headed cow bird (*Molothrus ater*) and European starling (*Sturnus vulgaris*) were also observed. Appendix E provides additional information on the survey results for the least Bell's vireo.

Sharp-shinned hawk (*Accipiter striatus*), a CDFG Watch List species, and bald eagle (*Haliaeetus leucocephalus*) were also observed. Bald eagles are a California Fully Protected Species and are a Forest Service Sensitive Species that appears to be a routine winter visitor to the Reservoir.

Sensitive mammals detected at the site included the pallid bat (*Antrozous pallidus*), a CDFG Species of Special Concern and Forest Sensitive Species and Yuma myotis (*M. yumanensis*), a California Special Animal. Although not observed during the surveys, Nelson's (San Gabriel Mountains) bighorn sheep (*Ovis Canadensis nelson*) have been observed at the Reservoir by Forest Service staff (Chris Huntley, personal communication, 10 September 2012).

5.2.1 Special-Status Wildlife Species Accounts

The species accounts below address all special-status species observed or determined to be present within the Study Area.

Amphibians

Arroyo Toad (Anaxyrus californicus)

Status: The arroyo toad is listed as federally endangered by the USFWS. This taxon is also a CDFG Species of Special Concern.

General Distribution: The distribution of arroyo toads historically extended from the upper Salinas River system in San Luis Obispo County south into coastal Baja California (Jennings and Hayes, 1994). Adults are primarily nocturnal and usually active between the first major rains in January and February to early August (Cunningham, 1962). After males emerge from the stream terrace over-wintering sites they precede females to breeding pools and call nightly from February or March through July (Holland and Goodman, 1998).

Distribution in the Study Area: Occurrences of this species is well documented within the Study Area (Figure 11). Most recently, arroyo toads were detected just south of Rocky Point during focused surveys conducted in 2011. The Study Area is located within the known geographic distribution for this species (CDFG, 2008). Suitable habitat occurs in the southern extent of the Study Area within the confines of Littlerock Creek, areas of Littlerock Creek upstream of the Study Area, and within nearby Santiago Creek. All areas of suitable habitat should be considered potentially occupied.

Habitat and Habitat Associations: Arroyo toads have one of the most specialized breeding habitat requirements of any amphibian in California. Adults require overflow pools adjacent to the inflow channel of streams that are generally 3rd order or greater and generally free of predators. Normally, shallow pools with sandy or gravely bottoms surrounded by little woody vegetation are preferred. Regular disturbance in the form of flooding is required to maintain areas of sparsely vegetated, sandy stream channels and terraces, which are used by adults and subadults for foraging and burrowing

(USFWS, 2001). Outside the breeding season, arroyo toads use a wide range of habitats in both upland (to a distance of at least 3,740 feet from the upland-riparian ecotone) and riparian areas (Holland and Sisk, 2001). Upland habitats used by arroyo toads include coastal sage scrub, chaparral, oak woodland, grassland, riparian, and agricultural habitats (Griffin, 1999; USFWS, 2001).

Natural History: The arroyo toad is a medium-sized toad, and adults range from 2.2 to 2.6 inches in length (USFWS, 1999). Dorsal coloration ranges from cream to light gray to light greenish-gray. Formerly considered a subspecies of the southwestern toad (*B. microscaphus*), the arroyo toad was elevated to full species status by Gergus (1998). Arroyo toads typically begin migrating to breeding sites in February or March, and migrations continue through July (Holland and Goodman, 1998). Males produce a trilling call from suitable breeding sites along the stream to attract females. When a female approaches, the male clasps the female across the abdomen (amplexus). The female arroyo toad then deposits 2,000 to 10,000 eggs in 2 long strands that are fertilized externally by the amplectic male (Sweet 1991 in Jennings and Hayes, 1994). Larvae require 65 to 85 days to complete metamorphosis (Jennings and Hayes, 1994; Holland and Goodman, 1998), at which time they are approximately 0.5 to 0.9 inches in length (Holland and Goodman, 1998). Even newly metamorphic individuals are able to burrow into loose sand. Juveniles initially remain near the natal pool until reaching a length of about 1.2 inches, when they may begin dispersing into adjacent riparian vegetation and become nocturnal (Jennings and Hayes, 1994; Holland and Goodman, 1998). Sexual maturity is typically attained in 2 years, though males can reach maturity in one year under favorable environmental conditions (Jennings and Hayes, 1994).

Jennings and Hayes (1994) stated that the arroyo toad has been extirpated from 76 percent of its total historic range in the United States (which is limited to California). They cite loss of habitat to agriculture and urbanization, changes to the hydrological regime in streams and rivers within their historic range, and predation from introduced aquatic species as significant factors in the decline of the arroyo toad. Those and other factors, such as human use and disturbance in and near aquatic habitats (e.g., campgrounds, off-road vehicle use), placer mining, and cattle grazing are threats to remaining populations (Jennings and Hayes, 1994). Additionally, fire and drought have produced severe declines in populations that are already stressed (Jennings and Hayes, 1994).

Threats: Major threats to this species include the direct loss of aquatic, riparian and upland habitat, alteration of natural flow regimes, water pollution and the introduction of exotic predators. Invasion of exotic plant species can also degrade arroyo toad habitat by altering natural flow regimes (USACE and CDFG, 2010).

Reptiles

Silvery legless lizard (Anniella pulchra)

Status: The silvery legless lizard is a CDFG Species of Special Concern. This taxon is not federally or State listed as threatened or endangered.

General Distribution: Silvery legless lizard occurs from Contra Costa County, California, south through the Coast, Transverse, and Peninsular Ranges; through parts of the San Joaquin Valley; and, along the western edge of the southern Sierra Nevada and western edge of the Mohave Desert (Jennings and Hayes, 1994). Its reported elevation range extends from sea level to approximately 5,700 feet in the Sierra Nevada foothills, but most historic localities along the central and southern California coast are below 3,500 feet (Jennings and Hayes, 1994). This fossorial species is rarely seen and it may be more abundant than it appears.

Distribution in the Study Area: This species was observed within the Study Area during surveys conducted in April 2012. An individual was observed, after a light rain, under a woodpile adjacent to the Reservoir.

The Study Area is located within the known geographic distribution for this species (CDFG, 2008). Suitable habitat occurs within limited portions of the Study Area.

Habitat and Habitat Associations: The silvery legless lizard requires sandy or loose loamy soils under sparse vegetation for burrowing and is strongly associated with soils that contain high moisture content. It has been found in beaches, chaparral, and pine-oak woodland habitat and sycamore, cottonwood, or oak riparian habitat that grows on stream terraces. It is most common in coastal dune, valley-foothill, chaparral, and coastal scrub habitats (Zeiner *et al.*, 1988).

Natural History: The silvery legless lizard is a member of the family Anniellidae, commonly known as North American legless lizards. The silvery, gray, or beige dorsal side of this subspecies is separate from the yellow ventral side by a dark mid-dorsal line (Stebbings, 2003). Little is known about specific habitat requirements for courtship and breeding (CDFG, 2008). Breeding occurs in early spring through July. The gestation period lasts for approximately four months (Jennings and Hayes, 1994). Live young are born in September, October, or occasionally as late as November, with litter size ranging from one to four, but two is most common (Stebbins, 1954). Soil moisture is essential for the subspecies and they die if they are unable to reach a moist substrate (Stephenson and Calcarone, 1999). Silvery legless lizards have a relatively low thermal preference, allowing for active behavior on cool days, early morning, and even at night during warmer periods (Bury and Balgooyen, 1976). This subspecies typically forages at the base of shrubs or other vegetation either on the surface or just below in leaf litter or sandy soils. The diet consists of insect larvae, small adult insects, and spiders (Stebbins, 1954).

Threats: The subspecies has been extirpated from approximately 20 percent of its known historical range (Lind, 1998a). Potential threats to local populations may include wildfires that destroy the desert shrub with which the subspecies is associated.

Coastal western whiptail (Aspidoscelis tigris stejnegeri)

Status: The coastal western whiptail is a CDFG Special Animal. This taxon is not federally or State listed as threatened or endangered.

General Distribution: This subspecies is found in coastal southern California, mostly west of the Peninsular Ranges and south of the Transverse Ranges. Its range extends north into Ventura County and south to Baja California.

Distribution in the Study Area: This species was documented within the Study Area during surveys conducted in 2012. The Study Area is located within the known geographic distribution for this subspecies (CDFG, 2008). Suitable habitat occurs throughout the Study Area. All areas of suitable habitat should be considered potentially occupied.

Habitat and Habitat Associations: The coastal western whiptail occurs in a variety of habitats, including valley-foothill hardwood, valley-foothill hardwood-conifer, valley-foothill riparian, mixed conifer, pine-juniper, chamise-redshank chaparral, mixed chaparral, desert scrub, desert wash, alkali scrub, and annual grasslands. This species is most commonly associated with areas of dense vegetation, but are also found around sandy areas along gravelly arroyos or washes (Stebbins, 2003).

Natural History: The coastal western whiptail is a subspecies of the western whiptail (A. tigris). Members of this species are distinctly characterized by a jerking gait and nearly constant mobility when active. The

reproductive season for western whiptails generally occurs between May and August; however, this may vary depending on local conditions. It has been reported that whiptails in the southern California desert regions may atypically lay more than one clutch of eggs per year (Pianka, 1970).Whiptails forage actively on the ground hunting a wide variety of ground-dwelling invertebrates, including grasshopper, ants, beetles, termites, and spiders (Stebbins, 2003). This diet may change seasonally to reflect the abundance of prey that is available (Vitt and Ohmart, 1977). Most activities occur in the morning, except on cloudy days when activities may last throughout the day (Vitt and Ohmart, 1977).

Threats to Species: There are no identified threats to this species.

Southwestern pond turtle (Actinemys marmorata pallida)

Status: The southwestern pond turtle is a CDFG Species of Special Concern. This taxon is not federally or State listed as threatened or endangered.

General Distribution: This subspecies occurs from northwestern Baja California north through western California to the central region of the state, where it intergrades with the northwestern pond turtle (*C. m. marmorata*) (Seeliger, 1945; Bury, 1970).

Distribution in the Study Area: This subspecies was documented within aquatic habitat above and below the Reservoir during surveys conducted in 2012. The Study Area is located within the known geographic distribution for this subspecies. Suitable habitat occurs throughout the Project areas where water is present. All areas of suitable habitat should be considered potentially occupied.

Habitat and Habitat Associations: Southwestern pond turtles inhabit permanent or nearly permanent bodies of water in a wide variety of habitat types. Suitable basking sites, such as partially submerged logs, vegetation mats, or open mud banks are a required element for this subspecies.

Natural History: The southwestern pond turtle is a subspecies of western pond turtle (*C. marmorata*) which represent the only abundant native turtles in California. This species is thoroughly aquatic and is possesses a low carapace typically olive, brown, or blackish in color (Stebbins, 2003). The subspecies usually lays a clutch of 3 to 14 eggs between April and August as females may move overland up to over 300 feet to find suitable nesting sites. Nests have been observed in many soil types from sandy to very hard and soils must be at least four inches deep for nesting (CDFG, 2008). Most activity is diurnal, but some crepuscular and nocturnal behavior has been observed (CDFG, 2008). Southwestern pond turtles feed on aquatic plants, insects, worms, fish, amphibian eggs and larvae, crayfish, and carrion (Stebbins, 2003).

Threats: Western pond turtles are estimated to be in decline across 75-80 percent of their range (Stebbins, 2003). The primary reason for this decline has been attributed to loss of suitable habitat associated with urbanization, agricultural activities, and flood control and water diversion projects (Jennings *et al.*, 1992).

Coast (San Diego) horned lizard (Phrynosoma coronatum [blainvillii population])

Status: The coast (San Diego) horned lizard is a CDFG Species of Special Concern. This taxon is not federally or State listed as threatened or endangered.

General Distribution: The coast (San Diego) horned lizard's historic range extended from the Transverse Ranges in Kern, Los Angeles, Santa Barbara, and Ventura Counties south through the Peninsular Ranges of southern California and into Baja California, Mexico as far south as San Vicente; however, the current range is much more fragmented (Jennings and Hayes, 1994).

Distribution in the Study Area: This species was observed within a sandy drainage west of the Reservoir during surveys conducted in 2012. The Study Area is located within the known geographic distribution for this species (CDFG, 2008). Suitable habitat occurs within the Study Area. All areas of suitable habitat should be considered potentially occupied.

Habitat and Habitat Associations: The coast (San Diego) horned lizard occurs in a wide variety of habitats throughout its range, though is found primarily in chaparral and mixed chaparral-coastal sage scrub, to stands of pure coastal sage scrub. It is also known to occur in riparian habitats, washes, and most desert habitats. They are occasionally locally abundant in conifer-hardwood and conifer forests. This species is most common in open, sandy areas where abundant populations of native ant species (e.g., *Pogonomyrmex* and *Messer* spp.) are present.

Natural History: The coast (San Diego) horned lizard is a flat bodied lizard with a wide, oval-shaped body and scattered enlarged pointed scales on the upper body and tail. Coast (San Diego) horned lizards are oviparous and lay one clutch of 6-17 (average 11-12) eggs per year from May through early July (Jennings and Hayes, 1994). Incubation occurs for two months and hatchlings first appear in late July and early August. It is surface active primarily from April to July. This species spends a considerable amount of time basking, either with the body buried and head exposed, or with the entire body oriented to maximize exposure to the sun. Although little is known about longevity in the wild, adults are thought to live for at least eight years (Jennings and Hayes, 1994). They primarily eat native harvester ants (*Pogonmyrmex* spp.) and do not appear to eat invasive Argentine ants that have replaced native ants in much of central and southern California. This species is an opportunistic feeder, and while harvester ants can comprise upwards of 90% of their diet, they will feed on other insect species when those species are abundant (Jennings and Hayes, 1994). Defense tactics used by this species include remaining motionless to utilize its cryptic appearance, only running for the nearest cover when disturbed or touched. Captured lizards puff up with air to appear larger, and if roughly handled, will squirt blood from a sinus in each eyelid (Jennings and Hayes, 1994).

Threats: Though once common throughout much of coastal and cismontane southern California, coast (San Diego) horned lizards have disappeared from much of their former range. Their population decline is mainly attributed to habitat loss due to urbanization and agricultural conversion. The introduction of non-native Argentine ants (*Iridomyrmex humilis*), which are inedible to horned lizards and tend to displace native carpenter and harvester ants, is another factor in their decline.

Two-striped garter snake (Thamnophis hammondii)

Status: The two-striped garter snake is a CDFG Species of Special Concern. This taxon is not federally or State listed as threatened or endangered.

General Distribution: This species occurs along a continuous range from northern Monterey County south through the South Coast and Peninsular Ranges to Baja California. Isolated populations also occur through southern Baja California, Catalina Island, and desert regions along the Mojave and Whitewater Rivers in San Bernardino and Riverside Counties, respectively (Jennings and Hayes, 1994). This species typically occurs at elevations ranging between sea level and approximately 8,000 feet (Jennings and Hayes, 1994).

Distribution in the Study Area: This species was documented within aquatic habitat above and below the Reservoir during surveys conducted in 2012. The Study Area is located within the known geographic distribution for this subspecies. Suitable habitat occurs throughout the Project areas where water is present. All areas of suitable habitat should be considered potentially occupied.

Habitat and Habitat Associations: This species is primarily associated with aquatic habitats that border riparian vegetation and provide nearby basking sites (Jennings and Hayes, 1994). These areas typically include perennial and intermittent streams and ponds in a variety of vegetation communities, including chaparral, oak woodland, and forest habitats (Jennings and Hayes, 1994). During the winter, two-striped garter snakes will seek refuge in upland areas, such as adjacent grassland and coastal sage scrub (Rossman et al., 1996).

Natural History: After several taxonomic revisions, two-striped garter snake has been recognized as a separate species where it had previously been considered a subspecies of the western aquatic garter snake (T. couchii) (Rossman and Stewart, 1987). This species is usually morphologically distinguished by the lack of a mid-dorsal stripe. Two-striped garter snakes breed from late March to early April and young are typically born between late July and August; however, some have been observed as late as November (Rossman et al., 1996; Jennings and Hayes, 1994). Two-striped garter snakes hibernate during the winter months; however, they have been observed actively above ground on warm winter days (Jennings and Hayes, 1994). The mainly aquatic diet of this species consists primarily of fish, fish eggs, and tadpoles and metamorphs of toads and frogs; however, they will also consume worms and newt larvae (Jennings and Hayes, 1994).

Threats: Lind (1998b) noted that quantity and quality of habitat for two-striped garter snakes is declining throughout much of its range. More than 40 percent of this species' historic range has been lost (Jennings and Hayes, 1994). Primary factors for the decline of this species in southern California include habitat conversion and degradation resulting from urbanization, construction of reservoirs, and cement-lining of stream channels.

Birds

Cooper's hawk (Accipiter cooperii)

Status: The Cooper's hawk is a CDFG Watch List Species that was removed from the Species of Special Concern list in 2008. This taxon is not federally or State listed as threatened or endangered.

General Distribution: The Cooper's hawk is widespread, occurring throughout much of the United States, southern Canada, and northern Mexico.

Distribution in the Study Area: A review of online eBird data reports observations of this species at the Reservoir. The Study Area is located within the known geographic distribution for this species and suitable habitat occurs within portions of the Study Area. Suitable foraging habitat occurs throughout the Study Area. The Study Area is located within the known geographic year-round distribution for this species and suitable nesting habitat occurs within the portions of the Study Area. All areas of suitable habitat should be considered potentially occupied.

Habitat and Habitat Associations: The Cooper's hawk breeds in small and large deciduous, conifer, and mixed woodlands. It also nests in pine plantations and suburban and urban environments (Curtis *et al.*, 2006). In California, this species nests predominately in oaks and pines. Cooper's hawks utilize a variety of habitat types with vegetative cover and often hunt on the edges of wooded areas (Palmer, 1988).

Natural History: One of three accipiter species in California, the Cooper's hawk is a medium-sized bird adapted to woodlands. This species shows a high degree of sexual dimorphism, with females generally up to one-third larger than males. Eastern and western individuals also differ in size. The Cooper's hawk generally breeds at two years of age and older and lays 3-6 eggs from early April to late May (Rosenfield

and Bielefeldt, 1993). This species feeds primarily on birds (70-80 percent of the diet) (Zeiner *et al.*, 1990a).

Threats: Habitat destruction (including logging and development), pesticide contamination, and shooting have been identified as the primary threats to the Cooper's hawk. However, breeding populations have increased in California and expanded into urban areas and populations are considered stable (Shuford and Gardali, 2008).

Sharp-shinned hawk (Accipiter striatus)

Status: The sharp-shinned hawk is a CDFG Watch List Species that was removed from the Species of Special Concern list in 2008. This taxon is not federally or State listed as threatened or endangered.

General Distribution: This species breeds from central and western Alaska and the greater portion of Canada south to central and south-central California, central Arizona, New Mexico, Texas, northern parts of the Gulf states, and into Mexico (AOU, 1998). Wintering grounds extend from the southern portions of Canada south throughout the United States and Mexico into Central America. In California, sharp-shinned hawks breed throughout the state, including the northern half of the state, and, to a lesser extent, the mountains of southern California (Small, 1994).

Distribution in the Study Area: This species was observed in the Study Area during surveys conducted in 2010. The Study Area is located within the known geographic year-round distribution for this species (CDFG, 2008). Suitable nesting habitat does occur within limited portions of the Study Area; however, suitable foraging habitat occurs throughout the Study Area. All areas of suitable foraging habitat should be considered potentially occupied.

Habitat and Habitat Associations: In California, this species typically nests in coniferous forests, often within riparian areas or on north-facing slopes (Stephenson and Calcarone, 1999). Where conifers are scarce, cottonwoods, poplars, and other tall riparian trees may be used for nest sites (Bent, 1937). Foraging habitat during the breeding season is essentially the same as that chosen for nesting. During the winter, however, males tend to hunt most frequently among hedgerows, field edges and other ecotonal habitats, while females typically hunt in extensive stands of forest or riparian areas (Meyer, 1987).

Natural History: This species is a small hawk with a pronounced size difference among males and females. Although the sexes are alike in color and pattern, the male is often substantially smaller than the female. This size difference is more evident in this species than most other hawks. The sharp-shinned hawk, which is presumed to be serially monogamous, breeds from April through August with peak breeding activity occurring between late May and July. During this period, the male exhibits undulating courtship flights teamed with high bouts of soaring and calling. Once nesting begins, the male brings food to the female and nestling until they fledge after roughly 60 days. Fledging is timed to coincide with fledging of prey birds, providing a food supply for young, inexperienced hunters (CDFG, 2008). Although small birds comprise the primary source of food, sharp-shinned hawks also take small mammals, reptiles, amphibians, and insects.

Threats: The primary threat to this species is the loss of suitable habitat as a result of large stand-replacing fires.

Southern California rufous-crowned sparrow (Aimophila ruficeps canescens)

Status: The southern California rufous-crowned sparrow is a CDFG Watch List Species that was removed from the Species of Special Concern list in 2008. This taxon is not federally or State listed as threatened or endangered.

General Distribution: Rufous-crowned sparrows are year-round residents throughout their range. Historically, four of the subspecies of rufous-crowned sparrow bred in coastal California from Mendocino County south through northwestern Baja California Norte (Thorngate and Parsons, 2005). Southern California rufous-crowned sparrows range from San Luis Obispo County south to San Diego County (Garrett and Dunn, 1981). This subspecies is increasingly restricted due to urbanization and agricultural development in Los Angeles, Orange, Riverside, San Bernardino, and San Diego Counties (Collins, 1999).

Distribution in the Study Area: This species was observed within the Study Area during surveys conducted in 2012 and was documented breeding within areas above and below the Reservoir. The Study Area is located within the known geographic year-round distribution for this species. Suitable breeding and foraging habitat occurs throughout the Study Area. All areas of suitable habitat should be considered potentially occupied.

Habitat and Habitat Associations: Southern California rufous-crowned sparrows typically breed in sparsely vegetated scrubland on hillsides and canyons between 60 and 1400 meters. This subspecies is often found in coastal sage scrub dominated by California sagebrush, but will also utilize coastal bluff scrub, low-growing serpentine chaparral, and along the edges of tall chaparral habitats (Thorngate and Parsons, 2005). Southern California rufous-crowned sparrows thrive in recently burned habitats and can be found utilizing these open areas for years (Thorngate and Parsons, 2005).

Natural History: The southern California rufous-crowned sparrow is one of five subspecies of the rufous-crowned sparrow that occur in the United States. Twelve additional subspecies occur in Mexico (Collins, 1999). This species nests on the ground and has a typical clutch size of three to four eggs (Thorngate and Parsons, 2005). Nests are well-hidden at the base of bushes, grass tussocks, or overhanging rock concealed by vegetation or rock (Thorngate and Parsons, 2005). This species forages at or near the ground in areas of dense grass or herbaceous cover, and is rarely observed foraging in the open. They glean insects from low shrubs, grasses, and herbaceous vegetation (Thorngate and Parsons, 2005).

Threats: This subspecies is extremely sensitive to edge effects and appears to avoid small fragments of habitat in favor of large tracts away from edges (Thorngate and Parsons, 2005). Southern California rufous-crowned sparrows are threatened by urbanization and agricultural conversion of habitat (Thorngate and Parsons, 2005).

Great blue heron (Ardea herodias)

Status: The great blue heron is a CDFG Special Animal. This taxon is not federally or State listed as threatened or endangered.

General Distribution: This species is fairly common all year throughout most of California. Few rookeries are found in southern California, but many are scattered throughout northern California. Knowledge of specific rookery locations is incomplete (Mallette, 1972; Belluomini, 1978; Garrett and Dunn, 1981).

Distribution in the Study Area: This species was documented below and within the Reservoir during surveys conducted in 2012. The Study Area is located within the known geographic year-round distribution for this species (CDFG, 2008). Suitable rookery habitat occurs within portions of the Study

Area and suitable foraging habitat occurs throughout the Study Area. All areas of suitable foraging and/or rookery habitat should be considered potentially occupied.

Habitat and Habitat Associations: Great blue herons are most commonly found in shallow estuaries and fresh or saline emergent wetlands. However, they also can occur along riverine and rocky marine shores, in croplands, pastures, and in mountains above foothills.

Natural History: This species is the largest and most widespread heron in North America. Great blue herons are large, grayish birds with a long "S"-shaped neck, long legs, and a long, thick bill. They are typically distinguishable by a white crown stripe surrounded by a black plume extending from behind the eye to the back of the neck. Great blue herons usually arrive to breeding ground in February and courtship and nest building begin shortly thereafter. Breeding territories are small, usually including only the nest site and immediately surrounding areas (Cottrille and Cottrille, 1958; Mock, 1976). Secluded groves of tall trees near shallow water are preferred for nesting sites. Feeding areas can occur as far as ten miles away and may be defended vigorously, especially during the non-breeding season (Palmer, 1962; Krebs, 1974; Kushlan, 1976). Although this species will occasionally eat small rodents, amphibians, reptiles, insects, and birds, its diet is dominated by fish (nearly 75%) (Cogswell, 1977). When hunting, great blue herons stand motionless, or walk slowly, in shallow water, or less commonly, open fields and grasp prey with their bill, rarely impaling the intended target. This species typically roosts in secluded, tall trees.

Threats: This species is sensitive to human disturbance near nests, and probably to pesticides and herbicides in nesting and foraging areas (Jackman and Scott, 1975).

Costa's hummingbird (Calypte costae)

Status: The Costa's hummingbird is a CDFG Special Animal. This taxon is not federally or State listed as threatened or endangered.

General Distribution: This species breeds in central California, southern Nevada, and southwestern Utah south to Santa Barbara Island, Baja California, and offshore islands, southern Arizona, west-central Mexico, and southwestern New Mexico. Wintering populations occur in southern California and southwestern Arizona south to Sinaloa, Mexico (Terres, 1980; AOU, 1998). Costa's hummingbird occurs as a permanent resident in Ventura County (CDFG, 2008).

Distribution in the Study Area: This species was observed within the Study Area during surveys conducted in 2012 and breeding individuals were confirmed within areas below the Reservoir. The Study Area is located within the known geographic range for this species and suitable breeding and foraging habitat occurs throughout the Study Area. All areas of suitable habitat should be considered potentially occupied.

Habitat and Habitat Associations: Costa's hummingbird occurs in more arid habitats than other hummingbirds of California, including desert wash, desert riparian edges, coastal scrub, desert scrub, low-elevation chaparral, and palm oases. This species most commonly occurs along canyons and washes when nesting (NatureServe, 2011).

Natural History: Costa's hummingbird is the second smallest bird in North America, displaying an iridescent violet crown and gorget down the side of the neck and greenish sides and flanks. This species breeds from March through May in the deserts and from April through July along the coast (CDFG, 2008). As is usual in hummingbirds, all nesting activities are performed by the female. Nests are located in a wide variety of trees, cacti, shrubs, woody forbs, and sometimes vines, often in proximity to

conspecific nests (Bent, 1940). Costa's hummingbird feeds on the flower nectar of various herbaceous and woody plants; however, small insects and spiders are also consumed. During the winter, exotic shrubs may become an important food source (Garrett and Dunn, 1981).

Threats: No persistent threats have been identified for this species.

Lawrence's goldfinch (Carduelis lawrencei)

Status: Lawrence's goldfinch is a CDFG Special Animal and a USFWS Bird of Conservation Concern. This taxon is not federally or State listed as threatened or endangered.

General Distribution: Lawrence's goldfinch breeds from the western foothills of the Sierra Nevada and the Coast Ranges in Shasta County south to northern Baja California. The wintering range for this species extends from the coastal slope of the Coast Ranges in southern California to northern Baja California, and from the Lower Colorado River Valley in Needles, California, and east to southern Texas, and south to Sonora, Mexico.

Distribution in the Study Area: This species was observed within the Reservoir and within the southern extent of the Study Area in 2012. The Study Area is located within the known geographic range for this species and suitable foraging habitat occurs throughout the Study Area. Suitable breeding habitat present within portions of the Study Area. All areas of suitable habitat should be considered potentially occupied.

Habitat and Habitat Associations: This species breeds in a variety of habitats throughout its range in southern California, including mixed conifer-oak forest, blue oak savannah, pinyon-juniper woodland, chaparral, riparian woodland, and desert oases (Garrett and Dunn, 1981; Lehman, 1994; Roberson and Tenney, 1993; Unitt, 1984). However, it prefers xeric open oak woodland bordering chaparral in the upper foothills. Arid, open woodlands with adjacent bushy areas, such as chaparral or tall weedy fields characterize typical nesting habitat. This species is often found nesting within proximity to foraging habitat and open water (Davis, 1999).

Natural History: This small, conspicuous songbird reaches a height of four to five inches and possesses distinctly bright yellow coloration on its breast and wing bars; however, females are much less distinct. The breeding season for this species begins as early as late May and can last into September with peak activity occurring between late April and August. Nests are typically constructed on the outer branches of trees, particularly oaks (Grinnell and Miller, 1944). Both parents continue to provision the young for five to seven days after fledging, at which time the young join the parents on foraging bouts. Lawrence's goldfinch feeds primarily on seeds of native plant species, particularly fiddleneck (*Amsinckia* spp.) during the spring months and chamise (*Adenostoma fasciculatum*), mistletoe (*Phoradendron* spp.), coffee berry (*Rhamnus californica*), and annual grasses during other seasons (Davis, 1999). Lawrence's goldfinches often form large flocks, particularly in winter. However, both males and females of this species will rigorously defend territories from conspecific intruders during the breeding season.

Threats: Recent survey data (1980-2000) indicates that there has been a substantial, but not significant, decline in populations of this species across its range. Populations in Arizona and California have been reported as significantly declining (Sauer *et al.*, 1996). However, since this species seems to be well adapted to a wide range of woodland habitats and may even thrive, to some extent, from non-intensive human disturbance that increase annual plant populations, there doesn't appear to be a significant problem with this species at this time.

Vaux's swift (Chaetura vauxi vauxi)

Status: Vaux's swift is a CDFG Species of Special Concern. This taxon is not federally or State listed as threatened or endangered.

General Distribution: This swift breeds from southwestern Canada through the western United States to Mexico, Central America and northern Venezuela. (Cornel, 2012)

Distribution in the Study Area: This species was observed within the Study area during surveys conducted in 2012. The Study Area is located within the known geographic range for this species and suitable foraging habitat occurs throughout the Study Area. Suitable breeding habitat is present within the Study Area. All areas of suitable habitat should be considered potentially occupied.

Habitat and Habitat Associations: Hollow trees are this species favored nesting and roosting sites (Cornel, 2012).

Natural History: Found to be the smallest swift in North America, this species constructs a nest of woven twigs held together by its own saliva (Cornel, 2012). Like most swifts this species is predominantly insectivorous and makes up to 50 trips a day for food when feeding young.

Threats: The primary threat to Vaux's swift is habitat loss.

Yellow warbler (Dendroica petechia brewsteri)

Status: The yellow warbler is a CDFG Species of Special Concern. This taxon is not federally or State listed as threatened or endangered.

General Distribution: The breeding range for yellow warblers of the yellow group of subspecies includes the Pacific coast from the northern limits of the boreal forests in Alaska and Canada south to the southern United States and northern Baja California. The winter range extends from the coasts of northern Mexico to northern South America (Lowther *et al.*, 1999). Although this species is primarily a summer resident, some small winter populations remain in the lowlands of southern California (Garrett and Dunn, 1981).

Distribution in the Study Area: This species was observed within the Study Area during surveys conducted in 2012 and breeding individuals were confirmed within areas above and below the Reservoir. The Study Area is located within the known geographic range for this species and suitable breeding and foraging habitat occurs throughout the Study Area. All areas of suitable habitat should be considered potentially occupied.

Habitat and Habitat Associations: In southern California, this species breeds in riparian woodlands situated within lowlands and canyons (Garrett and Dunn, 1981; Lehman, 1994; Roberson and Tenney, 1993; Unitt, 1984). Suitable habitat typically consists of riparian forests containing sycamores, cottonwoods, willows, and/or alders (Stephenson and Calcarone, 1999).

Natural History: There is a considerable morphological variation within the *D. petechia* species. Of the three recognized groups of subspecies, only the "yellow" group breeds in North America. The "yellow" group is further divided into nine subspecies, which are distinguished by slight differences in plumage color and patterns of breast streaking in males (Lowther *et al.*, 1999). Yellow warblers migrate annually between breeding grounds in North America and wintering grounds in the neotropics and are highly territorial on both breeding and wintering grounds (Lowther *et al.*, 1999). During migration, yellow warblers form flocks and will often join with flocks of other species, including warblers, vireos, and

flycatchers. The primary diet of yellow warblers consists of arthropods, such as bees, wasps, caterpillars, flies, beetles, and true bugs, which are usually gleaned from leaf surfaces; however, this subspecies will occasionally sally to capture prey in flight. Males typically forage higher in trees than females (Lowther *et al.*, 1999).

Threats: Nest parasitism by brown-headed cowbird (*Malothrus ater*) has been implicated as a major cause to population declines of yellow warblers in southern California (Garrett and Dunn; 1981; Stephenson and Calcarone, 1999; Unitt, 1984).

Bald Eagle (Haliaeetus leucocephalus)

Status: The bald eagle is designated as a Forest Service sensitive species by the Regional Forrester.

General Distribution: The bald eagle occurs throughout most of North America. Historically, bald eagles bred throughout the mountains of coastal California. Currently, breeding populations exist on the Los Padres and San Bernardino National Forests. This species has also been documented in Ventura County at Casitas Lake. Bald eagles have not nested within or adjacent to the Angeles National Forest in Los Angeles County for at least 30 years however, a bald eagle was sighted in a riparian area on the Tejon Ranch on August 24, 1994 (Bautista and Brown, Pers. Obs.). This species are occasionally seen on or near the Santa Clara/Mojave Rivers Ranger District during the winter, but apparently none are resident birds. In the Angeles National Forest, bald eagles were observed at Littlerock Reservoir in 2007 (L. Welch, District Biologist, pers. comm.) and by Aspen in 2012. The largest wintering population of bald eagles in southern California is at Big Bear Lake in the San Bernardino Mountains. It has been successfully reintroduced as a breeding species on Santa Catalina Island after becoming extirpated from the Channel Islands in the 1950s.

Distribution in the Study Area: This species was observed within the Reservoir and the southern extent of the Study Area during surveys conducted in 2012. The Study Area is located within the known geographic range for this species and suitable foraging habitat occurs throughout the Study Area. All areas of suitable habitat should be considered potentially occupied.

Habitat and Habitat Associations: This species requires large bodies of water, or free flowing rivers with abundant fish, and adjacent snags or other perches (Zeiner et al. 1990a). Perches must be high in large, stoutly limbed trees, on snags or broken-topped trees, or on rocks near water (Zeiner et al. 1990a). Bald eagles are active diurnally and yearlong. Bald eagles are primarily fish eaters; however, they are opportunistic and will utilize avian and mammalian prey and carrion if readily available, especially in the nonbreeding season (Evans 1982; Zeiner et al. 1990a). Bald eagles swoop from hunting perches, or soaring flight, to pluck fish from water (Evans 1982; Zeiner et al. 1990a). Bald eagles roost communally in winter in dense, sheltered, remote conifer stands (Zeiner et al. 1990a). Eagle nests are characteristically large, ranging from a minimum of 3 feet in width and depth to 16 feet deep and 10 feet across; size and shape are determined partly by the supporting branches (Evans 1982). Where suitable nest trees are scarce, nests are placed on ridges, cliffs, and on sea stacks (Evans 1982). Nests are located 50-200 feet above ground, usually below tree crown (Zeiner et al. 1990a) and nests are usually located near a permanent water source (Zeiner et al. 1990a). In southern California, nesting most often occurs in large trees near water, but occasionally nests are on cliffs or the ground.

Natural History: Bald eagles are fairly common as a winter migrant at a few favored inland waters in Southern California (Zeiner et al. 1990a). Bald eagles engage in courtship flights consisting of the pair soaring together for long periods of time at great heights (Evans 1982). Occasionally they will lock talons and somersault downward several hundred feet (Evans 1982). Breeding season is February through July,

but may start as early as November (Zeiner et al. 1990a). Clutch size is 1-3 (Evans 1982; Zeiner et al. 1990a)and incubation is usually 34-36 days (Evans 1982; Zeiner et al. 1990a) followed by fledging at 10-12 weeks (Evans 1982). Semi-altricial young hatch asynchronously (Zeiner et al. 1990a). Bald eagles are monogamous, and breed first at 4-5 years (Zeiner et al. 1990a). Bald eagles are considered long-lived, with the oldest living bald eagle reported near Haines, Alaska at 28 years old (Schempf 1997). In captivity, bald eagles may live 40 or more years (USDI - Fish and Wildlife Service 1999).

Occasionally raccoons, bobcats, crows, and under unusual circumstances, gulls prey on eggs and small young, forcing the adults away from the nest (Evans 1982). Organochlorine (DDE) interferes with normal calcium metabolism, resulting in thin-shelled eggs, which cannot withstand normal incubation (Evans 982). Dierldrin, PCBs, and mercury have been linked to embryonic and early chick mortality (Evans 1982). High concentrations of dieldrin and DDT are known to result in mortality of bald eagles (Evans 1982).

Threats: Illegal shooting remains the greatest single known cause source of bald eagle mortality (Evans 1982). Roughly half of all recorded bald eagle deaths are a direct result of shooting (Evans 1982). Other causes of mortality include impact injuries (usually power line or tower), electrocution, trapping injuries (eagles caught in "sight bait" sets for fur bearers), automobile or train accidents, and poisoning from contaminated coyotes or other carcasses (Evans 1982). Territories have been abandoned after disturbance from logging, recreational developments, and other human activities near nests (Zeiner et al. 1990a).

Summer Tanager (Piranga rubra)

Status: Summer tanager is a CDFG Species of Special Concern. This taxon is not federally or State listed as threatened or endangered.

General Distribution: The summer tanager is found in the eastern and southwestern United States, Central America, and South America, and regularly occurs north of Mexico. It primarily breeds in the eastern United States from New Jersey south to Florida, west to southern Illinois, and south to Texas. It also breeds in portions of New Mexico, Arizona, California, and Baja California. It winters in Central Mexico, south through Central America, and as far south as Bolivia and Brazil. (Newhall)

Distribution in the Study Area: This species was observed below the Reservoir during surveys conducted in 2012. The Study Area is located within the known geographic range for this species and suitable foraging habitat occurs throughout the Study Area. Suitable breeding habitat is present within the Study Area. All areas of suitable habitat should be considered potentially occupied.

Habitat and Habitat Associations: Western populations of summer tanagers occupy riparian woodlands dominated by willows (Salix spp.) and cottonwoods (Populus spp.) at lower elevations (Robinson 1996; Rosenberg et al. 1982, 1991) and mesquite (Prosopis spp.) and tamarisk (Tamarix spp.) habitats at higher elevations (Robinson 1996). During the winter, the summer tanager occurs in open and second-growth habitats within its range, typically below 1,200 meters (3,937 feet) AMSL (Robinson 1996). (Newhall)

Natural History: The males begin to arrive to the breeding grounds in April, slightly before the females. Nests are constructed on a large, horizontal limb of a tree within riparian vegetation, usually a cottonwood or willow tree, approximately 3 to 6 meters (10 to 20 feet) above the ground (Zeiner et al. 1990A). The nest is constructed in an open-cup shape from dried herbaceous vegetation, and is usually placed among or under leaves (Robinson 1996).

The summer tanager commonly feeds on bees and wasps, often foraging for larvae from hives and nests (Robinson 1996). It feeds on other insects, spiders, and small fruits and berries. It also captures flying insects during short sallies from a perch and gleans insects and fruits from leaf and bark surfaces of trees and shrubs (Robinson 1996).

Threats: There is little specific threat information for the summer tanager. Robinson (1996) describes habitat destruction as the largest effect of human activities on the summer tanager. In the southwest, particularly in southern California and the Colorado River valley, populations of summer tanagers have declined, due the elimination of riparian willow and cottonwood forest. Nest parasitism by brown-headed cowbirds may also be a factor contributing to declining populations.

Least Bell's vireo (Vireo bellii pusillus)

Status: The least Bell's vireo was listed as federally endangered by the USFWS on May 2, 1986 (51 FR 16474-16482). Critical habitat was designated on February 2, 1994 (59 FR 4845-4867). This taxon is also listed as State endangered and considered a USFWS Bird of Conservation Concern.

General Distribution: The least Bell's vireo was historically widespread in riparian woodlands of the Central Valley and low-elevation riverine valleys of California and northern Baja California. However, over 95 percent of historic riparian habitat has been lost throughout its former range, which may have accounted for 60 to 80 percent of the original population throughout the state of California (USFWS, 1986). The current breeding distribution for this subspecies in California is restricted to Kern, San Diego, San Bernardino, Riverside, Ventura, Los Angeles, Santa Barbara, and Imperial Counties.

Distribution in the Study Area: This species was observed within the Study Area during surveys conducted from 2010 – 2012 and breeding individuals were confirmed within areas below the Reservoir. The Study Area is located within the known geographic range for this species and suitable breeding and foraging habitat occurs within portions of the Study Area. All areas of suitable habitat should be considered potentially occupied.

Habitat and Habitat Associations: During the breeding season, least Bell's vireo is a low-elevation riparian obligate that inhabits dense, willow-dominated habitats with lush understory vegetation and in the immediate vicinity of water. Most areas that support viable populations are in early stages of succession where most woody vegetation is between five and ten years old (Franzeb, 1989; Gray and Greaves, 1984).

Natural History: The least Bell's vireo is one of four recognized subspecies of Bell's vireo (*V. bellii*) and is the western-most occurring subspecies, breeding entirely within California and northern Baja California. This subspecies is a small vireo with a short, straight bill and plumage varying from drab gray to green above and white to yellow below. The breeding season for least Bell's vireo begins with males arriving at breeding sites to establish territories, typically by late March. Females settle on male territories within two days of arriving to breeding sites and courtship begins immediately, lasting for 1-2 days before a nest site is selected and both birds construct the nest. Both sexes brood and feed the young. After the breeding season is complete, the least Bell's vireo leaves its breeding range to winter in Baja California. This subspecies typically forages in riparian habitat, feeding primarily on small insects and spiders (Chapin, 1925). Feeding will also occasionally occur in oak woodlands and adjacent chaparral habitats (Salata, 1983).

Threats: The primary threats that have been identified for this subspecies include the loss of lowland riparian habitat and nest parasitism by the brown-headed cowbird (USFWS, 1998)

Mammals

Pallid bat (Antrozous pallidus)

Status: The pallid bat is a CDFG Species of Special Concern. This taxon is not federally or State listed as threatened or endangered.

General Distribution: Pallid bats have a broad geographic range, extending from southern British Columbia to central Mexico and from California east to the Midwestern United States (Harvey *et al.*, 1999). This species occurs most commonly below elevations of roughly 6,000 feet (Stephenson and Calcarone, 1999). Pallid bats are year-round residents in California (Philpott, 1997).

Distribution in the Study Area: This species was detected below the dam structure during surveys conducted in May 2012. The Study Area is located within the known geographic distribution for this species (CDFG, 2008). Suitable roosting habitat occurs within limited portions of the Study Area. Suitable foraging habitat occurs throughout the Study Area. All areas of suitable habitat should be considered potentially occupied.

Habitat and Habitat Associations: Pallid bats occur in a variety of habitats, including grasslands, shrublands, woodlands, scattered desert scrub, agricultural fields, and mixed conifer forests (Barbour and Davis, 1969; Hermanson and O'Shea, 1983; Orr, 1954; Philpott, 1997). This species appears to prefer edges and open areas without trees (SNFPA, 2001). Roosting sites include rock crevices, mines, caves, tree hollows, buildings, bridges, and culverts (Hermanson and O'Shea, 1983; Tactarian, 2001).

Natural History: The pallid bat is a large, light-colored bat with prominent ears. This is a social species, communicating through a variety of vocalizations to indicate territorial disputes, direct individuals to roosting sites, and facilitate mother-infant relations (Nagorsen and Brigham, 1993). Pallid bat maternity colonies form in early April and may contain from 12 to 100 individuals (Zeiner *et al.*, 1990b). The diet of pallid bats primarily consist of large arthropods, including scorpions, crickets, moths, and praying mantids which are gleaned from the ground or on the surfaces of vegetation (Hermanson and O'Shea, 1983). Emergence from roosting sites typically begins 30 to 60 minutes after sunset, but can vary seasonally (Hermanson and O'Shea, 1983; Zeiner *et al.*, 1990b). Foraging is usually concentrated into two periods, with the first activity peak occurring 90 to 190 minutes after sunset, and the second occurring just prior to dawn (Hermanson and O'Shea, 1983; Zeiner *et al.*, 1990b). Nagorsen and Brigham (1993) report that pallid bats will travel up to 2.5 miles between day roosts and foraging areas. Between activity periods, pallid bats may remain torpid for up to five hours (O'Shea and Vaughn, 1977). This species is known to hibernate, but will periodically arouse to forage for food and water (Philpott, 1997).

Threats: Some of the threats that have been associated to the decline of this species in southern California include the destruction of buildings that provide suitable roosting and maternal colony sites, eradication of roosting colonies due to public health concerns, and urban expansion (Brown-Berry, 2002). As bat species often exhibit high site fidelity to maternity roosts and are highly sensitive to disturbance at these sites, local extirpations may be attributed to roost disturbance (Hermanson and O'Shea, 1983; Orr, 1954; O'Shea and Vaughn, 1977; Philpott, 1997).

Yuma myotis (Myotis yumanensis)

Status: The Yuma myotis is a CDFG Special Animal. This taxon is not federally or State listed as threatened or endangered.

General Distribution: The Yuma myotis is widespread throughout western North America from British Columbia, Canada, south through the western United States to Baja California and central Mexico (Hall 1981). In the United States, the species occurs in all of Washington and Oregon, most of California, western Idaho and Montana, the extreme western portion of Nevada, the southeastern half of Utah, all of Arizona and New Mexico, and western Texas. It occurs throughout California except for the most arid areas of the Mojave and Colorado deserts (Zeiner et al. 1990B). [Newhall]

Distribution in the Study Area: This species was detected below the dam structure during surveys conducted in May and July 2012. The Study Area is located within the known geographic distribution for this species (CDFG, 2008). Suitable roosting habitat occurs within limited portions of the Study Area. Suitable foraging habitat occurs throughout the Study Area. All areas of suitable habitat should be considered potentially occupied.

Habitat and Habitat Associations: Although the Yuma myotis occurs in a wide variety of life zones at elevations ranging from sea level to 3,300 meters (10,820 feet), its actual distribution is closely associated with access to water (Zeiner et al. 1990B). Forests and woodlands are primary habitats, and foraging usually occurs within open, uncluttered habitats and occurs low, over water sources such as ponds, streams, and stock ponds (Brigham et al. 1992; Zeiner et al. 1990B). Yuma myotis day roosts include rock crevices, caves, mines, buildings, abandoned swallow nests, and large, live trees (Evelyn et al. 2004; Zeiner et al. 1990B). [Newhall]

Natural History: Females establish colonial maternity roosts with up to several thousand individuals where young are born and raised (Zeiner et al. 1990B). Males appear to establish solitary roosts during the breeding season or roost with other bat species (Wilson and Ruff 1999; Zeiner et al. 1990B). Births are variable, but generally occur in late May to mid-June, with a peak in early June in California (NatureServe 2007; Zeiner et al. 1990B). Time of first flight is unknown. The Yuma myotis typically forages over water sources for moths, true flies, gnats, midges, mosquitoes, termites, true bugs, caddis flies, ants, bees, and wasps (Brigham et al. 1992). [Newhall]

Threats: No documented threats to Yuma myotis colonies have been reported in the scientific literature, but, like most bats, this species is likely very sensitive to human disturbance and, because it may roost in large trees, abandoned buildings, and under bridges (nocturnal roosts), it is vulnerable to vandalism, extermination, or inadvertent disturbance of roost sites. Other plausible threats to Yuma myotis resulting from construction activities include disturbances of day roosts from human activity, noise, and dust, as well as effects of dust on insect prey. Potential long-term impacts from urban development also include human and pet, stray, and feral animals' disturbances of roost sites; roost site and foraging habitat degradation, such as trampling and invasive species; and, pesticides that may cause secondary poisoning and affect prey abundance.

Western small-footed myotis (Myotis ciliolabrum)

Status: Western small-footed myotis is listed as a CDFG Special Animal. This taxon is not federally or State listed as threatened or endangered.

General Distribution: The western small-footed myotis is widespread throughout western North America, from western Canada south through the western United States to northern Baja California and central Mexico (Hall, 1981; as cited in USACE and CDFG, 2010). In the United States, the species occurs in all states west of, and including, North Dakota to the north and Texas to the south. The species is absent from the coastal regions of Washington, Oregon, and California south to about Ventura County (Zeiner *et al.*, 1990b; as cited in USACE and CDFG, 2010).

Distribution in the Study Area: This species was detected while actively monitoring just above the dam structure in July 2012. The Study Area is located within the known geographic distribution for this species (CDFG, 2008). Suitable roosting habitat occurs within limited portions of the Study Area. Suitable foraging habitat occurs throughout the Study Area. All areas of suitable habitat should be considered potentially occupied.

Habitat and Habitat Associations: The western small-footed myotis occurs in a wide variety of arid upland habitats at elevations ranging from sea level to 2,700 meters (8,860 feet) (Zeiner *et al.*, 1990b; as cited in USACE and CDFG, 2010). Habitats used by this species include riparian areas, woodlands, and brushy uplands (Holloway and Barclay, 2001; Zeiner *et al.*, 1990b; all as cited in USACE and CDFG, 2010). Western small-footed myotis day roosts include rock crevices, caves, tunnels and mines, and, sometimes, buildings and abandoned swallow nests (Holloway and Barclay, 2001; as cited in USACE and CDFG, 2010). They also use day roosts as nocturnal roosts (i.e., they may return to the day roost during the night) or may use buildings and concrete underpasses strictly as nocturnal roosts (Holloway and Barclay, 2001; as cited in USACE and CDFG, 2010).

Natural History: In California, it occurs in coastal southern California, the foothills of the Sierra Nevada, and the Great Basin Desert, and it is absent from the higher elevations in the mountains and from the lower elevations in the Mojave and Colorado deserts (Zeiner et al. 1990b; as cited in USACE and CDFG, 2010).

Western small-footed myotis forage for moths, true flies, gnats, midges, mosquitoes, true bugs, and beetles, often along the margins of trees and over water (Zeiner et al. 1990b; as cited in USACE and CDFG, 2010). Females establish maternity roosts, which may be solitary or colonial (with up to 20 individuals), where young are born and raised (Zeiner et al. 1990b; as cited in USACE and CDFG, 2010). Males appear to establish solitary roosts during the breeding season (Zeiner et al. 1990b; as cited in USACE and CDFG, 2010). Births generally occur in May and June, with a peak in late May (Zeiner et al. 1990b; as cited in USACE and CDFG, 2010), and first flight by young occurs by about one month (Wilson and Ruff 1999; as cited in USACE and CDFG, 2010).

Threats: No documented threats to western small-footed myotis colonies have been reported in the scientific literature, but, like most bats, this species is likely very sensitive to human disturbance and because it may roost in abandoned buildings and under bridges (nocturnal roosts), it is vulnerable to vandalism, extermination, or inadvertent disturbance of roost sites.

Nelson's bighorn sheep (Ovis Canadensis nelsoni)

Status: The Nelson's bighorn sheep is a U.S. Forest Service Sensitive species. This taxon is not federally or State listed as threatened or endangered.

General Distribution: Bighorn sheep were originally distributed from Baja California to Texas in the south to the Canadian Rockies in the north, with the eastern boundary reaching western Nebraska and the western boundary in California extending from Mount Shasta in the north to the crest of the central and southern Sierra Nevada to the Transverse Ranges and the east side of the Peninsular Ranges in the south (Cowan, 1940). Traditional taxonomy dating back more than half a century (Cowan, 1940) broke bighorn sheep from the southwestern desert region into four subspecies, one of which, the Nelson Bighorn (Ovis canadensis nelsoni), included bighorn from the Transverse Ranges through most of the desert mountain ranges of California, including the WMPA, and adjacent Nevada and northern Arizona to Utah (Shackleton, 1985). Recent research (Ramey, 1993, 1995; Wehausen and Ramey, 1993) has found a lack of support for Cowan's (1940) desert subspecies and instead has found previously

unrecognized north-south variation of the Nelson Bighorn (Wehausen and Ramey, 1993, 1999). [BLM, no date A]

Distribution in the Study Area: Nelson's bighorn sheep have been observed at the Reservoir by Forest Service staff (Chris Huntley, personal communication, 10 September 2012). The Study Area is located within the known geographic distribution for this species; suitable habitat occurs within portions of the Study Area.

Habitat and Habitat Associations: Basic to the biology of bighorn sheep is their agility on steep rocky terrain, an adaptation used to escape predators. Consequently, within the desert, preferred habitat of bighorn is primarily on or near mountainous terrain above the desert floor. Also fundamental to the biology of bighorn sheep is the use of eyesight as the primary sense for detecting predators at sufficient distances to assure adequate time to reach safe terrain (Bleich et al., 1990b). Thus, preferred habitat of bighorn sheep is visually open, as well as steep and rocky. Because of scant rainfall and hot summer temperatures that limit most vegetation to low stature, most Mojave Desert mountain ranges satisfy these habitat requirements well. Surface water is another element of desert bighorn habitat considered to be important to population health (Turner and Weaver, 1980). [BLM, no date]

Natural History: Bighorn sheep have a large rumen, relative to body size (Krausman et al., 1993), which allows digestion of grasses, even in a dry state (Hanly, 1982). This gives them flexibility to select diets that optimize nutrient content from available forage. Consequently, bighorn sheep feed on a large variety of plant species and diet composition varies seasonally and among locations. The nutritional quality of their diet depends on growth activity of forage species and varies greatly among seasons, years, and locations (Wehausen and Hansen, 1988; Wehausen, 1992a), and is influenced greatly by precipitation and temperature (Wehausen, 1992b). While diet quality in the Mojave Desert varies greatly among years, it is most predictably high in late winter and spring (Wehausen, 1992a), and this period coincides with the peak of lambing. Desert bighorn have a long lambing season that can begin in December and end in June in the Mojave Desert, and a small percentage of births commonly occur in summer as well (Thompson and Turner, 1982; Bunnell, 1982; Wehausen, 1991). Within the WMPA, the bighorn occurring north of I-15 have a later initiation of the lambing season than those further south (Wehausen and Ramey, 1999; Wehausen, 1991). The primary breeding season in the WMPA occurs between August and November (Bleich et al., 1997), and the gestation period for bighorn sheep is about 174 days (Hass, 1995). [BLM, no date A]

Threats: Potential threats must be approached from the standpoint of individual populations and metapopulations (BLM, no date A). Actions that impair the ability of bighorn sheep to move between mountain ranges (e.g. fencing along highways or other boundaries, canals, and high densities of human habitation) will limit the potential for natural colonization and gene exchange, both of which are key to metapopulation viability (BLM, no date A). Cattle grazing also poses a threat to this species, by creating competition for and reducing the availability of surface water sources for the bighorn sheep.

5.3 Wildlife Corridors and Special Linkages

Linkages and corridors facilitate regional animal movement and are generally centered around waterways, riparian corridors, flood control channels, contiguous habitat, and upland habitat. Drainages generally serve as movement corridors because wildlife can move easily through these areas, and fresh water is available. Corridors also offer wildlife unobstructed terrain for foraging and for dispersal of young individuals.

As the movements of wildlife species are more intensively studied using radio-tracking devices, there is mounting evidence that some wildlife species do not necessarily restrict their movements to some obvious landscape element, such as a riparian corridor. For example, recent radio-tracking and tagging studies of Coast Range newts, California red-legged frogs, southwestern pond turtles, and two-striped garter snakes found that long-distance dispersal involved radial or perpendicular movements away from a water source with little regard to the orientation of the assumed riparian "movement corridor" (Hunt, 1993; Rathbun et al., 1992; Bulger et al., 2002; Trenham, 2002; Ramirez, 2002, 2003a, 2003b). Likewise, carnivores do not necessarily use riparian corridors as movement corridors, frequently moving overland in a straight line between two points when traversing large distances (Newmark, 1995; Beier, 1993, 1995; Noss, et al., 1996; Noss et al., no date). In general the following corridor functions can be utilized when evaluating impacts to wildlife movement corridors:

a. **Movement corridors** are physical connections that allow wildlife to move between patches of suitable habitat. Simberloff et al. (1992) and Beier and Loe (1992) correctly state that, for most species, we do not know what corridor traits (length, width, adjacent land use, etc.) are required for a corridor to be useful. But, as Beier and Loe (1992) also note, the critical features of a movement corridor may not be its physical traits but rather how well a particular piece of land fulfills several functions, including allowing dispersal, plant propagation, genetic interchange, and re-colonization following local extirpation.

b. **Dispersal corridors** are relatively narrow, linear landscape features embedded in a dissimilar matrix that link two or more areas of suitable habitat that would otherwise be fragmented and isolated from one another by rugged terrain, changes in vegetation, or human-altered environments. Corridors of habitat are essential to the local and regional population dynamics of a species because they provide physical links for genetic exchange and allow animals to access alternative territories as dictated by fluctuating population densities.

c. **Habitat linkages** are broader connections between two or more habitat areas. This term is commonly used as a synonym for a wildlife corridor (Meffe and Carroll, 1997). Habitat linkages may themselves serve as source areas for food, water, and cover, particularly for small- and medium-size animals.

d. **Travel routes** are usually landscape features, such as ridgelines, drainages, canyons, or riparian corridors within larger natural habitat areas that are used frequently by animals to facilitate movement and provide access to water, food, cover, den sites, or other necessary resources. A travel route is generally preferred by a species because it provides the least amount of topographic resistance in moving from one area to another yet still provides adequate food, water, or cover (Meffe and Carroll, 1997).

e. **Wildlife crossings** are small, narrow areas of limited extent that allow wildlife to bypass an obstacle or barrier. Crossings typically are manmade and include culverts, underpasses, drainage pipes, bridges, and tunnels to provide access past roads, highways, pipelines, or other physical obstacles. Wildlife crossings often represent "choke points" along a movement corridor because useable habitat is physically constricted at the crossing by human-induced changes to the surrounding areas (Meffe and Carroll, 1997).

5.3.1 Wildlife Movement in the Study Area

Aside from smaller focused studies, there has been no known widespread analysis conducted within this portion of the Angeles National Forest as a corridor for wildlife movement. Although sufficient evidence is lacking, the Littlerock Creek (and Santiago Creek) riparian corridor, and its associated uplands, is still

recognized as a vital pathway for wildlife moving from the higher elevations of the surrounding Angeles National Forest to desired lower elevation habitats. Several migratory songbirds utilize the riparian vegetation within the corridor for breeding, nesting, and foraging, or at a minimum, as transient rest sites during migration flights. Additionally, large, wide-ranging animals, such as black bear, mountain lion, and coyote have been documented within the Angeles National Forest, utilizing Littlerock Creek corridor and the Reservoir in search of prey opportunities, water resources, and cover.

Even considering smaller spatial scales or single habitat types, habitat fragmentation is no less important an issue. At these spatial scales, several studies have documented the negative effects on population structure, home range size, and genetic connectivity resulting from dirt roads, pipeline corridors, transmission line corridors, and other seemingly innocuous features traversing formerly undisturbed habitat (Mader, 1984; Swihart and Slade, 1984; Dunning et al., 1992).

No known anthropogenic barriers to dispersal for ground-dwelling wildlife and plants were observed within the Study Area.

6. Regulatory Environment

6.1 Federal Regulations/Plans

6.1.1 Federal Endangered Species Act

Federal Endangered Species Act (ESA) provisions protect federally listed threatened and endangered species and their habitats from unlawful take and ensure that federal actions do not jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat. Under the ESA, “take” is defined as “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any of the specifically enumerated conduct.” The U.S. Fish & Wildlife Service’s (USFWS) regulations define harm to mean “an act which actually kills or injures wildlife.” Such an act “may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering” (50 CFR § 17.3). Critical habitat is defined in Section 3(5)(A) of the ESA as “(i) the specific areas within the geographical area occupied by the species on which are found those physical or biological features (I) essential to the conservation of the species, and (II) which may require special management considerations or protection; and (ii) specific areas outside the geographical area occupied by the species upon a determination by the Secretary of Commerce or the Secretary of the Interior (Secretary) that such areas are essential for the conservation of the species.” The effects analyses for designated critical habitat must consider the role of the critical habitat in both the continued survival and the eventual recovery (i.e., the conservation) of the species in question, consistent with the recent Ninth Circuit judicial opinion, Gifford Pinchot Task Force v. USFWS. Activities that may result in “take” of individuals are regulated by the USFWS. The USFWS produced an updated list of candidate species December 6, 2007 (72 FR 69034). Candidate species are not afforded any legal protection under ESA; however, candidate species typically receive special attention from Federal and State agencies during the environmental review process.

6.1.2 Migratory Bird Treaty Act

The Migratory Bird Treaty Act of 1918 (16 U.S.C. 703-711) makes it unlawful to possess, buy, sell, purchase, barter or “take” any migratory bird listed in Title 50 of the Code of Federal Regulations Part 10. “Take” is defined as possession or destruction of migratory birds, their nests or eggs. Disturbances

that cause nest abandonment and/or loss of reproductive effort or the loss of habitats upon which these birds depend may be a violation of the Migratory Bird Treaty Act. The Federal Migratory Bird Treaty Act (MBTA) prohibits killing, possessing, or trading in migratory birds except in accordance with regulations prescribed by the Secretary. This act encompasses whole birds, parts of birds, and bird nests and eggs.

6.1.3 Bald and Golden Eagle Protection Act of 1940 (16 USC 668)

The Bald Eagle Protection Act of 1940 (16 U.S.C. 668, enacted by 54 Stat. 250) protects bald and golden eagles by prohibiting the taking, possession, and commerce of such birds and establishes civil penalties for violation of this Act. Take of bald and golden eagles is defined as follows: "disturb means to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior'' (72 FR 31132; 50 CFR 22.3).

The USFWS is the primary federal authority charged with the management of golden eagles in the United States. A permit for take of golden eagles, including take from disturbance such as loss of foraging habitat, may be required for this Project. USFWS guidance on the applicability of current Eagle Act statutes and mitigation is currently under review. On November 10, 2009 the USFWS implemented new rules (74 FR 46835) governing the "take" of golden and bald eagles. The new rules were released under the existing Bald and Golden Eagle Act which has been the primary regulation protection unlisted eagle populations since 1940. All activities that may disturb or incidentally take an eagle or its nest as a result of an otherwise legal activity must be permitted by the USFWS under this act. The definition of disturb (72 FR 31132) includes interfering with normal breeding, feeding, or sheltering behavior to the degree that it causes or is likely to cause decreased productivity or nest abandonment. If a permit is required, due to the current uncertainty on the status of golden eagle populations in western United States, it is expected permits would only be issued for safety emergencies or if conservation measures implemented in accordance with a permit would result in a reduction of ongoing take or a net take of zero.

6.1.4 Federally Regulated Habitats

Areas meeting the regulatory definition of "Waters of the U.S." (Jurisdictional Waters) are subject to the jurisdiction of the USACE under provisions of Section 404 of the Clean Water Act (1972) and Section 10 of the Rivers and Harbors Act (1899). These waters may include all waters used, or potentially used, for interstate commerce, including all waters subject to the ebb and flow of the tide, all interstate waters, all other waters (intrastate lakes, rivers, streams, mudflats, sandflats, playa lakes, natural ponds, etc.), all impoundments of waters otherwise defined as "Waters of the U.S.," tributaries of waters otherwise defined as "Waters of the U.S.," the territorial seas, and wetlands (termed Special Aquatic Sites) adjacent to "Waters of the U.S." (33 CFR, Part 328, Section 328.3). Wetlands on non-agricultural lands are identified using the Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory, 1987). The Study Area falls within the South Pacific Division of the USACE, and is under the jurisdiction of the Los Angeles District.

Construction activities within jurisdictional waters are regulated by the USACE. The placement of fill into such waters must comply with permit requirements of the USACE. No USACE permit would be effective in the absence of State water quality certification pursuant to Section 401 of the Clean Water Act. As a part of the permit process the USACE works directly with the USFWS to assess potential Project impacts on biological resources.

6.1.5 National Environmental Policy Act

The National Environmental Policy Act of 1969 (NEPA) requires all Federal agencies to examine the environmental impacts of their actions, incorporate environmental information, and utilize public participation in the planning and implementation of all actions. Federal agencies must integrate NEPA with other planning requirements and prepare appropriate NEPA documents to facilitate better environmental decision making. NEPA requires Federal agencies to review and comment on Federal agency environmental plans/documents when the agency has jurisdiction by law or special expertise with respect to any environmental impacts involved (42 U.S.C. 4321- 4327) (40 CFR 1500-1508).

6.1.6 Angeles National Forest Land Management Plan

The Land Management Plan for the Angeles National Forest (ANF) (USFS 2005; R5-MB-076) includes a strategy to successfully meet the goals of the vision for the National Forests with design criteria detailed to manage the ANF. Primarily, goals relate to the long-term sustainability of social, economic, and ecological objectives of the forest. Many of the management tools and goals described in the plan are linked to National Strategic Plans for National Forests. For example, Invasive Species Prevention and Control (Goal IS 1) is linked to Goal 2 (reduce the impacts from invasive species) objective 1. Extensive guidance is also given for a range of conservation measures that must be applied to avoid, minimize, or mitigate negative, long-term effects on threatened, endangered, proposed, candidate, or sensitive species and habitats. Guidance includes the protection of known raptor nests; protection of all spotted owl territories; allowance for movement along corridors; use of seasonal closures to protect special-status species; avoidance of collection of forest products; and, avoidance of activities that result in the removal, crushing, burying, burning, or mowing of host plants within critical and occupied habitat for special-status butterfly species, among others. The Management Plan also lists relevant laws, regulations, agreements, and other management direction outside of the scope of the proposed project (Appendix A of the Management Plan).

6.1.7 Fish and Wildlife Coordination Act (16 U.S.C. 661-666)

This act applies to any federal project where the waters of any stream or other body of water are impounded, diverted, deepened, or otherwise modified. Project proponents are required to consult with FWS and the appropriate state wildlife agency. These agencies prepare reports and recommendations that document project effects on wildlife and identify measures that may be adopted to prevent loss or damage to wildlife resources. The term “wildlife” includes both animals and plants. Provisions of the Act are implemented through the NEPA process and Section 404 permit process.

6.1.8 National Wild and Scenic Rivers Act (16 U.S.C. 1271-1287)

The National Wild and Scenic Rivers Act is administered by a variety of State and federal agencies. Designated river segments flowing through federally managed lands are administered by the land managing agency, such as U.S. Forest Service, BLM, and the National Park Service. River segments flowing through private lands are administered by the Resources Agency in conjunction with local government agencies. The Act prohibits federal agencies from activities that would adversely affect the values for which the river was designated. Littlerock Creek upstream of the project area is an eligible Wild and Scenic River.

6.1.9 National Wildlife Refuge System Administration Act of 1966, 42 U.S.C. 668dd, enacted by Pub. L. No. 91-135 as amended

The National Wildlife Refuge System Administration Act of 1966 provides guidelines and directives for the administration and management of all lands within the system, including "wildlife refuges, areas for the protection and conservation of fish and wildlife that are threatened with extinction, wildlife ranges, game ranges, wildlife management areas, or waterfowl production areas." The Secretary of the Interior is authorized to permit by regulations the use of any area within the system provided "such uses are compatible with the major purposes for which such areas were established."

6.1.10 Executive Order 11988 Floodplain Management (May 24, 1977)

This order directs all federal agencies to avoid the long-term and short-term adverse impacts associated with floodplain modification and to avoid direct or indirect support of floodplain development whenever there is a practicable alternative.

6.1.11 Executive Order 11990 Protection of Wetlands (May 24, 1977)

This order establishes a National policy to avoid adverse impacts on wetlands whenever there is a practicable alternative.

6.2 State Regulations

6.2.1 California Environmental Quality Act

The California Environmental Quality Act (CEQA) establishes State policy to prevent significant, avoidable damage to the environment by requiring changes in projects through the use of alternatives or mitigation measures. CEQA applies to actions directly undertaken, financed, or permitted by State lead agencies. Regulations for implementation are found in the State CEQA Guidelines published by the Resources Agency. These guidelines establish an overall process for the environmental evaluation of projects.

6.2.2 California Endangered Species Act

Provisions of California Endangered Species Act protect State-listed Threatened and Endangered species. The CDFG regulates activities that may result in "take" of individuals ("take" means "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill"). Habitat degradation or modification is not expressly included in the definition of "take" under the California Fish and Game Code. Additionally, the California Fish and Game Code contains lists of vertebrate species designated as "fully protected" (California Fish & Game Code §§ 3511 [birds], 4700 [mammals], 5050 [reptiles and amphibians], 5515 [fish]). Such species may not be taken or possessed.

In addition to Federal and State-listed species, the CDFG also has produced a list of Species of Special Concern to serve as a "watch list." Species on this list are of limited distribution or the extent of their habitats has been reduced substantially, such that threat to their populations may be imminent. Species of Special Concern may receive special attention during environmental review, but they do not have statutory protection.

Birds of prey are protected in California under the State Fish and Game Code. Section 3503.5 states it is "unlawful to take, possess, or destroy any birds of prey (in the order Falconiformes or Strigiformes) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this Code or any regulation adopted pursuant thereto." Construction disturbance during the breeding season could result in the incidental loss of fertile eggs or nestlings or otherwise lead to nest abandonment. Disturbance that causes nest abandonment and/or loss of reproductive effort is considered "take" by the CDFG. Under Sections 3503 and 3503.5 of the State Fish and Game Code, activities that would result in the taking, possessing, or destroying of any birds-of-prey, taking or possessing of any migratory nongame bird as designated in the Migratory Bird Treaty Act, or the taking, possessing, or needlessly destroying of the nest or eggs of any raptors or non-game birds protected by the Migratory Bird Treaty Act, or the taking of any non-game bird pursuant to Fish and Game Code Section 3800 are prohibited.

6.2.3 Native Plant Protection Act (Fish & Game Code 1900-1913)

California's Native Plant Protection Act (NPPA) requires all State agencies to utilize their authority to carry out programs to conserve endangered and rare native plants. Provisions of NPPA prohibit the taking of listed plants from the wild and require notification of the CDFG at least 10 days in advance of any change in land use. This allows CDFG to salvage listed plant species that would otherwise be destroyed. The Applicant is required to conduct botanical inventories and consult with CDFG during project planning to comply with the provisions of this act and sections of CEQA that apply to rare or endangered plants.

6.2.4 Section 3503 & 3503.5 of the Fish and Game Code

Under these sections of the Fish and Game Code, the Applicant is not allowed to conduct activities that would result in the taking, possessing, or destroying of any birds-of-prey, taking or possessing of any migratory non-game bird as designated in the Migratory Bird Treaty Act, or the taking, possessing, or needlessly destroying of the nest or eggs of any raptors or non-game birds protected by the Migratory Bird Treaty Act, or the taking of any non-game bird pursuant to Fish and Game Code Section 3800.

6.2.5 Porter-Cologne Water Quality Control Act

Regional water quality control boards regulate the "discharge of waste" to "waters of the State." All projects proposing to discharge waste that could affect waters of the State must file a waste discharge report with the appropriate regional board. The board responds to the report by issuing waste discharge requirements (WDR) or by waiving WDRs for that project discharge. Both of the terms "discharge of waste" and "waters of the State" are broadly defined such that discharges of waste include fill, any material resulting from human activity, or any other "discharge." Isolated wetlands within California, which are no longer considered "waters of the United States" as defined by Section 404 of the CWA, are addressed under the Porter-Cologne Act.

6.2.6 State-Regulated Habitats

The State Water Resources Control Board is the State agency (together with the Regional Water Quality Control Boards [RWQCB]) charged with implementing water quality certification in California. The Project falls under the jurisdiction of the Los Angeles (Region 4) RWQCB.

The CDFG extends the definition of stream to include "intermittent and ephemeral streams, rivers, creeks, dry washes, sloughs, blue-line streams (USGS defined), and watercourses with subsurface flows.

Canals, aqueducts, irrigation ditches, and other means of water conveyance can also be considered streams if they support aquatic life, riparian vegetation, or stream-dependent terrestrial wildlife" (CDFG, 1994).

Activities that result in the diversion or obstruction of the natural flow of a stream; or which substantially change its bed, channel, or bank, or which utilize any materials (including vegetation) from the streambed, may require that the project applicant enter into a Streambed Alteration Agreement with the CDFG.

6.2.7 California Wild and Scenic Rivers Act (P.R.C. 5093.50 et seq.)

This act preserves certain designated rivers in their free-flowing state. These rivers must possess extraordinary scenic, recreational, fishery, or wildlife values. The Resources Agency is responsible for coordinating activities of State agencies that may affect these designated rivers.

6.3 Local Regulations/Plans

6.3.1 Los Angeles County Draft Preliminary General Plan

The Los Angeles County Draft Preliminary General Plan (2007) is an update of efforts begun in 1970 to formalize a development plan (adopted in 1980). It is the outline for growth and development in the unincorporated areas of Los Angeles County within the next 20 years that guides land use decisions. One of the 10 community priorities described in the plan is the protection of the natural environment, natural resources, and open spaces (Community Priority # 9, Goal C/OS-5). The Significant Ecological Area (SEA) designation provides an additional level of environmental review; any development within SEAs (described below) require a SEA-Conditional Use Permit, unless exempt. SEAs and other Special Management Areas include open space areas, hillside management areas, agricultural opportunity areas, and National Forests. Within the National Forests, development is not encouraged because "development requires the removal of forest vegetation around structures for fire protection, erosion from hillside development may occur, and the mountainous terrain subjects structures to potential landslides due to seismic activity." In addition, the Land Use Element of the General Plan requires development and infrastructure projects to preserve, to the best extent possible, major drainage features, riparian vegetation, rock outcroppings, and stands of other native trees. Productive farmland is also protected within Los Angeles County for local food production, open space, public health, and the local economy (Goal C/OS-6). In addition, the Los Angeles County Zoning Code references, in detail, policies described in the General Plan, such as the Oak Tree and Brushing Ordinances.

6.4 Other Applicable Regulations, Plans, and Standards

6.4.1 California Native Plant Society (CNPS) Rare Plant Program

The mission of the CNPS Rare Plant Program is to develop current, accurate information on the distribution, ecology, and conservation status of California's rare and endangered plants, and to use this information to promote science-based plant conservation in California. Once a species has been identified as being of potential conservation concern it is put through an extensive review process. Once a species has gone through the review process, information on all aspects of the species (listing status, habitat, distribution, threats, etc.) are entered into the online CNPS Inventory and given a California Rare Plant Rank (CRPR). In 2011 the CNPS officially changed the name "CNPS List" to "CRPR." The

Program currently recognizes more than 1,600 plant taxa (species, subspecies and varieties) as rare or endangered in California.

Vascular plants listed as rare or endangered by the CNPS, but which might not have designated status under State endangered species legislation, are defined by the following CRPR:

- CRPR 1A - Plants considered by the CNPS to be extinct in California
- CRPR 1B - Plants rare, threatened, or endangered in California and elsewhere
- CRPR 2 - Plants rare, threatened, or endangered in California, but more numerous elsewhere
- CRPR 3 - Plants about which we need more information – a review list
- CRPR 4 - Plants of limited distribution – a watch list

In addition to the CRPR designations above, the CNPS adds a Threat Rank as an extension added onto the CRPR and designates the level of endangerment by a 1 to 3 ranking, with 1 being the most endangered and 3 being the least endangered. The Threat Ranks are described as follows:

- 0.1 – Seriously threatened in California (high degree/immediacy of threat)
- 0.2 – Fairly threatened in California (moderate degree/immediacy of threat)
- 0.3 – Not very threatened in California (low degree/immediacy of threats or no current threats known.

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Appendix A Site Photographs

Photo 1 - View from the Reservoir looking north towards the dam structure.

Photo 2 - View of a potential raptor nest along the vertical rock face of the northeastern perimeter of the Reservoir.

Photo 3 – View looking west from within the Reservoir at the existing docks with the restaurant and residential structures in the background.

Photo 4 – View of a pool adjacent to and west of Cheseboro Road, near the boat launch in June 2001

Photo 5 – View looking east from the uplands immediately west of Fishermen's Point.

Photo 6 – Western toad observed during arroyo toad surveys on June 1, 2011.

Photo 7 - View from atop the dam structure looking northeast at the Littlerock Creek.

Photo 8 - View of a birds nest constructed of fishing line within a tree along the edge of the cove just north of Fisherman's Point on the west side of the Reservoir.

Photo 9 - View south at the Reservoir from the west side of the Reservoir just north of Fisherman's Point.

Photo 10 - View looking north from the boat docks at the Reservoir.

Photo 11 - View looking at inundated Fremont cottonwood forest on the west side of the Reservoir just south of the boat docks.

Photo 12 - View looking southeast at the Reservoir from Rocky Point.

Photo 13 - View of the active Littlerock Creek channel downstream of the dam structure.

Appendix B – Invasive Weed Descriptions and Control Methods

Noxious weeds present a severe threat to natural habitats. When noxious weeds become established in an area, they can cause a permanent or long-lasting change in the environment by increasing vegetative cover, thereby creating a dense layer that prevents native vegetation from germinating, and essentially halting normal successional processes that would typically allow an area to recover from disturbance. Weed populations can also alter edaphic and hydrological conditions and structure through nitrogen fixation (as in Spanish broom, *Spartium junceum*) or draining of the water table (as in giant reed [*Arundo donax*]). Monocultures of noxious weeds typically create an unfavorable environment for wildlife. Consequently, mutualistic species necessary for native plant life cycles, such as seed dispersers, fossorial mammals, or pollinators, can be lost from the area. Heavy infestations can also significantly reduce the recreational or aesthetic value of open space. This being said, weed control efforts are costly, labor intensive, often require several years of follow-up monitoring and a combination of control methods to completely eradicate populations, and in many cases pose significant risk to native plants that may occur within the weed control area. Even still, the ecological costs and risks associated with not managing noxious weed populations are so great that these exceed risks posed by most control methods (DiTomaso, 1997).

Weed species occurring in the Study Area and along the haul routes are ranked by three threat levels as defined by Cal-IPC (Cal-IPC, 2012):

- **High** – These species have severe ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal and establishment. Most are widely distributed ecologically.
- **Moderate** – These species have substantial and apparent (but generally not severe) ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal, though establishment is generally dependent upon ecological disturbance. Ecological amplitude and distribution may range from limited to widespread.
- **Limited** – These species are invasive but their ecological impacts are minor on a statewide level or there was not enough information to justify a higher score. Their reproductive biology and other attributes result in low to moderate rates of invasiveness. Ecological amplitude and distribution are generally limited, but these species may be locally persistent and problematic.
- **Evaluated Not Listed** – Sufficient information is lacking to assign a rating or the available information indicates that the species does not have significant impacts at the present time

Species Accounts

High Risk Invasive Plant Species

Tamarisk (*Tamarix sp.*)

Cal-IPC Pest Rating: High.

Present at the project site: Yes.

This species occurs in a large stand on the east side of the southern extent of the Reservoir. Current levels of this species are low however the salt cedar can quickly colonize open stream terraces after scouring events provided a source population is present.

Description:

Tamarisk is a type of woody shrub or small tree in the tamarisk family (Tamaricaceae) that invades desert washes and arid riparian areas throughout the western U.S. The Tehachapi Mountains are known to support at least four related Eurasian species with the common names Chinese tamarisk (T. chinensi), French tamarisk (T.gallica), smallflower tamarisk (T. parviflora), and saltcedar (T. ramosissima). Tamarisk reproduces by seed and by root sprouting or even disconnected stem fragments. Seedlings have very low survivorship because the deep root system that would protect them from desiccation or being washed away in floods is undeveloped (DiTomaso and Healy, 2007). Once this root system forms, however, tamarisk trees are associated with several negative effects, including draining of the water table, loss of diversity, and reduced habitat quality for many bird and wildlife species. Seed germination is not inhibited in saline soils, and the plants can tolerate saline conditions quite well. The plants can extract groundwater efficiently from deep in the soil profile and sequester the resulting salts in their leaf tissues. When these tissues decompose on the soil surface, they increase soil salinity, making the site less suitable for native species. Once established, tamarisk can spread quickly through vegetative means.

Control:

Prevention: Sites with intact native riparian vegetation are resistant to tamarisk invasion because the seedlings are such poor competitors. Minimizing impacts in riparian and desert wash habitats and restoring any necessary impacts with native vegetation will thus reduce the potential for tamarisk invasion into new areas.

Mechanical: Trees cut from the soil surface re-sprout from the root system, so aboveground tree removal should be followed with herbicidal methods as outlined below. Otherwise, the root system will need to be manually removed, which may cause more soil disturbance than necessary and leave the site open to new invasions.

Biocontrol: In 2002, the saltcedar beetle (*Diorhabda elongata*) was released in efforts to control tamarisk, but it is not yet known how effective the species will be in control of these species (DiTomaso and Healy 2007).

Fire Management: Burning is not recommended because plants re-sprout readily following fire.

Herbicide: Cut stumps should be painted with an herbicide preparation specifically approved for use in aquatic and wetland ecosystems in California. Care should be taken to use a strong enough application to kill the root crown bud. Repeat applications are required the following year when seedlings germinate in the spring. Young plants are easily scraped with a Hula Hoe or pulled by hand.

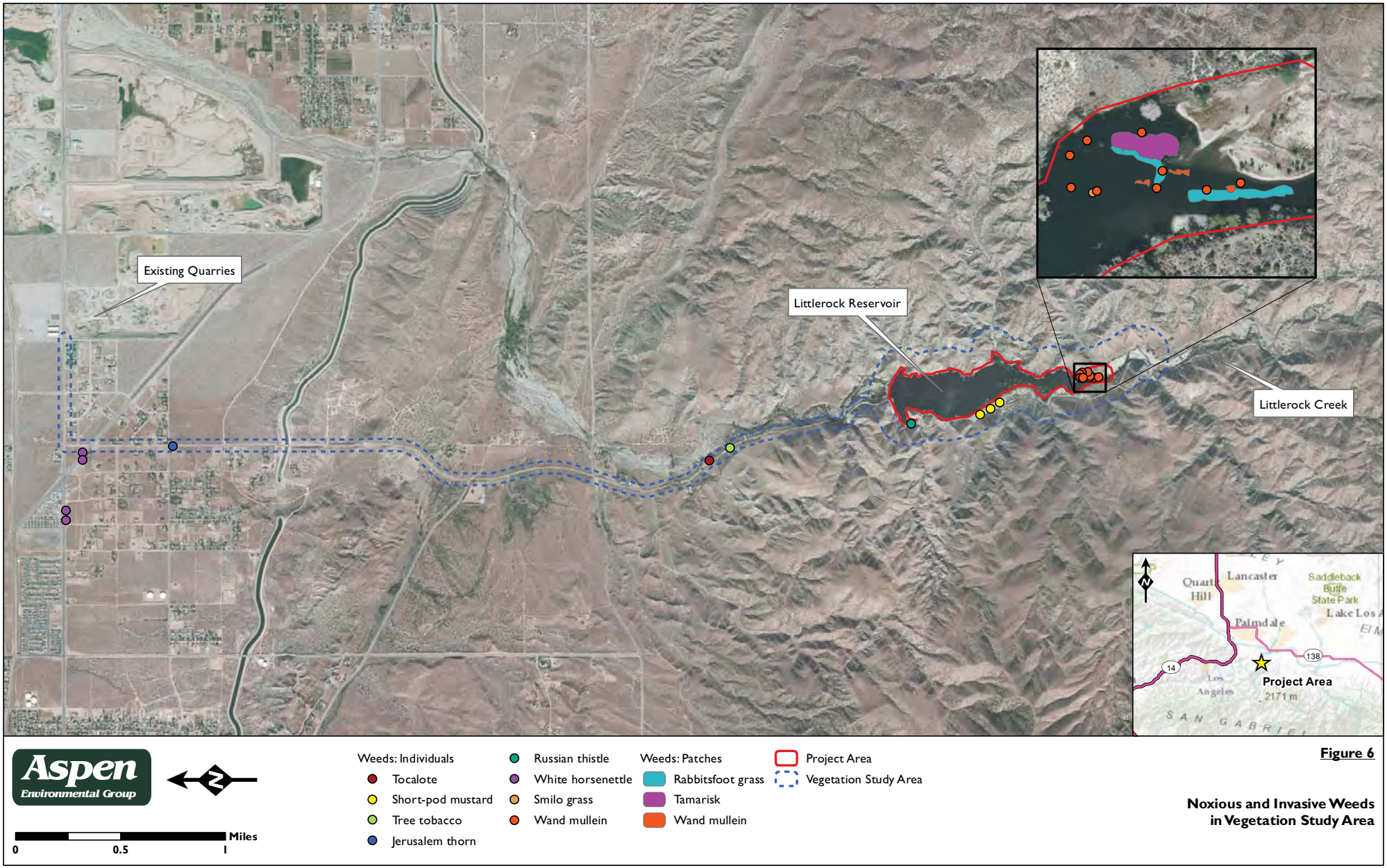


Figure 6

Noxious and Invasive Weeds in Vegetation Study Area

Moderate Risk Invasive Plant Species

Tocalote (*Centaurea melitensis*)

Cal-IPC Pest Rating: Moderate.

Present at the project site: Yes.

This species occurs in a single location along Cheseboro Road downstream of the dam structure.

Description:

Tocalote, also known as Maltese star-thistle, is an annual plant in the sunflower family (Asteraceae) that is native to southern Europe. It is widely distributed throughout California, with larger, more problematic populations being found in central-western and southwestern regions of the state within grassland and oak woodland communities. Dense infestations of tocalote threaten natural ecosystems by displacing native plants and animals. This species has an earlier phenology (annual timing of life stages) than the closely related, more widespread yellow star-thistle (C.solstitialis), and generally flowers from April to June (Bossard et al., 2000). Tocalote also is similar in appearance to yellow star-thistle. As it flowers and senesces earlier in the year than yellow star-thistle, control treatments should be timed appropriately. Otherwise, mechanical and herbicidal control techniques developed and used for yellow star-thistle are also effective for tocalote infestations (DiTomaso and Healy 2007).

Control:

Prevention: When working in areas infested with tocalote, equipment (including undercarriages) should be carefully cleaned before moving to a non-infested area. The collection and export of fill soils, pasture hay, and crops from infested areas should be avoided or minimized to the maximum extent practicable.

Mechanical: Mowing can provide effective treatment of infested areas if mowed at the correct time, which is immediately after the earliest 2 to 5% of plants have begun to produce flower heads, usually in April or early May (DiTomaso and Healy 2007). Mowing too early may cause plants to become bushier and produce more flower heads. Treatments should continue for at least 2 to 3 years, after which spot eradication may be required indefinitely.

Biocontrol: Responsible rangeland management, where range is grazed by sheep, goats, or cattle to a moderate degree can help prevent establishment or spread of populations in grasslands. Infested areas can be treated by high-intensity grazing between the period when the plant bolts (April) to just before the plant produces spiny seed heads in May-June. Biocontrol insects used to control yellow star-thistle may also feed on tocalote flower heads, but are more attracted to, and better at damaging yellow star-thistle.

Fire Management: Prescribed burning of tocalote can reduce populations if timed correctly, but to avoid heavy damage to native vegetation, burns should be timed to occur after other annual plants have dried but before tocalote seeds are produced. Due to its late spring-early summer flowering period, burning may be difficult to implement for tocalote.

Herbicide: Herbicide treatments by foliar spray or wick application are generally used to control or reduce spot infestations, or as follow-up to more intensive mechanical, grazing, or fire management-based treatments.

Shortpod Mustard (Hirschfeldia incana)

Cal-IPC Pest Rating: Moderate.

Present at the project site: Yes.

Summer mustard is distributed at several locations along the main access road adjacent to the Reservoir.

Description:

Shortpod mustard (*Hirschfeldia incana*) is an annual or short-lived perennial forb in the mustard family (Brassicaceae) that is native to Eurasia. It matures quickly in the spring and produces a large amount of biomass in infested areas, potentially outcompeting native species through shading or an early reduction in soil moisture. Reproduction occurs by seeds, which are sticky when wet and are thus easily transferred by equipment, vehicles, or people working or traveling through infested areas when moisture is present (Brooks 2004). Similar to other invasive mustard species, shortpod mustard can build up a large, long-lived seed bank at infestation sites. This species often invades areas dominated by exotic annual grasses and can contribute to type conversion of woodlands and scrublands into annual grasslands by adding to the early season fuel load of an area, as this can increase the amount of fuel available for fires. Fire frequency and intensity can increase such that shrub and tree species can no longer establish or survive. While the species is generally considered a successional plant, and thus might be expected to decrease in density or extent with increasing time since disturbance, the typically large seed bank in combination with repeated disturbance in riparian areas or associated with heavy grazing can favor the establishment of long-term infestations (Brooks 2004).

Black mustard (*Brassica nigra*) is very similar in appearance to shortpod mustard, and the two species are often difficult to tell apart in the field. The ecological effects of black mustard invasion are virtually identical to shortpod mustard in how it impacts ecosystems, but black mustard tends to be taller, may regularly produce sdenser infestations than shortpod mustard, and may be more widespread. It can readily invade chaparral and sensitive coastal sage scrub habitats, contributing to increased fire frequency and intensity leading to type conversion of these habitats into annual grasslands. Deeply buried black mustard seeds may remain viable for as much as 50 years under field conditions (DiTomaso and Healy 2007).

Control:

Prevention: Disturbance and fire favor establishment of these mustard species. Additionally, shortpod mustard may be more likely to invade areas already dominated by annual grasses (Brooks 2004). Therefore, protection and sound management of remaining bunchgrass grasslands and quick eradication of initial infestations in scrub- or woodlands is recommended.

Mechanical: Black and shortpod mustard are best controlled mechanically by hand-pulling of plants each year after they have bolted but before they produce seed. The plants have a fairly weak root system, and as annuals, do not re-sprout from root fragments left in the soil. Over time, this can deplete the seed banks and allow native or grassy vegetation to dominate previously infested areas. Mowing, particularly when timing is poor, can produce plants that branch heavily from the base, and could produce even more seed than undisturbed plants.

Fire Management: Burning is not recommended for shortpod mustard control as it can damage co-occurring native vegetation due to heavy fuel loads, as well as the fact that shortpod and other

exotic mustard species appear to be somewhat fire-adapted and can increase in density following fires.

Herbicide: Because early season mustards such as these emerge early in the growing season, often before native vegetation has broken dormancy, it is thought that early post-emergence herbicidal treatments may be effective for members of this group (Bossard et al. 2000), but more research is needed to develop a standardized, optimized methodology for control of these species.

Tree Tobacco (*Nicotiana glauca*)

Cal-IPC Pest Rating: Moderate.

Present at the project site: Yes.

This species occurs in a single location along Cheseboro Road downstream of the dam structure.

Description:

Tree tobacco is a shrub or tree in the nightshade family (*Solanaceae*), native to South America. Leaves and other structures of this species contain the highly toxic alkaloid anabasine, which can cause fetal deformities or even death in livestock that graze the plants. Tree tobacco occurs on sandy or gravelly soils, usually near streams, lakes, or ditches, although the plants are extremely drought tolerant and can withstand long periods of hot, dry weather (Guertin and Halvorson 2003). Tree tobacco plants are short-lived and the species does not appear to produce dense infestations in California (Cal-IPC, 2012), although the species is spreading throughout lower elevations of Arizona and California. While toxic to livestock, the plant is beneficial for native species such as hummingbirds and hawkmoths. Little is known about specifics of reproduction in this species, and optimal control methods are still being developed.

Control:

Prevention: In Australia, it has been observed that stem densities are significantly reduced in non-grazed plots, possibly due to the competition from native wetland vegetation (Florentine and Westbrooke 2005). As wetland areas are often grazed heavily by livestock in arid areas, protection of native emergent wetland vegetation by excluding livestock from sensitive areas may prevent seedling establishment or spread of existing infestations.

Mechanical: No mechanical methods of control other than hand-pulling are known, although cutting before herbicide application is an accepted control method for many weedy, woody species.

Herbicide: Optimal methods for control are still being developed, but glyphosate applied as foliar spray, drizzle, or as a treatment to cut-stumps all showed high levels of initial success when applied in fall (Oneto et al. 2004), although later regrowth was not assessed and other timing regimes were not compared in the 2004 publication.

Appendix C – Wildlife Species Observed in the Study Area

Wildlife Observed in the Study Area During 2007 – 2012 Surveys	
Common Name	Latin Name
REPTILES	
Southwestern pond turtle	*Actinemys marmorata*
California legless lizard	*Anniella pulchra*
Coastal whiptail	*Aspidoscelis tigris stejnegeri*
Red racer	*Coluber flagellum piceus*
Southern pacific rattlesnake	*Crotalus helleri*
San Diego nightsnake	*Hypsiglena ochrorhyncha klauberi*
California kingsnake	*Lampropeltis getula californiae*
Coast horned lizard	*Phrynosoma blainvillii*
Gopher snake	*Pituophis catenifer*
San Diego gopher snake	*Pituophis catenifer annectens*
Southwestern threadsnake	*Rena humilis humilis*
Long-nosed Snake	*Rhinocheilus lecontei*
Patch-nosed snake	*Salvadora hexalepis*
Western fence lizard	*Sceloporus occidentalis*
Two-striped garter snake	*Thamnophis hammondi*
Red-eared slider	*Trachemys scripta elegans*
California lyresnake	*Trimorphodon lyrophanes*
Western/California side-blotched lizard	*Uta stansburiana elegans*
FISH	
Bluegill	*Lepomis macrochiru*
Largemouth bass	*Micropterus salmoides*
AMPHIBIANS	
Western/California toad	*Anaxyrus boreas halophilus*
Arroyo toad	*Anaxyrus californicus*
California chorus frog	*Pseudacris cadaverina*
Baja California chorus frog	*Pseudacris hypochondriaca*
Bullfrog*	*Lithobates catesbeiana*
MAMMALS	
Pallid bat	*Antrozous pallidus*
Coyote	*Canis latrans*
Big Brown Bat	*Eptesicus fuscus*
Greater bonneted bat	*Eumops perotis*
Black-tailed jackrabbit	*Lepus californicus*
Bobcat	*Lynx rufus*
California vole	*Microtus californicus*
Long-tailed weasel	*Mustela frenata*
California myotis	*Myotis californicus*
Western small-footed myotis	*Myotis ciliolabrum*
Yuma myotis	*Myotis yumanensis*
Desert shrew	*Notiosorex crawfordi*
Mule deer	*Odocoileus hemionus*
California ground squirrel	*Otospermophilus beecheyi*
Canyon bat	*Parastrellus hesperus*

Wildlife Observed in the Study Area During 2007 – 2012 Surveys	
Common Name	Latin Name
Deer mouse	*Peromyscus maniculatus*
Mountain lion	*Puma concolor*
Raccoon	*Procyon lotor*
Desert cottontail	*Sylvilagus audubonii*
Mexican free-tailed bat	*Tadarida brasiliensis*
Botta's pocket gopher	*Thomomys bottae*
Gray fox	*Urocyon cinereoargenteus*
BIRDS	
Sharp-shinned hawk	*Accipiter striatus*
Spotted sandpiper	*Actitis macularia*
White-throated swift	*Aeronautes saxatalis*
Red-winged blackbird	*Agelaius phoeniceus*
So. Cal. rufous-crowned sparrow	*Aimophila ruficeps canescens*
Sage sparrow	*Amphispiza belli*
American wigeon	*Anas americana*
Mallard	*Anas platyrhynchos*
Gadwall	*Anas strepera*
Western scrub-jay	*Aphelocoma californica*
Black-chinned hummingbird	*Archilochus alexandri*
Great blue heron	*Ardea herodias*
Oak titmouse	*Baeolophus inornatus*
Great horned owl	*Bubo virginianus*
Bufflehead	*Bucephala albeola*
Red-tailed hawk	*Buteo jamaicenis*
Green heron	*Butoroides virescens*
California quail	*Callipepla californica*
Anna's hummingbird	*Calypte anna*
Costa's hummingbird	*Calypte costae*
Cactus wren	*Campylorhynchus brunneicapillus*
Wilson's warbler	*Cardellina pusilla*
House finch	*Carpodacus mexicanus*
Turkey vulture	*Cathartes aura*
Vaux's swift	*Chaetura vauxi*
Wrentit	*Chamaea fasciata*
Killdeer	*Charidrius vociferus*
Lark sparrow	*Chondestes grammacus*
Lesser nighthawk	*Chordeiles acutipennis*
Western wood-pewee	*Contopus sordidulus*
Common raven	*Corvus corax*
Western flycatcher	*Empidonax difficilis*
Willow flycatcher	*Empidonax traillii brewsteri*
Brewer's blackbird	*Euphagus cyanocephalus*
American kestrel	*Falco sparverius*
American coot	*Fulica americana*

Wildlife Observed in the Study Area During 2007 – 2012 Surveys	
Common Name	Latin Name
Common yellowthroat	*Geothlypis trichas*
Bald eagle	*Haliaeetus leucocephalus*
Barn swallow	*Hirundo rustica*
Bullock's oriole	*Icterus bullockii*
Song sparrow	*Melospiza melodia*
California towhee	*Melozone crissalis*
Brown-headed cowbird	*Molothrus ater*
Ash-throated flycatcher	*Myiarchus cinerascens*
Black-crowned night-heron	*Nycticorax nycticorax*
Mountain quail	*Oreortyx pictus*
Orange-crowned warbler	*Oreothlypis celata*
Nashville warbler	*Oreothlypis ruficapilla*
Western screech-owl	*Otus kennicottii*
Ruddy duck	*Oxyura jamaicensis*
Lazuli bunting	*Passerina amoena*
Cliff swallow	*Petrochelidon pyrrhonota*
Phainopepla	*Phainopepla nitens*
Black-headed grosbeak	*Pheucticus melanocephalus*
Double-crested cormorant	*Phlacrocorax auritus*
Nuttall's woodpecker	*Picoides nuttallii*
Downy woodpecker	*Picoides pubescens*
Spotted towhee	*Pipilo maculatus*
Western tanager	*Piranga ludoviciana*
Summer tanager	*Piranga rubra cooperi*
Eared grebe	*Podiceps nigricollis*
Pied-billed grebe	*Podilymbus podiceps*
Bushtit	*Psaltriparus minimus*
Great-tailed grackle	*Quiscalus mexicanus*
Rock wren	*Salpinctes obsoletus*
Black phoebe	*Sayornis nigricans*
Rufous hummingbird	*Selasphorus rufus*
Yellow-rumped warbler	*Setophaga coronata*
Yellow warbler	*Setophaga petechia*
Lawrence's goldfinch	*Spinus lawrencei*
Lesser goldfinch	*Spinus psaltria*
Northern rough-winged swallow	*Stelgidopteryx serripennis*
Caspian tern	*Sterna caspia*
European starling	*Sturnus vulgaris*
Tree swallow	*Tachycineta bicolor*
Violet-green swallow	*Tachycineta thalassina*
Bewick's wren	*Thryomanes bewickii*
California thrasher	*Toxostoma redivivum*
Solitary sandpiper	*Tringa solitaria*
House wren	*Troglodytes aedon*

Wildlife Observed in the Study Area During 2007 – 2012 Surveys	
Common Name	Latin Name
Western kingbird	*Tyrranus verticalis*
Barn owl	*Tyto alba*
Least Bell's vireo	*Vireo bellii pusillus*
Warbling vireo	*Vireo gilvus*
Mourning dove	*Zenaida macroura*

Appendix D – Plant and Wildlife Descriptions

Species Accounts

PLANTS WITH THE POTENTIAL TO OCCUR

California androsace (*Androsace elongata ssp. acuta*)

Status: California androsace has a CRPR 4.2, and is a U.S. Forest Service Watch List species. This species is not federally or State listed as threatened or endangered.

General Distribution: This species occurs from Oregon, throughout California, and into Baja California at elevations of 492 to 3,936 ft.

Distribution in the Study Area: There are several populations on the foothill desert slopes of the San Gabriel and Liebre Mountains. Suitable habitat is present.

Habitat and Habitat Associations: California androsace occurs in coastal scrub, chaparral, cismontane woodland, meadows and seeps, and valley and foothill grassland habitats.

Natural History: California androsace is an annual herb that is highly localized and often overlooked; many occurrences have been extirpated and it is very rare in Southern California. It flowers from March through June.

Threats: California androsace is possibly threatened by grazing, trampling, non-native plants, alteration of fire regimes, and recreational activities. It may also be threatened by wind energy development.

Slender silver moss (*Anomobryum julaceum*)

Status: Slender silver moss has a CRPR 2.2 This species is not federally or State listed as threatened or endangered.

General Distribution: This species occurs infrequently in California, but is abundant in Oregon. It can be found on road cuts at elevations of 300 to 3,000 feet.

Distribution in the Study Area: This species is represented in southern California from a single collection made from the high elevations of the San Gabriel Mountains. Suitable habitat is present in the project area.

Habitat and Habitat Associations: Slender silver moss grows on mesic soils and rocks along creeks in broadleaf and coniferous forests.

Natural History: Slender silver moss is a non-vascular moss.

Threats: This species may be threatened by human activities such as vehicle use, since it is often found along road cuts.

San Gabriel manzanita (*Arctostaphylos gabrielensis*)

Status: San Gabriel manzanita has a CRPR 1B.2, FSS This species is not federally or State listed as threatened or endangered.

General Distribution: This species is endemic to the San Gabriel Mountains near Mill Creek Summit, with an elevation range of 1900 to 5000 feet.

Distribution in the Study Area: This species is known from the upper watershed but the project area is below the elevation range for this species. It has a low potential to disperse into the project area from the upper watershed.

Habitat and Habitat Associations: San Gabriel manzanita is a large perennial evergreen shrub that grows on rocky chaparral habitats.

Natural History: San Gabriel manzanita blooms in March.

Threats: The primary threat to this species is development.

Palmer's mariposa lily (*Calochortus palmeri var. palmeri*)

Status: Palmer's mariposa lily has a CRPR 1B.2, and is designated a U.S. Forest Service Sensitive species. This species is not federally or State listed as threatened or endangered.

General Distribution: This species is endemic to California, and has been found in Kern, Los Angeles, Riverside, Santa Barbara, San Bernardino, San Luis Obispo, and Ventura counties. It occurs at elevations of 3,281-7,841 ft.

Distribution in the Study Area: This species was not observed during recent surveys but is known from the general area.

Habitat and Habitat Associations: Palmer's mariposa lily is found in wet meadows and seeps in lower montane coniferous forest and chaparral habitats.

Natural History: Palmer's mariposa lily is a perennial bulb that blooms from May through July.

Threats: This species is threatened by development, grazing, non-native plants, recreational activities and vehicles (CNPS, 2012).

Plummer's mariposa lily (*Calochortus plummerae*)

Status: Plummers's mariposa lily is a CRPR List 1B.2 species and is considered a U.S. Forest Service Sensitive species. This species is not federally or State listed as threatened or endangered.

General Distribution: Plummer's mariposa lily is known to occur in Riverside, San Bernardino, Orange, Los Angeles, and Ventura counties at elevations between 100 and 1,700 meters AMSL.

Distribution in the Study Area: This species was not documented within the Vegetation Study Area. The project is just outside of the known geographic range for this species but suitable habitat is present within the Vegetation Study Area.

Habitat and Habitat Associations: This bulbiferous herb is typically found in chaparral, coastal scrub, cismontane woodland, lower montane coniferous forest, and grassland, often on granitic and/or rocky soils, and blooms between May and July (CNPS, 2012).

Natural History: Perennial bulbs, including Plummer's mariposa lily, may persist below ground without producing flowers or even leaves during years of poor rainfall or other environmental causes. This species is identified by its (usually) toothed petal margins; petals covered with long yellow hairs inside; and its round, slightly depressed nectar gland at the base of each petal surrounded by hairs but without hairs on the nectary surface itself (Hickman, 1993). Seed dispersal for Calochortus is limited, with no obvious adaptations for wind or animal dispersal; fruits are capsular and borne close to the ground, with relatively heavy, passively dispersed seeds that lack fleshiness, sticktights, or (except in one species) wings (Patterson and Givnish, 2003). Typically, Calochortus flowers are generalists in terms of their pollinators, although bees have been observed to be the primary pollinator in some Calochortus species, such as Lyall's mariposa lily (C. lyallii) (Dilley *et al.*, 2000; Miller, 2000).

Threats: In addition to the direct loss of individuals, Plummer's mariposa lily is vulnerable to several effects related to urbanization. Non-native plant species, which compete for light, water, and nutrients, have been found to invade native vegetation communities and become established after repeated burnings, changes in surface and subsurface hydrologic conditions (changes in irrigation and runoff), use of chemical pollutants, clearing of vegetation, trampling, or following periods of drought and overgrazing, all of which are possible side effects of nearby human habitation. The successful invasion of exotic plant species may alter habitats and displace native species over time, leading to extirpation of natives such as the Plummer's mariposa lily.

Alkali mariposa lily (*Calochortus striatus*)

Status: Alkali mariposa lily has a CRPR 1B.2 and is designated a U.S. Forest Service Sensitive species. This species is not federally or State listed as threatened or endangered.

General Distribution: The geographic range of Alkali mariposa lily includes the southern Sierra Nevada; the western, central and southern Mojave Desert; the north base of the San Bernardino Mountains; the southern San Joaquin Valley; and disjunctly in southern Nevada. It occurs at elevations between 230ft and 5,232 feet.

Distribution in the Study Area: The species is known from alkaline soils in the Mojave Desert. Poor quality habitat was observed at the northern end of the haul roads but it is not expected in the project area.

Habitat and Habitat Associations: Alkali mariposa lily occurs in seasonally moist alkaline areas of arid lands (alkali meadows, ephemeral washes, vernally moist depressions, seeps; Fiedler 1985) in chaparral, chenopod scrub, and Mojavean desert scrub of southern California and southern Nevada.

Natural History: It is a perennial growing from a bulb; it has two or three slender, grass-like leaves that wither by the time the plant flowers (April through June). The flowers about 20-30 mm long, white to lavender with conspicuous purple veins. In dry years, the bulbs may remain dormant and no plants may be visible above-ground. It is threatened by the lowering of water tables, urbanization, trampling or grazing by cattle, and perhaps competition with native and non-native grasses (Greene and Sanders no date).

Threats: Alkali mariposa lilies face threats from urbanization, grazing, trampling, road construction, hydrological alterations, and water diversions that result in the lowering of the water table (CNPS 2012).

Peirson's morning-glory (*Calystegia peirsonii*)

Status: Peirson's morning glory has a CRPR 4.2. This species is not federally or State listed as threatened or endangered.

General Distribution: It is a rhizomatous perennial herb occurring in the San Gabriel and Liebre Mountains and the Antelope Valley of Los Angeles County (Allan et al. 1995), from about 100 ft. to 5000 feet elevation.

Distribution in the Study Area: This species was not observed during recent surveys but is known from the general area.

Habitat and Habitat Associations: It is a perennial vine found climbing over shrubs in coastal sage scrub, chaparral, and woodlands, often in the first few years following wildfire. It was known only from a few collections prior to 1970, but it is fairly common in the Newhall-Mint Canyon region (Boyd 1999).

Natural History: This perennial vine blooms from April to June.

Threats: Primary threats to this species include grazing and development (CNPS 2012).

Pygmy poppy (*Canbya candida*)

Status: Pygmy poppy has a CRPR 4.2 and is designated a U.S. Forest Service Sensitive species. This species is not federally or State listed as threatened or endangered.

General Distribution: Pygmy poppy is found in the foothills of the south-eastern Sierra Nevada range, the San Gabriel and San Bernardino Mountains, and in the Antelope Valley. It occurs at elevations of 1,968-4,790 feet.

Distribution in the Study Area: Suitable habitat is preset within the Vegetation Study Area and numerous historic records are known from the area.

Habitat and Habitat Associations: Pygmy poppy occurs in Joshua tree woodland, Mojavean desert scrub, or pinyon and juniper woodland habitats with gravelly, granitic, or sandy soils.

Natural History: Pygmy poppy is an annual herb of desert shrublands, only one or a few centimeters wide and tall. It may flower between March and June, depending on rainfall, and may not germinate at all in dry years.

Threats: This species may be threatened by land use changes, vehicles, and invasive non-native plants (CNPS 2012).

Mt. Gleason Indian paintbrush (*Castilleja gleasonii*)

Status: Mt. Gleason Indian paintbrush has a CRPR 1B.2, is State-listed as Rare, and is designated a U.S. Forest Service Sensitive species. This species is not federally or State listed as threatened or endangered.

General Distribution: Mt. Gleason Indian paintbrush is endemic to the San Gabriel Mountains of Los Angeles County.

Distribution in the Study Area: This species is known from higher elevation of the San Gabriel Mountains but several collections from lower elevations have been made. Suitable habitat is present.

Habitat and Habitat Associations: This species grows in rocky places within lower montane coniferous forest and pinyon and juniper woodland communities at elevations of 3800 to 7,120 feet (CNPS 2007).

Natural History: Mt. Gleason Indian paintbrush is a perennial hemi-parasitic herb in the figwort family (Scrophulariaceae) that blooms from May to June.

Threats: Threats to this species include recreational activities such as fuel wood harvesting, off-highway vehicle activities, and close proximity to trails and campgrounds (CNPS 2007).

Mojave Indian paintbrush (*Castilleja plagiotoma*)

Status: Mojave Indian paintbrush has a CRPR 4.3 and is designated a U.S. Forest Service Sensitive species. This species is not federally or State listed as threatened or endangered.

General Distribution: Mojave paintbrush is endemic to California, and is found in Kern, Los Angeles, San Bernardino, and San Luis Obispo counties at elevations between 984 and 8,200 feet.

Distribution in the Study Area: This species was not detected during recent surveys but suitable habitat is present within the Vegetation Study Area and it is known from the general vicinity.

Habitat and Habitat Associations: Mojave paintbrush is associated with Great Basin scrub, Joshua tree woodland, lower montane coniferous forest, and pinyon and juniper woodland habitats.

Natural History: Mojave paintbrush is a hemi-parasitic, perennial herb that blooms from April through June.

Threats: Threats to this species include recreational activities and road maintenance (CNPS 2012).

San Fernando Valley spineflower (*Chorizanthe parryi var. fernandina*)

Status: San Fernando Valley spineflower has a CRPR 1B.1 and is designated a U.S. Forest Service Sensitive species. It is listed as Endangered under the California Endangered Species Act and is a Candidate for federal listing.

General Distribution: It was historically known from the foothills surrounding the San Fernando Valley in Los Angeles County and from one site in Orange County. It had been presumed extinct, but was rediscovered on the Ahmanson Ranch in 1999 (Ventura County) in 1999 (Boyd 2001). Since then it has been discovered at Newhall Ranch (Los Angeles County; FWS 2002) and there are historic records from Newhall and Castaic (Boyd 1999). It occurs at elevations of 490 to 4,000 feet.

Distribution in the Study Area: The project area is outside of the historic range of the species; however suitable habitat is present.

Habitat and Habitat Associations: This species is found in sandy places, generally in coastal or desert shrublands; historically from San Fernando Valley, adjacent foothills, and coastal Orange County; it is now known only in E Ventura and W Los Angeles Counties; its habitat is open shrubland, generally on mesas or moderate slopes, in fine, silty sedimentary soils. It may also occur on alluvial benches or as occasional waifs in washes.

Natural History: San Fernando Valley spineflower is a low-growing annual species, flowering between April and June. It persists as long as a year after flowering season due to its wiry structure, and can be identified by its characteristic long straight spines even in dried condition.

Threats: This species is seriously threatened by development and non-native plants; most of its historical habitat is heavily urbanized.

California satintail (*Imperata brevifolia*)

Status: California satintail has a CRPR 2.1. This species is not federally or State listed as threatened or endangered.

General Distribution: California satintail occurs throughout the southwest U.S. at elevations below 4,000 feet. In California, it is known from only four extant occurrences, in Ventura, Los Angeles, and San Bernardino counties.

Distribution in the Study Area: Suitable habitat is present within the Vegetation Study Area but it was not detected during recent surveys and is not known from the area.

Habitat and Habitat Associations: Meadows and seeps within chaparral, coastal scrub, and Mojavean desert scrub communities.

Natural History: California satintail is a perennial grass that blooms from September to May.

Threats: Agriculture and development are threats to this species (CNPS, 2012).

Ocellated Humboldt lily (*Lilium humboldtii ssp. ocellatum*)

Status: Ocellated Humboldt lily has a CRPR of 4.2 and is a U.S. Forest Service Watch List species. This species is not federally or State listed as threatened or endangered.

General Distribution: It grows in shaded riparian woodlands of the Coast Ranges, Peninsular Ranges, and Transverse Ranges, from San Luis Obispo County to San Diego County, and inland to the San Bernardino and San Jacinto Mountains. Its elevation range is from just above sea level to about 6000 feet.

Distribution in the Study Area: This species is known from deep shaded canyons throughout the San Gabriel Mountains but it was not detected during recent surveys and is not known from the area.

Habitat and Habitat Associations: Riparian woodland openings within chaparral, cismontane woodland, coastal scrub, and lower montane coniferous forest communities; generally on gravelly soils within gullies.

Natural History: Depending on elevation, it may flower as early as March, but generally flowers in early to mid-summer in montane habitats.

Threats: This species may be threatened by development and horticultural collecting.

Lemon lily (*Lilium parryi*)

Status: Mojave Indian paintbrush has a CRPR 1B.2 and is designated a U.S. Forest Service Sensitive species. This species is not federally or State listed as threatened or endangered.

General Distribution: Lemon lily can be found in suitable habitats with elevations of 4,000 to 9,000 feet.

Distribution in the Study Area: Known from the upper reaches of the drainage but the project area is below the elevation range for this species and the project area lacks suitable habitats.

Habitat and Habitat Associations: Lemon lily can be found in meadows and seeps within lower and upper montane coniferous forests communities.

Natural History: Lemon lily is a perennial bulb that blooms from July to August.

Threats: Threats to this species include horticultural collecting, water diversion, recreational activities, and grazing (CNPS, 2012).

San Gabriel linanthus (*Linanthus concinnus*)

Status: San Gabriel linanthus has a CRPR 1B.2 and is designated a U.S. Forest Service Sensitive species. This species is not federally or State listed as threatened or endangered.

General Distribution: This species is endemic to the San Gabriel Mountains of southern California, occuring at elevations of 5,000 to 9,200 feet.

Distribution in the Study Area: Known from higher elevation areas of the San Gabriel Mountains, the project area is well below the elevation range of the species.

Habitat and Habitat Associations: San Gabriel linanthus is associated with dry rocky slopes within chaparral and montane coniferous forest communities.

Natural History: San Gabriel linanthus is an annual herb that blooms from April to July.

Threats: This species is threatened by recreational activities and road maintenance.

Sagebrush loeflingia (*Loeflingia squarrosa var. artemisiarum*)

Status: Sagebrush loeflingia has a CRPR 2.2. This species is not federally or State listed as threatened or endangered.

General Distribution: Sagebrush loeflingia is widespread at scattered locations in California deserts and more common to the east (Nevada) at elevations of 2,200 to 5,300 feet.

Distribution in the Study Area: The species is known from very few locations in the vicinity of alkali flats to the north of the project area. Poor quality habitat was observed at the northern end of the haul roads but it is not expected in the project area.

Habitat and Habitat Associations: Sagebrush loeflingia is found in sandy soils (dunes) in Great Basin scrub and Sonoran desert scrub.

Natural History: It is an annual herb, flowering in April or May, depending on rainfall. Like most desert annuals, it may not germinate at all during drought years.

Threats: This species may be threatened by grazing and vehicles.

Peirson's lupine (*Lupinus peirsonii*)

Status: Peirson's lupine has a CRPR 1B.3 and is designated a U.S. Forest Service Sensitive species. This species is not federally or State listed as threatened or endangered.

General Distribution: This species is known only from the San Gabriel Mountains, at elevations of 3,200 to 8,200 feet.

Distribution in the Study Area: This species is not known from the project vicinity but it is known from the upper reaches of the watershed, could be present within the vegetation study area as a wash-down waif species.

Habitat and Habitat Associations: Peirson's lupine occurs on gravelly or rocky slopes within Joshua tree woodland, lower and upper montane coniferous forest, and pinyon and juniper woodland communities.

Natural History: This species is a perennial herb that blooms from April to May.

Threats: This species may be threatened by development in the San Gabriel Mountains.

Davidson's bush-mallow (*Malacothamnus davidsonii*)

Status: Davidson's bush-mallow has a CRPR 1B.2. This species is not federally or State listed as threatened or endangered.

General Distribution: Its geographic range is the western margin of the San Gabriel Mountains and San Fernando Valley (Allan et al. 1995) and reportedly from the central coast ranges (Monterey and San Luis Obispo Counties; Tibor 2001), between about 600 and 2800 feet elevation.

Distribution in the Study Area: There are very few records of this species within the general vicinity of the project area.

Habitat and Habitat Associations: Davidson's bush-mallow occurs in chaparral, coastal sage scrub, cismontane woodland, riparian woodland, and open sandy alluvial benches and washes.

Natural History: Davidson's bush-mallow is a shrub that flowers in summer (June - September) but can be identified without flowers, by characteristics of its stems and leaves.

Threats: In Los Angeles County, this species may be threatened by urbanization (CNPS, 2012).

Robbins' nemacladus (*Nemacladus secundiflorus var. robbinsonii*)

Status: Robbins' nemacladus has a CRPR 1B.2. This species is not federally or State listed as threatened or endangered.

General Distribution: Known occurrences of this species have been recorded as far north as San Benito Canyon, and as far south as the San Gabriel Mountains, at elevations of 875 to 4250 feet.

Distribution in the Study Area: The subspecies is known from a single location in the San Gabriel Mtns, east of the Project Area. No suitable habitat is present.

Habitat and Habitat Associations: This species can be found in openings in chaparral and foothill grasslands.

Natural History: Robbins' nemacladus is an annual herb that blooms from April through June.

Threats: Road maintenance and widening may be a threat to this species (CNPS 2012).

Woolly mountain-parsley (*Oreonana vestitia*)

Status: Wooly mountain parsley has a CRPR 1B.3 and is designated a U.S. Forest Service Sensitive species. This species is not federally or State listed as threatened or endangered.

General Distribution: Wooly mountain-parsley occurs at elevations of 6,500 to 11,500 feet in the San Gabriel and San Bernardino mountains, as well as near Walker Pass.

Distribution in the Study Area: This species is not known from the project vicinity and the project area is well below the elevation range of this species.

Habitat and Habitat Associations: This species grows along ridge tops and on rocky soils such as dry gravel or talus in lower and upper montane coniferous forest and subalpine coniferous forest.

Natural History: Wooly mountain-parsley is a perennial herb that blooms from March to September.

Threats: Threats to this species include foot traffic and recreational activities within its habitat (CNPS 2012).

Rock Creek broomrape (*Orobanche valida ssp. valida*)

Status: Rock Creek broomrape has a CRPR 1B.2 and is designated a U.S. Forest Service Sensitive species. This species is not federally or State listed as threatened or endangered.

General Distribution: In California, this species has occurs in the San Gabriel and the Topatopa Mountains, at elevations of 4,000 to 7,000 feet.

Distribution in the Study Area: This species is not known from the project vicinity and the project area is below the elevation range of this species.

Habitat and Habitat Associations: Rock Creek broomrape grows on granitic soils within chaparral and pinyon and juniper woodland communities.

Natural History: Rock Creek broomrape is a parasitic, perennial herb that blooms from May through July.

Threats: This species may possibly be threatened by non-native plants and recreational activities (CNPS, 2012).

Mason's neststraw (*Stylocline masonii*)

Status: Mason's neststraw is a federal species of concern and has a CRPR 1B.1.

General Distribution: Mason's neststraw is known only from the southern San Joaquin Valley and adjacent inner coastal ranges (Morefield, 1992) and the desert slopes of the Liebre Mountains in Los Angeles County (Ross and Boyd, 1996), between 300 and 1300 feet in elevation (and rarely to almost 4000 feet).
.
Distribution in the Study Area: This species is not known from the project vicinity but suitable habitat is present.

Habitat and Habitat Associations: Mason's neststraw occurs in open, dry sandy soils in juniper woodland or saltbush scrub vegetation.

Natural History: Mason's neststraw is a diminutive ephemeral annual herb that flowers between March and May.

Threats: A major threat to Mason's neststraw is disturbances from land use conversion.

Greata's aster (*Symphytotrichum greatae*)

Status: Greata's aster has a CRPR 1B.3. This species is not federally or State listed as threatened or endangered.

General Distribution: Its geographic range is the Liebre and San Gabriel Mountains, between about 1000 and 6600 feet elevation.

Distribution in the Study Area: Greata's aster is known from the upper watershed and although the habitat in the project area is not ideal, it has some potential to occur.

Habitat and Habitat Associations: Greata's aster generally occurs along streams, near springs, or where ground water nears the surface in chaparral, woodlands, and lower montane forests.

Natural History: This species is a tall, perennial herb with daisy-like flowers, which blooms from June through October.

Threats: Greata's aster is threatened by recreational activities, trail maintenance, and non-native plants (CNPS, 2012).

WILDLIFE WITH THE POTENTIAL TO OCCUR

INVERTEBRATES

Trask shoulderband snail (*Helminthoglypta traskii*)

Status: The trask shoulderband snail is considered a CDFG Special Animal. This taxon is not federally or State listed as threatened or endangered.

General Distribution: This snail is a southern California endemic, known from Ventura, Los Angeles, Orange, and San Diego Counties (Magney, 2005).

Distribution in the Study Area: Although there are no known records from the Study Area, the Study Area is located within the known geographic distribution for this species. Suitable habitat occurs throughout the Study Area. All areas of suitable habitat should be considered potentially occupied.

Habitat and Habitat Associations: Trask shoulderband snails are terrestrial and occur in a variety of habitats, including coastal sage scrub, chaparral, oak woodland, and riparian woodland.

Natural History: *Haplotrema* is a genus of predatory, air-breathing terrestrial snails. The shells of these snails vary in size from relatively small to medium and usually consist of a low, flattened spire and very wide umbilicus. The structure of the radula, or teeth, is unusual in this genus. The haplotrematids have fewer cusps than most snails, but they are considerably elongated (hence the name "lancetooth"), suitable for predatory behavior. The known diet of these snails consists entirely of other terrestrial mollusks (Pilsbry, 1946).

Members of the genus *Helminthoglypta* are air-breathing, terrestrial snails. Shells are relatively medium to large in size, with no apertural teeth, but usually with a reflected apertural lip. These snails possess a single dart apparatus with one stylophore (dart sac) and two mucus glands which are utilized to create love darts. Love darts, shaped in many distinctive ways which vary considerably between species, are hard, sharp, calcareous or chitinous darts that are used as part of the sequence of events during courtship before actual mating takes place.

Threats: There are no identified threats to these species.

San Emigdio blue butterfly (*Plebulina emigdionis*)

Status: The San Emigdio blue butterfly is designated by CDFG as a California Special Animal. This taxa is not federally or State listed as threatened or endangered.

General Distribution: The San Emigdio blue butterfly is restricted to southern California in lower Sonoran and riparian habitats from the Owens Valley south to the Mojave River, and west to northern Ventura and Los Angeles Counties. The primary location where this species has been collected is along the Mojave River near Victorville, but isolated colonies have been reported in Bouquet and Mint canyons near Castaic, in canyons along the north side of the San Gabriel Mountains near the desert's edge, and in arid areas south of Mount Abel near San Emigdio Mesa (Emmel and Emmel, 1973; Murphy, 1990).

Distribution in the Study Area: There are no known recent records for this species in the Study Area. The Study Area is located within the known geographic distribution for this species. Suitable habitat occurs within limited portions of the Study Area.

Habitat and Habitat Associations: This butterfly can be locally abundant in association with its primary host plant, four-wing saltbush (*Atriplex canescens*), but has also been observed in association with quail brush (*A. lentiformis*).

Natural History: Although its primary host plant is widespread throughout the western United States, the distribution of the San Emigdio blue butterfly is much more localized, suggesting that other factors may determine habitat suitability (Murphy, 1990). For example, habitat suitability may, at least in part, be attributed to a suspected symbiotic relationship with at least one ant species, *Formica pilicornis* (Ballmer and Pratt, 1991). These ants presumably extract droplets containing glucose and amino acids from the nectary glands of San Emigdio blue butterfly larvae and provide the butterfly larvae protection from predators.

San Emigdio blue butterfly adults are active from late April to early September. The species can have up to three broods per year, with the first brood generally occurring in late April to May, the second brood in late June to early July, and the third brood in August to early September (Emmel and Emmel, 1973). Adults are generally observed perching on their host plant or other plants in the immediate vicinity, and nectaring on nearby flowers.

Threats: The San Emigdio blue butterfly has a limited distribution and often occurs in small, isolated colonies. These characteristics make colonies vulnerable to direct and indirect habitat disturbance, given the limited extent of occupied habitat and limited potential for recolonization. Many colonies in the Mojave Desert and Owens Valley are isolated from anthropogenic disturbances, but other colonies found closer to growing urban areas may be situated near major roads, railroad tracks, and other developments, which may contribute to further decline.

AMPHIBIANS

Mountain (foothill) yellow-legged frog (*Rana boylii*)

Status: Mountain yellow-legged frog is a CDFG Species of Special Concern. This species is not federally or State listed as threatened or endangered.

General Distribution: Range includes Pacific drainages from the upper reaches of the Willamette River system, Oregon (west of the Cascades crest), south to the upper San Gabriel River, Los Angeles County, California, including the Coast Ranges and Sierra Nevada foothills in the United States

(Stebbins 2003). The species occurred at least formerly in a disjunct location in northern Baja California. [Natureserve, 2012]

Distribution in the Study Area: Although suitable habitat occurs within portions of the Study Area, it is outside the known range of this subspecies.

Habitat and Habitat Associations: In the mountains of southern California, inhabits rocky streams in narrow canyons and in the chaparral belt from 984 ft. to over 12,000 ft. in elevation. [CaliforniaHerps, 2011]

Natural History: This small frog differs from the related red-legged frog in having yellow on its hind limbs and having no well-developed dorsolateral folds (Natureserve, 2012). Most often found in or close to water and preys on a variety of terrestrial and aquatic invertebrates with mating and egg laying activities taking place from March – May (CaliforniaHerps, 2011).

Threats: Primary threats to this species include predation by non-native amphibians and fish, cattle grazing, off highway vehicle use, excessive flooding and poor water quality.

Western spadefoot (*Spea hammondii*)

Status: The western spadefoot toad is a CDFG Species of Special Concern. This species is not federally or State listed as threatened or endangered.

General Distribution: The western spadefoot toad is endemic to California and northern Baja California. The species ranges from the north end of California's great Central Valley near Redding, south, east of the Sierras and the deserts, into northwest Baja California (Jennings and Hayes, 1994; Stebbins, 2003; all as cited in USACE and CDFG, 2010).

Distribution in the Study Area: There are no known records for this species in the Study Area within a 15 mile radius. The Study Area is located just outside the known geographic distribution for this species. Pockets of suitable habitat occur within the Study Area.
Habitat and Habitat Associations: Although the species primarily occurs in lowlands, it also occupies foothill and mountain habitats. Within its range, the western spadefoot toad occurs from sea level to 1,219 meters (4,000 feet) AMSL, but mostly at elevations below 910 meters (3,000 feet) AMSL (Stebbins, 2003; as cited in USACE and CDFG, 2010). Holland and Goodman (1998) report that riparian habitats with suitable water resources may also be used. The species is most common in grasslands with vernal pools or mixed grassland/coastal sage scrub areas (Holland and Goodman, 1998; as cited in USACE and CDFG, 2010).

Natural History: The western spadefoot toad is almost completely terrestrial, remaining underground eight to 10 months of the year and entering water only to breed (Jennings and Hayes, 1994; Holland and Goodman, 1998; Storey *et al.*, 1999; all as cited in USACE and CDFG, 2010). The species aestivates in upland habitats near potential breeding sites in burrows approximately one meter in depth (Stebbins, 1972) and adults emerge from underground burrows during relatively warm rainfall events to

breed. While adults typically emerge from burrows from January through March, they may also emerge in any month between October and April if rain thresholds are met (Stebbins, 1972; Morey and Guinn, 1992; Jennings and Hayes, 1994; Holland and Goodman, 1998; all as cited in USACE and CDFG, 2010).

Eggs are deposited in irregular small clusters attached to vegetation or debris (Storer, 1925; as cited in USACE and CDFG, 2010) in shallow temporary pools or sometimes ephemeral stream courses (Stebbins, 1985; Jennings and Hayes, 1994; all as cited in USACE and CDFG, 2010) and are usually hatched within six days. Complete metamorphosis can occur rapidly, within as little as three weeks (Holland and Goodman, 1998; as cited in USACE and CDFG, 2010), but may last up to 11 weeks (Burgess, 1950; Feaver, 1971; Jennings and Hayes, 1994; all as cited in USACE and CDFG, 2010).

Western spadefoot toads likely do not move far from their breeding pool during the year (Zeiner *et al.*, 1988; as cited in USACE and CDFG, 2010), and it is likely that their entire post-metamorphic home range is situated around a few pools. However, opportunistic field observations indicate that they readily move up to at least several hundred meters from breeding sites (NatureServe, 2012).

Threats: Loss of aquatic and adjacent upland habitats supporting the life cycle of the western spadefoot toad is a primary threat to this species, but other factors related to urban development probably are contributing to this species' decline.

Coast Range newt (*Taricha torosa torosa*)

Status: The Coast Range newt is a CDFG Species of Special Concern. This taxon is not federally or State listed as threatened or endangered.

General Distribution: The Coast Range newt occurs along the coast ranges of California, from Mendocino County south to Los Angeles County and disjunctly south to the Cuyumaca Mountains in San Diego County (NatureServe, 2012). This subspecies has also been recorded along the southern Sierra Nevada from Tulare County to Kern County (Kuchta and Tan, 2006).

Distribution in the Study Area: Suitable habitat occurs onsite. Nearest recorded occurrence is approximately 14.5 miles southeast of the Study Area in the west fork of Bear Creek.

Habitat and Habitat Associations: This subspecies breeds in ponds, reservoirs, and streams. Terrestrial adults occupy various adjacent upland habitats, including grasslands, woodlands, and forests (NatureServe, 2012).

Natural History: The Coast Range newt belongs to the genus *Taricha*, whose members are readily distinguishable from all other western salamanders by a distinctive tooth pattern, lack of costal grooves, and rough skin (except in breeding males) (Stebbins, 2003). Migration towards suitable breeding grounds usually occurs at night following the first rains in the fall (CDFG, 2008). Upon arriving at breeding sites, adults become aquatic and may remain at these sites for several weeks. Breeding typically occurs between December and May with optimal peaks between February and April (NatureServe, 2012). Adults migrate back to subterranean refuges during the spring and remain at these aestivation sites through the summer. Larvae normally transform in the summer or fall, or when water dries up, of their first year (CDFG, 2008). Metamorphosed individuals feed on earthworms, snails,

slugs, sow bugs, and various other invertebrates. Some adults, especially females may consume conspecific eggs. Larvae eat small aquatic organisms and decomposing organic material (Stebbins, 1951).

Threats: This subspecies has suffered marked population declines likely due to the introduction of exotic predators, including green sunfish (*Lepomis cyanellus*), mosquito fish, and crayfish (*Procambarus* sp.) (Stebbins, 2003).

San Gabriel Mountains slender salamander (*Batrachoseps gabrieli*)

Status: The San Gabriel Mountains slender salamander is a U.S. Forest Service Sensitive Species. This taxon is not federally or State listed as threatened or endangered.

General Distribution: This species is known from select localities in the San Gabriel Mountains and the Mt. Baldy area of Los Angeles County and the western end of the San Bernardino Mountains in San Bernardino Co., with an elevation range of 1,200 -5,085 feet (Stebbins, 2003).

Distribution in the Study Area: The San Gabriel slender salamander is not known to occur in Study Area but could potentially utilize Littlerock Creek and adjacent riparian areas. The Study Area is outside of the known range of this species but it is known from the portions of the San Gabriel Mountains to the south of the Study Area.

*Habitat and Habitat Association*s: This species occurs on talus slopes surrounded by a variety of conifer and montane hardwood species, including bigcone spruce, pine, white fir, incense cedar, canyon live oak, black oak, and California laurel (Wake 1996, Stebbins, 2003).

Natural History: Known to seek cover in cavities below talus rocks and under logs. Because of the need for moisture, near-surface activity is probably limited to a few winter and early spring months (Wake, 1996). Summer and fall drought probably cause individuals to retreat deep into the talus slope (Wake 1996).

Threats: Habitat degradation is the main threat to this species.

REPTILES

Southwestern pond turtle (*Actinemys marmorata pallida*)

Status: The southwestern pond turtle is a CDFG Species of Special Concern. This taxon is not federally or State listed as threatened or endangered.

General Distribution: This subspecies occurs from northwestern Baja California north through western California to the central region of the state, where it intergrades with the northwestern pond turtle (*C. m. marmorata*) (Seeliger, 1945; Bury, 1970).

Distribution in the Study Area: This species was observed within the Study Area (above and below the Reservoir) during surveys conducted in 2012. The Study Area is located within the known geographic distribution for this species.

Habitat and Habitat Associations: Southwestern pond turtles inhabit permanent or nearly permanent bodies of water in a wide variety of habitat types. Suitable basking sites, such as partially submerged logs, vegetation mats, or open mud banks are a required element for this subspecies.

Natural History: The southwestern pond turtle is a subspecies of western pond turtle (*C. marmorata*) which represent the only abundant native turtles in California. This species is thoroughly aquatic and is possesses a low carapace typically olive, brown, or blackish in color (Stebbins, 2003). The subspecies usually lays a clutch of 3 to 14 eggs between April and August as females may move overland up to over 300 feet to find suitable nesting sites. Nests have been observed in many soil types from sandy to very hard and soils must be at least four inches deep for nesting (CDFG, 2008). Most activity is diurnal, but some crepuscular and nocturnal behavior has been observed (CDFG, 2008). Southwestern pond turtles feed on aquatic plants, insects, worms, fish, amphibian eggs and larvae, crayfish, and carrion (Stebbins, 2003).

Threats: Western pond turtles are estimated to be in decline across 75-80 percent of their range (Stebbins, 2003). The primary reason for this decline has been attributed to loss of suitable habitat associated with urbanization, agricultural activities, and flood control and water diversion projects (Jennings *et al.*, 1992).

Coast (San Diego) horned lizard (*Phrynosoma coronatum* [*blainvillii* population])

Status: The coast (San Diego) horned lizard is a CDFG Species of Special Concern. This taxon is not federally or State listed as threatened or endangered.

General Distribution: The coast (San Diego) horned lizard's historic range extended from the Transverse Ranges in Kern, Los Angeles, Santa Barbara, and Ventura Counties south through the Peninsular Ranges of southern California and into Baja California, Mexico as far south as San Vicente, however, the current range is much more fragmented (Jennings and Hayes, 1994).

Distribution in the Study Area: This species was documented within a sandy drainage, adjacent to the main access road through the Reservoir, during surveys conducted in 2012. The Study Area is located within the known geographic distribution for this species; suitable habitat occurs in portions of the Study Area.

Habitat and Habitat Associations: The coast (San Diego) horned lizard occurs in a wide variety of habitats throughout its range, though is found primarily in chaparral and mixed chaparral-coastal sage scrub, to stands of pure coastal sage scrub. It is also known to occur in riparian habitats, washes, and most desert habitats. They are occasionally locally abundant in conifer-hardwood and conifer forests. This species is most common in open, sandy areas where abundant populations of native ant species (e.g., *Pogonomyrmex* and *Messer* spp.) are present.

Natural History: The coast (San Diego) horned lizard is a flat bodied lizard with a wide, oval-shaped body and scattered enlarged pointed scales on the upper body and tail. Coast (San Diego) horned lizards are oviparous and lay one clutch of 6-17 (average 11-12) eggs per year from May through early July (Jennings and Hayes, 1994). Incubation occurs for two months and hatchlings first appear in late July and

early August. It is surface active primarily from April to July. This species spends a considerable amount of time basking, either with the body buried and head exposed, or with the entire body oriented to maximize exposure to the sun. Although little is known about longevity in the wild, adults are thought to live for at least eight years (Jennings and Hayes, 1994). They primarily eat native harvester ants (*Pogonmyrmex* spp.) and do not appear to eat invasive Argentine ants that have replaced native ants in much of central and southern California. This species is an opportunistic feeder, and while harvester ants can comprise upwards of 90% of their diet, they will feed on other insect species when those species are abundant (Jennings and Hayes, 1994). Defense tactics used by this species include remaining motionless to utilize its cryptic appearance, only running for the nearest cover when disturbed or touched. Captured lizards puff up with air to appear larger, and if roughly handled, will squirt blood from a sinus in each eyelid (Jennings and Hayes, 1994).

Threats: Though once common throughout much of coastal and cismontane southern California, coast (San Diego) horned lizards have disappeared from much of their former range. Their population decline is mainly attributed to habitat loss due to urbanization and agricultural conversion. The introduction of non-native Argentine ants (*Iridomyrmex humilis*), which are inedible to horned lizards and tend to displace native carpenter and harvester ants, is another factor in their decline.

Two-striped garter snake (*Thamnophis hammondii*)

Status: The two-striped garter snake is a CDFG Species of Special Concern. This taxon is not federally or State listed as threatened or endangered.

General Distribution: This species occurs along a continuous range from northern Monterey County south through the South Coast and Peninsular Ranges to Baja California. Isolated populations also occur through southern Baja California, Catalina Island, and desert regions along the Mojave and Whitewater Rivers in San Bernardino and Riverside Counties, respectively (Jennings and Hayes, 1994). This species typically occurs at elevations ranging between sea level and approximately 8,000 feet (Jennings and Hayes, 1994).

Distribution in the Study Area: This species was documented within the Study Area downstream of the dam and upstream of Rocky Point. Surveys conducted in 2012. The Study Area is located within the known geographic distribution for this species; suitable habitat occurs throughout the Study Area.

Habitat and Habitat Associations: This species is primarily associated with aquatic habitats that border riparian vegetation and provide nearby basking sites (Jennings and Hayes, 1994). These areas typically include perennial and intermittent streams and ponds in a variety of vegetation communities, including chaparral, oak woodland, and forest habitats (Jennings and Hayes, 1994). During the winter, two-striped garter snakes will seek refuge in upland areas, such as adjacent grassland and coastal sage scrub (Rossman *et al.*, 1996).

Natural History: After several taxonomic revisions, two-striped garter snake has been recognized as a separate species where it had previously been considered a subspecies of the western aquatic garter snake (*T. couchii*) (Rossman and Stewart, 1987). This species is usually morphologically distinguished by the lack of a mid-dorsal stripe. Two-striped garter snakes breed from late March to early April and young are typically born between late July and August; however, some have been observed as late as November

(Rossman *et al.*, 1996; Jennings and Hayes, 1994). Two-striped garter snakes hibernate during the winter months, however, they have been observed actively above ground on warm winter days (Jennings and Hayes, 1994). The mainly aquatic diet of this species consists primarily of fish, fish eggs, and tadpoles and metamorphs of toads and frogs; however, they will also consume worms and newt larvae (Jennings and Hayes, 1994).

Threats: Lind (1998b) noted that quantity and quality of habitat for two-striped garter snakes is declining throughout much of its range. More than forty percent of this species' historic range has been lost (Jennings and Hayes, 1994). Primary factors for the decline of this species in southern California include habitat conversion and degradation resulting from urbanization, construction of reservoirs, and cement-lining of stream channels.

Coastal rosy boa (Charina trivirgata roseofusca)

Status: The rosy boa is designated by CDFG as a California Special Animal. This taxon is not federally or State listed as threatened or endangered.

General Distribution: The rosy boa in California ranges from Los Angeles, eastern Kern, and southern Inyo counties, and south through San Bernardino, Riverside, Orange, and Diego counties (Spiteri, 1988; Stebbins, 2003; Zeiner *et al.,* 1988). The species occurs at elevations from sea level to 5,000 feet AMSL in the Peninsular and Transverse mountain ranges. Within its range in southern California, the rosy boa is absent only from the southeastern corner of California around the Salton Sea and the western and southern portions of Imperial County (Zeiner *et al.,* 1988).

Distribution in the Study Area: Suitable habitat is present within the Study Area outside the perimeter of the Reservoir. This species was reported approximately 6 miles west of the Study Area in June 2009 along a transmission line corridor.

Habitat and Habitat Associations: The rosy boa inhabits rocky shrubland and desert habitats and is attracted to oases and streams but does not require permanent water (Stebbins, 2003). In coastal areas, the rosy boa occurs in rocky chaparral-covered hillsides and canyons, while in the desert it occurs on scrub flats with good cover (Zeiner *et al.,* 1988).

Natural History: Rosy boas are primarily nocturnal but may be active at dusk and rarely in the daytime (Stebbins 2003). Rosy boas are active between April and September (Holland and Goodman 1998). The rosy boa may aestivate in the hottest months and hibernate in the coolest months of the year, remaining inactive in burrows or under surface debris (NatureServe, 2012). There is little information on the foraging habits or prey species for the rosy boa. Holland and Goodman (1998) and Stebbins (2003) indicate that this species preys upon small mammals (including pocket mice (*Chaetodipus* and *Perognathus* spp.) and young woodrats), reptiles, amphibians, and birds.

Threats: This species may be threatened with local extirpation in coastal regions of southern California resulting from development-related habitat fragmentation and isolation of populations. The species is noted to search black top roads for prey (Stebbins, 2003), making it vulnerable to road mortality. Other potential threats related to urban development include the use of rodenticides near open space, which

could result in fewer mammal burrows that provide refugia and a reduced prey base, collecting of snakes (the rosy boa is popular in the pet trade (NatureServe, 2012)), and habitat degradation (*e.g.*, trampling of vegetation and introduction of exotic species).

San Bernardino ringneck snake (Diadophis punctatus modestus)

Status: The San Bernardino ringneck snake is designated by CDFG as a California Special Animal. This taxon is not federally or State listed as threatened or endangered.

General Distribution: The ringneck snake is widespread in California and is absent only from large portions of the Central Valley, high mountains, desert, and areas east of the Sierra–Cascade crest (Zeiner *et al.,* 1988). Currently there are six recognized subspecies in California occurring at elevations ranging from sea level to 2,150 meters (7,050 feet) AMSL (Zeiner *et al.,* 1988). The San Bernardino ringneck snake subspecies is found along the southern California coast from the Santa Barbara area south to northern San Diego County, and inland into the San Bernardino Mountains.

Distribution in the Study Area: Suitable habit occurs within the Study Area; however, there are no known reports of this species within or adjacent to the Study Area.

Habitat and Habitat Associations: The ringneck snake is found in moist habitats, including woodlands, hardwood and conifer forest, grassland, sage scrub, chaparral, croplands/hedgerows, and gardens (NatureServe, 2012; Stebbins, 2003).

Natural History: A fair amount of information is available for the full species ringneck snake (*Diadophis punctatus*), while less information is available for the subspecies San Bernardino ringneck snake (*D. p. modestus*). Therefore, much of this discussion is based on the life history of the full species ringneck snake, with expected similarities occurring in behaviors and habitat associations with the San Bernardino ringneck snake subspecies.

During the day in the spring and summer, ringneck snakes are typically found under surface objects (Holland and Goodman, 1998; Zeiner *et al.,* 1988), with crepuscular (dawn and dusk) and some nocturnal activity observed during the summer (Holland and Goodman, 1998; Zeiner *et al.* 1988). Ringneck snakes may aestivate during the heat of summer and are generally inactive and hibernate during the winter (NatureServe, 2012).

Threats: Habitat degradation is the main threat to San Bernardino ringneck snakes.

Desert tortoise (Gopherus agassizii)

Status: The desert tortoise is Federal-listed and State-listed as Threatened.

General Distribution: The desert tortoise is an herbivorous reptile that occurs in the Mojave and Sonoran deserts in southern California, southern Nevada, Arizona, and the southwestern tip of Utah in the U.S., as well as Sonora and northern Sinaloa in Mexico. The designated Mojave population of the desert tortoise includes those animals living north and west of the Colorado River in the Mojave Desert

of California, Nevada, Arizona, and southwestern Utah, and in the Sonoran (Colorado) Desert in California (USFWS, 2011a).

Distribution in the Study Area: The Study Area lies outside of the known range of this species; portions of the identified haul routes however do occur within the range and have suitable habitat.

Habitat and Habitat Associations: The desert tortoise occupies a variety of habitats from flats and slopes typically characterized by creosote bush scrub at lower elevations to rocky slopes in blackbrush scrub and juniper woodland ecotones (transition zone) at higher elevations. Throughout most of the Mojave Desert, tortoises occur most commonly on gently sloping terrain with sandy-gravel soils and where there is sparse cover of low-growing shrubs, which allows establishment of herbaceous (non-woody) plants. However, surveys at the Nevada Test Site revealed that tortoise sign (e.g., scat, burrows, tracks, shells) was more abundant on upper alluvial fans and low mountain slopes than on the valley bottom. Soils must be friable (easily crumbled) enough for digging burrows, but firm enough so that burrows do not collapse.

Natural History: During the winter, tortoises will opportunistically use burrows of various lengths, deep caves, rock and caliche crevices, or overhangs for cover. Neonate desert tortoises use abandoned rodent burrows for daily and winter shelter; these burrows are often shallowly excavated and run parallel to the surface of the ground (USFWS, 2011a).

Threats: Threats to the desert tortoise include degradation and loss of habitat (including through the spread of nonnative, invasive plants), disease, raven predation on juvenile tortoises, collection for the pet trade, and direct mortality and crushing of burrows by off-highway vehicles.

San Bernardino mountain kingsnake (*Lampropeltis zonata parvirubra*)

Status: The San Bernardino mountain kingsnake is a CDFG Species of Special Concern. This taxon is not federally or State listed as threatened or endangered.

General Distribution: The San Bernardino mountain kingsnake is only known to occur within the San Bernardino Mountains and San Jacinto Mountains bioregions above 4,500 feet (Fisher and Case, 1997).

Distribution in the Study Area: While suitable habitat occurs within the Study Area it is outside of the known geographic distribution for this species.

Habitat and Habitat Associations: San Bernardino mountain kingsnakes are restricted to rock outcrops, talus, and steep shady canyons within coniferous and mixed coniferous, hardwood, or riparian woodlands and other edge habitats when associated with coniferous habitat.

Natural History: This species is normally diurnally and crepuscularly active from mid-March to mid-October at lower elevations with a reduced period at higher elevations (Newton and Smith 1975; Zeiner et al. 1988; Holland and Goodman 1998). Their diet is known to include lizards, lizard eggs, smaller snakes, nestling birds and eggs, and small mammals.

Threats: Poaching is a major threat to this species. Firewood harvesting is another threat, as collection of fallen wood removes the ground debris that is a limiting habitat requirement for this species.

BIRDS

Tricolored blackbird (*Agelaius tricolor*)

Status: The tricolored blackbird is a CDFG Species of Special Concern. This taxon is not federally or State listed as threatened or endangered.

General Distribution: This species is primarily a permanent resident across its range in California and occurs throughout the Central Valley and in coastal districts from Sonoma County south to Baja California.

Distribution in the Study Area: There are no known recent records for this species in the Study Area; the Study Area is located within the known geographic range for this species; suitable breeding and foraging habitat occurs, depending on water levels, within the upper extents of the Reservoir (changes year to year). Nearest recorded occurrence is approximately seven miles northwest of the Study Area in Lake Palmdale.

Habitat and Habitat Associations: The tricolored blackbird breeds near fresh water, preferably in emergent wetland with tall dense cattails (*Typha* spp.) or tules, but also in thickets of willows, blackberry, wild rose, and tall herbs (CDFG, 2008). This species forages primarily in grassland and cropland habitats.

Natural History: The tricolored blackbird is distinguishable from similar species by dark red shoulder patches with broad white tips bordering the distal side. This highly gregarious species is highly colonial and nesting areas must be large enough to support a minimum colony of roughly fifty pairs (Grinnell and Miller, 1944). Tricolored blackbirds are polygynous and during the breeding season, which typically occurs from mid-April into late July, each male may claim several mates nesting in his small territory. Foraging generally occurs in the vicinity of colony sites; however, some breeding individuals have been documented leaving nest sites as far as four miles to feed (Orians, 1961).

Threats: Some of the threats that have been identified for this species include loss of habitat due to draining of freshwater marshes and cowbird parasitism.

Bell's sage sparrow (*Amphispiza belli bellie*)

Status: Bell's sage sparrow is a CDFG Watch List species. This taxon is not federally or State listed as threatened or endangered.

General Distribution: Five subspecies of sage sparrow are recognized, two of which are migratory (County of Riverside, 2008). The subspecies Bell's sage sparrow (formerly known as Bell's sparrow), *A. b. belli*, occurs as a non-migratory resident on the western slope of the central Sierra Nevada Range

and in the coastal ranges of California southward from Marin County and Trinity County, extending into north-central Baja California (County of Riverside, 2008).

Distribution in the Study Area: There are no known records for this species in the Study Area; suitable habitat is present within the Study Area outside of the Reservoir footprint. Nearest recorded occurrence, from 2005, is approximately 13 miles northwest of the Study Area.

Habitat and Habitat Associations: Bell's sage sparrow is uncommon to fairly common in dry chaparral and coastal sage scrub along the coastal lowlands, inland valleys, and lower foothills of the mountains within its range. The Bell's sage sparrow often occupies chamise chaparral in the northern part of its range (Gaines, 1988; Unitt, 1984) and in coastal San Diego County (Bolger *et al.,* 1997). At higher elevations in southern California, Bell's sage sparrow often occurs in big sagebrush (County of Riverside, 2008).

Natural History: Sage sparrows primarily forage on the ground, usually near or under the edges of shrubs (Zeiner *et al.,* 1990A; County of Riverside, 2008). During the breeding season, the species consumes adult and larval insects, spiders, seeds, small fruits, and succulent vegetation (County of Riverside, 2008). Bell's sage sparrow usually nests in sagebrush or chaparral, and may have two broods per nesting season (Ehrlich *et al.,* 1988). In Riverside County, nests of Bell's sage sparrow have been found in brittlebush, black sage, California buckwheat, California sagebrush, and bush mallow. In other locations, chamise, white sage, cholla, ceanothus, and willows have been used by the species (County of Riverside, 2008). Sage sparrows also nest occasionally in bunchgrass or on the ground under shrubs (County of Riverside, 2008).

Threats: The largest threat to the sage sparrow is the loss and fragmentation of appropriate shrub habitat. Like other species, it has lost suitable habitat to urbanization and agricultural conversion, especially in southern California (County of Riverside, 2008). This species is also vulnerable to brown-headed cowbird nest parasitism (County of Riverside, 2008), which is increased near habitat edges. Grazing may result in habitat degradation and reduction of populations, such as on San Clemente Island where removal of grazing animals resulted in the recovery of native vegetation and sage sparrow populations (County of Riverside, 2008). Proximity to humans also increases the possibility of predation by domestic cats.

Golden eagle (*Aquila chrysaetos*)

Status: The golden eagle is on CDFG Watch List and a California Fully Protected species. This taxon is not federally or State listed as threatened or endangered.

General Distribution: In North America, this species breeds locally from northern Alaska eastward to Labrador and southward to northern Baja California and northern Mexico. The species winters from southern Alaska and southern Canada southward through the breeding range. The golden eagle ranges from sea level up to 11,500 feet AMSL (Grinnell and Miller, 1944).

Distribution in the Study Area: There are no known records for this species within the Study Area; limited suitable nesting habitat for this species occurs within the Study Area but does occur on portions of the ANF. Suitable foraging habitat is present within Study Area.

Habitat and Habitat Associations: The golden eagle requires rolling foothills, mountain terrain, and wide arid plateaus deeply cut by streams and canyons, open mountain slopes and cliffs, and rock outcrops (Zeiner *et al.* 1990A).

Natural History: The golden eagle requires rolling foothills, mountain terrain, and wide arid plateaus deeply cut by streams and canyons, open mountain slopes and cliffs, and rock outcrops (Zeiner *et al.* 1990A). Nest construction in southern California occurs in fall and continues through winter (Dixon 1937). This species nests on cliffs with canyons and escarpments and in large trees (generally occurring in open habitats) and is primarily restricted to rugged, mountainous country (Garrett and Dunn 1981; Johnsgard 1990). It is common for the golden eagle to use alternate nest sites, and old nests are reused. The nests are large platforms composed of sticks, twigs, and greenery that are often three meters (10 feet) across and one meter (three feet) high (Zeiner *et al.* 1990A).

Threats: A major threat to this species is human disturbance in the form of habitat loss as well as human development and activity adjacent to golden eagle habitat. Accidental deaths attributed to increased development include collisions with vehicles, power lines, and other structures; electrocution; hunting; and poisoning (Franson *et al.* 1995). Golden eagles avoid developed areas; the golden eagle population in California has undergone a decline within the past century due to a decrease in open habitats (Grinnell and Miller 1944). If nests are disturbed by humans, abandonment of these nests in early incubation will typically occur (Thelander 1974), thereby threatening the species' reproductive success.

Short-eared owl (*Asio flammeus*)

Status: The short-eared owl is a CDFG Species of Special Concern. This taxon is not federally or State listed as threatened or endangered.

General Distribution: This species is a widespread winter migrant in California, primarily occurring in the Central Valley, the western Sierra Nevada foothills, and along the coastline. Short-eared owls very irregularly breed along the southern California coast (Garrett and Dunn, 1981).

Distribution in the Study Area: There are no known recent records for this species in the Study Area; suitable habitat is not present within the Study Area. Limited suitable habitat may be present along the proposed haul routes.

Habitat and Habitat Associations: The short-eared owl is usually found in open areas with few trees, including annual grasslands, prairies, dunes, meadows, agricultural fields, and emergent wetlands. Tall grasses, brush, ditches, and wetlands are used for resting and roosting cover (Grinnell and Miller, 1944).

Natural History: This species is a big-headed, short-necked owl with tawny to buff-brown plumage and whitish belly. Short-eared owls typically breed from early March through July (Bent, 1938; as cited in USACE and CDFG, 2010). Courtship activities consist of aerial displays and hooting (Pitelka *et al.*, 1955; as cited in USACE and CDFG, 2010). Clutches usually consist of 5-7 eggs, however, may be higher during periods of high prey abundance. Females incubate the eggs and care for the semialtrical

young while males bring food to females at the nest. This species is primarily a crepuscular hunter and the great majority of their diet consists of small mammals (Holt and Leasure, 1993; Clark, 1975).

Threats: Numbers of this species have declined over much of its range due to the destruction and fragmentation of grassland habitats, grazing, and increased levels of predation (Remsen, 1978; Holt and Leasure, 1993).

Long-eared owl (*Asio otus*)

Status: The long-eared owl has been designated by CDFG as a California Species of Special Concern. This taxon is not federally or State listed as threatened or endangered.

General Distribution: The long-eared owl (*Asio otus*) occurs in North America, Europe, Asia, and northern Africa between elevations from near sea level to over 2,000 meters (6,560 feet) AMSL (Zeiner *et al.* 1990A). In North America, this species breeds from British Columbia east across Canada and the United States and south to southern California, southern Arizona, and northern Mexico. It also winters in most of its breeding range, except in the northernmost areas. The long-eared owl's wintering range extends from southern Canada and northern New England to the Gulf states and to the Jalisco, Michoacan, Guerrero, and Oaxaca states in Mexico (Marks *et al.* 1994).

Distribution in the Study Area: Suitable habit occurs within the Study Area; however, there are no known reports of this species within or adjacent to the Study Area. This species is known to occur on portions of the ANF to the southwest of the Study Area

Habitat and Habitat Associations: The long-eared owl primarily uses riparian habitat for roosting and nesting, but can also use live oak thickets and other dense stands of trees (Zeiner *et al.* 1990A). It appears to be more associated with forest edge habitat than with open habitat or forest habitat (Holt 1997). The long-eared owl usually does not hunt in the woodlands where it nests, but in open space areas such as fields, rangelands, and clearings. At higher elevations, the species is found in conifer stands that are usually adjacent to more open grasslands and shrublands (Marks *et al.* 1994). In California, long-eared owls also nest in dense or brushy vegetation amid open habitat (Bloom 1994). Long-eared owls have also been known to nest in caves, cracks in rock canyons, and in artificial wicker basket nests (Marks *et al.* 1994; Garner and Milne 1997).

Natural History: The long-eared owl eats mostly voles and other rodents, though it also occasionally eats birds and other vertebrates (Armstrong 1958). It typically begins hunting before sunset, especially during the nesting season and while feeding its young (Bayldon 1978). The long-eared owl uses abandoned crow, magpie, hawk, heron, and squirrel nests in a variety of trees with dense canopy (Call 1978; Marks 1986). The nest is usually three to 15 meters (9.8 to 49.2 feet) above the ground; rarely is the nest on the ground or in a tree cavity (Karalus and Eckert 1974). Breeding season extends from early March to late July (Call 1978).

Threats: Resident populations of the long-eared owl in California have been declining since the 1940s, especially in southern California (Grinnell and Miller 1944; Remsen 1978; Bloom 1994). Habitat destruction, including grasslands used for foraging, fragmentation of riparian nesting habitat and live oak groves, and proximity to urban development are cited as major factors in the decline of populations in California (Marks *et al.* 1994; Bloom 1994; Remsen 1978). Nesting long-eared owls appear to be

particularly sensitive to human activity. Human disturbance usually flushes females from active nests, and while females usually return within 10 minutes of the disturbance, eggs and hatchlings are vulnerable to predation while the nest is exposed (Marks 1986). Other urban-related factors that could affect long-eared owls are nighttime lighting, which may disrupt activity patterns and expose nests to nocturnal predators; use of pesticides, which may cause secondary poisoning and reduction or loss of prey; and predation and harassment by pet, stray, and feral cats and dogs.

Burrowing owl (*Athene cunicularia*)

Status: The burrowing owl is a CDFG Species of Special Concern. This taxon is not federally or State listed as threatened or endangered.

General Distribution: The burrowing owl (Athene cunicularia) breeds from southern interior British Columbia, southern Alberta, southern Saskatchewan, and southern Manitoba, south through eastern Washington, central Oregon, and California to Baja California, east to western Minnesota, northwestern Iowa, eastern Nebraska, central Kansas, Oklahoma, eastern Texas, and Louisiana, the southern portion of Florida, and south to central Mexico. The species is also locally distributed throughout suitable habitat in Central and South America to Tierra del Fuego, and in Cuba, Hispaniola, the northern Lesser Antilles, Bahama Islands, and in the Pacific Ocean off the west coast of Mexico (County of Riverside, 2008; as cited in USACE and CDFG, 2010). The western subspecies, western burrowing owl, occurs throughout North and Central America west of the eastern edge of the Great Plains south to Panama (County of Riverside, 2008; as cited in USACE and CDFG, 2010). The winter range of the western burrowing owl is much the same as the breeding range, except that most individuals apparently vacate the northern areas of the Great Plains and the Great Basin (County of Riverside, 2008; as cited in USACE and CDFG, 2010).

Distribution in the Study Area: There are no known records for this species in the Study Area; nearest CNDDB record for this species occurs approximately 10 miles to the northwest. While suitable habitat for this species does not occur within the Study Area it does occur along portions of the proposed haul routes.

Habitat and Habitat Associations: In California, western burrowing owls are yearlong residents of flat, open, dry grassland and desert habitats at lower elevations (Bates, 2006; as cited in USACE and CDFG, 2010). They typically inhabit annual and perennial grasslands and scrublands characterized by low-growing vegetation and also may occur in areas that include trees and shrubs if the cover is less than 30% (Bates, 2006; as cited in USACE and CDFG, 2010); however, they prefer treeless grasslands. Although western burrowing owls prefer large, contiguous areas of treeless grasslands, they have also been observed in fallow agriculture fields, golf courses, cemeteries, road allowances, airports, vacant lots in residential areas and university campuses, and fairgrounds when nest burrows are present (Bates 2006; County of Riverside, 2008; as cited in USACE and CDFG, 2010). The availability of numerous small mammal burrows, such as those of California ground squirrel (*Spermophilus beecheyi*), is a major factor in determining whether an area with apparently suitable habitat supports western burrowing owls (Coulombe, 1971; as cited in USACE and CDFG, 2010).

Natural History: The majority of western burrowing owls that breed in Canada and the northern United States are believed to migrate south during September and October and north during March and April,

and into the first week of May. These individuals winter within the breeding habitat of more southern-located populations. Thus, winter observations may include both the migrant individuals as well as the resident population (County of Riverside, 2008; as cited in USACE and CDFG, 2010). Western burrowing owls occurring in Florida are predominantly non-migratory, as are populations in southern California (Thomsen, 1971; as cited in USACE and CDFG, 2010). Western burrowing owls in northern California are believed to migrate (Coulombe, 1971; as cited in USACE and CDFG, 2010). In many parts of the United States, the western burrowing owl's breeding range has been reduced and it has been extirpated from certain areas, including western Minnesota, eastern North Dakota, Nebraska, and Oklahoma (Bates 2006; as cited in USACE and CDFG, 2010).

Western burrowing owls are opportunistic feeders, primarily feeding on arthropods, small mammals, and birds, and often need short grass, mowed pastures, or overgrazed pastures for foraging (County of Riverside, 2008; as cited in USACE and CDFG, 2010). Western burrowing owls are primarily crepuscular in their foraging habits but hunting has been observed throughout the day (Thomsen 1971; Marti 1974; all as cited in USACE and CDFG, 2010). Insects are often taken during daylight, whereas small mammals are taken more often after dark (County of Riverside, 2008; as cited in USACE and CDFG, 2010).

Threats: Factors related to declines in western burrowing owl populations include the loss of natural habitat due to urban development and agriculture; other habitat destruction; predators, including domestic dogs; collisions with vehicles; and pesticides/poisoning of ground squirrels (Grinnell and Miller 1944; Zarn 1974; Remsen 1978; as cited in USACE and CDFG, 2010). A ranking of the most important threats to the species included loss of habitat, reduced burrow availability due to rodent control, and pesticides (James and Espie 1997; as cited in USACE and CDFG, 2010).

Ferruginous hawk (*Buteo regalis*)

Status: The California horned lark is designated a CDFG Watch List species. This taxon is not federally or State listed as threatened or endangered.

General Distribution: The ferruginous hawk (*Buteo regalis*) occurs throughout western North America from southernmost Canada between the Great Plains and Rocky Mountains, south to northern Arizona and New Mexico. This species breeds from southeast Alberta and extreme southwest Manitoba south to the northwest corner of Texas, west to the Great Basin, Columbia River Basin regions of eastern Oregon and southeast Washington. It was more recently discovered breeding in California (Small 1994). The ferruginous hawk most commonly winters from southern California, Colorado, Arizona, and New Mexico to northern Texas. Northern populations are completely migratory, while birds from southern breeding locations appear to migrate short distances or to be sedentary (Bechard and Schmutz 1995). The ferruginous hawk is an uncommon winter resident and migrant at lower elevations and open grasslands in the Modoc Plateau, Central Valley, and Coast Ranges of California (Polite and Pratt 1999).

Distribution in the Study Area: There are no known records for this species in the Study Area; nearest CNDDB record for this species occurs approximately 10 miles to the northwest. This species is a

known winter resident in the Antelope Valley. Limited foraging habitat is present within the Study Area.

Habitat and Habitat Associations: The ferruginous hawk forages in open grasslands, agriculture (primarily grazing lands), sagebrush flats, desert scrub, and fringes of pinyon–juniper habitats (Polite and Pratt 1999). Birds seem to show a strong preference for elevated nest sites (boulders, creek banks, knolls, low cliffs, buttes, trees, large shrubs, utility structures, and haystacks), but will nest on nearly level ground when elevated sites are absent and when located far from human activities (Bechard and Schmutz 1995). Their winter range consists of open terrain from grassland to desert.

Natural History: Nest-building generally occurs in March in southern to mid-latitudes and birds occur on breeding areas from late February through early October (NatureServe 2012). In California, it has been reported that this species prefers native grassland and shrubland habitats over cropland, and areas with no perches for their nest sites (Janes 1985). Clutch size for this species is usually two to four with an incubation period of about 32 to 33 days. Young fledge in 35 to 50 days (Natureserve 2012).

Threats: The major threat to this species is the loss of breeding and wintering habitat. Local declines of ferruginous hawk have been noted (*e.g.*, Woffinden and Murphy 1989), but a widespread decline was not evident as of the early 1990s (57 FR 37507–37513; Olendorff 1993). Olendorff (1993) attributed population declines to the effects of cultivation, grazing, poisoning, and controlling small mammals, mining, and fire in nesting habitats, with cultivation being the most serious source of impact. Impacts from collisions with stationary or moving structures or objects, pesticides and other contaminants, and shooting and trapping are not considered significant for this species.

Swainson's hawk (*Buteo swainsoni*)

Status: Swainson's hawk is State Listed as Threatened. This taxon is a USFWS Bird of Conservation Concern and a U.S. Forest Service Sensitive species.

General Distribution: Swainson's hawks breed regularly from southwestern Canada to northern Mexico. The western limit of their breeding distribution extends from eastern Washington, eastern Oregon, and northeastern California, through Nevada to northern and southeastern Arizona. The eastern limit of the breeding range extends to western Minnesota, eastern Nebraska, central Kansas, central Oklahoma, and central Texas. Apparently isolated outlier populations also occur in the interior valleys of British Columbia, the Central Valley of California, west-central Missouri, and in northeastern Illinois. Nearly all Swainson's hawks spend the northern hemisphere winter in South America (BLM, 2005).

Historically, the Swainson's hawk breeding range in California included the Great Basin (including the Modoc Plateau); the Sacramento and San Joaquin Valleys; along the coast in Marin, Monterey, Ventura, Los Angeles, and San Diego counties; and a few scattered sites in the Colorado and Mojave deserts. Today, Swainson's hawks still nest in most previously occupied regions of the state, but the number of breeding birds has been greatly reduced throughout major portions of the range (e.g., Central Coast Ranges), and the species has been extirpated in coastal southern California. Only the Central Valley and Modoc Plateau still support more than a few isolated pairs. In California, migrating flocks of up to 100 or more Swainson's hawks may be observed away from the major mountain ranges

during the spring and fall. These observations have become less frequent as the overall population has declined. About 30 birds have wintered in the Sacramento-San Joaquin River Delta annually since 1991 and are the only confirmed regularly wintering population in California (BLM, 2005).

Distribution in the Study Area: Limited suitable nesting habitat is present within the Study Area; there are no known records for this species within the Study Area. This species may migrate through the Study Area during the winter.

Habitat and Habitat Associations: The natural foraging habitat of Swainson's hawks is relatively open stands of grass-dominated vegetation and relatively sparse shrublands. Trees are typically widely scattered or found in bands along riparian corridors. Much of the original habitat has been converted to either urban development or cultivated agricultural uses. Swainson's hawks can forage agricultural fields with many types of crops. However, some studies have found that this species is more abundant in areas of moderate agricultural development than in either grassland or areas of extensive agricultural development. Alfalfa fields are routinely used by foraging Swainson's hawks. Orchards and vineyards in general are not suitable foraging habitat for Swainson's hawk due to the dense woody cover (BLM, 2005).

Natural History: Breeding Swainson's hawks have three general habitat requirements: (1) suitable foraging habitat with adequate prey, (2) nest sites, and (3) and isolation from disturbances that may disrupt breeding activities. The primary nest trees in the western Mojave Desert are Joshua trees and Fremont cottonwoods, but other large trees could also be used, especially where planted in narrow bands such as agricultural windbreaks (e.g., cottonwoods). In both the West Mojave Planning Area and the Eastern Mojave National Preserve, Swainson's hawks forage on suitable prey within the Joshua tree woodlands. In addition, agricultural areas with suitable crop types and located in proximity to nest sites may meet Swainson's hawk foraging requirements (BLM, 2005).

Threats: Several hypotheses have been suggested to explain the decline of Swainson's hawks in California. Among them are: (1) mortality during migration and on the wintering grounds in South America; (2) poisoning by toxic chemicals, including pesticides, in South America; (3) eggshell thinning; (4) habitat loss on the wintering grounds; (5) disturbance on the breeding grounds; (6) loss or degradation of habitat on the breeding grounds; and (7) increased competition with other species. No single hypothesis provides an adequate explanation for the observed declines in California, and all are likely contributors. Within the West Mojave Planning Area, loss or degradation of nesting and foraging habitat is the primary threat to the small breeding population of Swainson's hawks (BLM, 2005).

Northern harrier (*Circus cyaneus*)

Status: The northern harrier is a CDFG Species of Special Concern. This taxon is not federally or State listed as threatened or endangered.

General Distribution: The northern harrier is found throughout the northern hemisphere. In North America, this species breeds from Alaska and the southern Canadian provinces south to Baja California, New Mexico, Texas, Kansas, and North Carolina (Limas, 2001).

Distribution in the Study Area: There are no known recent records for this species in the Study Area; the Study Area is located within the known geographic range for this species; suitable breeding and foraging habitat occurs within the Study Area.

Habitat and Habitat Associations: Northern harriers use a wide variety of open habitats in California, including deserts, coastal sand dunes, pasturelands, croplands, dry plains, grasslands, estuaries, flood plains, and marshes (MacWhirter and Bildstein, 1996; as cited in USACE and CDFG, 2010). The species can also forage over coastal sage scrub or other open scrub communities.

Natural History: The northern harrier's owl-like facial disk and white rump patch, which is prominent in flight, distinguish this species from all other North American falconiformes (Alsop III, 2001). Many California populations, including those in Ventura County, are residents, and many migrating harriers winter in California (CPIF, 2000). The breeding season for this species typically occurs between mid-March to early April. During this period, males, and occasionally females, exhibit uniquely characteristic courtship flights consisting of a series of nose dives (Bent, 1937). The northern harrier is predominately monogamous, but polygyny occurs when prey abundance is high. Nests are built on the ground. Clutch size averages five, and incubation lasts 30-32 days with nestlings fledging at 30-35 days. Hatching occurs from April through June (CPIF, 2000). This bird relies on hearing as well as sight while hunting and primarily feeds on small mammals, but will also take reptiles, amphibians, birds, and invertebrates.

Threats: The primary threat to northern harriers is habitat loss through development and agricultural conversion (CPIF, 2000).

Western yellow-billed cuckoo (*Coccyzus americanus occidentalis*)

Status: The western yellow-billed cuckoo is state listed as endangered and is listed as a federal candidate for listing.

General Distribution: The yellow-billed cuckoo (Coccyzus americanus) occurs as a breeding bird in temperate North America, south to Mexico, and the Greater Antilles. It possibly breeds in Central America and northwestern South America, although its breeding range may be confused by reports of non-breeding adult vagrants outside of known breeding areas during the breeding season. The northern limit of its distribution extends west from southern Maine through southern New Hampshire, Vermont, northern and central New York, extreme southwestern Quebec, southern Ontario, the Upper Peninsula of Michigan, northern Minnesota, and possibly into southeastern North Dakota and northeastern and western South Dakota (Hughes 1999; as cited in USACE and CDFG, 2010). Its breeding range extends southward along the Atlantic Coast to southern Florida, and west to the extreme eastern portion of Wyoming, the eastern plains of Colorado, and throughout Texas (Hughes 1999; as cited in USACE and CDFG, 2010).

Distribution in the Study Area: There are no known records for this species in the Study Area; there are no CNDDB records for this species within a 15 mile radius of the Study Area; the Study Area is located

within the known geographic distribution for this species; extremely limited breeding and foraging habitat occurs in the Study Area.

Habitat and Habitat Associations: Breeding habitat for the western yellow-billed cuckoo primarily consists of large blocks of riparian habitat, particularly cottonwood–willow riparian woodlands (66 FR 38611–38626; as cited in USACE and CDFG, 2010). Laymon and Halterman (1989; as cited in USACE and CDFG, 2010) proposed that the suitable habitat for the western yellow-billed cuckoo for California be defined as habitat classified as willow–cottonwood with a patch size greater than 80 hectares (198 acres) and width greater than 600 meters (1,270 feet). It prefers dense riparian thickets with dense low-level foliage near slow-moving water sources.

Natural History: The western yellow-billed cuckoo's range is considered to be where it formerly bred from southwestern British Columbia, western Washington, northern Utah, central Colorado, and western Texas south and west to southern Baja California, Sinaloa, and Chihuahua in Mexico (Hughes, 1999; as cited in USACE and CDFG, 2010). In California, the western yellow-billed cuckoo's breeding distribution is now thought to be restricted to isolated sites in the Sacramento, Amargosa, Kern, Santa Ana, and Colorado river valleys (Laymon and Halterman, 1987; as cited in USACE and CDFG, 2010). Nests are constructed in willows on horizontal branches in trees, shrubs, and vines, but cottonwoods (Populus spp.) are used extensively for foraging and humid lowland forests are used during migration (Hughes, 1999; as cited in USACE and CDFG, 2010).

The western yellow-billed cuckoo is a long-distance migrant, though details of its migration patterns are not well known (Hughes, 1999; as cited in USACE and CDFG, 2010). It is a relatively late spring migrant, arriving on the breeding grounds starting mid- to late May (Franzreb and Laymon, 1993; as cited in USACE and CDFG, 2010). The migratory route of western yellow-billed cuckoos is not well known because few specimens collected on wintering grounds have been ascribed to the western or eastern subspecies. The western yellow-billed cuckoo likely moves down the Pacific Slope of Mexico and Central America to northwestern South America (Hughes, 1999; as cited in USACE and CDFG, 2010).

Yellow-billed cuckoos generally forage for caterpillars and other large insects by gleaning (Hughes 1999; as cited in USACE and CDFG, 2010). They occasionally prey on small lizards, frogs, eggs, and young birds as well (Zeiner *et al.*, 1990a; as cited in USACE and CDFG, 2010). Foraging occurs extensively in cottonwood riparian habitat (Hughes, 1999).

Threats: The western yellow-billed cuckoo is sensitive to habitat fragmentation and degradation of riparian woodlands due to agricultural and residential development (Hughes, 1999; as cited in USACE and CDFG, 2010), and major declines among western populations reflect local extinctions and low colonization rates (Laymon and Halterman, 1989; as cited in USACE and CDFG, 2010).

White-tailed kite (*Elanus leucurus*)

Status: The white-tailed kite is a CDFG Fully Protected Species. This taxon is not federally or State listed as threatened or endangered.

General Distribution: The white-tailed kite is a permanent resident in California, southern Texas, Washington, Oregon, and Florida. It also occurs as a resident from Mexico into parts of South America (Dunk, 1995). In California, this species inhabits coastal and valley lowlands and is typically found in agricultural areas. It has increased population numbers and range in recent decades (Zeiner *et al.*, 1990a).

Distribution in the Project Areas: There are no known records for this species in the Study Area or surrounding areas. The Study Area is located within the known geographic distribution for this species; limited breeding and foraging habitat occurs in the Study Area.

Habitat and Habitat Associations: The white-tailed kite inhabits savanna, open woodlands, marshes, desert grasslands, partially cleared lands, and cultivated fields (Dunk, 1995). This species roosts in trees with dense canopies as well as saltgrass and Bermuda grass (Zeiner *et al.*, 1990a).

Natural History: The white-tailed kite is a medium-sized, long-winged raptor with red eyes. This monogamous species breeds from February to October, with peak activity occurring between May and August. Incubation is solely performed by the female; however, during incubation and the nestling period, the male feeds the female and provides her with food to feed the young (CDFG, 2008). The white-tailed kite is the only North American kite that hovers while hunting, usually less than thirty meters above the ground before descending vertically upon prey (Alsop III, 2001; Zeiner *et al.*, 1990a). This species primarily feeds on voles and other small mammals but will also take birds, insects, reptiles, and amphibians. Although white-tailed kites are non-migratory, individuals may become nomadic in response to prey availability (Zeiner *et al.*, 1990a).

Threats: While the white-tailed kite is reported to have increased in numbers and range over the past several decades, it is still vulnerable to habitat loss due to development.

Southwestern willow flycatcher (*Empidonax traillii extimus*)

Status: The southwestern willow flycatcher is federally and state listed as endangered.

General Distribution: The southwestern willow flycatcher has a known United States breeding range in six states: Arizona, New Mexico, California, southwestern Colorado, extreme southern portions of Nevada and Utah, and, possibly, western Texas. In California, its breeding range extends from the Mexican border north and inland to the City of Independence in the Owens Valley east of the Sierra Nevada, to the South Fork Kern River in the San Joaquin Valley and coastally to the Santa Ynez River in Santa Barbara County (Craig and Williams 1998; as cited in USACE and CDFG, 2010). The southwestern willow flycatcher was formerly a common summer resident throughout California, but has been extirpated from most of its historic breeding range in California.

Distribution in the Study Area: There are no known records for this species in the Study Area or surrounding areas. The Study Area is located within the known geographic distribution for this species; suitable breeding habitat is not present within the Study Area as this species prefers riparian areas of greater density than are present. Suitable foraging habitat occurs throughout the Study Area.

Habitat and Habitat Associations: The southwestern willow flycatcher is a riparian-obligate species restricted to complex streamside vegetation. Four general habitat types are used by the southwestern willow flycatcher at its breeding sites: monotypic high-elevation willow; exotic monotypes (e.g., dense stands of tamarisk (Tamarix spp.) or Russian olive (Elaeagnus angustifolius)), especially in the desert southwest; native broadleaf-dominated riparian forest; and mixed native/exotic forests (Sogge *et al.*, 1997; as cited in USACE and CDFG, 2010). Of these, native broadleaf-dominated and mixed native/exotic are the primary habitats used by southwestern willow flycatcher in California. The native broadleaf-dominated habitat is composed of a single species, such as Goodding's or other willow (Salix spp.) species,, or a mixture of broadleaf trees and shrubs, including cottonwood (Populus spp.), willow, box elder (Acer negundo), ash (Fraxinus spp.), and alder (Alnus spp.). Stands are usually three to 15 meters (10 to 50 feet) in height and are characterized by trees of different size classes, yielding multiple layers of canopy (Sogge *et al.*, 1997; as cited in USACE and CDFG, 2010).

Natural History: Willow flycatchers are late spring migrants and have a breeding season of three months or less (Sedgwick 2000; as cited in USACE and CDFG, 2010). The earliest spring arrival of the willow flycatcher in southern California is typically between late April and early May. When a willow flycatcher is observed in southern California after about June 22, or if nesting activity is observed, it can be concluded that the individual is E. t. extimus (southwestern willow flycatcher). By this date, most migrant willow flycatchers have passed through southern California; however, migrant willow flycatchers may again be observed—virtually always away from the coast—in late July as they pass through the region heading south to their wintering area (Sogge *et al.* 1997; as cited in USACE and CDFG, 2010).

Breeding territory sizes of the southwestern willow flycatcher vary greatly in relation to population density, habitat quality, and nesting stage (USFWS 2002c; as cited in USACE and CDFG, 2010). The observed range of territory sizes is 0.1 to 2.30 hectares (0.26 to 5.70 acres), with most in the range of 0.2 to 0.5 hectares (0.5 to 1.2 acres) (USFWS 2002c; as cited in USACE and CDFG, 2010). Clutches of two to four eggs are laid in the third week in June, with fledglings first appearing in mid-July (Sanders and Flett 1989; as cited in USACE and CDFG, 2010). Fledglings stay close to the nest and to each other for three to five days after leaving the nest and stay in the area for a minimum of 14 to 15 days (Sogge *et al.* 1997; as cited in USACE and CDFG, 2010).

Threats: The decline of southwestern willow flycatchers is primarily due to loss, fragmentation, and degradation of suitable riparian habitat resulting from urbanization, recreation, water diversion and impoundments, channelization, invasive plant species, overgrazing by livestock, and conversion of riparian habitat to agricultural land (USFWS, 2002; Sedgwick, 2000; all as cited in USACE and CDFG, 2010). Channelization, bank stabilization, levees, and other flow control structures, surface water diversions, and groundwater pumping for agricultural, industrial, and municipal uses are major factors in the deterioration of suitable southwestern willow flycatcher habitat.

California horned lark (*Eremophila alpestris actia*)

Status: The California horned lark is designated a CDFG Watch List species. This taxon is not federally or State listed as threatened or endangered.

General Distribution: Horned larks (*Eremophila alpestris*) have a holarctic distribution, ranging from the Arctic south to central Asia and Mexico. There are numerous regional subspecies representing the superspecies across this holarctic range, including the California horned lark (*Eremophila alpestris* ssp. *actia*). Horned larks are common and abundant residents in a variety of open habitats, usually where trees and shrubs are absent and can be found from sea level to elevations of 4,000 meters (13,123 feet) AMSL (Beason 1995). In general, the northernmost populations of horned lark are migratory, moving south during the winter into remaining areas of the breeding range. There are also southward movements into areas south of the breeding range, particularly in the southeastern United States (Beason 1995). The California horned lark breeds and resides in the coastal region of California from Sonoma County southeast to the United States–Mexico border, including most of the San Joaquin Valley, and eastward to the foothills of the Sierra Nevada (Grinnell and Miller 1944; AOU 1998).

Distribution in the Study Area: There are no known records for this species in the Study Area; there are no CNDDB records for this species within a 15 mile radius of the Study Area. Limited breeding and foraging habitat occurs in the Study Area.

Habitat and Habitat Associations: It is found in grasslands along the coast and deserts near sea level and alpine dwarf-shrub habitat above the tree line. It is less common in mountain regions, on the north coast, and in coniferous or chaparral habitats (McCaskie *et al.* 1979). The California horned lark uses predominantly agriculture, grassland, and disturbed areas for foraging, as well as sparse shrub and scrub habitats (Garrett and Dunn 1981). In winter, flocks frequent roadsides, feedlots, and fields where manure from feedlots is spread.

Natural History: California horned larks breed from March through July, with a peak in activity in May and they frequently raise two broods in a season (Zeiner *et al.* 1990A).

Threats: In addition to direct loss of habitat and fragmentation, California horned larks are vulnerable to several effects related to agriculture and urbanization. Increased use of pesticides, specifically Carbofuran and Fenthion, have been shown to poison and kill horned larks (Beason 1995). The demonstrated deleterious effects of these pesticides illustrate that horned larks may be vulnerable to certain chemicals because of their ground-foraging habits and seasonally varying diet. Pesticides may also cause a decline in prey abundance. Mowing of grasslands occupied by nesting horned larks substantially increased nest failures (Kershner and Bollinger 1996). Horned lark nests can also be parasitized by brown-headed cowbirds, especially after the first brood when there are multiple broods in a single season (Beason 1995). Other development- and human-related impacts expected to affect this species include construction-related dust; noise and ground vibration; nighttime lighting, which may induce physiological stress and increase predation by nocturnal predators; and increased predation by pet, stray, and feral cats and dogs. Areas of increased moisture may attract Argentine ants that prey on nestlings.

Merlin (*Falco columbarius*)

Status: The merlin is a CDFG Watch List Species that was removed from the Species of Special Concern list in 2008. This taxon is not federally or State listed as threatened or endangered.

General Distribution: In North America, this species breeds from the northward tree limit in Alaska and Canada southward to southern Alaska, Oregon, Idaho, South Dakota, the northern Great Lakes

region, New York, Maine, and Nova Scotia. Breeding does not occur in California; however, this species does occur in most of the western half of the state below roughly 4000 feet through the winter season (September to May) (CDFG, 2008).

Distribution in the Study Area: There are no known records for this species in the Study Area or surrounding areas; this species is a winter resident that does not breed in California; the Study Area is located within the known geographic winter distribution for this species; suitable foraging habitat occurs throughout the Study Area.

Habitat and Habitat Associations: The merlin occurs in a wide variety of habitats, including marshes, deserts, seacoasts, open woodlands, fields, and communities in early successional stages (Garrett and Dunn, 1981).

Natural History: The merlin is a small, averaging twelve inches in length, member of the falcon family (Falconidae) with a long tail and long, pointed wings. This species winters in California from September to May and wanders, but does not apparently defend, foraging territories throughout the winter range (Becker and Sieg, 1987; Warkentin and Oliphant, 1990; Sodhi and Oliphant, 1992). Merlins primarily prey on small birds, which are captured on the ground or in the air, after direct pursuit (CDFG, 2008). Small mammals and insects are also consumed, the latter of which may be taken while young merlins are developing their predatory skills.

Threats: There are no persistent threats identified for this species; however, because merlins feed primarily on birds, numbers have been likely reduced due to pesticide use.

Prairie Falcon (*Falco mexicanus*)

Status: The prairie falcon is a CDFG Watch List Species that was removed from the Species of Special Concern list in 2008, and a USFWS Bird of Conservation Concern. This taxon is not federally or State listed as threatened or endangered.

General Distribution: This species is an uncommon permanent resident that occurs throughout California with the exception of the humid northwest coastal belt (Small, 1994).

Distribution in the Study Area: There are no known records for this species in the Study Area. The CNDDB reports one historic occurrence approximately 10 miles to the west of the Study Area. Marginal (at best) nesting habitat occurs within the Study Area; suitable foraging habitat occurs throughout the Study Area.

Habitat and Habitat Associations: The prairie falcon occurs in a wide variety of habitats from annual grasslands to alpine meadows, but is most commonly associated with perennial grasslands, savannahs, rangelands, some agricultural fields, and desert scrub areas (CDFG, 2008). This species usually nests on sheltered cliff ledges overlooking open areas.

Natural History: This species is a medium-sized falcon with a dark brown cap and cheek and distinct dark mustache markings. Prairie falcons breed in mid-April on cliff edges or rock outcrops in open areas. The male rarely takes an active role in the incubation process; however, may provide food to the female during this time (Stephenson and Calcarone, 1999). Hatchlings are tended by both adults until fledging at roughly forty days (Baicich and Harrison, 1997). Prairie falcons prey primarily on small passerine birds; however, lizards, ground squirrels, and other small mammals are also consumed (Steenhof, 1998). This species utilizes two hunting strategies, including flushing a prey item while flying along a concealed route until the last moment and patrolling along long distances close to the ground until surprising and attacking a prey item (Dunne *et al.*, 1988).

Threats: The loss of suitable foraging habitat to human development, particularly in coastal California, has been identified as a primary threat to this species.

American peregrine falcon (*Falco peregrinus anatum*)

Status: The peregrine falcon is a California Fully Protected species.

General Distribution: The peregrine falcon has a worldwide distribution that is more extensive than that of any other bird. In North America, the peregrine falcon breeds from Alaska to Labrador, southward to Baja California and other parts of northern Mexico, and east across central Arizona through Alabama. Its distribution is patchy in North America, and populations in the eastern United States are still chiefly in urban areas (AOU, 1998; White *et al.*, 2002; as cited in USACE and CDFG, 2010).

Distribution in the Study Area: There are no known recent records for this species in the Study Area; the Study Area is located within the known geographic range for this species; suitable breeding habitat does not occur within but may be present in areas adjacent to the Study Area; foraging habitat occurs throughout the Study Area.

Habitat and Habitat Associations: Peregrine falcons in general use a large variety of open habitats for foraging, including tundra, marshes, seacoasts, savannahs, grasslands, meadows, open woodlands, and agricultural areas. Sites are often located near rivers or lakes (AOU, 1998; Brown, 1999; Snyder, 1991; all as cited in USACE and CDFG, 2010). Riparian areas, as well as coastal and inland wetlands, are also important habitats year-round for this species. The species breeds mostly in woodland, forest, and coastal habitats (Zeiner et al,. 1990a; Brown, 1999; all as cited in USACE and CDFG, 2010).

Natural History: In California, the American peregrine falcon is an uncommon breeder or winter migrant throughout much of the state. It is absent from desert areas (Zeiner *et al.*, 1990a; as cited in USACE and CDFG, 2010). Active nests have been documented along the coast north of Santa Barbara, in the Sierra Nevada, and in other mountains of northern California. As a transient species, the American peregrine falcon may occur almost anywhere that suitable habitat is present (Garrett and Dunn, 1981; as cited in USACE and CDFG, 2010).

The diet of the American peregrine falcon primarily consists of birds that, while most are pigeon-sized, can be as small as hummingbirds or as large as small geese (White *et al.*, 2002; as cited in USACE and

CDFG, 2010). Other prey species include jays, flickers, meadowlarks, starlings, woodpeckers, shorebirds, and other readily available birds. The American peregrine falcon may feed on large numbers of rodents when present (Brown, 1999; as cited in USACE and CDFG, 2010).

Breeding requires cliffs or suitable surrogates that are close to preferred foraging areas. Nests are typically located in cliffs between 50 and 200 meters (164 to 656 feet) tall that are prominent in the landscape. American peregrine falcons have also been known to nest in trees and on small outcrops. Tall buildings, bridges, or other tall man-made structures are also suitable for nesting (White *et al.*, 2002; as cited in USACE and CDFG, 2010). The nest site usually provides a panoramic view of open country and often overlooks water. It is always associated with an abundance of avian prey, even in an urban setting. A cliff or building nest site may be used for many years (Brown, 1999; as cited in USACE and CDFG, 2010). The nest site itself usually consists of a rounded depression or scrape with accumulated debris that is occasionally lined with grass (Call, 1978; as cited in USACE and CDFG, 2010). Higher-quality nest sites confer greater protection from the elements and have greater breeding success (Olsen and Olsen, 1989; as cited in USACE and CDFG, 2010).

Threats: There are no persistent threats identified for this species.

California condor (*Gymnogyps californianus*)

Status: The California condor is listed as both state and federally endangered and is a California Fully Protected species.

General Distribution: The southern California population of the California condor is largely confined to the semi-arid, rugged mountain ranges surrounding the southern San Joaquin Valley, including the Coast Ranges from Santa Clara County south to Los Angeles County, the Transverse Ranges, Tehachapi Mountains, and southern Sierra Nevada (Zeiner *et al.*, 1990a; as cited in USACE and CDFG, 2010). The California condor has also historically occurred in northern Baja California, Mexico; northern California; Oregon; Washington; and south British Columbia, Canada in the early nineteenth century (Harris, 1941; Koford, 1953; Wilbur, 1978; Kiff, 2000; Snyder and Snyder, 2000; all as cited in USACE and CDFG, 2010).

Distribution in the Study Area: There are no known records for this species in the Study Area although they have been observed flying over the San Gabriel Mountains. Suitable breeding and foraging habitat is not present within the Study Area.

Habitat and Habitat Associations: California condors require vast expanses of open savannah, grasslands, and foothill chaparral, with cliffs, large trees, and snags for roosting and nesting (Zeiner *et al.*, 1990a; as cited in USACE and CDFG, 2010).

Natural History: Prior to all California condors being removed from the wild for captive breeding in the late 1980s, nonbreeding California condors often moved north to Kern and Tulare counties in April and returned south in September to winter in the Tehachapi Mountains, Mount Pinos, and Ventura and Santa Barbara counties (Zeiner et al,. 1990A; as cited in USACE and CDFG, 2010). Since that time,

California condors have been reintroduced into suitable habitat in eastern Ventura County as well as in the Ventana Wilderness area along the coast south of San Francisco.

The California condor requires an adequate food supply, open habitat in which food can readily be found and accessed, and reliable air movements that allow extended soaring flight (Snyder and Schmitt, 2002; as cited in USACE and CDFG, 2010). Most foraging has been documented in grasslands and oak woodlands, where individuals can easily launch into flight from nearly any location by running downhill, and where winds deflected by topographic relief usually provide the uplift necessary for extended flight (Snyder and Schmitt, 2002; as cited in USACE and CDFG, 2010). Most California condors forage within 50 to 70 kilometers (31 to 43 miles) of nesting areas, with core foraging areas ranging around 2,500 to 2,800 square kilometers (1,553 to 1,740 miles). This wide-ranging foraging area appears to be an adaptation to unpredictable food supplies.

The California condor primarily feeds on mammalian carrion, although remains of reptiles and birds have been occasionally found within nests (Collins *et al.*, 2000; as cited in USACE and CDFG, 2010). California condors are scavengers of fresh medium- to large-sized carcasses, such as sheep, cattle, deer, and elk (Koford, 1953; Snyder and Snyder, 2000; Collins *et al.*, 2000; all as cited in USACE and CDFG, 2010). California condors are not known to feed on vehicle-killed animals, but in recent years, hunter-shot mule deer, shot or poisoned coyotes, and ground squirrels were consumed when available (Snyder and Schmitt, 2002; as cited in USACE and CDFG, 2010).

California condors typically breed annually but frequently breed less often. Observations of new pair formations have been observed in late fall and early winter (Snyder and Schmitt 2002; as cited in USACE and CDFG, 2010). Once pairs have been formed, the California condors stay together year round for multiple years. California condors lay only one egg; this can occur from the last week of January through the first week of April, with an incubation period averaging 57 days. The hatching of the eggs ranges between the last week of March and the first week of June. The chicks are tended by both parents until the chicks are fledged, which occurs five and a half to six months after hatching. The chicks are fully dependent on their parents for approximately another six months, ending roughly a year after hatching, from early March to mid-May (Snyder and Schmitt, 2002; as cited in USACE and CDFG, 2010).

Threats: Major threats to this species include lead poisoning, collisions, poisoning due to ingestion of antifreeze, drowning and shooting. An increase in power lines and utility poles, which can result in collisions and electrocution; microtrash (e.g., bottle caps, pull tabs, broken glass, cigarette butts, small plastic items, lead bullets, and shell casings, which condors can ingest); long-term habitat degradation; and contaminants other than lead and antifreeze also have the potential to affect individuals.

Yellow-breasted chat (*Icteria virens*)

Status: The yellow-breasted chat is a CDFG Species of Special Concern. This taxon is not federally or State listed as threatened or endangered.

General Distribution: Although this species is a widespread summer resident in eastern North America, its distribution is much more fragmented in the west. In California, yellow-breasted chat primarily occurs in the northern portion of the state and is considered scarce in the central and southern portions.

Distribution in the Study Area: There are no known recent records for this species in the Study Area; the Study Area is located within the known geographic range for this species; limited breeding and foraging habitat occurs in the Study Area.

Habitat and Habitat Associations: In southern California, this species utilize dense riparian thickets and brushy tangles near watercourses for breeding (Garrett and Dunn, 1981). Similar habitat is used during migration (Dunn and Garrett, 1997).

Natural History: The yellow-breasted chat is the largest member of the warbler family (Parulidae). Its yellow throat and breast, olive underparts and white spectacles distinguish this species from other similar birds. The yellow-breasted chat breeds in April or May through August. Females initiate nest construction, which begins shortly after pair formation, above ground in dense shrubs along a river or stream. Both parents tend to nestlings until they fledge at roughly nine days (Stephenson and Calcarone, 1999). This species feeds primarily on insects and spiders that are gleaned from the foliage of low trees and shrubs; however, berries and other fruits are also consumed (CDFG, 2008).

Threats: The loss and degradation of riparian habitat have resulted in a marked decline of breeding populations of yellow-breasted chat in California. Nest parasitism by brown-headed cowbird (*Molothrus ater*) has also contributed to declines (Gaines, 1974; Remsen, 1978).

Loggerhead shrike (*Lanius ludovicianus*)

Status: The loggerhead shrike is a CDFG Species of Special Concern and a USFWS Bird of Conservation Concern. This taxon is not federally or State listed as threatened or endangered.

General Distribution: The breeding range of the loggerhead shrike includes Alberta, Saskatchewan, and Manitoba in Canada; the majority of the United States except the Pacific Northwest; and Mexico (Yosef, 1996). This species is a common resident and winter visitor in lowlands and foothills throughout California.

Distribution in the Study Area: Although not documented within the Study Area an occurrence of this species is reported from the CNDDB approximately 2.5 miles east of the Study Area. Suitable foraging and breeding habitat occurs within the Study Area.

Habitat and Habitat Associations: The loggerhead shrike prefers open habitats with scattered shrubs, trees, posts, fences, utility lines, or other perches. This species most often occurs in open-canopied valley foothill hardwood forests, valley-foothill hardwood-conifer forests, valley foothill riparian, pinyon-juniper woodlands, desert riparian, and Joshua tree habitats.

Natural History: The loggerhead shrike is a large-headed bird with a hooked beak and whitish underparts. The breeding season for this species generally begins in late January or early February, earlier than those of other sympatric passerine species, and lasts through July (Stephenson and Calcarone, 1999). Nests are typically constructed in well-concealed microsites in densely foliaged trees or shrubs (Miller, 1931; Bent, 1950). Females typically feed nestlings until fledging occurs at 16 to 20 days; however, males will feed nestlings if females are absent from the nest for extended periods of time (Stephenson and Calcarone, 1999). This species preys primarily on large insects, but will also take small birds, mammals, amphibians, reptiles, fish, carrion, and various invertebrates. Loggerhead shrikes often impale their prey on barbed wire or other sharp objects.

Threats to Species: Breeding Bird Survey data indicate that loggerhead shrike populations are declining in most states (Sauer *et al.*, 1996). Threats include habitat loss and degradation, shooting, and pesticide and other toxic contamination.

Long-billed curlew (*Numenius americanus*)

Status: The long-billed curlew is a CDFG Watch List Species. This taxon is not federally or State listed as threatened or endangered.

General Distribution: The breeding range of this migratory species extends from eastern New Mexico and the Texas panhandle, north through western Kansas, central Nebraska, central South Dakota, and western North Dakota and west to portions of Montana and southern Alberta, Saskatchewan, Manitoba, and British Columbia. In the Great Basin the curlew ranges from Utah west to California and north into eastern Washington and British Columbia. Winter distribution is scattered across the southern United States. Long-billed curlews winter from California, into western Nevada, Arizona, eastern New Mexico, western and southern Texas, and coastal Louisiana south to Baja, California, and Guatemala. Wintering curlews are found in small numbers along the Atlantic coast from South Carolina to Florida as well. [NRCS, 2010]

Distribution in the Study Area: There are no known recent records for this species in the Study Area; there are a variety of eBird records for this species approximately 20 miles to the north within the Lancaster Area. Suitable habitat occurs within portions of the Study Area.

Habitat and Habitat Associations: Generally nest in short grasses including grass prairies or agricultural fields and move to denser grasslands after young have fledged. Long-billed curlews winter at the coast and in Mexico.

Natural History: The long-billed curlew is the largest nesting or regularly-occurring sandpiper in North America. The bird usually feeds in flocks. Using its long bill, it probes the mud near its habitat, foraging for suitable food. The usual food consists of crabs and various other small invertebrates. The species also feeds on grasshoppers, beetles and other insects. This bird has occasionally been known to eat the eggs of other birds. The long-billed curlew is a precocial bird, and the chicks leave the nest soon after hatching. Both parents look after the young.

Threats: Development and urbanization along the coastal habitats threaten this species.

Osprey (*Pandion haliaetus*)

Status: The osprey is a CDFG Watch List Species. This taxon is not federally or State listed as threatened or endangered.

General Distribution: The osprey is one of only two wild bird species with a worldwide distribution (the other is peregrine falcon). In California, this species typically breeds in the northern part of the state from the Cascade Range south to Lake Tahoe and along the coast to Marin County (Stephenson and Calcarone, 1999). Osprey is an uncommon visitor along the coast of southern California (Zeiner *et al.*, 1990a). Although this species is almost entirely migratory across its range, some areas of southern California, including Ventura County, support year-round residents (Ferguson-Lees and Christie, 2001).

Distribution in the Study Area: There are no known recent records for this species in the Study Area; there are a variety of eBird records for this species approximately 20 miles to the north within the Lancaster Area. Suitable habitat occurs within portions of the Study Area.

Habitat and Habitat Associations: This species most commonly occurs along rivers, lakes, reservoirs, and sea coasts, often crossing land between bodies of water (AOU, 1998). Nests are typically found in tree snags, on cliffs, and among various manmade structures, usually near or above water.

Natural History: The osprey is easily distinguished by its unmarked white belly, wing shape, and flight style. This species typically breeds between late March and early June as the male arrives to breeding sites first followed by the female a few days later (Johnsgard, 1990). Nests consist of a massive accumulation of sticks and other debris and may be added to and used in successive years (Stephenson and Calcarone, 1999). A single brood of three eggs is incubated by both sexes. Ospreys hunt by initially scanning water surfaces from an elevated perch, often followed by a period of hovering, and then diving from heights of roughly 16-23 feet above the water (Stephenson and Calcarone, 1999). Prey consists almost entirely of salt or freshwater surface feeding fish; however, reptiles, sick or injured birds, crustaceans, or small mammals are sometimes taken (Ferguson-Lees and Christie, 2001).

Threats: Threats that have been identified for this species include disturbance from recreation and other activities near nests, development near lakes and rivers, and removal of suitable nesting sites.

Vermilion flycatcher (*Pyrocephalus rubinus*)

Status: The vermilion flycatcher is designated by CDFG as a California Species of Special Concern. This taxon is not federally or State listed as threatened or endangered.

General Distribution: In California, the vermilion flycatcher was formerly considered a more common and widespread breeder along the lower Colorado River, Imperial Valley, Coachella Valley, upper Mojave River drainage, and San Diego County (Grinnell and Miller 1944; Garrett and Dunn 1981), but its breeding range has declined throughout this area (Wolf and Jones 2000). Currently, in California, there are some isolated breeding populations in the lowlands in the south central and southeast portions of the state, including San Bernardino, Riverside, San Diego, Santa Barbara, Ventura, and Kern

counties (Wolf and Jones 2000). Zeiner *et al.* (1990A) state that there are sporadic breeding populations in desert oases west and north of the Morongo Valley and Mojave Narrows in San Bernardino County. It has been recorded in summer along the Santa Clara River near Castaic and at Frazier Park, Kern County; however, there has been no evidence of breeding, and these observations are likely vagrants (Garrett and Dunn 1981).

Distribution in the Study Area: There are no known recent records for this species in the Study Area; there is a 2010 eBird record for this species approximately 7 miles to the northwest at Lake Palmdale. Suitable habitat occurs within portions of the Study Area.

Habitat and Habitat Associations: This species is found in riparian thickets near open, mesic habitats. It breeds in cottonwood, willow, mesquite, oak, sycamore, and other vegetation in desert riparian communities that are located adjacent to irrigated fields, irrigated ditches, or pastures (Zeiner *et al.* 1990A; Wolf and Jones 2000).

Natural History: Although the vermilion flycatcher is largely a resident species, where it does show migratory movements, the male arrives to the breeding locations in February or March and females arrive afterwards, typically in March or April, depending on location (Wolf and Jones 2000). Males play a large role in determining the nest site, which is built in a horizontal fork or branch under a canopy in an area free of leaves, about eight to 20 feet above ground (Wolf and Jones 2000; Tinkham 1949). The nest is a shallow open cup, loosely constructed out of small twigs, forbs, rootlets, grasses, fibers, or other similar materials and is lined with feathers and hair (Wolf and Jones 2000).

Threats: This species primarily is threatened by the degradation and loss of habitat. The abundance and distribution of this species has been drastically reduced over the last 50 years in the lower Colorado River Valley. Water management, such as groundwater pumping and damming, can reduce and degrade riparian habitat and remove vegetation, such as cottonwoods and willows, that is critical to its breeding. Urbanization and human development have also degraded or reduced vermilion flycatcher habitat. Like other riparian bird species, however, several other potential human- or development-related factors may affect the vermilion flycatcher. Construction-related impacts include dust; noise and ground vibration; diminished water quality and altered hydrology; increased human activity in close proximity to foraging areas; and lighting, which may alter foraging behavior, induce physiological stress, and increase predation risk. Long-term effects related to development include increased human activity; noise; lighting; diminished water quality and altered hydrology; predation and harassment by pet, stray, and feral cats and dogs and other mesopredators; and pesticides, which may reduce insect prey or cause secondary poisoning.

Bank swallow (*Riparia riparia*)

Status: The bank swallow is state listed as threatened.

General Distribution: A neotropical migrant found primarily in riparian and other lowland habitats in California west of the deserts during the spring-fall period. A spring and fall migrant in the interior, less common on coast; an uncommon and very local summer resident. Casual in southern California in winter; a few winter records along central coast to San Mateo Co. (McCaskie *et al.*, 1988).

Distribution in the Study Area: There are no known recent records for this species in the Study Area; There are numerous eBird records for this species approximately 20 miles to the northwest near the City of Lancaster. Suitable habitat occurs within portions of the Study Area.

Habitat and Habitat Associations: This swallow requires fine-textured or sandy banks or cliffs to dig horizontal nesting tunnels/burrows (CDFG, 1999).

Natural History: Predominantly a colonial breeder; colonies range in size of 10 to 1,500 nesting pairs in California, although most colonies have 100-200 nesting pairs. Forages by hawking insects during long, gliding flights. Feeds predominantly over open riparian areas, but also over brushland, grassland, wetlands, water, and cropland. Feeds on a wide variety of aerial and terrestrial soft-bodied insects including flies, bees, and beetles. Uses holes dug in cliffs and river banks for cover. Will also roost on logs, shoreline vegetation, and telephone wires. [CDFG, 1999].

Threats: Channelization and stabilization of banks of nesting rivers, and other destruction and disturbance of nesting areas, are major factors causing the marked decline in numbers in recent decades (CDFG, 1999)

Allen's hummingbird (*Selasphorus sasin*)

Status: The Allen's hummingbird is a CDFG Special Animal. This taxon is not federally or State listed as threatened or endangered.

General Distribution: This species is a permanent resident in Ventura County. It also occurs as a common summer resident and migrant along much of the California coast.

Distribution in the Study Area: There are no known recent records for this species in the Study Area. There are several eBird records for this species approximately 5 miles to the northwest and 10 miles to the east. Suitable habitat occurs throughout the Study Area.

Habitat and Habitat Associations: Breeding for this species most commonly occurs in coastal scrub, valley and foothill hardwood forests, valley and foothill riparian forests, and urban habitats. Allen's hummingbird also occurs in a variety of woodland and scrub habitats as a migrant (CDFG, 2008).

Natural History: This species is a small hummingbird with a green back and crown and distinctive rufous markings on the flanks and tail. The Allen's hummingbird often attaches its nest to more than one lateral support on eucalyptus, juniper, willow, other trees, vines, shrubs, or ferns (CDFG, 2008). Breeding occurs from mid-February through early August with peak activity occurring in April. Large mating territories are rigorously defended as are smaller feeding territories (Legg and Pitelka, 1956). The primary diet of this species consists of nectar taken from a variety of herbaceous and woody flowering plants; however, small insects and spiders may also be consumed (CDFG, 2008).

Threats: No persistent threats have been identified for this species.

Le Conte's thrasher (*Toxostoma lecontei*)

Status: The Le Conte's thrasher is designated by CDFG as a California Species of Special Concern. This taxon is not federally or State listed as threatened or endangered.

General Distribution: The Le Conte's thrasher is found throughout the Southwestern United States and Northwestern Mexico.

Distribution in the Study Area: There are no known records for this species in the Study Area. The CNDDB reports occurrences of this species approximately 5 miles northeast of the Study Area. Suitable habitat occurs within portions of the Study Area.

Habitat and Habitat Associations: Sparse desert scrub such as creosote bush, Joshua tree, and saltbush scrubs, or sandy-soiled cholla-dominated vegetation. Nests in dense, spiny shrubs or densely branched cactus in desert wash habitat.

Natural History: The Le Conte's thrasher forages on the ground for insects and spiders, as well as some seeds and berries.

Threats: In some parts of its range, the Le Conte's Thrasher has lost extensive habitat to development. Irrigated lawns, groves, and fields are not compatible with its need for desert vegetation.

MAMMALS

Ringtail (*Bassariscus astutus*)

Status: The ringtail is a CDFG Fully Protected Species. This taxon is not federally or State listed as threatened or endangered.

General Distribution: This species is widely distributed throughout California with the exceptions of the northeastern deserts and the Central Valley.

Distribution in the Study Area: There are no known recent records for this species in the Study Area; the Study Area is located within the known geographic range for this species and it is known to occur within sections of the San Gabriel Mountains. Suitable habitat is present within portions of the Study Area.

Habitat and Habitat Associations: Ringtails occur in a variety of habitats, including chaparral, coastal sage scrub, riparian scrub, oak woodlands, and riparian woodlands. This species prefers habitats in proximity to permanent water.

Natural History: Some authors consider ringtails a subfamily of the family Procyonidae, which includes the raccoons and coatis (Burt and Grossenheider, 1954). Ringtails are long, slender animals with large ears and eyes, semi-retractile claws, and distinct black and white bands on a bushy tail. This species nests in rock recesses, hollow trees, logs, snags, abandoned burrows, or woodrat nests and breeding typically

occurs between February and May (NatureServe, 2012). Ringtails are opportunistic feeders, but primarily prey on rodents, rabbits, birds, bird eggs, reptiles, and invertebrates (Zeiner *et al.*, 1990b).

Threats: While no persistent threats have been identified for this species, the degradation of preferred riparian habitats has been suggested as a potential threat (Stephenson and Calcarone, 1999).

Pallid San Diego pocket mouse (*Chaetodipus fallax pallidus*)

Status: The pallid San Diego pocket mouse is designated by CDFG as a California Species of Special Concern. This taxon is not federally or State listed as threatened or endangered.

General Distribution: The pallid San Diego pocket mouse occurs mainly in arid coastal and desert border areas in San Diego Co., in Riverside Co. southwest of Palm Springs, in San Bernardino Co. from Cactus Flat in the San Bernardino Mts. to Oro Grande and east to Twenty-nine Palms. Elevational range from sea level to 4500 feet (Santa Rosa Mts., Riverside Co.) and 6000 feet (Cactus Flat, north slope San Bernardino Mts.) (Zeiner, et al., 1990b).

Distribution in the Study Area: There are no known recent records for this species in the Study Area; the Study Area is located within the known geographic range for this species. Nearest CNDDB for this record is approximately 7 miles to the southeast of the Study Area. Suitable habitat occurs within portions of the Study Area.

Habitat and Habitat Associations: The pallid San Diego pocket mouse prefers to inhabit desert wash, desert scrub, desert succulent scrub and/or pinyon-juniper woodland.

Natural History: This is a nocturnal species that is active year-round, although surface activity may be reduced during cold periods (Zeiner, et al., 1990b). The primary diet consists of seeds of forbs, grasses and shrubs, which are transported in cheek pouches. Predators include foxes, coyotes, badgers, owls and snakes.

Threats: A potential threat to this species is urban expansion and development.

Townsend's big-eared bat (*Corynorhinus townsendii*)

Status: The Townsend's big-eared bat is designated by CDFG as a California Species of Special Concern, and is a U.S. Forest Service Sensitive species. This taxon is not federally or State listed as threatened or endangered.

General Distribution:
The Townsend's big-eared bat (*Corynorhinus townsendii*) (big-eared bat) ranges throughout the western United States, British Columbia, Canada, and Mexico (Kunz and Martin, 1982). In the United States, it occurs in a continuous distribution in all the western states and east into western South Dakota, northwestern Nebraska, southwestern Kansas, western Oklahoma, and western Texas (Kunz and Martin 1982). It also is known from isolated gypsum caves in northeast Texas, Oklahoma, and Kansas and from limestone areas in Arkansas, Missouri, Oklahoma, Kentucky, Virginia, and West Virginia (Kunz and Martin, 1982). These relict populations are thought to reflect post-Pleistocene climates (Kunz and

Martin, 1982). In California, the CNDDB (CDFG, 2007A) contains 212 records for this species, of which 52 are from four counties in southern California: San Bernardino (33 records), San Diego (10 records), Riverside (five records) and Imperial (four records). There are no records for Los Angeles, Orange, or Ventura counties.

Distribution in the Study Area: There are no known recent records for this species in the Study Area; the Study Area is located within the known geographic range for this species. Roosting and foraging habitat occur within portions of the Study Area.

Habitat and Habitat Associations:
The big-eared bat is primarily associated with mesic habitats characterized by coniferous and deciduous forests, although it also occurs in xeric areas (Kunz and Martin 1982). In California, this species was historically associated with limestone caves and lava tubes located in coastal lowlands, agricultural valleys, and hillsides with mixed vegetation; it occurs in all parts of California, with the exception of alpine and subalpine areas of the Sierra Nevada (Zeiner *et al*. 1990B). The species also occurs in man-made structures and tunnels (Kunz and Martin 1982), and it has been suggested that the big-eared bat has become more common in the western United States due to the availability of man-made structures (Kunz and Martin 1982).

Natural History:
Big-eared bats are relatively sedentary and are not known to disperse or migrate large distances.
Maternity roosts are established in the warm parts of caves, mines, and buildings, with one or more clusters of females numbering up to about 100 individuals. Summer roosts of males are solitary. Young are born from late spring to early summer and are fully weaned by 42 days of age. First flight occurs by about 18 to 21 days. Big-eared bats take a variety of prey on the wing from the edge of forested habitats but also glean prey from vegetation to forage, including small moths, beetles, flies, lacewings, wasps, bees, and ants.

Threats:
Big-eared bats are very sensitive to human disturbances and a single disturbance of a maternity roost or hibernation site may cause abandonment (Zeiner *et al*. 1990B). All known limestone cave sites in California, for example, have been abandoned (Zeiner *et al*. 1990B). Other plausible threats to big-eared bats resulting from construction activities include disturbances of day roosts from human activity, noise, and dust, as well as effects of dust on insect prey. Potential long-term impacts from urban development also include human and pet, stray, and feral animals' disturbances of roost sites, roost site and foraging habitat degradation, such as trampling and invasive species, and pesticides that may cause secondary poisoning and affect prey abundance.

Spotted bat (*Euderma maculatum*)

Status: The spotted bat is a CDFG Species of Special Concern. This taxon is not federally or State listed as threatened or endangered.

General Distribution: The spotted bat has been found at a small number of localities, mostly in the foothills, mountains and desert regions of southern California. [CDFG, 2000]

Distribution in the Study Area: There are no known recent records for this species in the Study Area; the Study Area is located within the known geographic range for this species; potential breeding and suitable foraging habitat occurs within portions of the Study Area.

Habitat and Habitat Associations: Habitats occupied include arid deserts, grasslands and mixed conifer forests. Elevational range extends from below sea level in California to above 3000 m (10000 ft) in New Mexico. [CDFG, 2000]

Natural History: This bat prefers to roost in rock crevices but is occasionally found in caves and buildings; cliffs provide optimal roosting habitat. Moths are the principal food source of this species (CDFG, 2000). This species feeds in flight, over water, and near the ground, using echolocation to find prey and prefers sites with adequate roosting habitat, such as cliffs.

Threats: Threats to the spotted bat may include loss of habitat to development and the use of insecticides.

Western mastiff bat (*Eumops perotis californicus*)

Status: The western mastiff bat is a CDFG Species of Special Concern. This taxon is not federally or State listed as threatened or endangered.

General Distribution: The western mastiff bat occurs in two populations; one from the southwestern United States to central Mexico and the other from the northern and central portions of South America (Harvey *et al.*, 1999). The western or California mastiff bat subspecies primarily occurs from low to mid elevations in southern and central California southeast to Texas and south to central Mexico (Best *et al.*, 1996).

Distribution in the Study Area: There are no known recent records for this species in the Study Area; the Study Area is located within the known geographic range for this species; potential breeding and suitable foraging habitat occurs within portions of the Study Area.

Habitat and Habitat Associations: The western mastiff bat utilizes a variety of habitat types including desert scrub, chaparral, mixed conifer forest, giant sequoia forests, and montane meadows (Philpott, 1997). In southern California this bat typically roosts in semiarid areas with low-growing chaparral that does not obstruct cliffs or rock outcrops (Best *et al.*, 1996). Because of its large wingspan, this bat requires roosts that have at least 2 m of free space to drop from to initiate flight. These bats utilize natural crevices in granitic and sandstone cliffs as well as crevices in buildings for roosting (Best *et al.*, 1996; NatureServe, 2012).

Natural History: The western mastiff bat is the largest bat in the United States with a total length of 15.7 to 18.5 cm (NatureServe, 2012). This bat breeds in early spring with most births likely occurring from June through July, and females usually give birth to one offspring (NatureServe, 2012). Colonies typically consist of less than 100 individuals (NatureServe, 2012). Western mastiff bats are primarily insectivorous, and the diet contains a high proportion of moths (Philpott, 1997). Predators include peregrine falcon, American kestrel, red-tailed hawk, and barn owl (Best *et al.*, 1996).

Threats: Threats to the western mastiff bat include loss of habitat to development and the use of insecticides (Williams, 1986). In the southwest, loss of large open ponds used for drinking water threaten this subspecies, and activities that disturb or destroy cliff habitat (such as water impoundments, highway construction, and quarry operations) pose a threat as well (Texas Parks and Wildlife, 2009).

Western red bat (*Lasiurus blossevillii*)

Status: The Western red bat is designated by CDFG as a California Species of Special Concern, and is a U.S. Forest Service Sensitive species. This taxon is not federally or State listed as threatened or endangered.

General Distribution: The western red bat (*Lasiurus blossevillii*) occurs in California from Shasta County and Mendocino County in the north, and through the central coastal region and the Central Valley west of the Sierra Nevada/Cascade ranges to coastal southern California (Cryan 2003; Zeiner *et al*. 1990B), east into Arizona and New Mexico, and south into Baja California and mainland Mexico to South America (Cryan 2003). The species inhabits California year-round but makes seasonal movements within the state and, possibly, to Arizona and New Mexico (Cryan 2003).

Distribution in the Study Area: There are no known recent records for this species in the Study Area; the Study Area is located within the known geographic range for this species; potential breeding and suitable foraging habitat occurs within portions of the Study Area

Habitat and Habitat Associations: Red bats (*Lasiurus* spp.) typically roost in trees, occasionally in shrubs, and even on the ground (Shump and Shump 1982). They are usually solitary, but different bats may use different roosts on different days, and they occasionally form nursery colonies. Day roosts are commonly located in edge habitats adjacent to streams, open fields, and urban areas (Shump and Shump 1982).

Natural History: Red bats take a variety of prey, including moths, crickets, flies, true bugs, beetles, and cicadas (Shump and Shump 1982). They generally forage in grasslands, shrublands, open woodlands, and croplands, but they also take advantage of congregations of insects attracted to streetlights and building floodlights. Births occur in about mid-June and young develop rapidly, with flight occurring by 21 to 42 days of age (Shump and Shump 1982).

Threats: Like other bats, western red bats probably are generally vulnerable to human activity and related impacts. Unlike many other bat species, due to their use of day roosts in trees, shrubs, and sometimes on the ground, western red bats are especially vulnerable to predation by domestic cats, as well as opossums, great horned owls, kestrels, and roadrunners. Other plausible threats to western red bats resulting from construction activities include disturbances of day roosts from human activity, noise, and dust, as well as effects of dust on insect prey. Potential long-term impacts from urban development, in addition to pet, stray, and feral animals, include human disturbances of roost sites, roost site and foraging habitat degradation, such as trampling and invasive species, and pesticides that may cause secondary poisoning and affect prey abundance.

Hoary bat (*Lasiurus cinereus*)

Status: The hoary bat is a CDFG Special Animal. This taxon is not federally or State listed as threatened or endangered.

General Distribution: This species is the most widespread North American bat and occurs throughout California, although distribution is patchy in the southeastern deserts.

Distribution in the Study Area: There are no known recent records for this species in the Study Area; the Study Area is located within the known geographic range for this species; potential breeding and suitable foraging habitat occurs within portions of the Study Area.

Habitat and Habitat Associations: The hoary bat occurs in a wide variety of environments, but prefers open habitats or habitat mosaics with access to trees for cover. Open areas or habitat edges are also preferred for foraging.

Natural History: This species is distinguishable by its size and color, exhibiting distinct white markings on hair tips over most of the body (Burt and Grossenheider, 1954). Hoary bats breed in autumn and young are typically born between mid-May and early June (Zeiner *et al.*, 1990b). Females bear young while roosting in trees and may leave the young at the roosting site while foraging (Zeiner *et al.*, 1990b). Typically a solitary species, hoary bats are known to forage with many other bat species (CDFG, 2008). The primary diet of hoary bats consists of moths that are taken in flight; however, other flying insects are also consumed (Black, 1974, Whitaker *et al.*, 1977, 1981). There is a relatively high incidence of rabies in this species (Shump and Shump, 1982). No important predators are known, but owls likely prey on hoary bats (Zeiner *et al.*, 1990b).

Threats: No persistent threats have been identified for this species.

California leaf-nosed bat (*Macrotus californicus*)

Status: California leaf-nosed bat is listed as a CDFG Special Animal. This taxon is not federally or State listed as threatened or endangered.

General Distribution: This species has a limited distribution which extends from northwestern Mexico (Sonora and Sinaloa) and Baja California into Arizona, southern Nevada, and southern California (CDFG, 1998).

Distribution in the Study Area: There are no known recent records for this species in the Study Area; the Study Area is located outside the known geographic range for this species; potential breeding and suitable foraging habitat occurs within portions of the Study Area.

Habitat and Habitat Associations: The California leaf-nosed bat appears to be confined to lowland Sonoran Desert habitat below 900 m. This species also appears to be totally dependent on either caves or mines for roosting. Although it has occasionally been found night roosting in buildings or bridges, its maternity, mating, and overwintering sites are all in mines or caves. [CDFG, 1998]

Natural History: This bat is colonial, forming large seasonal aggregations. Females congregate in the spring and summer in maternity colonies of typically 100 to 200 bats (Barbour and Davis 1969, Vaughan 1959), although colonies of only 6-20 bats are also found. Within the larger colonies, clusters of five to 25 females will be associated with a single "harem" male that defends the cluster against intruding males (Brown and Berry 1991). Large male roosts may also form. Each female bears a single young between mid-May and early July. Maternity colonies disband once the young are independent in late summer. In September and October, males aggregate in "display" roosts, which may be separate from the maternity sites, where they are visited by females for mating (Pierson, 1998). Although pregnancy is initiated immediately, embryos undergo several months of "delayed development," remaining at a very early embryonic stage until development resumes in March (Bradshaw 1962). The total gestation period is almost nine months. This species also forms larger, mixed sex aggregations of up to 2,000 bats in winter. Unlike vespertilionids, phyllostomids do not hibernate. M. californicus has a narrow thermal-neutral zone, and appears incapable of entering torpor (Pierson, 1998). [CDFG, 1998]

Threats: Potential threats to this species include renewed mining, abandoned mine closures, disturbance from the public, urban expansion, loss of foraging habitat, landfills and military activities.

Western small-footed myotis (*Myotis ciliolabrum*)

Status: The Western small-footed myotis is designated by CDFG as a California Special Animal. This taxon is not federally or State listed as threatened or endangered.

General Distribution:
The western small-footed myotis (*Myotis ciliolabrum*) is widespread throughout western North America, from western Canada south through the western United States to northern Baja California and central Mexico (Hall 1981). In the United States, the species occurs in all states west of, and including, North Dakota to the north and Texas to the south. The species is absent from the coastal regions of Washington, Oregon, and California south to about Ventura County (Zeiner *et al.* 1990B). In California, it occurs in coastal southern California, the foothills of the Sierra Nevada, and the Great Basin Desert, and it is absent from the higher elevations in the mountains and from the lower elevations in the Mojave and Colorado deserts (Zeiner *et al.* 1990B).

Distribution in the Study Area: There are no known recent records for this species in the Study Area; the Study Area is located within the known geographic range for this species; potential breeding and suitable foraging habitat occurs within portions of the Study Area.

Habitat and Habitat Associations:

The western small-footed myotis occurs in a wide variety of arid upland habitats at elevations ranging from sea level to 2,700 meters (8,860 feet) (Zeiner *et al.* 1990B). Habitats used by this species include riparian areas, woodlands, and brushy uplands (Holloway and Barclay 2001; Zeiner *et al.* 1990B). Western small-footed myotis day roosts include rock crevices, caves, tunnels and mines, and, sometimes, buildings and abandoned swallow nests (Holloway and Barclay 2001). They also use day roosts as nocturnal roosts (*i.e.*, they may return to the day roost during the night) or may use buildings and concrete underpasses strictly as nocturnal roosts (Holloway and Barclay 2001).

Natural History:
Western small-footed myotis forage for moths, true flies, gnats, midges, mosquitoes, true bugs, and beetles, often along the margins of trees and over water (Zeiner *et al.* 1990B). Females establish maternity roosts, which may be solitary or colonial (with up to 20 individuals), where young are born and raised (Zeiner *et al.* 1990B). Males appear to establish solitary roosts during the breeding season (Zeiner *et al.* 1990B). Births generally occur in May and June, with a peak in late May (Zeiner *et al.* 1990B), and first flight by young occurs by about one month (Wilson and Ruff 1999).

Threats:
No documented threats to western small-footed myotis colonies have been reported in the scientific literature, but, like most bats, this species is likely very sensitive to human disturbance and because it may roost in abandoned buildings and under bridges (nocturnal roosts), it is vulnerable to vandalism, extermination, or inadvertent disturbance of roost sites.

Fringed myotis (*Myotis thysanodes*)

Status: The fringed myotis is designated by CDFG as a California Special Animal. This taxon is not federally or State listed as threatened or endangered.

General Distribution: The fringed myotis (*Myotis thysanodes*) is widespread throughout the western United States, southern British Columbia, Canada, Mexico, and Central America (O'Farrell and Studier 1980).

Distribution in the Study Area: There are no known recent records for this species in the Study Area; the Study Area is located within the known geographic range for this species; potential breeding and suitable foraging habitat occurs within portions of the Study Area.

Habitat and Habitat Associations: The fringed myotis typically occurs in a wide variety of desert, grass, and woodland habitats at middle elevations of 1,200 to 2,850 meters AMSL (3,937 to 9,350 feet) but is known from lower elevations along the west coast and may occur in pine–fir associations at higher elevations (O'Farrell and Studier 1980). Individuals observed in desert/steppe habitats were within a one-hour flight of forest and riparian habitats (O'Farrell and Studier 1980).

Natural History: During their most active season (April through September), fringed myotis leave their roosts at sundown and forage for small beetles, which comprise about 73% of their diet, in the vegetation canopy (O'Farrell and Studier 1980). They return to the roost by daylight. Females establish maternity colonies in late April in caves, tunnels, mines, and buildings where young are born and raised. Males establish solitary roost areas during the breeding season. Females leave by late September

and probably migrate or disperse to winter hibernacula (Wilson and Ruff 1999). Young are born in late June to early July (O'Farrell and Studier 1980). Young develop rapidly, with flight occurring by 16 days of age, and are fully developed by 20 to 21 days.

Threats: The fringed myotis is sensitive to disturbance of roost sites by humans, potentially resulting in abandonment (O'Farrell and Studier 1980; Wilson and Ruff 1999). Such disturbances could also disrupt the interaction of females and young, such as females failing to retrieve young that have fallen from the neonate cluster, which can result in mortality of the young. Other plausible threats to fringed myotis resulting from construction activities include disturbances of day roosts from human activity, noise, and dust, as well as effects of dust on insect prey. Potential long-term impacts from urban development also include pet, stray, and feral animals' disturbances of roost sites; roost site and foraging habitat degradation, such as trampling and invasive species; and pesticides that may cause secondary poisoning and affect prey abundance.

Long-legged myotis (*Myotis volans*)

Status: The long-legged myotis is designated by CDFG as a California Special Animal. This taxon is not federally or State listed as threatened or endangered.

General Distribution: The long-legged myotis (*Myotis volans*) is widespread throughout western North America, from extreme southeastern Alaska and western Canada (British Columbia and Alberta) south into Baja California and central Mexico (Hall 1981). In California, it occurs throughout the state except for the Central Valley, eastern Lassen and Modoc counties, and the non-mountainous regions of the Mojave and Colorado deserts (Zeiner *et al*. 1990B).

Distribution in the Study Area: There are no known recent records for this species in the Study Area; the Study Area is located within the known geographic range for this species; potential breeding and suitable foraging habitat occurs within portions of the Study Area.

Habitat and Habitat Associations: The long-legged myotis is a yearlong resident of California and primarily occurs in coniferous forests, but it also uses riparian and oak woodland habitats for roosting and foraging (Warner and Czaplewski 1984; Wilson and Ruff 1999; Zeiner *et al*. 1990B). Day roosts during warmer months typically are in hollow trees and under the bark of exfoliating trees (Zeiner *et al*. 1990B) but also include abandoned buildings, cracks in the ground, and crevices in canyons and cliff faces (Warner and Czaplewski 1984). Johnson *et al.* (2007) found that the long-legged myotis in a forested region of north-central Idaho used snags for roosts located mid-slope. This species uses caves and tunnels as winter hibernation areas, indicating local seasonal migrations. In addition to using forests and woodlands, the long-legged myotis also forages in coastal scrub, chaparral, and desert habitat (Zeiner *et al.* 1990B). Johnson *et al.* (2007) suggest that habitat selection is a function of preferred prey availability. Long-legged myotis occur at elevations ranging from 60 to 3,770 meters (197 to 12,370 feet) but are most commonly found at 2,000 to 3,000 meters (6,560 to 9,840 feet).

Natural History: Long-legged myotis appear to be opportunistic feeders, foraging both within and above the forest canopy and congregating with other bat species at areas of high insect concentrations (Zeiner *et al.* 1990B). They may be moth specialists, but they also feed on a variety of insects, including true flies, gnats, midges, mosquitoes, termites, true bugs, leafhoppers, ants, bees, wasps, lacewings, and beetles. They are active throughout the night, with a peak of foraging activity three to four hours after dark (Warner and Czaplewski 1984). Large maternity colonies of several hundred

individuals are formed in day roosts (Zeiner *et al.* 1990B). Timing of births is variable and occurs from May to August, possibly in relation to climate (Czaplewski 1984). Young have been observed flying by mid-July (Zeiner *et al.* 1990B).

Threats: No documented threats to long-legged myotis colonies have been reported in the scientific literature, but, like most bats, this species is likely very sensitive to human disturbance and because it may also roost in abandoned buildings, it is vulnerable to vandalism, extermination, or inadvertent disturbance of roost sites.

Southern grasshopper mouse (*Onychomys torridus Ramona*)

Status: The southern grasshopper mouse is designated by CDFG as a California Species of Special Concern. This taxon is not federally or State listed as threatened or endangered.

General Distribution: The southern grasshopper mouse (*Onychomys torridus*) occurs throughout desert habitats in the southwestern United States and much of Mexico, including western Nevada; the southern portions of California, Arizona, and New Mexico; northern Baja California; western Texas; and south to central Mexico (Hall 1981). The subspecies *O. t. ramona*, which is a California Species of Special Concern (CSC), is restricted to coastal southern California.

Distribution in the Study Area: There are no known recent records for this species in the Study Area; the Study Area is located within the known geographic range for this species; Suitable habitat occurs within limited portions of the Study Area.

Habitat and Habitat Associations: The southern grasshopper mouse is found rangewide in low arid scrub and semi-scrub vegetation (Frank and Heske 1992; McCarty 1975), and the subspecies *O. t. ramona* (which is the subspecies designated as a California Species of Special Concern) occurs in grasslands and sparse coastal scrub habitats. Specific habitat requirements of the southern grasshopper mouse generally are unknown, but Stapp (1997) found that the southern grasshopper mouse uses open expanses and microhabitats dominated by gopher mounds and burrows, possibly because of greater prey availability (*e.g.*, arthropods using burrows for refuge), greater mobility in open expanses, and dust bathing sites in these microhabitats.

Natural History: The southern grasshopper mouse's diet consists mainly of arthropods (*e.g.*, crustaceans, insects, centipedes, millipedes, and arachnids), but may also include other insects and small rodents (Baily and Sperry 1929; Horner *et al.* 1965; McCarty 1975; Stapp 1997). The southern grasshopper mouse is primarily nocturnal and appears to be active on the surface all year round (Baily and Sperry 1929; Frank and Heske 1992; McCarty 1975). Because of its high population turnover, relatively early age of sexual maturity, and senescence after the first year, the southern grasshopper mouse probably is subject to "boom and bust" population cycles and is perhaps at high risk of local extirpation under poor conditions.

Threats: There are no identified threats to the southern grasshopper mouse other than loss and fragmentation of grassland and sparse sage scrub habitats in coastal southern California, which probably are the greatest threats to local southern grasshopper mouse populations.

Tehachapi pocket mouse (*Perognathus alticolus inexpectatus*)

Status: The Tehachapi pocket mouse is designated by CDFG as a California Species of Special Concern, and is a U.S. Forest Service Sensitive species. This taxon is not federally or State listed as threatened or endangered.

General Distribution: P. a. inexpectatus occupies the Tehachapi Mountains from Tehachapi Pass southwest towards Gorman, as far west as Cuddy Valley near Mount Pinos, and east along the lower slopes of the San Gabriel Mountains to Elizabeth Lake (Williams et al., 1993).

Distribution in the Study Area: There are no known recent records for this species in the Study Area; the Study Area is located outside the known geographic range for this species. This species is however known to occur on the east slopes of the San Gabriel Mountains. Suitable habitat is present within the Study Area.

Habitat and Habitat Associations: The Tehachapi pocket mouse typically occupies native and non-native grasslands, Joshua tree woodland, pinyon-juniper woodland, yellow pine woodland, and oak savannah (Williams et al., 1993). It has also been captured in open pine forests at higher elevations (Huey, 1926), in chaparral and coastal sage communities at lower elevations (Best, 1994), and on rangeland and fallow grain fields (Sulentich, 1983). It constructs burrows in loose, sandy soils (Zeiner et al., 1990b).

Natural History: Little information is available concerning the ecology of the Tehachapi pocket mouse. Other members of the species group are nocturnal granivores, foraging primarily on seeds of grasses, forbs and annuals, but also on leafy plant material and insects (Verts and Kirkland, 1988). Most other members of the genus exhibit seasonal hibernation (Verts and Kirkland, 1988), and it is expected that P. a. inexpectatus does as well.

Threats: Livestock grazing is the predominate land-use throughout much of its range. It is unclear how grazing and its subsequent effects on plant diversity and abundance affect the Tehachapi pocket mouse. Many areas within the range of the Tehachapi pocket mouse are used for wind-generated electricity production or have the potential to support wind farms. Such areas are typically crossed by a network of roads, which could lead to increased erosion in steeper terrain. Mineral extraction is another potential threat to the Tehachapi pocket mouse. In general, surface disturbing activities such as mineral extraction are incompatible with persistence of the native small mammal assemblage. Conversion of native habitats to urban use has occurred in the Elizabeth Lake area. If the subspecies persists in small, scattered populations, it is highly vulnerable to local extirpation resulting from natural or human-related events. [BLM, No Date B]

Mohave ground squirrel (*Spermophilus mohavensis*)

Status: The Mohave ground squirrel is State Listed as Threatened.

General Distribution: The Mohave ground squirrel occupies portions of Inyo, Kern, Los Angeles and San Bernardino counties in the western Mojave Desert. The species ranges from near Palmdale on the

southwest to Lucerne Valley on the southeast, Olancha on the northwest and the Avawatz Mountains on the northeast (BLM, 2005).

Distribution in the Study Area: While this species has not been documented within the Study Area it is known to occur north and east of the Study Area. Although not expected to occur in the Study Area it may occur along the proposed haul routes north of the Study Area.

Habitat and Habitat Associations: The Mohave ground squirrel occupies all major desert scrub habitats in the western Mojave Desert. It has been observed in habitats such as Mojave creosote scrub, desert saltbush scrub, desert sink scrub, desert greasewood scrub, shadscale scrub, and Joshua tree woodland. These habitat types are distributed throughout the range of the Mohave ground squirrel. In the northern portion of the range of the Mohave ground squirrel, it is found in a plant association described as Mojave mixed woody scrub, typically occurring on hilly terrain and composed of a variety of shrub species (BLM, 2005).

Natural History: Activity periods for this species vary, and little is known about their reproduction (Ingles, 1979). Their diet consists of seeds and vegetative parts of desert plants, including fruits of the Joshua tree. Because of the aridity and high temperatures of its environment, the Mohave ground squirrel is a diurnal species spending up to seven months underground (Vanherweg, 2010).

Threats: The primary cause of the decline of the Mohave ground squirrel is destruction and fragmentation of its habitat and conversion to urban, suburban, agricultural, military and other uses (BLM, 2005).

American badger (*Taxidea taxus*)

Status: The American badger is a CDFG Species of Special Concern. This taxon is not federally or State listed as threatened or endangered.

General Distribution: The vast geographic range of the American badger extends as far north as Alberta, Canada and as far south as central Mexico (Hall, 1981). This species occurs in suitable habitat throughout California with the exceptions of the humid coastal forests of Del Norte and Humboldt Counties in the northwest part of the state (Williams, 1986). The elevation range for this species occurs between below sea level at Death Valley to as high as the Arctic-Alpine Life Zone (Long, 1973).

Distribution in the Study Area: There are no known records for this species in the Study Area; the Study Area is located within the known geographic distribution for this species; suitable habitat occurs within portions of the Study Area.

Habitat and Habitat Associations: American badgers exploit a wide variety of open, arid habitats, but are most commonly found in grasslands, savannas, mountain meadows, and open areas of desert scrub (Stephenson and Calcarone, 1999). Basic requirements that have been identified for this species appear to

be sufficient food (burrowing rodents), friable soils, and relatively open, uncultivated ground (Williams, 1986).

Natural History: American badgers are most often solitary animals that are primarily nocturnal, but have been reported occasionally foraging and dispersing during the daytime (Lindzey, 1978; Messick and Hornocker, 1981). This species is active year-round except at higher elevations and latitudes, where winter torpidity is common. During winter, individuals at lower elevations will exhibit reduced surface activity and may remain in a single burrow for days or even weeks (Long, 1973; Messick and Hornocker, 1981). This species is an opportunistic predator feeding on such prey resources as mice, chipmunks, ground squirrels, gophers, rabbits, and kangaroo rats. Reptiles, insects, birds, eggs, and carrion are also consumed (Williams, 1986; Zeiner *et al.*, 1990b). American badgers mate in the summer and early autumn with young born in March and early April (Long, 1973).

Threats: This species has experienced large population declines in many areas of southern California and has been steadily decreasing throughout the state over the last century (Williams, 1986). The major cause of mortality to adult badgers is vehicular accidents. Other common threats include habitat conversion to urban and agricultural uses, farming operations, shooting and trapping, poisoning, and reduction of prey base as a result of rodent control activities (Williams, 1986).

Appendix E – Least Bell's Vireo Survey Report

Appendix B

Geotechnical Investigation, Data Collection, and Survey Memoranda

EVALUATION OF GEOTECHNICAL TESTING ACTIVITIES AT LITTLEROCK RESERVOIR

1. Introduction

The intent of this evaluation is to provide the USDA Forest Service, Angeles National Forest (Forest Service) with information regarding geotechnical testing activities required to be undertaken associated with project design of the Littlerock Reservoir Sediment Removal Project as proposed by the Palmdale Water District (District). At the request of the Forest Service, this evaluation consists of a description of the geotechnical testing activities, and a discussion of impacts to hydrology, biology, and heritage resources.

2. Description of Drilling Activities

Overview and Purpose

The Littlerock Reservoir Sediment Removal Project would consist of the construction of a grade control structure and the excavation of between 270,000 and 540,000 cubic yards of sediment from Littlerock Reservoir (Reservoir). The grade control structure would be constructed of soil cement or concrete and span approximately 250 feet of the channel.

The purpose of the geotechnical drilling and testing is to obtain subsurface information to be used in a geotechnical investigation in support of the design of the proposed grade control structure.

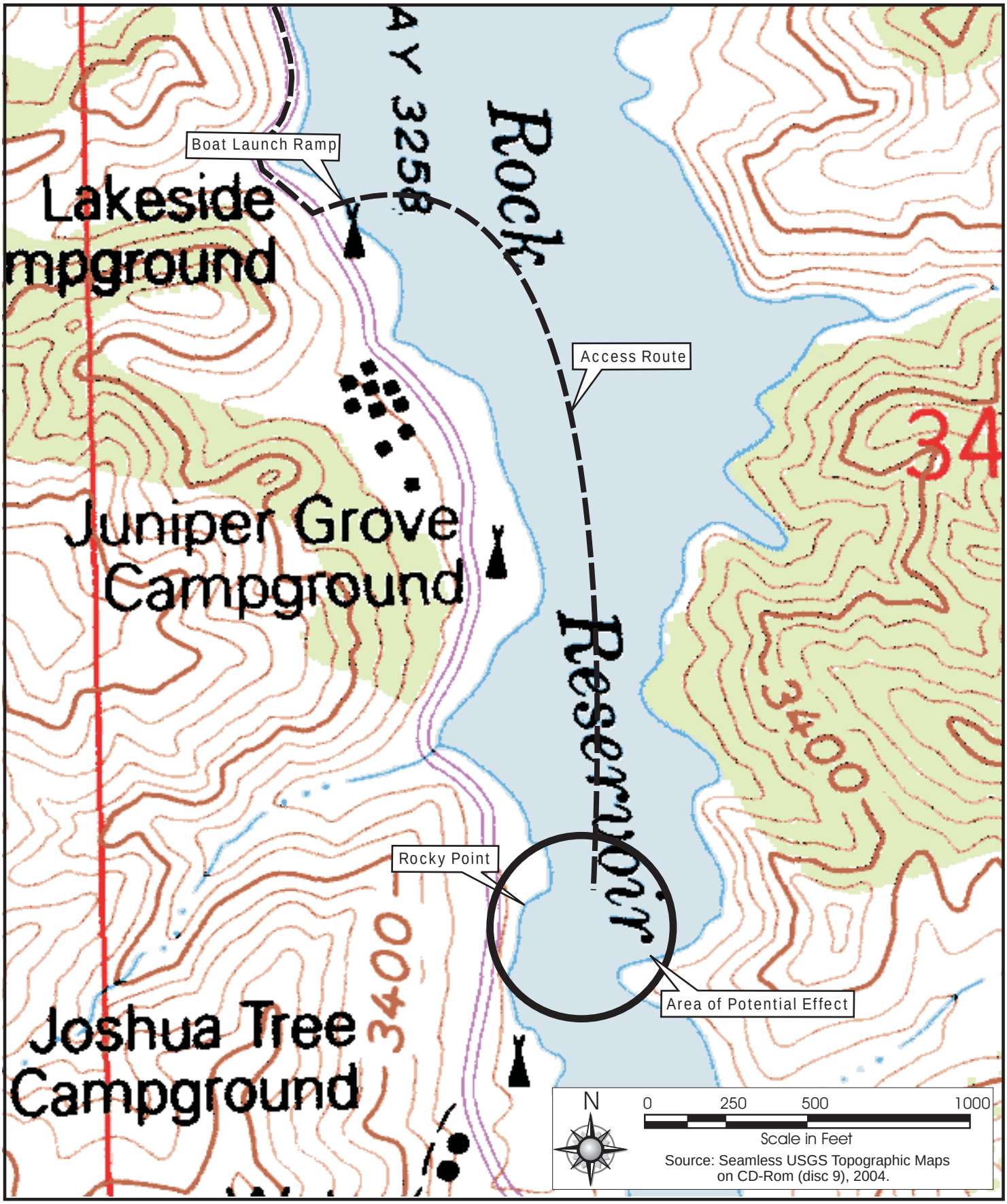
Location, Schedule, and Equipment

The geotechnical testing would occur at the proposed grade control site within the Littlerock Reservoir, which is a man-made feature formed by the impoundment of water by the Littlerock Dam. The Reservoir is located on Littlerock Creek in the northeastern foothills of the San Gabriel Mountains on the western edge of the Mojave Desert. The Reservoir is located within the boundaries of the Santa Clara Mojave Rivers Ranger District of the Angeles National Forest. Littlerock Creek, which supplies water to the reservoir, is an intermittent stream supported by annual rainfall and snowmelt, and flows north from its headwaters located on the slope of nearby Mount Williamson. Regionally, the reservoir is located approximately 10 miles southeast of the City of Palmdale and 4 miles south of the community of Littlerock in the northern Los Angeles County area.

Construction of the proposed grade control structure would occur at or just downstream of River Station 4,235 (the Rocky Point area). Although there is some flexibility in the location of the grade-control structure, this area has been selected at a location that would allow a minimum size of the structure, allow for the removal of reservoir sediment, and prevent impacts to the stream channel from sediment loss and headcutting upstream of this location.

The area of potential effect (APE) for geotechnical testing activities is shown on Figure 1, which illustrates the access (via a dashed line) route that testing equipment would use, and a circle where drilling of test pits could potentially occur.

Drilling activities would begin approximately the last week of August 2007, and would take up to 10 calendar days.



Aspen Environmental Group	**Area of Potential Effect for Geotechnical Testing**	**LITTLEROCK RESERVOIR SEDIMENT REMOVAL PROJECT** Figure 1

Equipment that would be used to conduct the drilling and testing activities include an all-terrain (caterpillar-tread) drilling rig with up to two support vehicles. Support vehicles would be a pick-up truck and a water truck. A water tank may be towed behind the drill rig instead of using a separate truck for water. A drill rig plus support vehicles would enter the dry reservoir at the boat ramp and travel up the dry reservoir bed to the Rocky Point area as shown in Figure 1. Alternatively, the equipment would access to the reservoir at the existing off highway vehicle access point just north of Rocky Point. The drill rig will set up and make borings up to 100 feet in depth and approximately 8 inches in diameter. Drilling will be by rotary wash drilling.

Mud brought up from the hole would be collected in a metal pan and removed with the drill rig when the job is complete. The drilling mud would be tested for hazardous substances and, if any found, the mud will be disposed of in an approved hazardous waste disposal facility.

The total area of disturbance for each boring will be about 12 feet by 15 feet, and there will be a disturbance from vehicle access and turn-around. After drilling is finished the holes are sealed with grout. The final observed result on the ground is a disturbed area about 180 square feet in size, plus surrounding vehicle tracks. There will be up to seven borings. Each boring may have a separate set up.

3. Biological Resources Evaluation

The proposed geotechnical testing would occur within and/or adjacent to Littlerock Creek at Rocky Point near the upstream terminus of the Reservoir. This area is historically subject to annual inundation and when water levels recede, routine off highway vehicle use. Littlerock Creek is also known to support sensitive biological resources at locations upstream of the Reservoir including the arroyo toad (*Bufo californicus*), a federally endangered species. Under optimal conditions, arroyo toads have been documented to occur above Sage Campground which is located approximately 300 feet upstream of Rocky point. This biological resources evaluation is intended to provide a concise summary of the existing biological conditions at the proposed testing site and to provide an assessment of the potential to impact arroyo toads or other sensitive plant or wildlife species that may occur in the area.

Literature Review

The project area is currently located within the project footprint of the Littlerock Reservoir Sediment Removal Project. As part of the environmental documentation for the project, a literature search was performed prior to conducting the field surveys of the project area. This included portions of the project located within the U.S. Geological Survey's (USGS) Pacifico Mountain California 7.5' topographic quadrangle. A search of the California Department of Fish and Game California Natural Diversity Data Base (CNDDB) was also conducted for this quadrangle and the surrounding eight quadrangles to determine special-status plants, wildlife, and vegetation communities that have been documented within the vicinity of the proposed Project. Additional data regarding the potential occurrence of special-status species and policies regarding these sensitive natural resources were gathered from the following sources:

- State and federally listed endangered and threatened animals of California (CDFG 2007a);
- Special animals list (CDFG 2007b);
- Inventory of Rare and Endangered Plants of California (CNPS 2001);
- Inventory of Rare and Endangered Plants (online edition, v7-07b). (CNPS 2007);

- Angeles National Forest Land Management Plan (USDA Forest Service, 1987);
- County of Los Angeles General Plan (County of Los Angeles 1980);
- Pacific Southwest Region Regional Forester's Sensitive Species List (USDA Forest Service 2001); and
- Biological Assessment for the Littlerock Dam and Reservoir Sediment Control Plan (PCR 2001).

This information, combined with field observations, was used to determine the potential for impacts to sensitive plants and wildlife at the proposed geotechnical testing site.

Survey Methodology

Both the USDA Forest Service (USFS) and the District's environmental consultant, Aspen Environmental Group (Aspen), have conducted a variety of surveys in the project area and Rocky Point, particularly for arroyo toads. The field survey areas have included the entire Project area of the reservoir and area immediately upstream of the reservoir. Surveys for arroyo toads were performed at Rocky Point and the area upstream of Sage Campground. However, as typical toad usage has been documented at and above Santiago Canyon, most of the focused surveys for these species has commenced in this section of the creek. Santiago Canyon is located over one thousand feet upstream of the proposed geotechnical testing site. Some of the field surveys of the project area were conducted on June 19, 2005, July 8, 2006, October 5, 2006, December 7, 2006, January 15, 2007, and June 11, 2007. Weather conditions varied during the surveys but were generally conducted when the weather was clear with temperatures ranging between 55 and 95 degrees Fahrenheit.

Vegetation and Wildlife

Habitat at the proposed testing site was characterized according to Holland (1986) where applicable. The proposed testing area is located within the existing creek bed of Littlerock Creek. The creek in this area is sand dominated with a narrow, less than 3-foot wide mud dominated channel. This area is largely unvegetated as the site is submerged most of the year. As the water levels recede, the area is then open to off highway vehicle (OHV) usage the remainder of the year. Similarly, as the water recedes most of the emergent vegetation that remains becomes desiccated in the hot dry air as the riparian species are unable to keep pace with the receding water levels of the Reservoir. Currently the portions of the site are largely barren with small patches of herbaceous vegetation. The evegated areas support emergent black willow (*Salix gooddingii*) with a very limited herbaceous layer of scattered vervain (*Verbena lasiostachys*), alkali mallow (*Malvella leprosa*), salt heliotrope (*Heliotropium currassavicum*), and cocklebur (*Xanthium strumarium*). Rabbits foot grass (*Polypogon monspeliensis*) lamb's quarters (*Chenopodium album*), rushes (*Juncus sp.*), willow herb (*Epilobium ciliatum*), salt heliotrope, and monkey flowers (*Mimulus spp.*) are present to some degree in the northern section of the testing site. This area typically supports vegetation for slightly longer periods of time as it has been placed off limits to OHV use. However, the orange snow fence is routinely breached by OHV's. Vegetation currently present at the testing site may be present for up to a year or two until the next major scour event occurs.

Southern cottonwood-willow riparian forest occurs along the upper banks and flood terraces at the site and is dominated by mature western cottonwood (*Populus fremontii ssp. fremontii*) and black willow. The understory is very limited, with only scattered vegetation including vervain, alkali mallow, salt and heliotrope. As described above, due to both biotic and abiotic factors; little evidence of cottonwood recruitment was apparent and portions of the Reservoir may ultimately be subject to a total loss of riparian habitat.

Although a wide variety of wildlife likely use the Reservoir, few species of wildlife were observed at or near the testing site. Common raven (*Corvus corax*), ground squirrels (*Spermophilus beecheyi*), and the tracks of bush rabbit (*Sylvilagus bachmani*), coyote (*Canus latrans*) and mule deer (*Odocoileus hemionus*) were observed. Other common species include Bottas' pocket gopher (*Thomomys bottae*), western scrub jay (*Aphelocoma californica*), and mourning dove (*Zenaida macroura*). Red-tailed hawks (*Buteo jamaicensis*) were observed soaring above the Reservoir but there was no indication of stick nests near the testing site. Anna's hummingbird (*Calypte anna*) and a great blue heron (*Ardea herodias)* were observed overhead and probably also use this habitat.

Sensitive Plants and Wildlife

Sections of Littlerock Creek, outside the project area, are known to support populations of rare species including the arroyo toad, mountain yellow-legged frog (*Rana muscosa*), and two-striped garter snake (*Thamnophis hammondii*). In addition, there is potential habitat in some areas to support a variety of riparian birds, albeit not federally listed. However, these sections are generally well outside the proposed testing area. Rare plants, while they may occur in the adjacent upland areas, are not expected to occur in the channel or Reservoir area due to a lack of suitable habitat.

Sensitive plants and wildlife were not observed at or near the testing site. Due to the high level of disturbance at the site rare plants are not expected to occur and would not be impacted by testing activities. Wildlife usage at the testing site is very low and sensitive wildlife including arroyo toads are not expected to be present at this time. During a period of high rainfall and subsequent run off it may be possible for toads to be washed or move downstream but there have been no documented sightings at the proposed testing site. Toads that entered the Reservoir would also be subject to predation by exotic fish or mechanical crushing from recreationists and vehicles. Current surveys of the project area conducted in 2007 did not detect the presence of toads, egg masses or larvae within three thousand feet of the testing site. In addition, toads were not detected anywhere below Santiago creek. Tadpoles, that may have been arroyo toads, were detected approximately three thousand feet upstream of the project site and adult toads are likely foraging in the upstream sections of the creek. However, these animals were not detected during the surveys.

While sensitive plants and wildlife are known in the region these species are not present in the proposed testing site at this time. Nonetheless it is recommended that the drilling crew implement the following biological guidelines when working in the stream.

1) The District shall conduct a pre-construction (diurnal and nocturnal) survey for arroyo toads within 500 feet of the testing site. If arroyo toads are detected no activities shall occur without authorization from the USFS. The biologist shall also ensure that nesting raptors are not present. Testing activities shall not occur if nesting raptors are present within 150 feet of the project area. (This buffer is based on the routine use of OHV in the project area); and

2) The District shall provide a biological monitor that will be present during all testing activities. The monitor shall ensure that arroyo toads or other sensitive wildlife are not present in the testing area.

The District's consultant, Aspen Environmental Group, can provide a biological monitor during drilling activities to ensure that these measures are implemented.

4. Hydrology Evaluation

Drilling will be performed during the month of August, 2007. Based on historical records, and current (July 2007) observations of zero flow at the location of the drilling, no stream flow is expected at the drilling site. The reservoir level will be well below the drilling site, and below the access route. Drilling will be performed on a dry ground surface. Possible impacts to hydrologic resources include:

- Disposal of drilling mud into the stream bed, resulting in later turbidity problems as these muds are carried into the reservoir by stream flows; and,
- Accidental spill or discharge of oil, gasoline, or other vehicle fluids into the stream bed along the access route or at the drill site.

The drilling contractor will be collecting and removing drill mud from the site, such that a negligible amount would be left at the site. Drill muds will be non-toxic, and the impact of this minor residual amount is not significant.

Hydrology impacts of the drilling will not occur if the drilling permit contains the following provisions, which are adhered to:

1) The District shall ensure that excess drilling mud will be collected and removed from the site, and disposed of in a permitted landfill according to applicable disposal regulations;

2) The District shall ensure that no vehicle maintenance involving the use of fluids which may contaminate surface or groundwater shall take place within the stream bed; and

3) The District shall ensure that any spill of oil or other vehicular or drilling fluid will be collected and removed from the site prior to the termination of drilling.

The District's consultant, Aspen Environmental Group, can provide a construction monitor during drilling activities to ensure that these measures are implemented.

5. Heritage Resources Evaluation

As part of the EIR/EIS preparation process for the Littlerock Reservoir Sediment Removal Project, the District has prepared a Phase I Cultural Resources Investigation (attached). The location for the proposed geotechnical testing is within the APE studied in the Phase I Cultural Resources Investigation conducted for the project by Conejo Archaeological Consultants. The Phase I Cultural Resources Investigation Report (Report) for the project did not identify any historic resources, pre-historic resources, or traditional cultural properties in the area of the proposed geotechnical testing other than the Angeles National Forest itself (CAC Document No. 06-442, page 16). The Report identifies the potential to disturb buried cultural sites in undisturbed soils outside the Littlerock Creek bed and recommends that a professional archaeologist be on-site to monitor earth moving activities in these soils. Due to the location of the proposed geotechnical testing in the bed of the creek, an archaeological monitor should not be required. However, to ensure that impacts of the drilling will not occur the following is recommended:

- The District shall ensure that an archaeologist reviews the proposed testing location in the field to verify it is within the historic bed of the creek and that the set-up and completion of the geotechnical testing will not impact the adjacent banks; and

- The District shall ensure that an archaeologist will be on-call to respond to any unanticipated cultural discoveries made during the testing activities.

The District's consultant, Aspen Environmental Group, can provide an archaeological monitor during drilling activities to implement these measures.

Appendix C

Littlerock Reservoir Hydrologic and Sediment Transport Analysis Technical Report

Littlerock Reservoir

Hydrologic and Sediment Transport Analysis Technical Report

Prepared for
Palmdale Water District

Prepared by
Aspen Environmental Group

June 2005

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1. INTRODUCTION

The Littlerock Reservoir is approximately 100 acres in size and is located on the Littlerock Creek near Palmdale, California. The reservoir is contained by Littlerock Dam, which was originally constructed in 1924. Littlerock Reservoir has been filling with sediment resulting in a substantial reduction in water storage capacity. The Palmdale Water District (District) desires to remove sediment to increase reservoir capacity and to ensure the long-term viability of the reservoir as a water source.

A population of the arroyo toad exists in the stream channel upstream of the reservoir. The arroyo toad relies on a sandy bed channel, with sand bars, as habitat. Should removal of sediment from the reservoir result in alteration of the channel bed upstream of the reservoir, habitat for the toad could be affected. The purpose of this study is to develop sediment removal alternatives, and evaluate their potential effect on the channel bed upstream of the reservoir.

2. SETTING AND BASELINE CONDITIONS

2.1 AREA DESCRIPTION

Figures 1 and 2 illustrate the basic area setting. Littlerock Reservoir has an area of approximately 100 acres when full, and extends a distance of approximately one mile upstream of the dam. The dam spillway crest is at elevation 3,270 (feet above mean sea level). The reservoir bed is mostly coarse sand, with cobbles present in the streambed upstream of the dam. The surrounding area, including the 60-square-mile watershed (at the upstream end of the reservoir), is mountainous, arid, and primarily in a natural state. Littlerock Creek drains to the north out of the San Gabriel Mountains and the Angeles National Forest. Major features referred to in this report include Littlerock Dam, Rocky Point, the maximum upstream limit of the reservoir pool (as of February, 2005), Santiago Creek, and the USGS stream gage for Littlerock Creek. Figure 1 shows the location of these features. Rocky Point is a campground area on the south side of the reservoir at a point where the reservoir narrows by encroachment of a local ridge, approximately 4,500 feet upstream of the dam. The upstream limit of the reservoir pool is as observed in early February of 2005.

2.2 HYDROLOGY

The watershed area of Little Rock Creek at the upstream end of the reservoir is 60 square miles. Santiago Creek, which enters Littlerock Creek just upstream of the reservoir, comprises 11 square miles. Littlerock Creek above Santiago Creek is 49 square miles. USGS flow records include average daily flows, average monthly and yearly flows, and annual peaks. The record for Littlerock Creek, USGS Stream Gage #10264000, extends from 10/1/1930 to 9/30/1979, and from 1/25/2002 to 9/30/2003. The Santiago Creek record (USGS Stream Gage #10264100) extends from 1/19/2002 to 9/30/2003 (USGS, 2005).

The 100-year discharge for Littlerock Creek at Littlerock Reservoir was estimated by Woodward Clyde (1991) at 21,120 cfs. Peak discharge rates for other return periods for Littlerock Creek and Santiago Creek at the USGS stream gages are listed in Table 1.

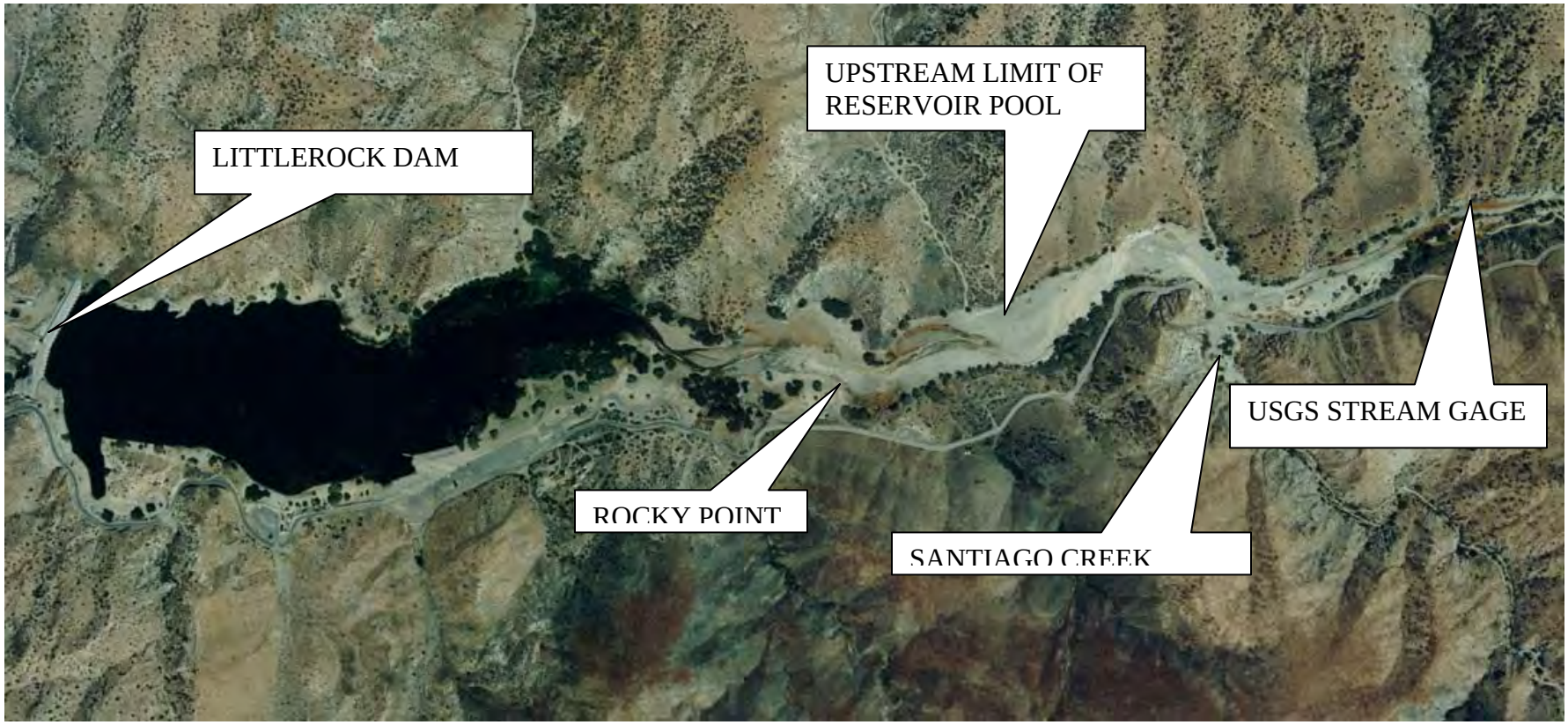


Figure 1 Aerial Photograph

VIEW LOOKING DOWNSTREAM TOWARD THE RESERVOIR

VIEW LOOKING UPSTREAM FROM ROCKY POINT

Figure 2 Typical Views of the Reservoir

Table 1 Peak Discharge Rates for Littlerock Creek and Santiago Creek for Various Return Period Floods

Flood Return Period	Peak Discharge in cfs	
	Santiago Creek	Littlerock Creek
100-Year	4,337	16,320
50-Year	2,309	11,415
25-Year	1,154	7,568
10-Year	400	3,893
2-Year	24	528

Source: Woodward Clyde (1991). Data derived from stream gage records. Santiago Creek gage is at the confluence with Littlerock Creek. Littlerock gage is above the confluence with Santiago Creek.

Whereas the Santiago Creek 100-year peak is approximately one-fourth that of Littlerock, the frequent floods are proportionally much less. The Santiago Creek 2-year flood is only 5 percent of the Littlerock flow. Comparison of average daily flow records for the period of gage record overlap reveals that Santiago Creek flows were generally less than 1 percent of Littlerock flows for the same day. For this reason, and since none of the average daily discharges represented in the USGS record for Littlerock Creek are above 2,700 cfs, Littlerock Creek is assumed to be dominant in the frequent flows, which are the main basis of the analysis presented below. Only Littlerock Creek flow records, from USGS Stream Gage #10264000, are used in the subsequent analysis.

Flows are highly seasonal (Figure 3), as is the precipitation in the area. Highest flows are in February, averaging approximately 42 cfs. Lowest flows are in the summer, July to October, with August flows averaging the lowest at 0.4 cfs. Annual recorded discharge into Littlerock Reservoir ranges from a low of 1,332 acre feet in 1961 to a high of 51,185 acre feet in 1941, and averages 11,636 acre feet.

Figures 4, 5, and 6 show seasonal flow hydrographs for a typical dry year (1961), median year (1955) and typical wet year (1941) inflow to the reservoir. The time interval of the hydrographs is one day, from the USGS data. Figure 7 shows the time to fill the reservoir assuming the current 1995 topography adjusted for sediment inflow and 2005 survey, and assuming no outflow from the reservoir. It is assumed for this figure and for all subsequent analyses that relate to reservoir filling, that the reservoir is empty at the beginning of the runoff season.

Dry year (1961) average daily inflow to the reservoir never exceeded 25 cfs for the entire season. Under current topographic conditions, the 1961 total annual inflow would not fill the reservoir. Median year (1955) average daily inflow exceeded 25 cfs on 30 days, and reached an average daily peak of 116 cfs. The median year inflow, received today, would fill the reservoir by approximately March 2. Approximately 60 percent of the 1955 flow arrived after March 2. Wet year (1941) average daily inflow exceeded 25 cfs on 132 days, and reached an average daily peak of 1,730 cfs. The 1941 inflow would fill the reservoir by February 9. Approximately 94 percent of the 1941 flow arrived after February 9.

Reservoir water storage capacity is currently approximately 3,000 acre feet. Based on the USGS record, runoff volume in approximately 80 percent of the years exceeds that amount. Runoff volume for more than half of the years exceeds 6,000 acre feet.

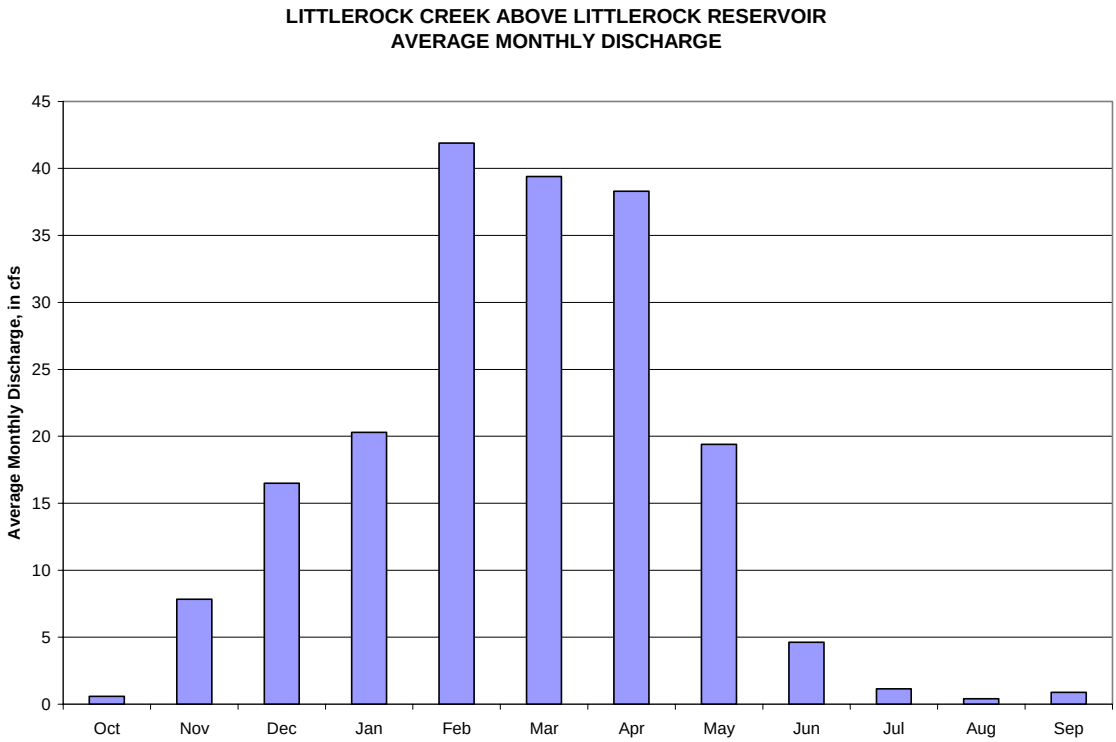


Figure 3 Average Monthly Discharge for Littlerock Creek

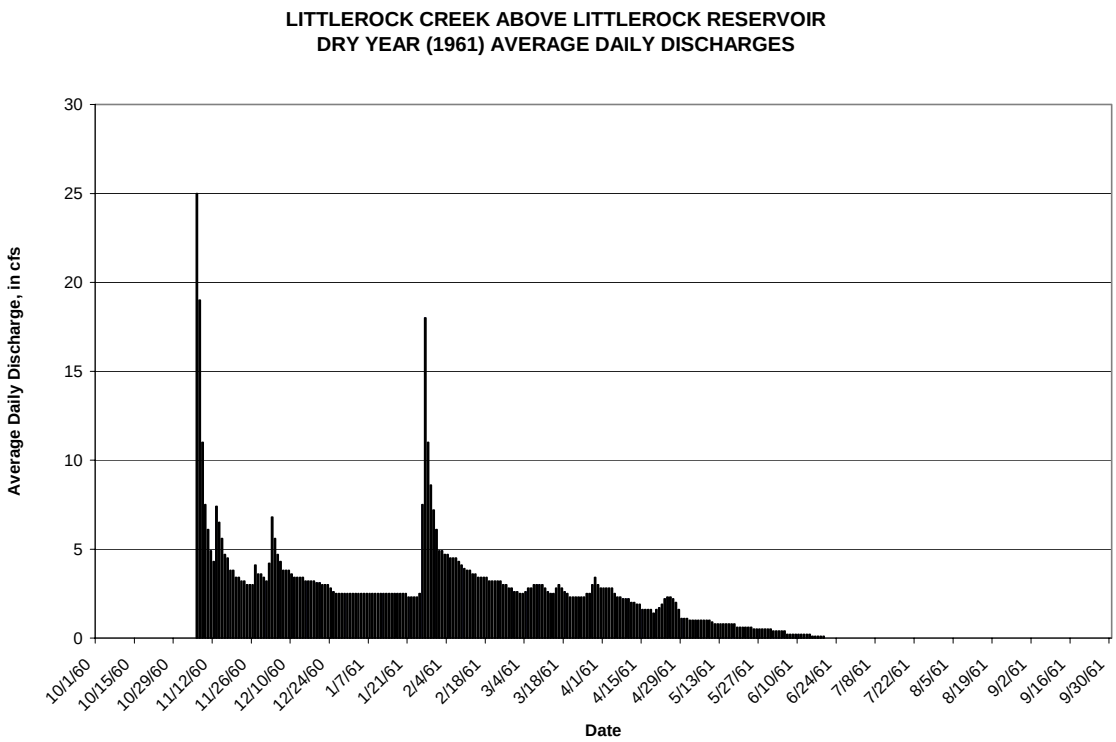


Figure 4 Typical Dry Year (1961)

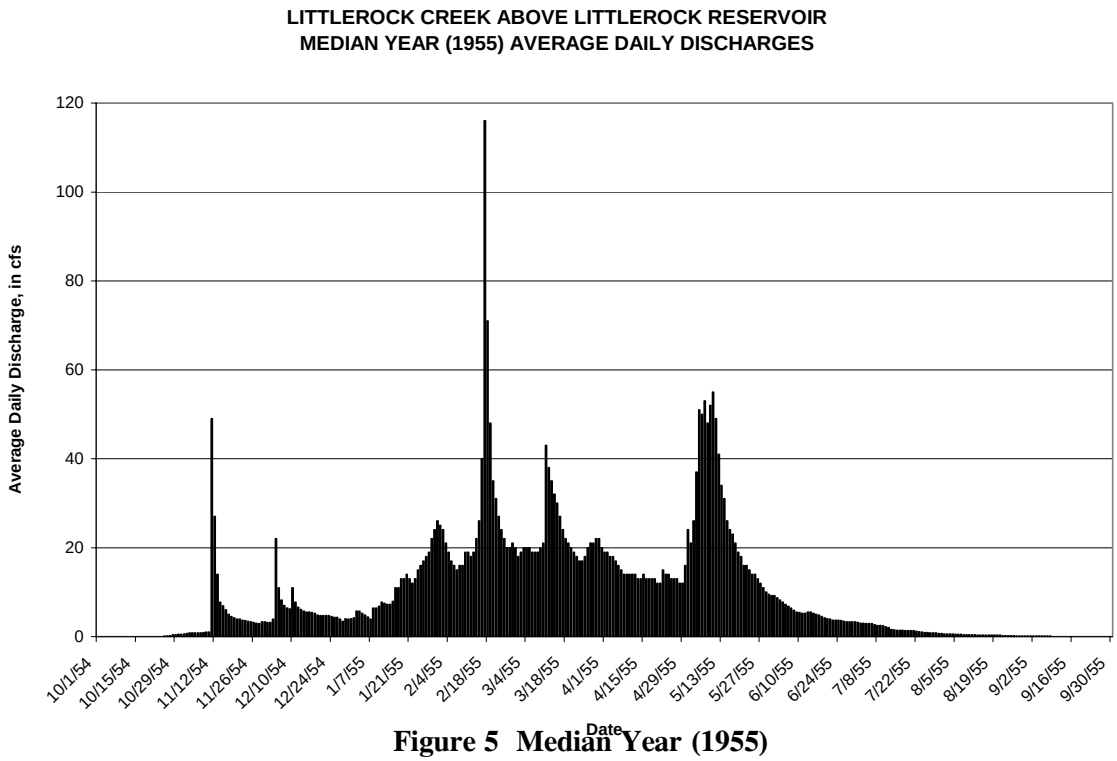


Figure 5 Median Year (1955)

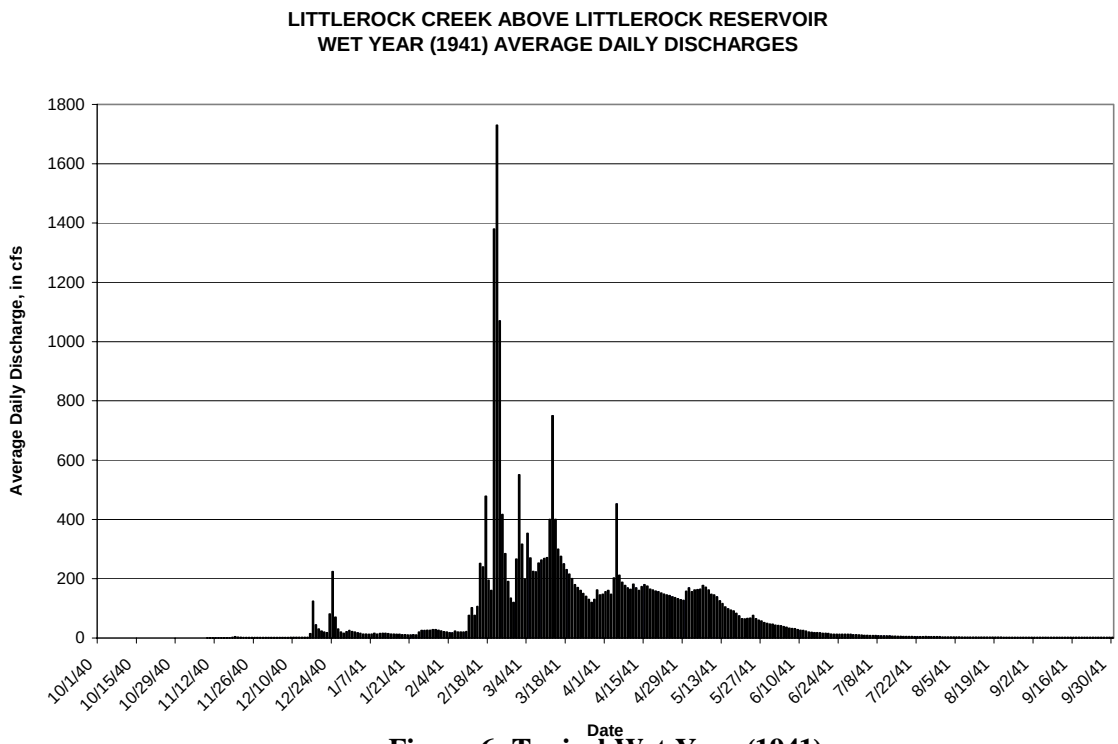


Figure 6 Typical Wet Year (1941)

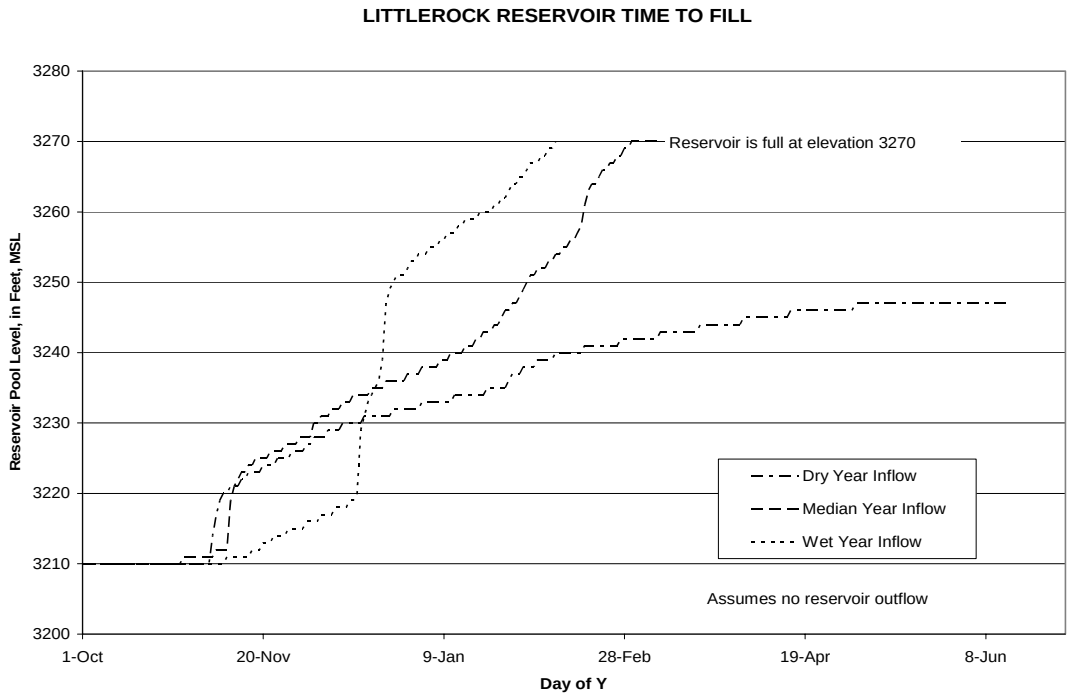


Figure 7 Reservoir Time to Fill

2.3 RESERVOIR TOPOGRAPHY

Topographic maps of the reservoir are available for the years 1915, 1989, and 1995. These maps are presented in the Appendix. Additional topography includes the USGS (1959) topography, which shows no information below the reservoir water surface, and cross section and profile information obtained from a field survey of the channel upstream of the reservoir in January of 2005. This field survey took place after the January, 2005 floods, when the reservoir was full to the spillway crest. No 2005 topographic information below the water surface was available. Stream cross sections were taken in the vicinity of the USGS gage. The downstream terminus of this survey was at the upstream reservoir water's edge. Since the reservoir was full at this time, this point represented the maximum upstream extent of the reservoir pool.

Figures 8 and 9 show thalweg profiles of the stream for the topography available. Station zero is approximately at the Littlerock Dam. The assumed 2005 profile is based on extending the profile downstream of the terminus of the 2005 surveyed profile such that the volume between the 2005 profile and the 1995 profile would equal the amount of sediment expected to have been delivered to the reservoir in that period of time. It was assumed that 54,000 cubic yards of sediment per year were delivered, based on the Woodward Clyde (1991) estimate. For a period of ten years, this would give an accumulated volume of 540,000 cubic yards.

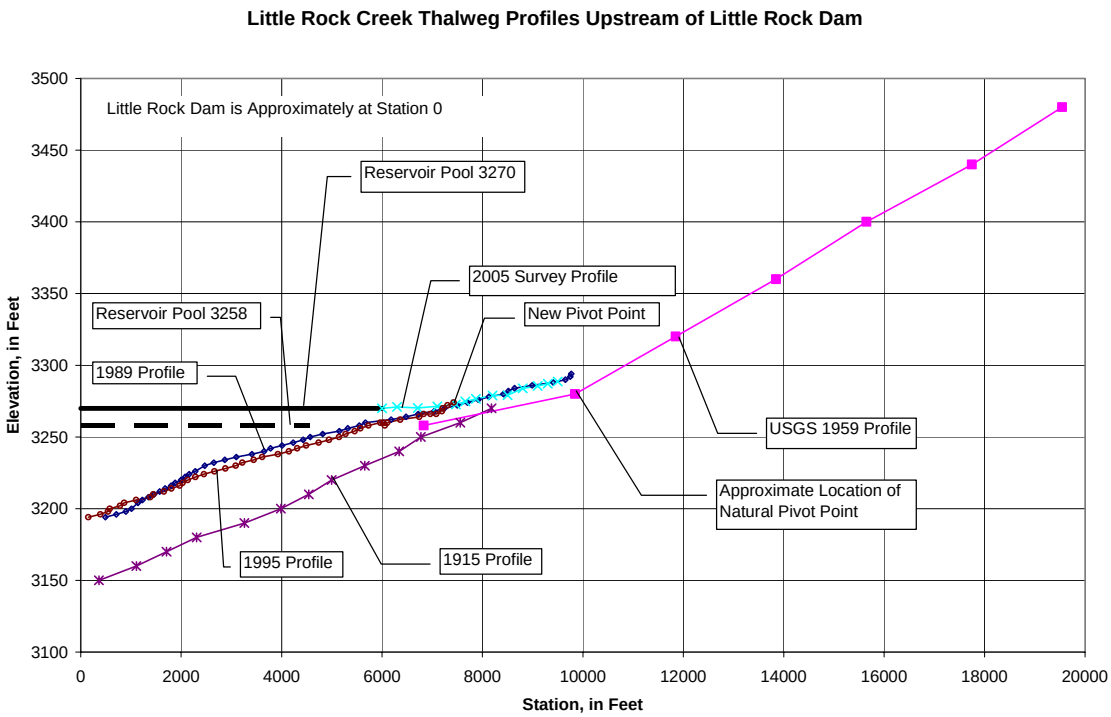


Figure 8 Thalweg Profile Showing Upstream Topography

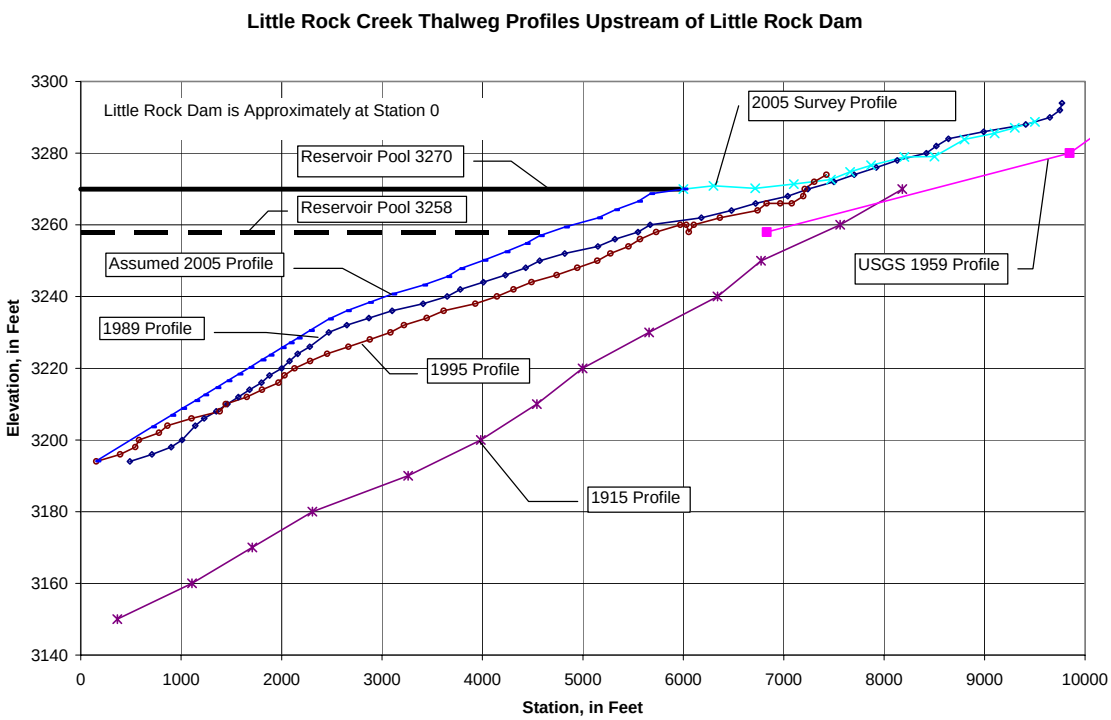


Figure 9 Thalweg Profile

2.4 QUALITATIVE GEOMORPHIC ANALYSIS

Prior to construction of the dam, Littlerock Creek at the site of the reservoir was likely in a state of dynamic sediment equilibrium, meaning that the supply of sediment to the reach now occupied by the reservoir was approximately equal to the sediment transport capacity of the reach. There would likely be natural fluctuations resulting from changing watershed characteristics (for instance by fire) or by flood events of varying magnitude, but in the long run the channel slope would remain fairly constant at about 0.016 (see Figure 9, 1915 slope).

The dam altered the hydraulics of the creek such that sediment transport capacity of the creek through the reservoir was essentially reduced to zero, resulting in deposition. Based on Figure 9, deposition within the reservoir has been as much as 50 feet or more in places.

Deposition of sediment at the upper end of the reservoir would reduce the capacity of the channel immediately upstream of the reservoir to transport sediment by reducing the bed slope and widening the channel. Sediment transport capacity is partly a function of flow velocity and depth. Both would be reduced by a flatter slope and wider channel. Since the sediment supply to this area would remain unchanged, deposition upstream of the reservoir would be expected to occur. Comparison of the 1915 and 1959 profiles with the 1989, 1995, and 2005 profiles indicates that approximately 10 feet of aggradation has occurred upstream of the reservoir everywhere post-1959 topography is available.

Sediments brought by the creek would cease to be transported soon after arriving at the reservoir pool. Since the runoff from most years exceeds the capacity of the reservoir to store water, deposition for most years would arrive at a full or near full reservoir, and therefore tend to be concentrated toward the upper end of the reservoir, resulting in a deposition slope (topset slope) as shown in Figure 10 (USACE, 1989). According to the Army Corps of Engineers (USACE, 1989), a rule of thumb for the deposition slope (topset slope) is that it should be 50 percent of the original stream slope. This is approximately the case with the observed 1989 and 1995 deposition slopes at Littlerock Reservoir (Figure 9). These slopes are approximately 0.009 to 0.010 feet per foot. The original bed slope was approximately 0.016. Further, the 1989 and 1995 profiles show a grade break, with steepening slope in the downstream direction at approximately channel station 1400. The 2005 profile shows a similar break, but this is an assumption. This grade break corresponds to the break between the topset and bottomset slopes in Figure 10. According to USACE (1989), this break, which in 1989 and 1995 was at about elevation 3225, occurs at approximately the mean operating elevation

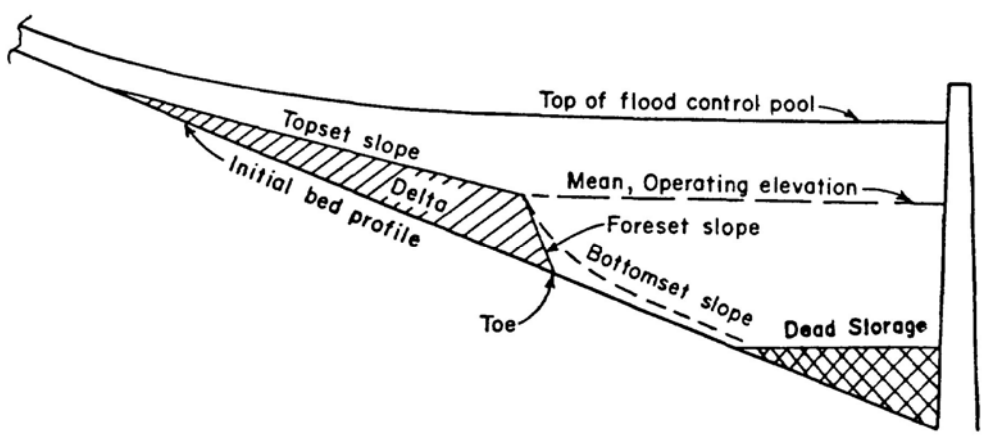


Figure 10 Typical Reservoir Deposition Pattern

Dry year flows, which do not deliver enough runoff to fill the reservoir, constitute about 20 percent of the flow record. During dry years, and at the beginning of the season in all years, flow entering the lower portions of the dry reservoir, where the slope is steeper than at the upper end, would pick up sediment due to higher flow velocities on the steeper slope, and channel cutting would occur. This cutting would progress upstream, and likely be most pronounced at locations where the channel bed profile breaks to a steeper slope such as at the break between the topset and bottomset slopes, and at the maximum upstream extent of the reservoir pool in the 2005 profile. In this way sediments would be transported toward the lower end of the reservoir, and some temporary channel degradation at the upper end, and beyond, would be expected. Thus, the natural cycle of the channel bed in the upper end of the reservoir and in the immediate area upstream of it would be of seasonal aggradation and degradation, with the overall trend toward aggradation.

Table 2 provides a summary of various channel bed slopes. Review of this table and Figures 8 and 9 indicate the following observations:

- Assuming the 1915 slope was the natural equilibrium slope in the vicinity of the reservoir, all of the current reservoir bed slopes are flatter than the natural equilibrium slope. By 1959, a slope of approximately 0.008 had been established in the channel for a distance of approximately 3,000 feet upstream of the reservoir pool. However, this reach of the channel was approximately 10 feet lower than the current channel bed in that reach. In 1989 this same reach was at a slope of 0.009. Currently (2005 survey) the slope is 0.007 to 0.009. It appears a slope of approximately 0.009 for the reach upstream of the dam is relatively stable, and, with some limitations, this reach may serve as a supply reach for a sediment transport analysis.
- There are two pivot points (points of abrupt slope change from steep to flat). One is in the 2005 survey at approximately Station 5890. This is approximately 930 feet upstream of the maximum extent of the reservoir pool. The other is in the 1959 profile just upstream of the USGS gage, which is approximately at Station 8300. These pivot points are indicators of possible degradation control points. Sediment transport capacity depends heavily on flow velocity. With other flow-related variables equal, flow velocities are lower on flat slopes than on steep slopes, so sediment transport capacity would be lower downstream of a pivot point than upstream, resulting in sediment deposition (channel aggradation) downstream of the pivot point. Artificial removal of sediment from the deposition area, as long as it does not exceed the depth represented by the projection of the slope from upstream of the pivot, may not cause cutting upstream of the pivot.
- None of the previous slopes are as flat as the 2005 survey between the maximum reservoir pool and Station 7470. This slope appears to be the result of deposition following the January 2005 storm. It is likely that as the reservoir level drops this reach of the channel will degrade.
- Maximum channel degradation, particularly at or near the upstream end of the reservoir, is likely limited to the elevation produced by extension of the slope of 0.009 from the supply reach as shown in Figure 11. At Rocky Point, this depth is 13 feet.

Table 2 Littlerock Creek Channel Bed Slopes.

Bed Slope Description	Approximate Bed Slope, in Feet per Foot
1915 Topography. Beneath current reservoir pool.	0.016
1959 Topography. USGS stream gage to current reservoir pool.	0.008
1959 Topography. Upstream of USGS stream gage.	0.021
1989 Topography. Upstream of Station 2400	0.009
1989 Topography. Upstream of the Reservoir Pool	0.009
1995 Topography. Upstream of Station 2470.	0.010
2005 Survey. Upstream of Station 6240.	0.007
2005 Survey. Maximum reservoir pool to Station 5890 (Reservoir pool is at Station 4960.	0.002

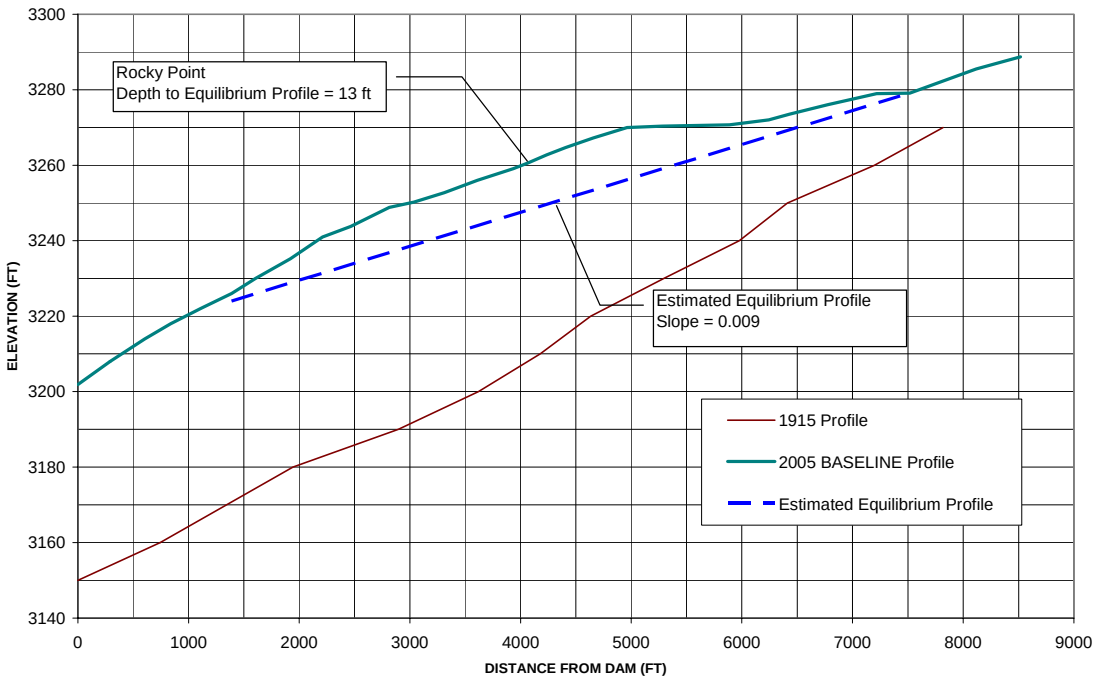


Figure 11 Maximum Potential Degradation

2.5 HYDRAULIC ANALYSIS

Hydraulic analysis was conducted using the U.S. Army Corps of Engineers HEC-RAS program using the 1989 and 1995 Topography, and the 2005 Survey. It is assumed for purposes of the hydraulic analysis that the reservoir is empty and has no influence on flow conditions. The analysis is based on stream cross sections located as shown in Figure 12. 2005 surveyed cross sections, for the sediment supply reach, are identified in Figure 13. All other cross sections for 2005 were adjusted from the 1989 and 1995 cross sections based on the 2005 profile and assumed extent of channel deposition since 1995. Figure 14 shows a comparison of 1989, 1995 and 2005 cross sections. The hydraulic analysis below presents only the 2005 analysis.

Figure 12 HEC-RAS Cross Section Locations

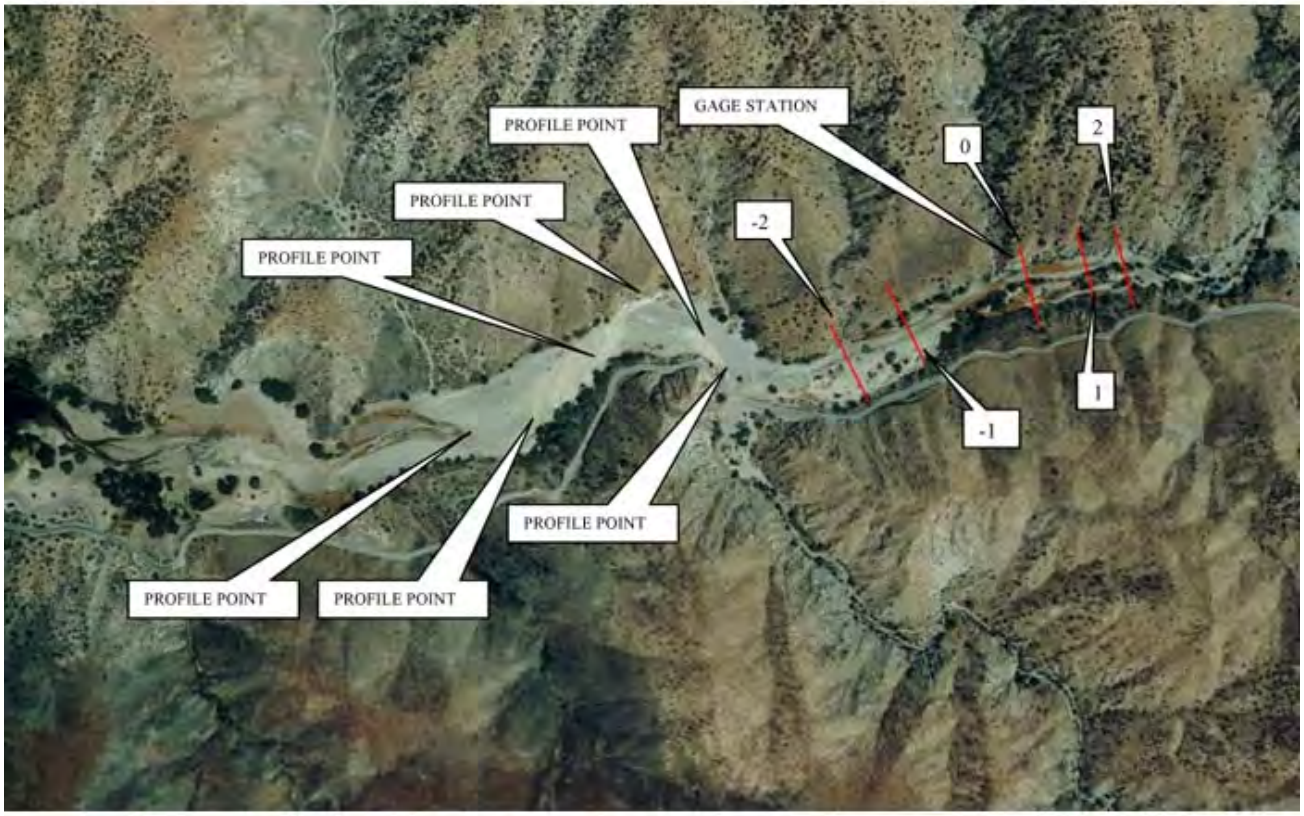


Figure 13 Survey Cross Section Locations

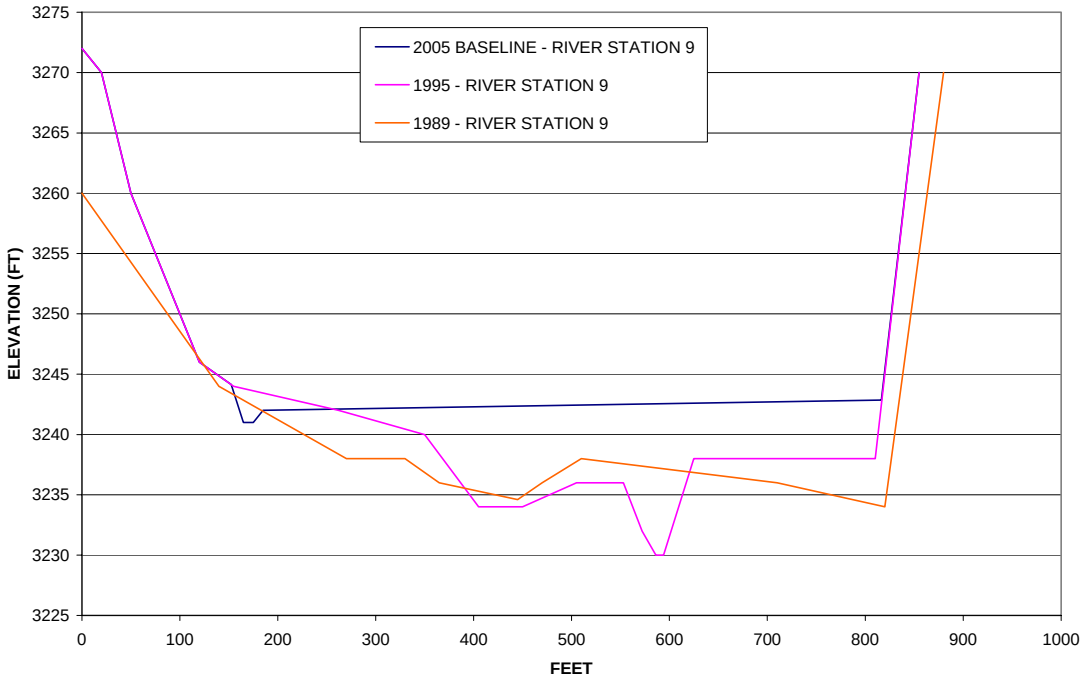


Figure 14 Cross Section 9 Comparison

Mannings roughness coefficients (Mannings "n") were computed based on the following basic procedure:

$$n = (n_b + n_1 + n_2 + n_3 + n_4) * M$$

Where:
n = Overall channel roughness coefficient;
n_b = Base value of "n" for material involved;
n_1 = Value for degree of irregularity;
n_2 = Value for variations of cross section;
n_3 = Value for obstructions;
n_4 = Value for vegetation; and,
M = Multiplier to account for degree of meandering.

Table 3 shows the results of the calculation for the channel upstream of Cross Section 25 as an example. Roughness coefficients for all cross section channels and overbanks are presented in the Appendix.

A hydraulic analysis was performed for a range of discharges from 1 cfs to the 100-year discharge of 21,120 cfs. Discharges used are listed in the Appendix. Figures 15, 16 and 17 summarize flow top widths, velocities and depths for a range of representative discharges. Flow velocities and depths are highest in the upper portion of the modeled reach, decreasing in the downstream direction due primarily to the widening of the channel in the downstream direction.

The reservoir would dramatically alter the hydraulic conditions presented above up to about cross sections 20 to 23. As flow reaches the reservoir pool, flow velocities would drop to near zero, and the depth would increase to the reservoir depth. The reservoir pool would also represent a hydraulic

boundary condition that would increase flow depths and decrease flow velocities in the channel immediately upstream of the pool.

Table 3. Computation of Channel *n* Value for Cross Sections Upstream of Cross Section 23.

Roughness Coefficient Component	Assigned Value	Comments
n_b = Base value of "*n*" for material involved.	0.034	Based on Limerinos equation for California Streams as referenced in USGS (1998). Limerinos equation is: $n_b = (0.0926R^{1/6})/(0.35 + 2.0\log(R/d_{50}))$ Where: R = Hydraulic radius, d_{50} = 50% Sediment size, in feet. D_{50} = 20mm (0.066 feet) from sediment samples. R (assumed representative) = 1.
n_1 = Value for degree of irregularity	0.002	Smooth to minor irregularity.
n_2 = Value for variations of cross section	0002	Cross section gradual to alternating occasionally.
n_3 = Value for obstructions	0	Negligible in-channel obstructions.
n_4 = Value for vegetation	0	Negligible in-channel vegetation.
Multiplier for channel meandering	1	Minor meandering.
Overall "*n*" value is (0.034 + 0.002 +0.002) x 1 = 0.038.		

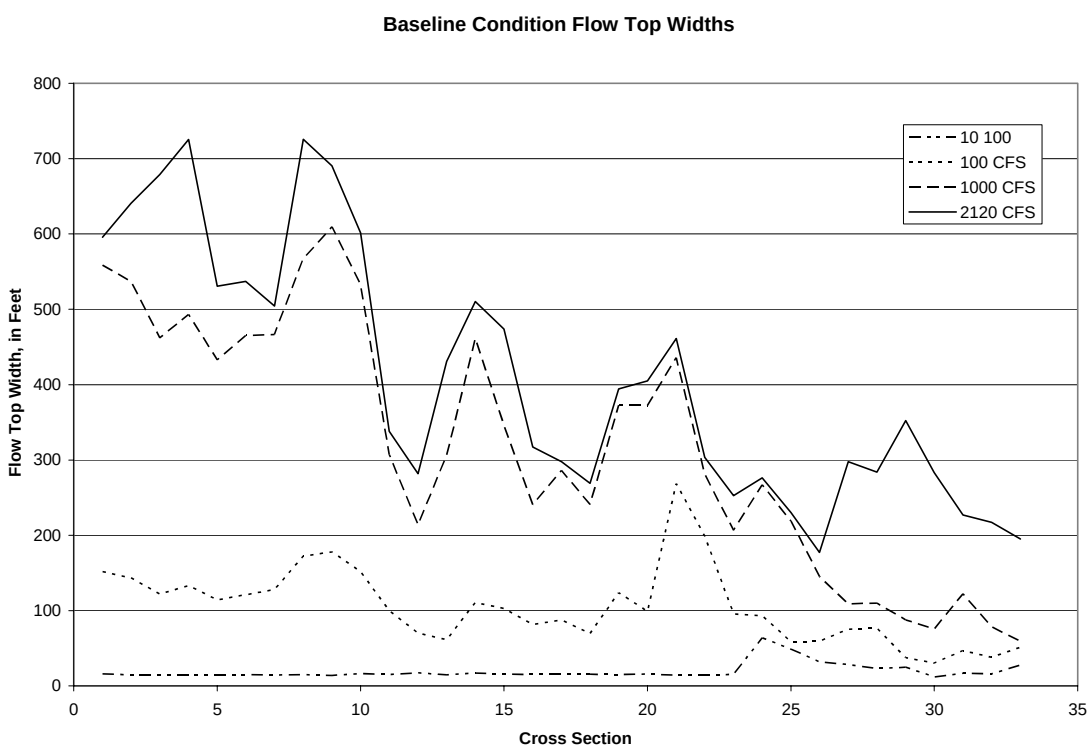


Figure 15 Baseline Condition Flow Top Widths

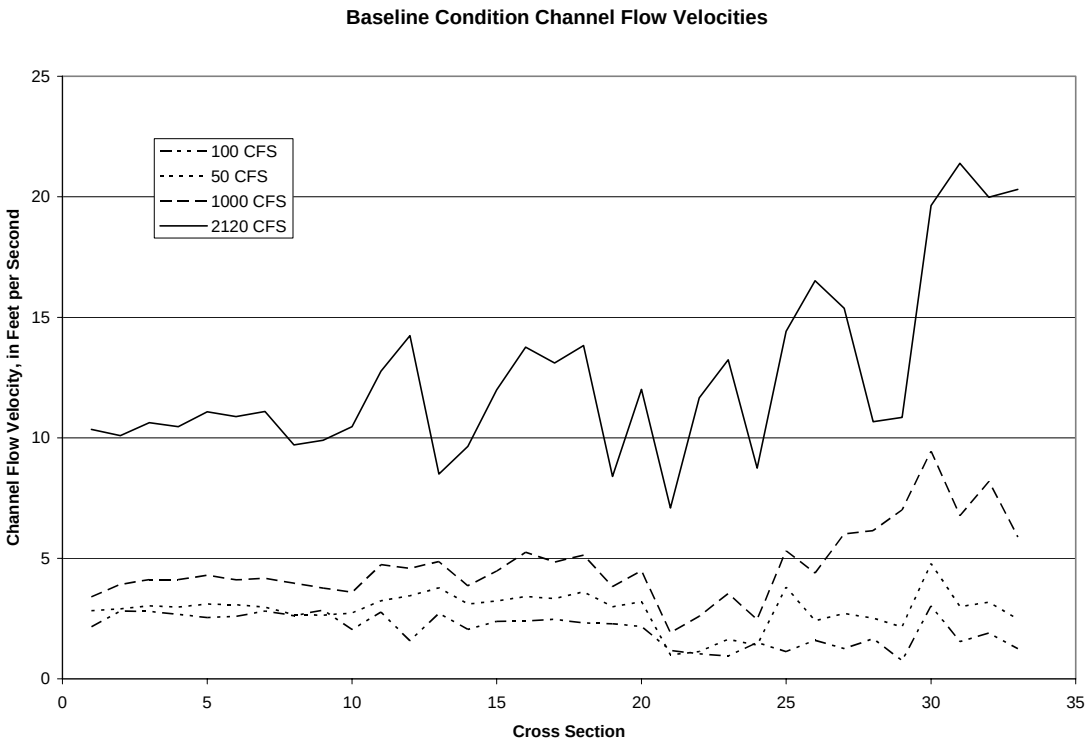


Figure 16 Baseline Condition Channel Flow Velocities

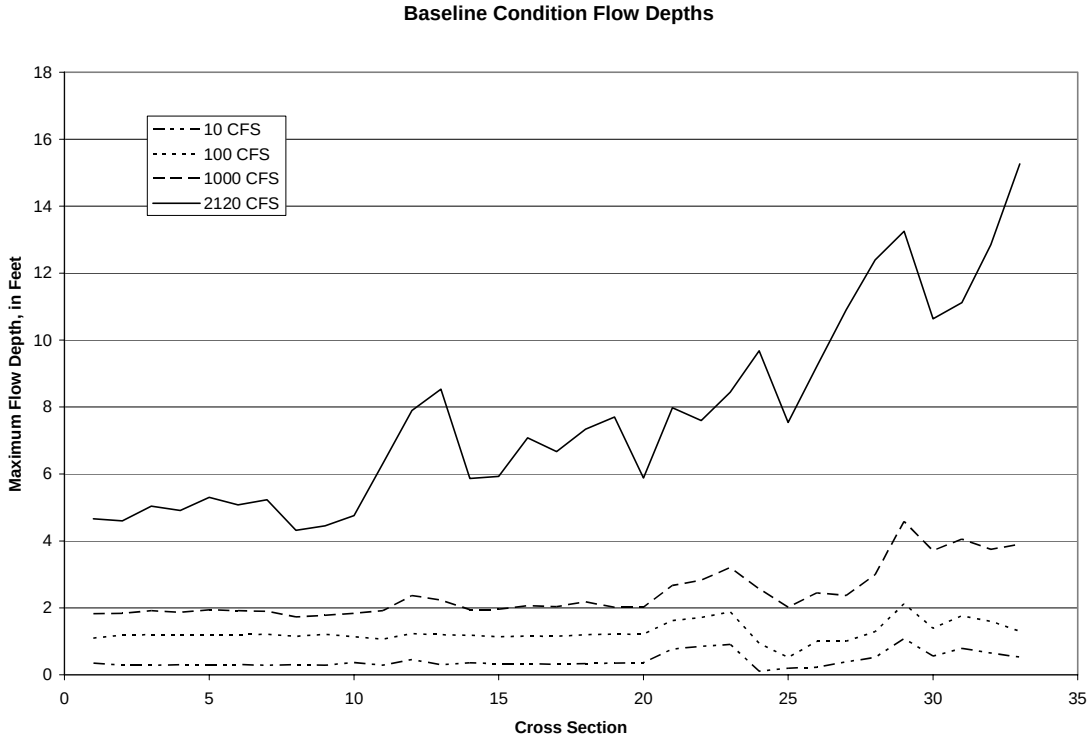


Figure 17 Baseline Condition Flow Depths

2.6 SEDIMENT TRANSPORT

The baseline sediment transport analysis was conducted using the hydraulic U.S. Army Corps of Engineers HEC-RAS program, which has the capability of performing a steady-state sediment transport analysis. A steady-state analysis predicts a sediment transport capacity for a channel cross section given a particular discharge. Cross sections are not updated for differences in sediment supply. The sediment analysis uses the hydraulic information computed from the HEC-RAS model, and sediment size distributions for the channel and channel overbanks. The Yang equation for sediment transport (USACE, 2002) was selected as the sediment transport equation for the reason that it was generally applicable to most of the sediment sizes used in the analysis, and gave results that most closely matched the observed record of sediment inflow.

Sediment size distributions were taken from sediment samples taken from the stream in January 2005, and from those published by Woodward Clyde (1991). The appendix provides maps showing the locations of sediment samples and the size distributions. Best results were obtained from using Woodward Clyde data for the channel, and January 2005 data for the overbanks.

The sediment model was calibrated using the uppermost four cross sections shown in Figure 13 as a supply reach. This supply reach contains the USGS stream gage for Littlerock Creek. A relationship between water discharge and sediment discharge was obtained. This relationship is summarized in Figure 18.

The water/sediment discharge relationship was then used to obtain sediment transport volumes for each day of the 48-year USGS stream gage record and the daily volumes summed and used to make an estimate of average annual sediment transport into the reservoir. The sediment transport model was then calibrated to obtain an estimate of average annual sediment supply that approximated the estimate of 54,000 cubic yards sediment deposited in the reservoir (Woodward Clyde, 1991). Calibration consisted of using channel sediment sizes from data published by Woodward Clyde, and adjusting channel and overbank roughness coefficients. Roughness coefficients were also calibrated from observed high water marks and a known discharge (discharge obtained from the USGS) for the January, 2005 runoff event. The calibrated model gives an average annual sediment transport estimate of 60,000 cubic yards, as opposed to 54,000 estimated by Woodward Clyde.

The study channel was divided into four reaches for the sediment transport analysis. The purpose was to compare reaches with relatively similar hydraulic conditions, and to reduce the effect of variations in sediment transport rate from cross section to cross section, which can be substantial. The reaches, numbered R1 to R4, are shown in Figure 19 and described in Table 4.

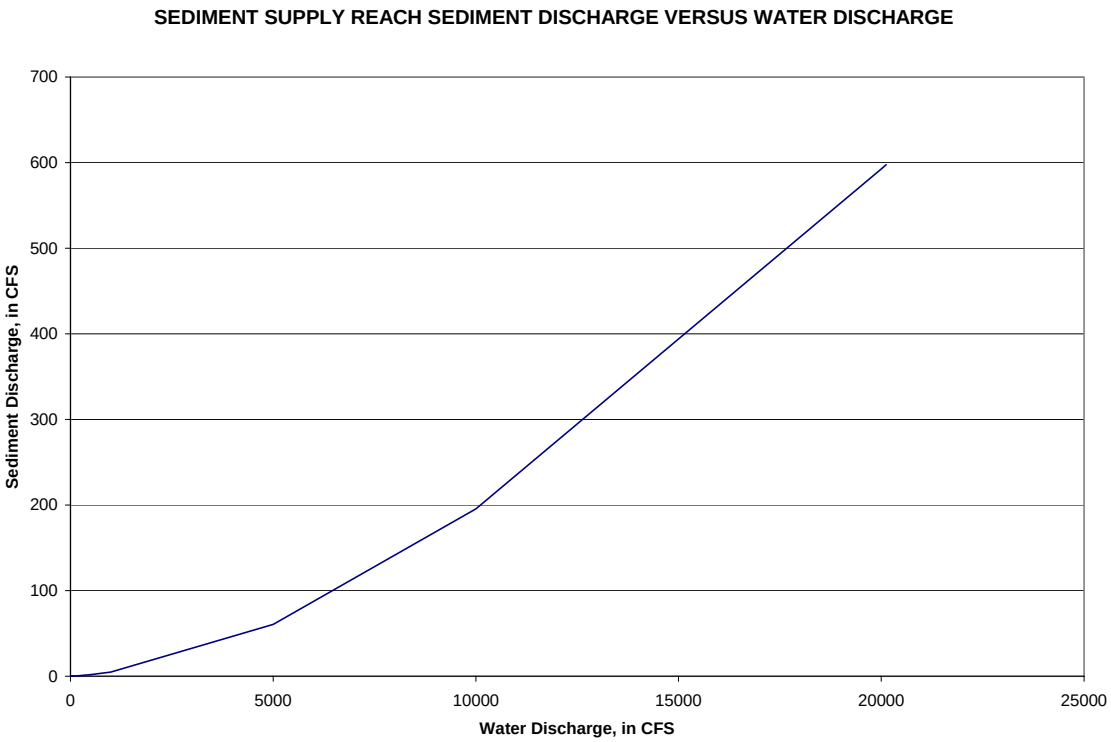


Figure 18 Sediment Supply Reach Sediment Discharge Versus Water Discharge

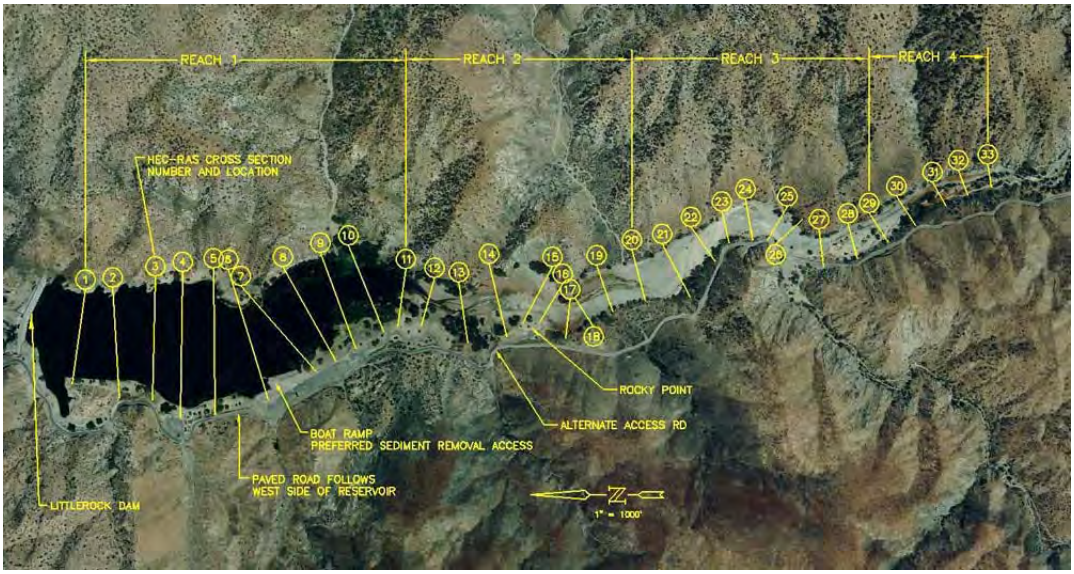


Figure 19 Sediment Transport Reach Locations

Table 4 Sediment Transport Reach Descriptions

Reach Number	Hec-Ras Cross Sections	Channel Stations, In Feet	Description and Comments
R1	0 – 11	0 – 2815	Downstream reach of reservoir. Includes reservoir bottomset slope.
R2	11-20	2815 – 4962	Middle reach of reservoir. Ends at maximum upstream reservoir pool
R3	20-29	4962 – 7517	Reach immediately upstream of the reservoir. Includes recent deposition area
R4	29-33	7517 – 8517	Sediment supply reach. Includes USGS gage.

Total sediment transport out of a reach, compared to total sediment transport into a reach, for a given discharge and given time period, can be compared to determine whether a reach is expected to aggrade or degrade for that discharge and that time period. The volume of the sediment deficit/surplus, in cubic feet, divided by the surface area of the reach, will give an estimate of the amount, in feet, of degradation or aggradation. This can be done for each time step of an inflow hydrograph to estimate total aggradation or degradation for the hydrograph. In this way, an estimate of probable aggradation or degradation can be obtained. The limitation is that the cross sections are not adjusted for sediment deficit/surplus after each time step, so estimates of aggradation/degradation are likely to be worst case.

Potential degradation or aggradation for a reach was estimated using sediment inflow/outflow volumes predicted by the relationships such as the one depicted in Figure 18. Depths of degradation/aggradation were estimated by dividing the sediment deficit/surplus for each reach for each time step by the wetted surface area for the reach obtained from HEC-RAS, and assuming a trapezoidal cut cross section with 3:1 side slopes for cuts. No estimate was made of aggradation depth. Although the hydraulic conditions estimated by the HEC-RAS model ignore the presence of the dam, the influence of the dam, and associated static rising water levels in the reservoir, was accounted for by tracking reservoir levels as the hydrograph enters, and stopping the analysis for each reach as that reach filled.

Although Reach 1 has no outlet, there is a sediment transport potential in the upper reaches of Reach 1 provided that this reach is not inundated by the reservoir. The estimated sediment transport for Reach 1 and the resulting estimates of aggradation or degradation are considered applicable to the upper end of Reach 1, not the entire reach.

The inflow hydrograph to the reservoir was taken from daily discharges available from USGS records for known years. The dry, median and wet years shown in Figures 15, 16 and 17 were used, as well as the peak discharge from the largest storm on record (1943). These are considered representative of the range of discharges likely to be encountered by the reservoir. It was assumed that the reservoir is empty at the beginning of each runoff season. Baseline condition results are shown in Figure 20. The 1943 storm results were similar to those of a wet year.

Reaches 1 and 2 are predicted to degrade in all three years. Reach 3, which is just upstream of the reservoir pool, is expected to aggrade. The degradation predicted in Reaches 1 and 2 reflects the expected cutting of those reaches during dry years and at the beginning of the runoff season when the reservoir is assumed to start the season empty. The aggradation/degradation pattern is as expected from an observation of the slopes. Reach 3 is generally flatter than the supply reach. Consequently, flow velocities would be slower in this reach, resulting in less sediment transport capacity, and deposition.

Reach 2 is steeper than Reach 3, and Reach 1 steeper than Reach 2, so degradation is expected in these reaches.

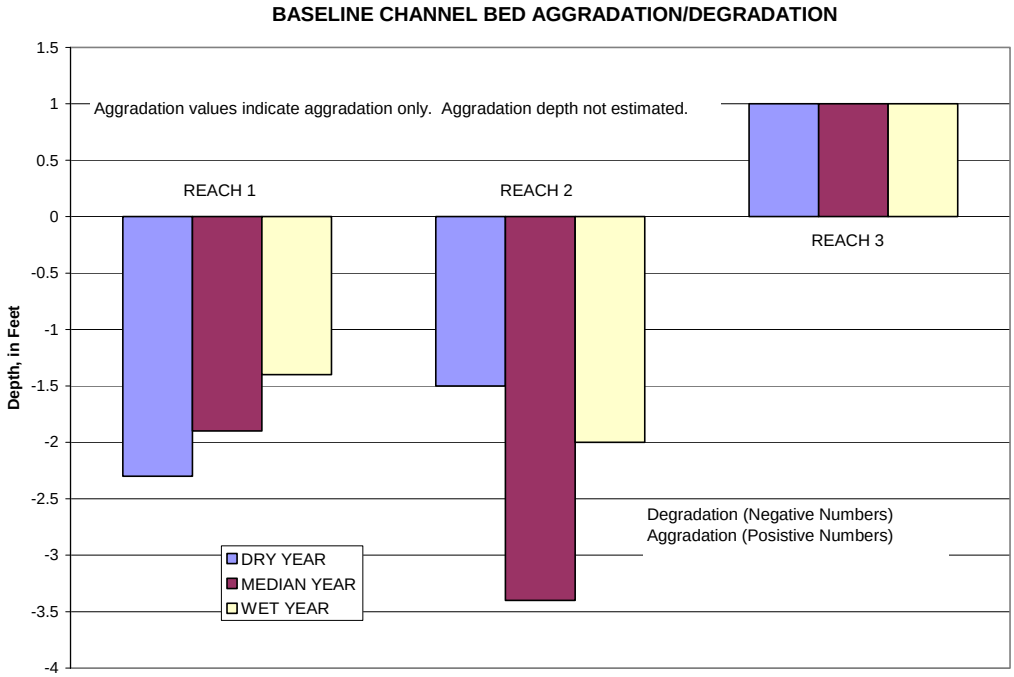


Figure 20 Baseline Channel Bed Aggradation/Degradation Predicted by the Sediment Transport Model

Since the purpose of this study is to determine probable degradation at and upstream of the Rocky Point area (at channel Station 4235), an estimate was made of the probable upstream distance the cut predicted for Reach 2 would extend by projecting a cut at a slope of 0.009 (the probable stable slope) extending upstream into Reach 3 from the maximum predicted cut at Reach 2. The result indicates a probable maximum cut distance from the Rocky Point area of 1,200 feet, with the cut diminishing in depth from 3.4 feet at Rocky Point to zero at a point 1,200 feet upstream of the Rocky Point area.

Although a cut at the Rocky Point area is likely and expected under current conditions, it is likely to be temporary, and may exist for only a few weeks or months depending on the hydrology. The degradation analysis is worst-case in the sense that it does not take into account refilling of cut areas that would occur at or near the leading edge of the reservoir pool as the pool moves upstream. This could occur in any of the three reaches. Furthermore, in most years a substantial amount of sediment is delivered to the reservoir after the reservoir fills. This sediment would all deposit in or just downstream of Reach 3, and tend to reduce or eliminate any cutting that may have occurred in that reach. For instance, in the median year, the reservoir fills by approximately the end of February. All of the cutting predicted in Figure 20 and described above would occur by that time. However, the sediment analysis shows that for this year approximately 16,000 cubic yards of sediment would arrive after the reservoir fills. This amount of sediment is more than the entire cut volume estimated for Reaches 1 and 2, and more than enough to refill the cut in Reach 3 predicted by extension of the Reach 2 cut. The excess sediment would be deposited in Reach 3, and be extended into Reach 2, beneath the water surface, as a sediment plume. Thus, the predicted cut would likely not last through the runoff season unless the reservoir is drawn down abruptly partway through the season. In the wet year, the amount of sediment arriving after the reservoir fills is approximately 160,000 cubic yards. This amount is 5.5 times the

amount of the predicted Reach 1/Reach 2 cut for that year, and 3 times the average annual sediment inflow.

The dry year runoff volume was not sufficient to fill the reservoir. Although the predicted cut at the Rocky Point area (Reach 2) is only 1.9 feet, this cut would likely last through the summer and into the next runoff season. Should another dry year occur, the cut would likely deepen and extend upstream. Dry years, in which the runoff volume is not sufficient to fill the reservoir, occur in about one out of every five years.

In summary for baseline conditions, Reaches 1 and 2 are expected to degrade slightly during dry years and at the beginning of the runoff season in all years. Maximum predicted degradation at the Rocky Point area is 3.4 feet, with a maximum possible upstream cut distance of 1,200 feet. For most years, this cut at and upstream of the Rocky Point area is expected to be temporary, and not likely to last into the summer unless the reservoir is drawn down before the runoff season ends. A dry year cut could deepen and continue if followed by more dry years, but would eventually be filled as wetter years occur. The long-term trend is aggradation, because all sediment brought into the reservoir is trapped there, resulting in the channel bed at and upstream of Rocky Point becoming wider and sandier.

3. DESCRIPTION OF ALTERNATIVES

The purpose of the proposed project is to excavate accumulated sediment from the reservoir to recover storage capacity that has been lost through sedimentation. Initial excavation quantities would be either 270,000 cubic yards or 540,000 cubic yards, followed by subsequent periodic excavations sufficient to ensure that the capacity obtained from the initial excavation remains. Since the upstream slopes of the excavated areas will be steeper than the existing slope, channel bed cutting, progressing upstream, is expected to be induced by the alternatives. The objective of the alternatives is to remove the desired amount of sediment while limiting or eliminating the upstream cut. Five alternatives, plus a no-project alternative, were developed. The no-project alternative is the same as continuing the baseline condition. The other five alternatives are described below:

3.1 ALTERNATIVE 1

Alternative 1 is designed to excavate 270,000 cubic yards of material from the reservoir, and to keep the excavation as close to the dam as possible so that any channel cutting that may occur as a result of Alternative 1 would begin as far downstream of the Rocky Point area as possible. The disadvantage of Alternative 1 is a steep cut slope likely to produce more dramatic upstream channel cutting than a cut of flatter slope.

Alternative 1 consists of excavating a trapezoidal section with approximately 80-foot bottom width and 5:1 side slopes beginning just upstream of the dam and ending at River Station 1,390. Maximum excavation depth just upstream of the dam would be approximately 43 feet. Excavation depth at Station 1,390 would be zero. Excavation top width would be approximately 520 feet just upstream of the dam, tapering to approximately 150 feet at River Station 1,110 and zero at Station 1,390. Figures 21, 22, and 23 show the plan view, cut profile and typical cross section for Alternative 1. Excavation volume would be approximately 270,000 cubic yards. This alternative would include continued annual removal of 54,000 cubic yards of material from the same area as the initial excavation of Alternative 1.

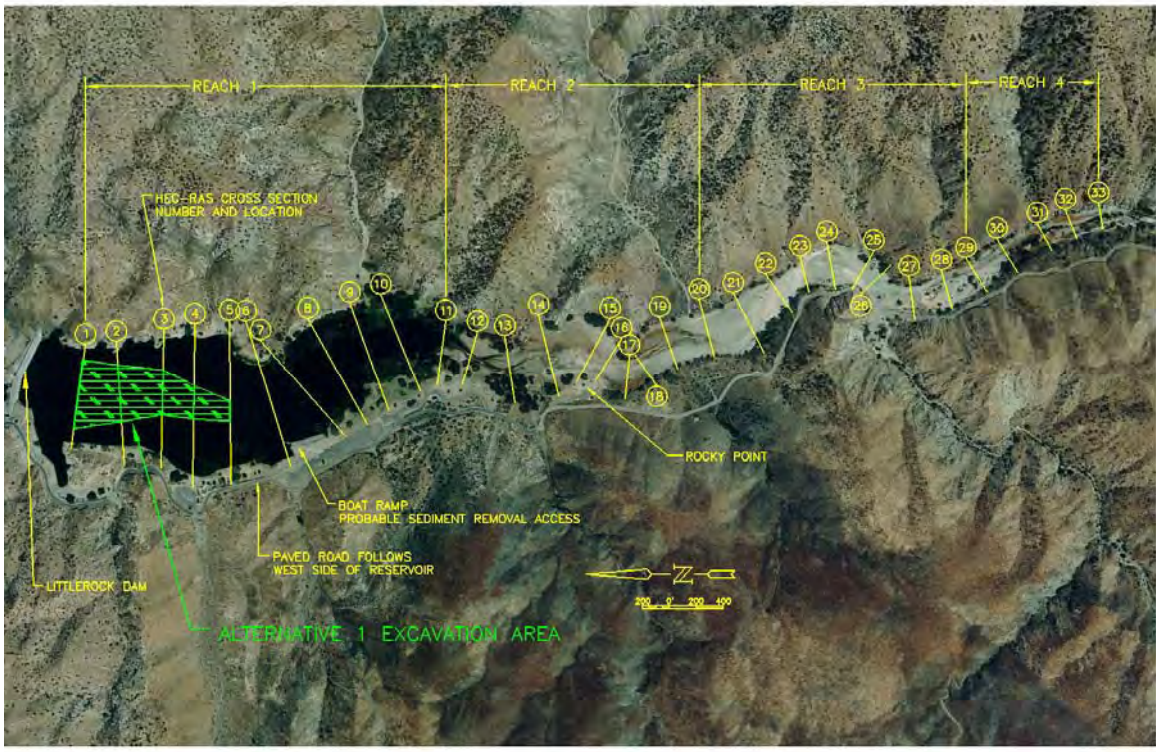


Figure 21 Alternative 1 Plan View

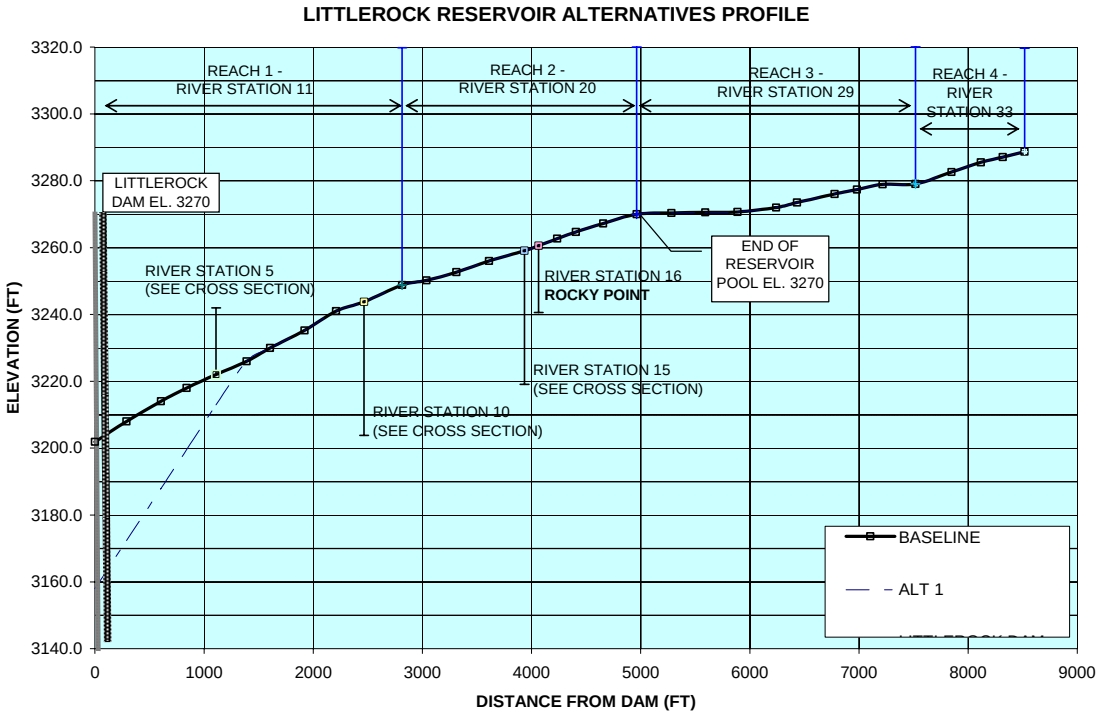


Figure 22 Alternative 1 Cut Profile

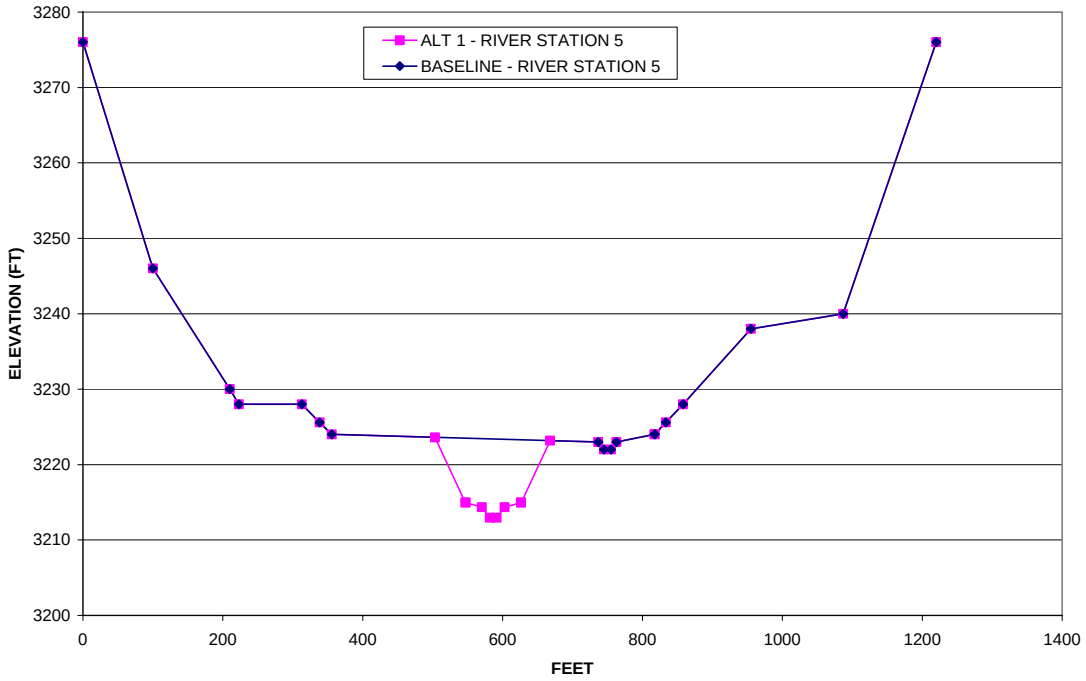


Figure 23 Alternative 1 Typical Cross Section

3.2 ALTERNATIVE 2

Alternative 2 is designed to excavate 270,000 cubic yards of material from the reservoir, and to keep the excavation slope as flat as possible to reduce disparities in sediment transport capacity and thereby keep the upstream cut to a minimum. The disadvantage of Alternative 1 is that it extends to the Rocky Point area so that any induced cut would almost certainly extend upstream of that point.

Alternative 2 consists of excavating a trapezoidal section with approximately 200-foot bottom width and 5:1 side slopes beginning just upstream of the dam and ending at River Station 4,235 (at the Rocky Point area). Figures 24, 25, and 26 show plan view, profile, and typical cross section. Excavation depth would vary depending on location as shown in Figure 25. Maximum excavation depth would be at approximately 11 feet at Station 2,210. Excavation depth at Rocky Point (Station 4,235) would be zero. Excavation top width would be 250 to 300 feet from the dam to Station 2,815, tapering to zero at Station 4,235. Excavation volume would be approximately 270,000 cubic yards. This alternative would include continued removal of 54,000 cubic yards of material from the same area as the initial excavation.

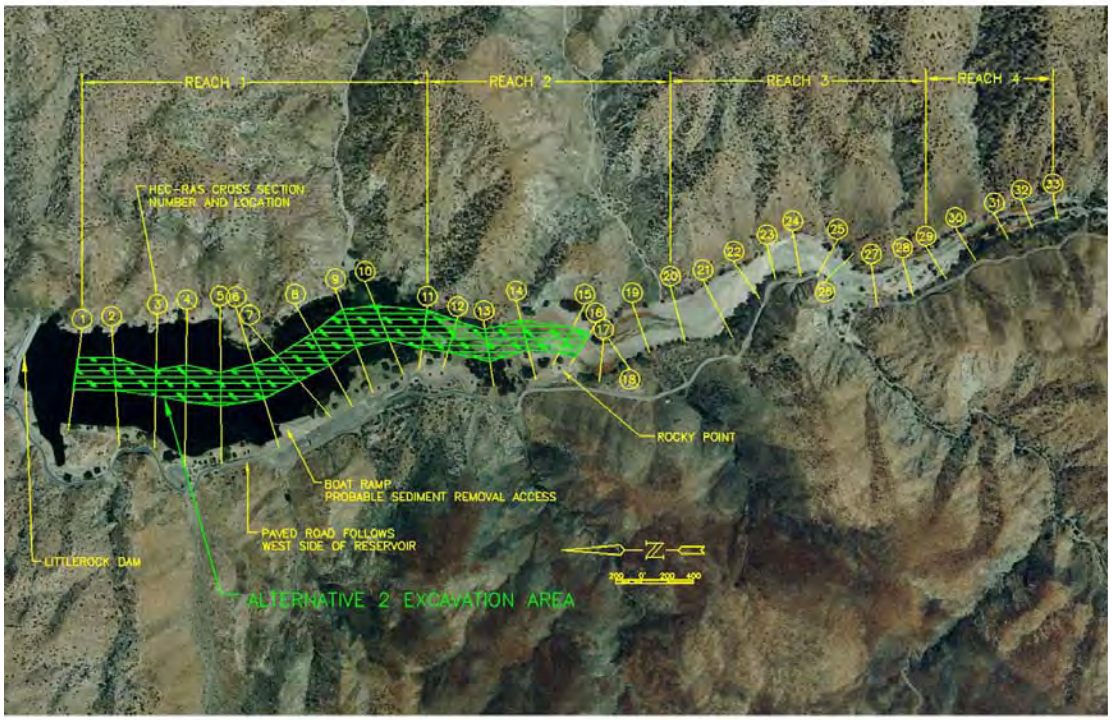


Figure 24 Alternative 2 Plan View

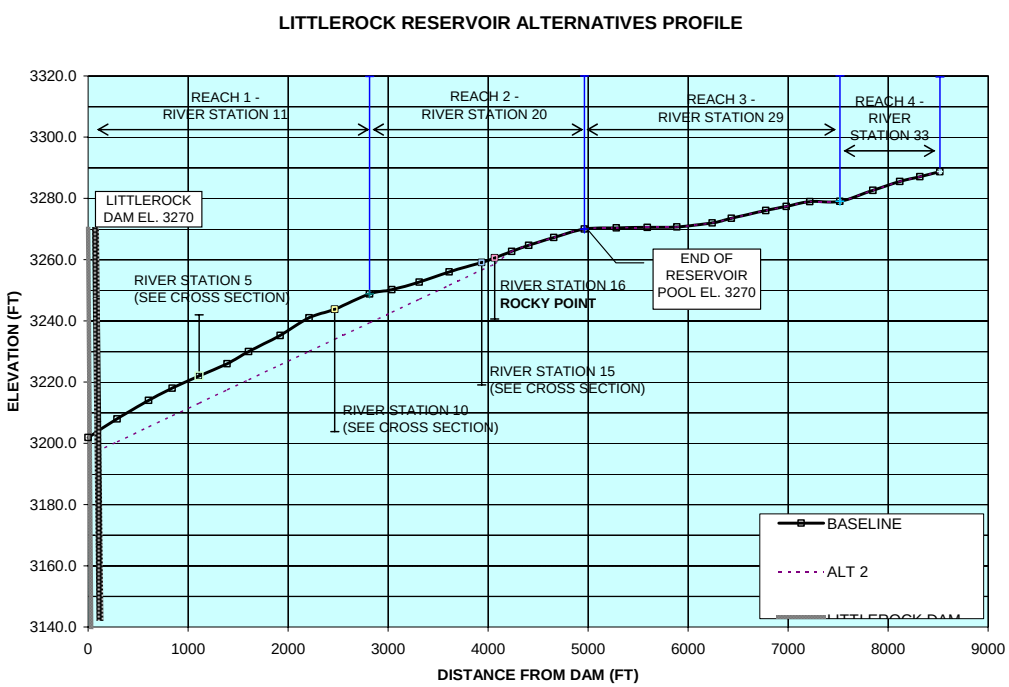


Figure 25 Alternative 2 Cut Profile

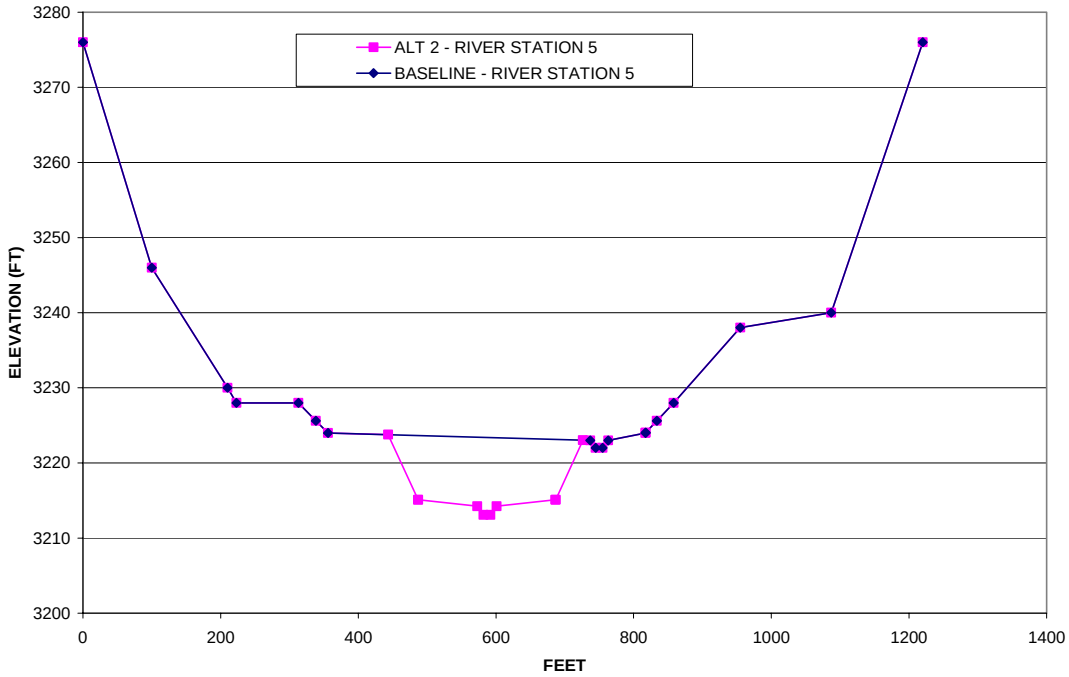


Figure 26 Alternative 2 Typical Cross Section

3.3 ALTERNATIVE 3

Alternative 3 is the same as Alternative 1, but with the goal of excavating 540,000 cubic yards rather than 270,000 cubic yards of sediment. Figures 27, 28, and 29 show plan view, profile, and typical cross section. Maximum excavation depth just upstream of the dam would be approximately 43 feet, same as Alternative 1, but excavation would extend to Station 2815. Excavation top width would be approximately 520 feet just upstream of the dam, tapering to zero at Station 2815. Excavation volume would be approximately 540,000 cubic yards. This alternative would include removal of 270,000 cubic yards of material from the same area as the initial excavation every five years.

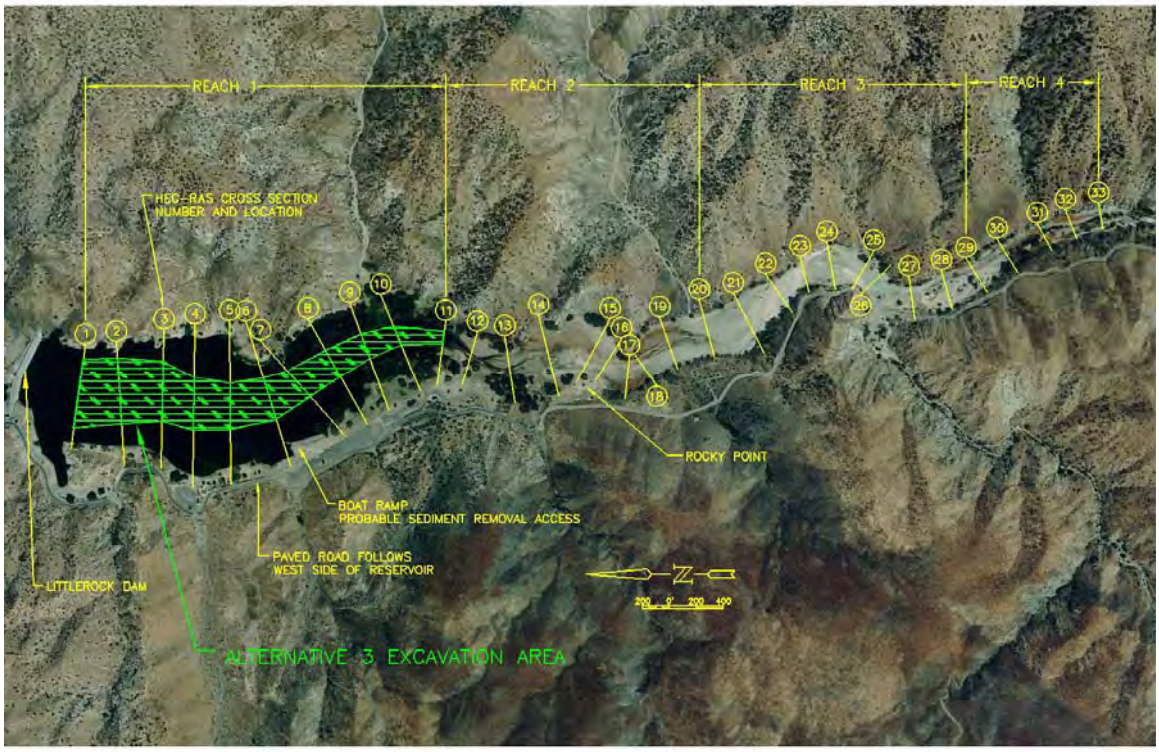


Figure 27 Alternative 3 Plan View

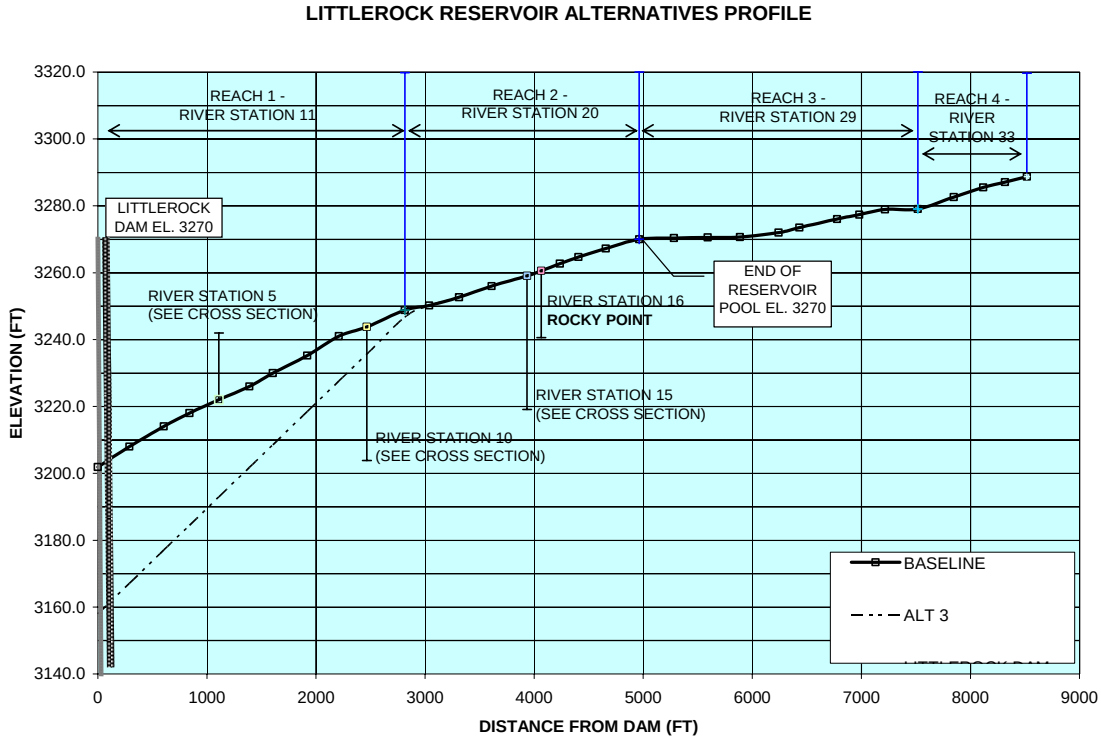


Figure 28 Alternative 3 Cut Profile

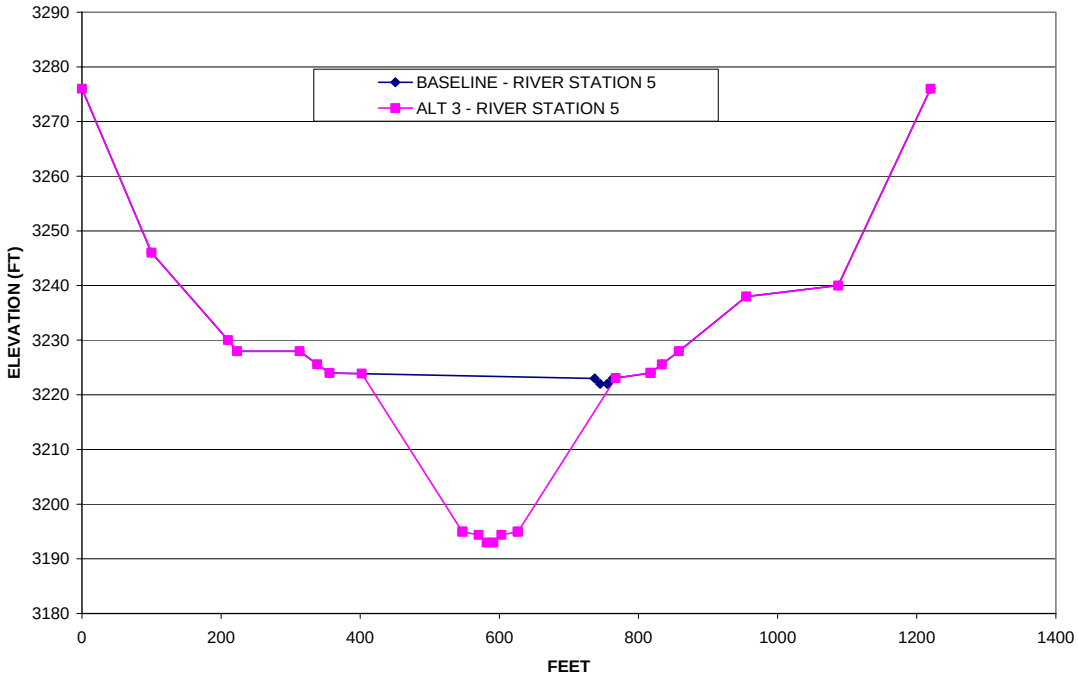


Figure 29 Alternative 3 Typical Cross Section

3.4 ALTERNATIVE 4

Alternative 4 is the same as Alternative 2, but with the goal of excavating 540,000 cubic yards rather than 270,000 cubic yards of sediment. Figures 30, 31 and 32 show plan view, profile, and typical cross section. Maximum excavation depth at Station 605 would be approximately 22 feet. Excavation top widths would be approximately 370 feet from the dam to approximately River Station 2,815, then taper to zero at Station 4,235. Excavation volume would be approximately 540,000 cubic yards. This alternative would include removal of 270,000 cubic yards of material from the same area as the initial excavation every five years.

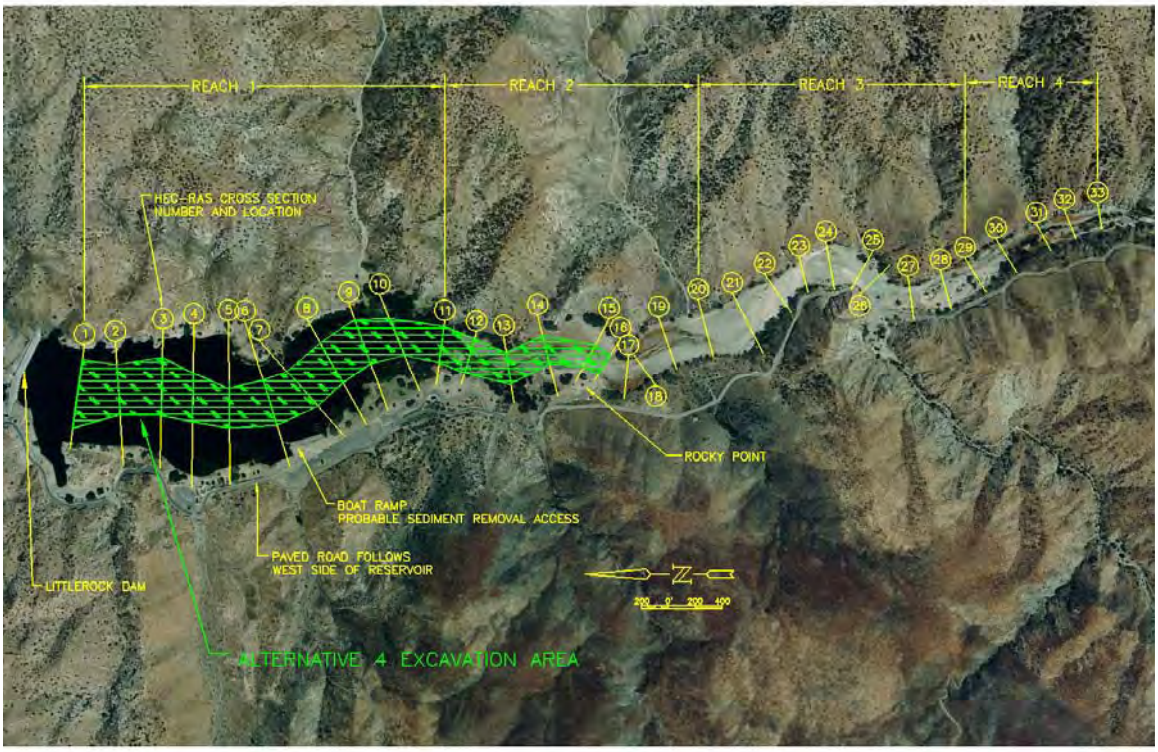


Figure 30 Alternative 4 Plan View

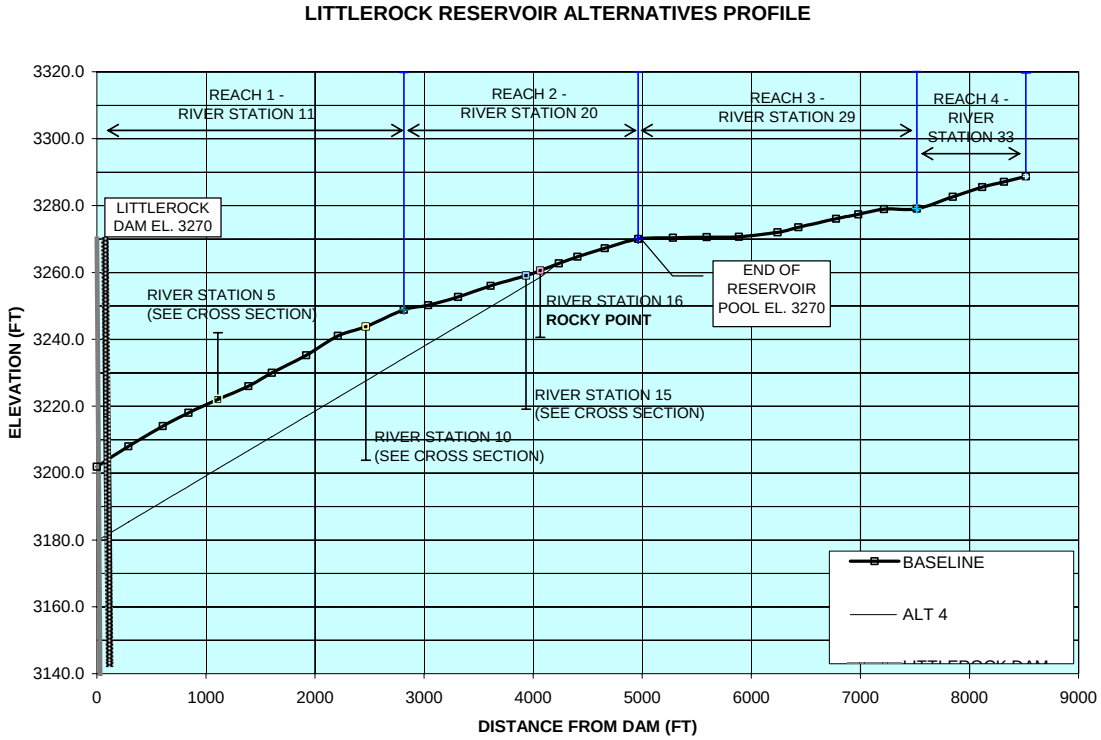


Figure 31 Alternative 4 Cut Profile

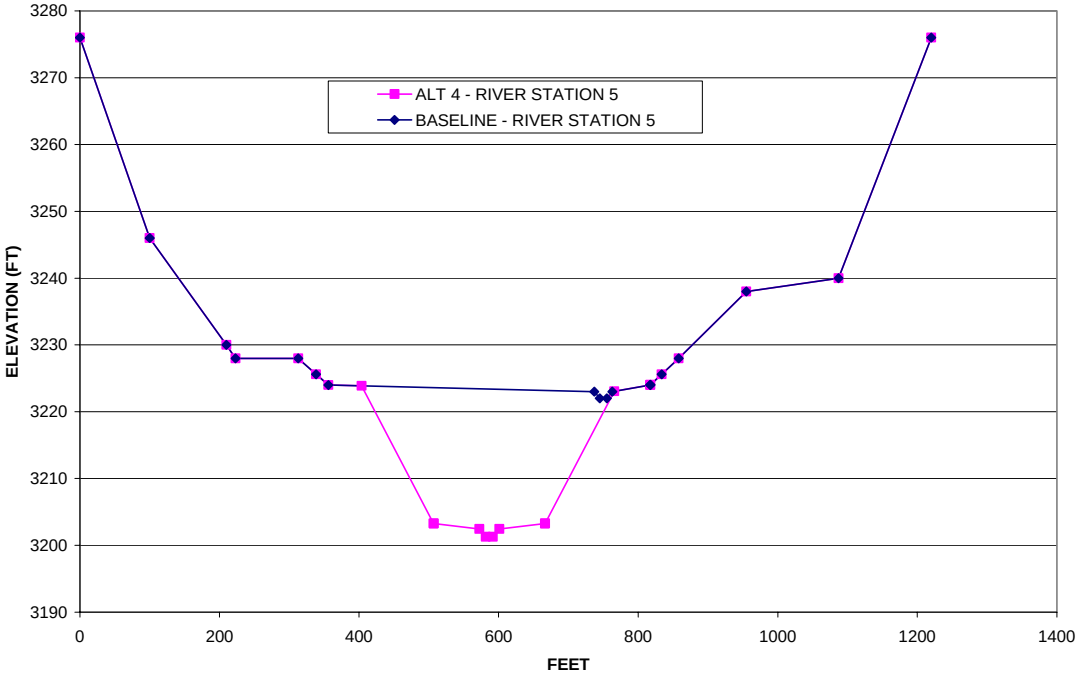


Figure 32 Alternative 4 Typical Cross Section

3.5 ALTERNATIVE 5

Alternative 5 consists of building a grade control structure at or just downstream of River Station 4,235 (the Rocky Point area) and excavating downstream of the grade control. Although there is some flexibility in the location of the grade-control structure, the approximate location is at Rocky Point shown in Figure 33 and Figure 19. The structure would be constructed of soil cement or concrete and span approximately 250 feet of the channel. Figure 33 shows a conceptual plan view and cross section. The structure would be buried, with the top flush with, or slightly below, the existing channel surface. Maximum depth of the structure would be approximately 70 feet. Construction of the structure would disturb a section of channel and adjacent bank approximately 300 feet wide in a direction perpendicular to flow, and 500 feet wide in the direction parallel to flow as shown in Figure 33. Disturbed channel areas would be returned to pre-construction conditions after construction. Alternative 5 would include excavation of the accumulated sediments in the reservoir downstream of the grade control structure. Since the grade control structure would be designed to prevent project-related reservoir excavation from progressing upstream, reservoir excavation could proceed according to a design and schedule determined by the District. For purposes of this analysis an excavation and maintenance schedule the same as Alternative 3 should be assumed.

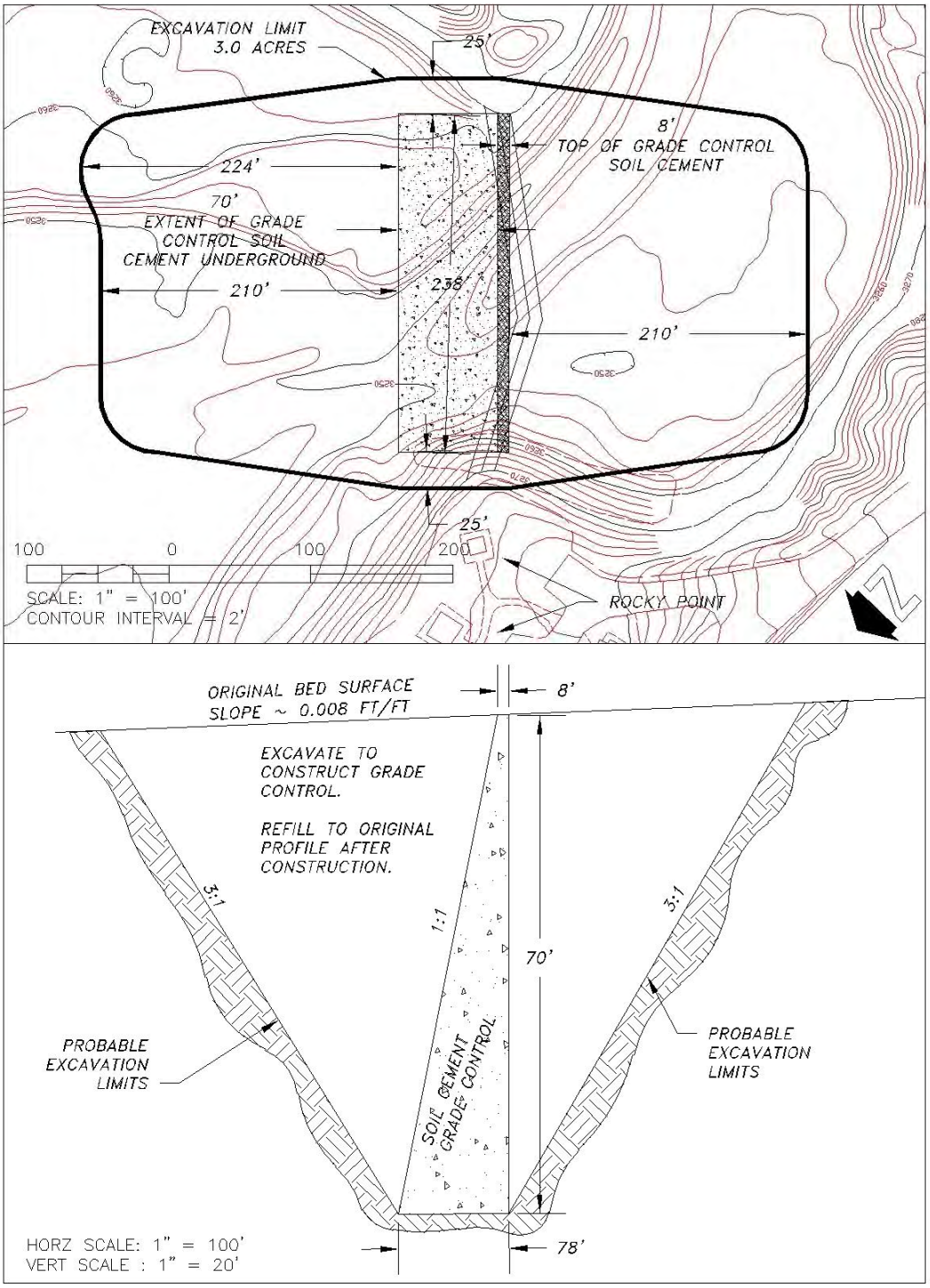


Figure 33 Alternative 5 Plan and Profile

4. IMPACT ANALYSIS

The purpose of the impact analysis was to determine whether the alternatives were likely to result in channel degradation upstream of the Rocky Point area, and make an estimate of how deep the degradation would be, and how far upstream it would extend. The analysis consisted of a sediment transport analysis similar to the evaluation described above for baseline conditions, and a qualitative geomorphic analysis based on reservoir and alternative topography, and channel profiles. Given the complexity of sediment transport, particularly in a situation such as the Littlerock Reservoir where hydraulic boundary conditions are constantly changing, and the variability and uncertainty of the future hydrology, the results of the analysis should be considered approximate and for comparison purposes rather than as firm predictions.

The results are presented as 1) short-term (one-year) impact based on the sediment transport analysis and the dry, median and wet year inflow scenarios; and 2) probable long-term effect assuming continued maintenance excavation of the reservoir as described in the alternatives.

4.1 ALTERNATIVE 1

Figure 34 shows the results of the sediment transport analysis for Alternative 1. As would be expected from a steepening of the slope from the Alternative 1 cut, substantial channel degradation, ranging from 6.5 to 13.5 feet, is expected in Reach 1. Reach 2 has predicted degradation up to 3.5 feet, and Reach 3 is expected to aggrade.

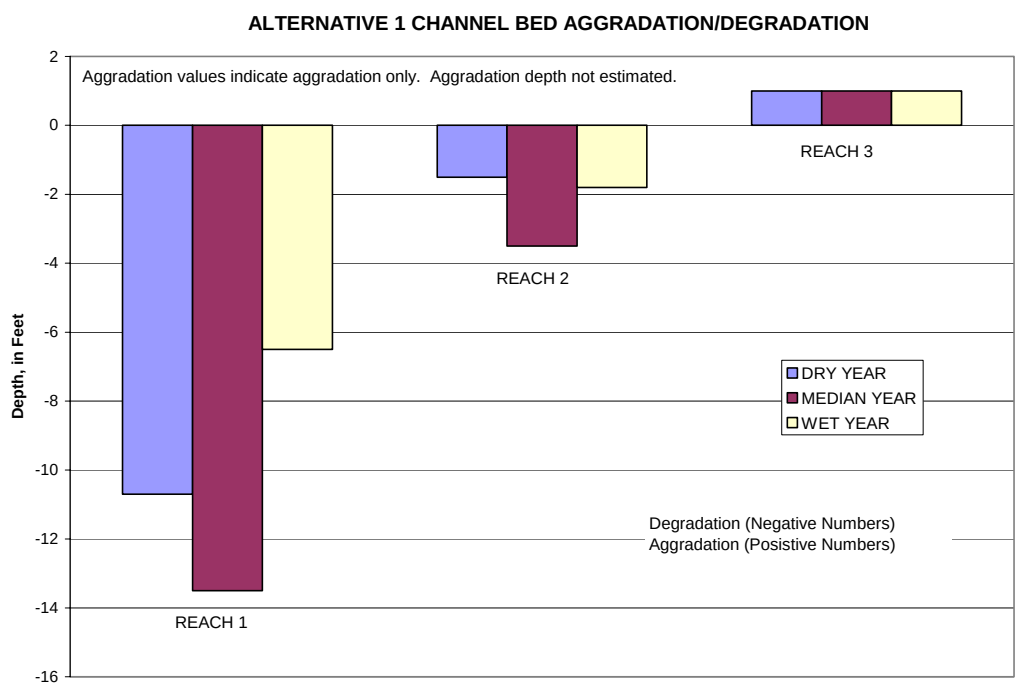


Figure 34 Alternative 1 Channel Bed Aggradation/Degradation by Reach as Predicted by the Sediment Transport Model

Predicted short-term degradation for Reach 1 is much more than for Reach 2. It is expected that this cut will actually extend upstream from Reach 1 at a relatively constant slope. An estimate of the possible extent of this cut was made by extending a line from the upstream end of the predicted Reach 1 cut, to the upstream end of the Reach 2 cut, and from there at a slope of 0.009, connecting with existing ground in Reach 3, which is predicted to aggrade. This with-project short-term profile is shown in Figure 35. The profile predicts a maximum cut at Rocky Point of 7 feet, extending to zero at a point 1,335 feet upstream of Rocky Point. Based on the results of the hydraulic and sediment analysis, the width of the low-flow channel in the 1989 and 1995 topography, and field observations, the cut is expected to be approximately 20 feet wide at the bottom. Side slopes in the sandy material would be 3:1 or flatter.

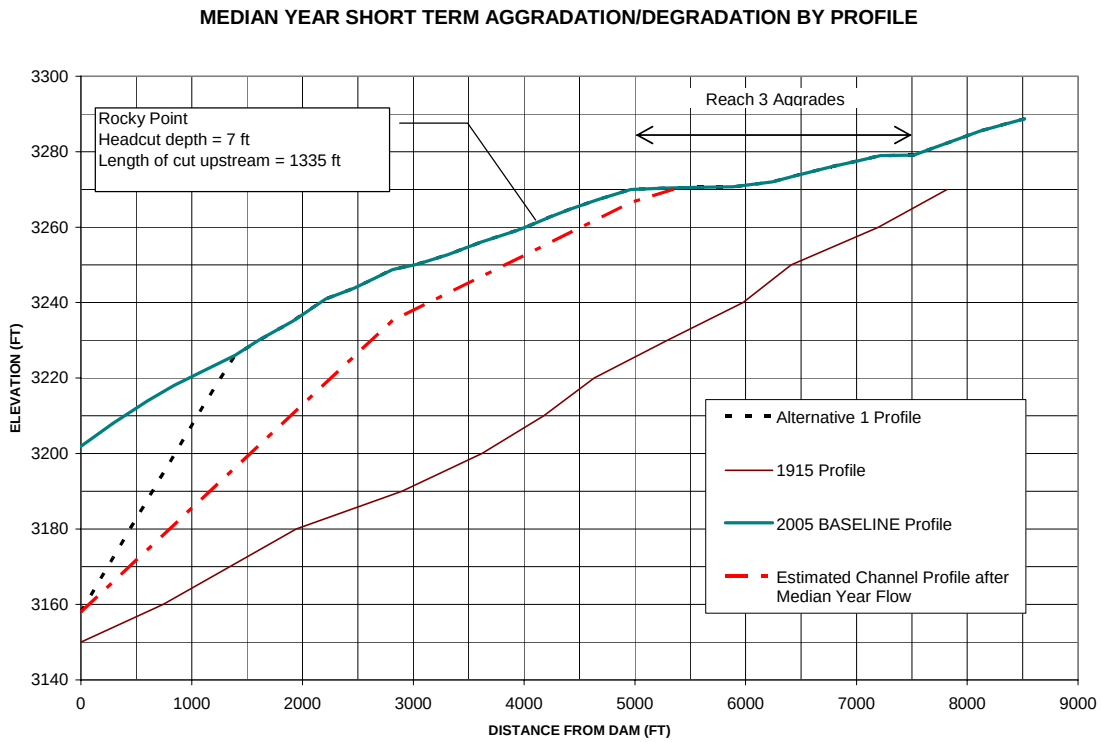


Figure 35 Alternative 1 Estimated Channel Profile After Median Year Flow

For the same reasons as for the Baseline Conditions cut, the degradation effect of Alternative 1 at and upstream of Rocky Point will be temporary unless excavation of incoming sediment is continued on a yearly basis. In the case of the 7-foot cut predicted for Rocky Point, predicted by the median year model, sufficient sediment would be delivered to the reservoir after the reservoir fills to completely fill this cut. All of this sediment would be deposited in the vicinity of the cut, so it is possible that by the end of the runoff season the cut would no longer be present.

Removal of incoming sediment, as proposed for this alternative, will simulate natural sediment transport in the sense that sediment will be transported out of the system. A new equilibrium will be reached, with the accumulated sediment in the reservoir not removed by Alternative 1 serving as the base elevation. Since it is proposed to remove sediment at the same rate as the supply, the channel can be expected to drop to a slope approximating the supply slope, particularly in the upper end of the reservoir. Given these conditions, the cut line represented by a slope of 0.009 in Figure 11 is a likely worst-case upstream channel degradation limit for Alternative 1 at Rocky Point.

Although a long-term worst-case cut of 13 feet at Rocky is estimated from the supply slope, the reservoir bed profile will actually not be at a constant slope, but be flatter at the upstream end and steeper at the downstream end due to backloading of sediment deposition at the upstream end of the reservoir after the reservoir is filled. Most (approximately 80 percent) of the years will bring sediment into the upstream end of the reservoir after the reservoir is filled. This sediment will be deposited at the upstream end and fill, at least partially, any cut that may exist there.

The volume of the maximum channel degradation cut upstream of Rocky Point is approximately 62,000 cubic yards. For Alternative 1, in a typical year, approximately 16,000 cubic yards of sediment are delivered after the reservoir is filled. This is sufficient to reduce the worst-case cut at Rocky Point to 8 feet. In a wet year, such as 1944, the excess arriving after the reservoir is filled is 160,000 cubic yards, 2.6 times the amount necessary to entirely fill the cut. On average, approximately 42,000 cubic yards of sediment arrive after the reservoir is filled each year, resulting in a probable average degradation at Rocky Point of three feet. Thus, with Alternative 1 in place, the long-term cut at Rocky Point is expected to vary, ranging from zero to 13 feet, and averaging about three feet. Table 5 provides a summary of estimated Alternative 1 impacts.

Table 5 Alternative 1 Impact Summary

Impact	Depth of Degradation At Rocky Point, in Feet	Maximum Distance of Cut Upstream of Rocky Point, in Feet
Short-Term (one year) Degradation	7	1,335
Worst-Case Long-Term Degradation Assuming Annual Excavation of 54,000 Cubic Yards	13	3,300
Probable Long-Term Average Degradation Based on Sediment Deposition at the Upstream End of the Reservoir	3	3,300

4.2 ALTERNATIVE 2

Figure 36 shows the results of the sediment transport analysis for Alternative 2. Because Alternative 2 would result in the steepening of Reach 2, substantial channel degradation is predicted there, ranging from 5.4 to 7.2 feet. Reach 2 degradation is approximately the same as or more than that of Reach 1, so Reach 2 is the dominant reach for predicting degradation. Maximum degradation of 7.2 feet occurs in a median year. Reach 3 is expected to aggrade.

Although Reach 3 is expected to aggrade, in the short term, the Reach 2 cut will likely extend into Reach 3. An estimate of the possible extent of the cut upstream of Reach 2 was made by extending a line at a slope of 0.009 from the upstream end of the predicted Reach 2 cut to connect with the Reach 3 profile. This with-project short-term profile is shown in Figure 37. The profile predicts that the 7.2-foot Reach 2 cut will extend upstream of Rocky Point a distance of approximately 1,335 feet. The cut would be approximately 20 feet wide with 3:1 or flatter side slopes.

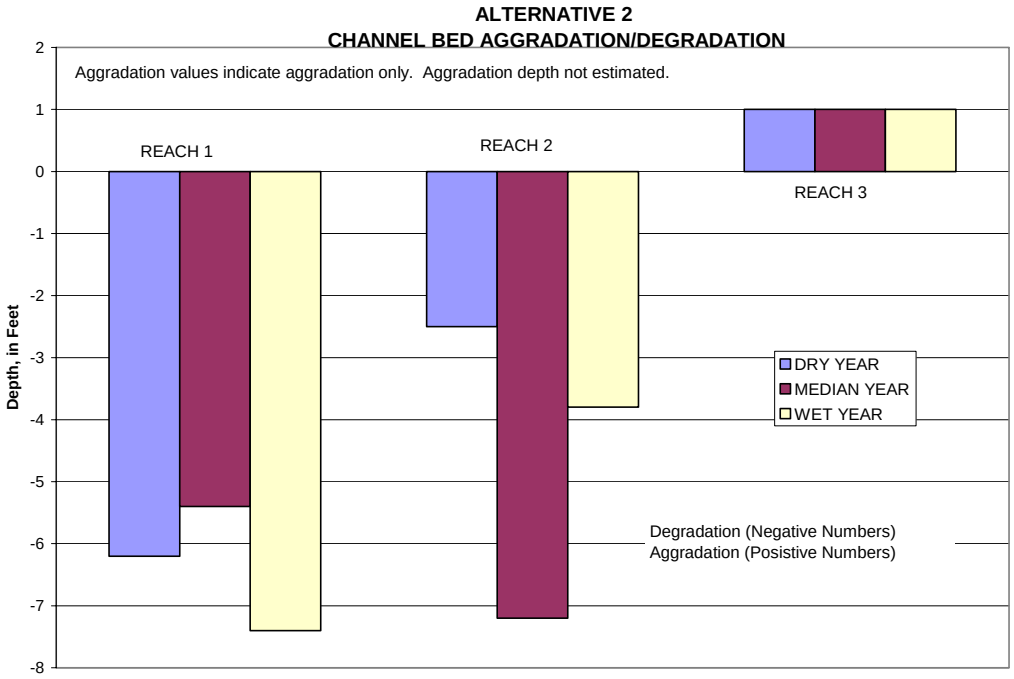


Figure 36 Alternative 2 Channel Bed Aggradation/Degradation by Reach as Predicted by the Sediment Transport Model

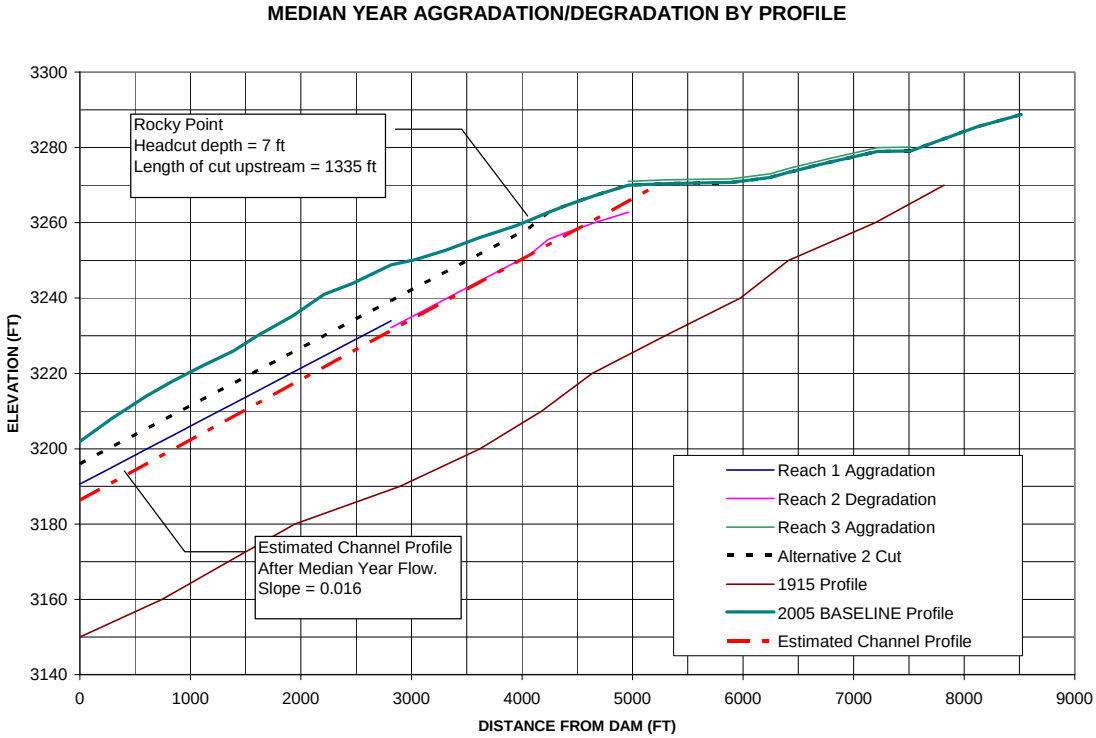


Figure 37 Alternative 2 Estimated Channel Profile After Median Year Flow

Alternative 2 involves annual removal of sediment from the Alternative 2 cut area. The stable slope discussion for Alternative 1 applies to the long-term degradation for Alternative 2 at Rocky Point. However, Alternative 2 involves an annual active excavation cut up to the Rocky Point area, resulting in a probable deeper average annual degradation than predicted for Alternative 1, similar to that predicted by the sediment transport analysis. Based on the results of the sediment transport analysis, and the long-term degradation analysis, the long-term average channel elevation at Rocky Point is likely to be approximately 7 feet. With Alternative 2 in place, the long-term cut at Rocky Point is expected to vary, ranging from zero to 13.2 feet, and averaging about 7 feet below the existing bed surface. Table 6 provides a summary of estimated Alternative 2 impacts.

Table 6 Alternative 2 Impact Summary

Impact	Depth Of Degradation At Rocky Point, In Feet	Maximum Distance Of Cut Upstream Of Rocky Point, In Feet
Short-Term (one year) Degradation	7	1,335
Worst-Case Long-Term Degradation Assuming Annual Excavation of 54,000 Cubic Yards	13	3,300
Probable Long-Term Average Degradation Based on Sediment Deposition at the Upstream End of the Reservoir	7	3,300

4.3 ALTERNATIVE 3

Figure 38 shows the results of the sediment transport analysis for Alternative 3. Similar to Alternative 1, substantial channel degradation, ranging from 5.4 to 8.7 feet, is expected in Reach 1. Degradation depth is less in Reach 1 than for Alternative 1 for the reason that the Alternative 3 excavation slope is flatter. Reach 2 has predicted degradation up to 4.1 feet, and Reach 3 is expected to aggrade.

It is expected that the Reach 1 cut will extend upstream from Reach 1 at a relatively constant slope. An estimate of the possible extent of this cut was made in the same manner as described for Alternative 1 and is shown in Figure 39. The profile predicts a maximum cut at Rocky Point of 7 feet, extending to zero at a point 1,335 feet upstream of Rocky Point. The cut is expected to be approximately 20 feet wide at the bottom with 3:1 side slopes.

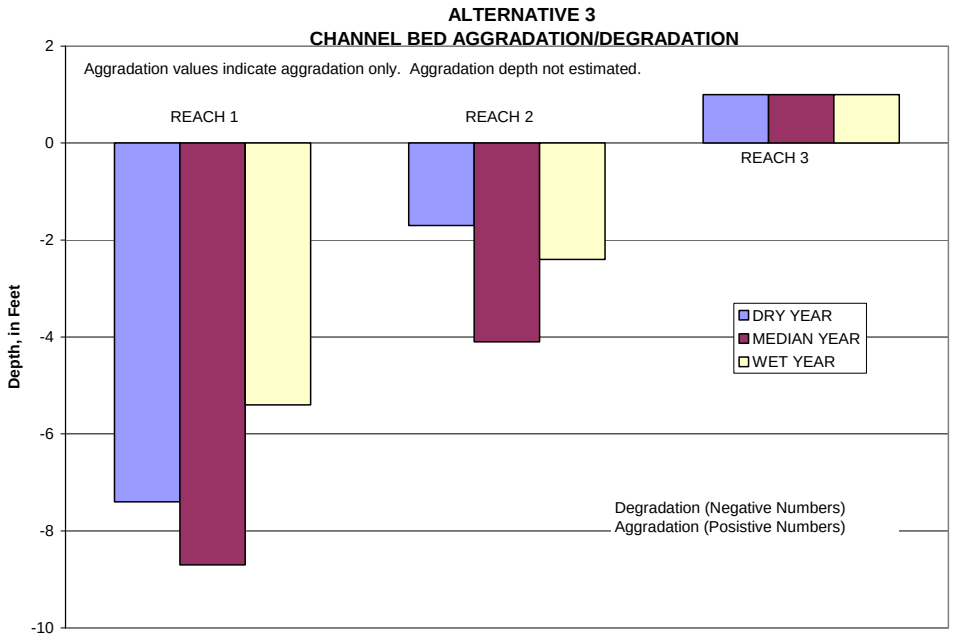


Figure 38 Alternative 3 Channel Bed Aggradation/Degradation by Reach as Predicted by the Sediment Transport Model

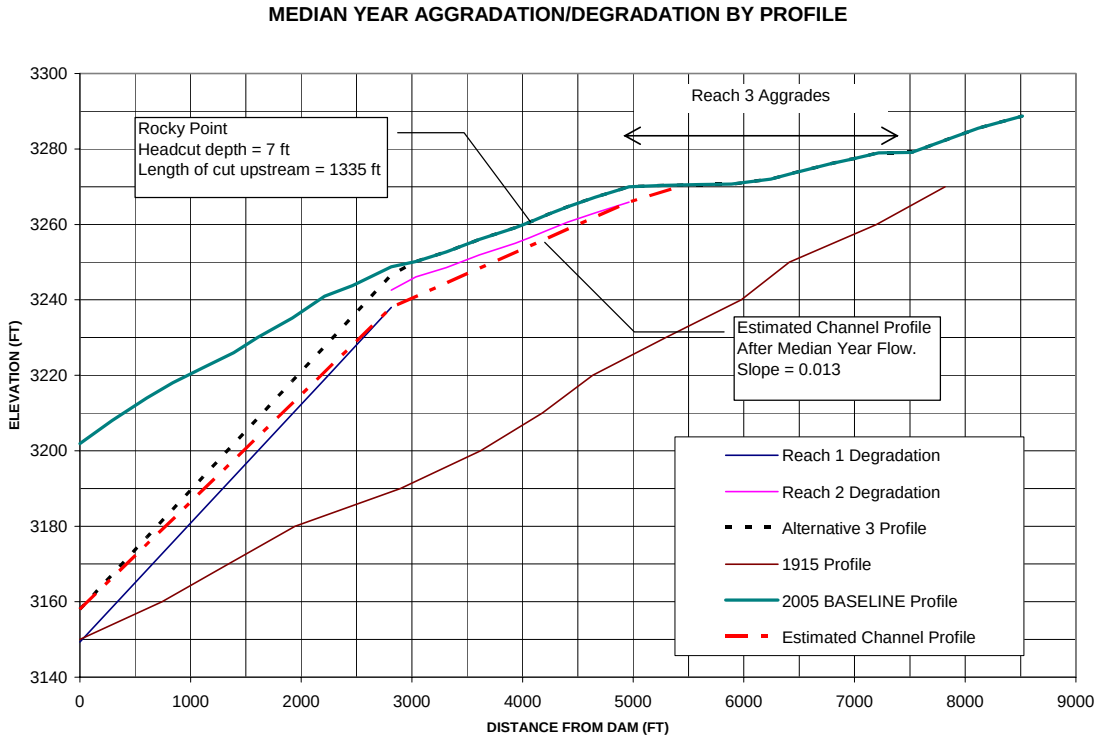


Figure 39 Alternative 3 Estimated Channel Profile After Median Year Flow

Alternative 3 involves removal of incoming sediment from the Alternative 3 cut area every five years. The removal amount would be the same as the incoming sediment volume (approximately 270,000 cubic yards). This would simulate natural sediment transport as described for Alternative 1, and the stable slope discussion for Alternative 1 applies to the long-term degradation for Alternative 3. Although Alternative 3 involves a much greater excavation than Alternative 1, and would therefore tend to move more quickly toward the equilibrium cut of 13 feet at Rocky Point, subsequent sediment removals would be every five years rather than annual, which would compensate by allowing sediment backloading of the reservoir more opportunity to recover the cut. The Alternative 3 long-term channel degradation at and upstream of Rocky Point (Table 7) is expected to be approximately the same as for Alternative 1. Alternative 3, with an annual active excavation cut up to the Rocky Point area, would result in a probable deeper average annual degradation than predicted for Alternative 1, with more dramatic fluctuations in bed level at Rocky Point.

Table 7. Alternative 3 Impact Summary

Impact	Depth Of Degradation At Rocky Point, In Feet	Maximum Distance Of Cut Upstream Of Rocky Point, In Feet
Short-Term (one year) Degradation	7	1,335
Worst-Case Long-Term Degradation Assuming Excavation of 270,000 Cubic Yards every five years.	13	3,300
Probable Long-Term Average Degradation Based on Sediment Deposition at the Upstream End of the Reservoir	3	3,300

4.4 ALTERNATIVE 4

Figures 40 and 41 show the results of the sediment transport analysis for Alternative 4. Reach 2 degradation is estimated at 11.4 feet. Reaches 1 and 3 are predicted to aggrade. Since the Reach 3 predicted aggradation is less than the Reach 2 degradation, the Reach 2 cut is expected to extend into Reach 3. Assuming a slope of 0.009 from the upstream end of the predicted Reach 2 cut, this cut is expected to extend approximately 1,485 feet upstream of the Rocky Point area. The cut is expected to be approximately 20 feet wide with 3:1 or flatter side slopes.

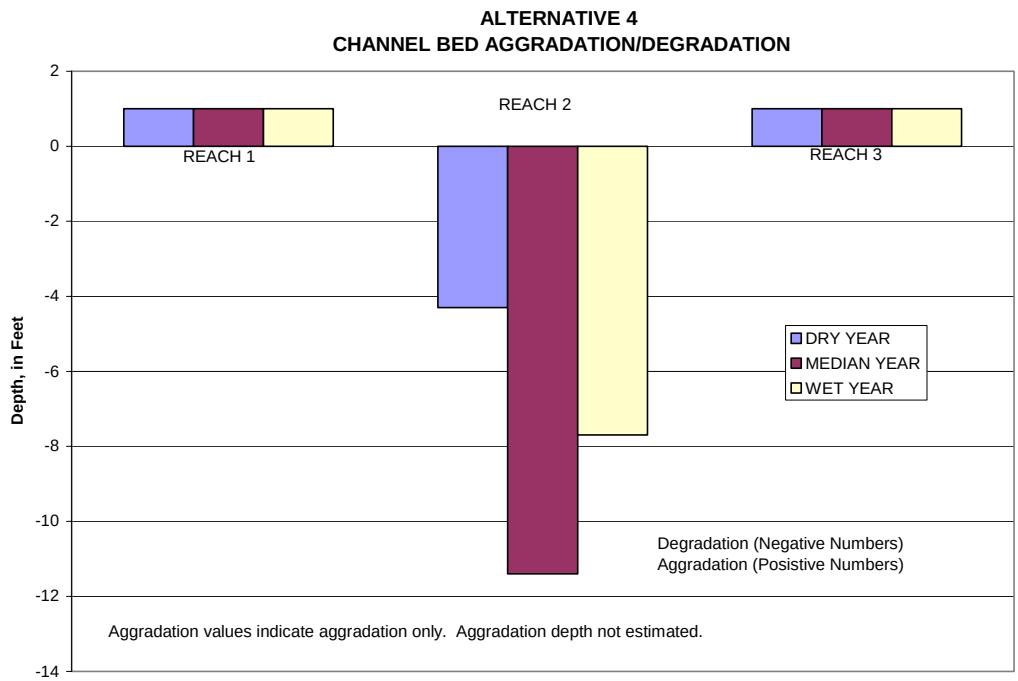


Figure 40 Alternative 4 Channel Bed Aggradation/Degradation by Reach as Predicted by the Sediment Transport Model

Alternative 4 involves 5-year removal of 270,000 cubic yards of sediment from the Alternative 4 cut area. The stable slope discussion for Alternative 1 applies to the long-term degradation for Alternative 4 at Rocky Point. However, as with Alternative 2, Alternative 4 involves active excavation cut up to the Rocky Point area, resulting in a probable deeper average annual degradation than predicted for Alternatives 1, 2, and 3. Based on the results of the sediment transport analysis, and the long-term degradation analysis, the long-term average channel elevation at Rocky Point is estimated at approximately 11 feet. With Alternative 4 in place, the long-term cut at Rocky Point is expected to vary dramatically, ranging from zero to 13 feet, and averaging about 11 feet below the existing bed surface. Table 8 provides a summary of estimated Alternative 4 impacts.

Table 8. Alternative 4 Impact Summary

Impact	Depth Of Degradation at Rocky Point, in Feet	Maximum Distance of Cut Upstream of Rocky Point, in Feet
Short-Term (one year) Degradation	11	1,485
Worst-Case Long-Term Degradation Assuming Annual Excavation of 54,000 Cubic Yards	13	3,300
Probable Long-Term Average Degradation Based on Sediment Deposition at the Upstream End of the Reservoir	11	3,300

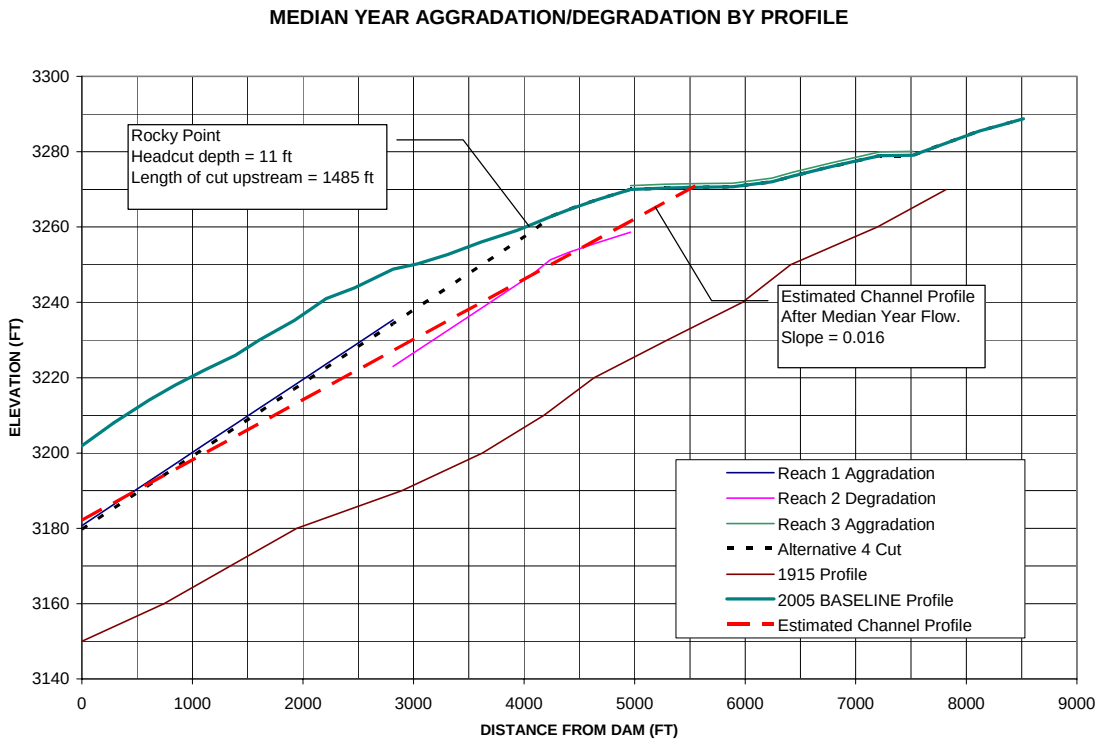


Figure 41 Alternative 4 Estimated Channel Profile After Median Year Flow

4.5 ALTERNATIVE 5

The Alternative 5 grade control structure would prevent project-related channel downcutting from extending upstream of the Rocky Point area. Substantial cutting would occur downstream of the structure, due to project-related excavation and alterations in sediment transport capacity. Upstream of the grade control structure, the channel bed would remain at the current condition, with perhaps some minor temporary downcutting as described for baseline conditions. Minor downcutting would be seasonal and generally follow periods of high flow when sediment deposited in the upper end of the reservoir causes the channel to aggrade. This is the same as the current baseline condition.

4.6 ALTERNATIVE SUMMARY AND DISCUSSION

Table 9 provides a summary of the results of the analysis for baseline conditions and the alternatives. In all cases seasonal fluctuations are expected, as was predicted under the baseline condition. Bed elevation fluctuations will be greatest in dry years when insufficient flow to fill the reservoir occurs. This should happen in about 20 percent of the years. In most years sediment is delivered to the reservoir after the reservoir fills, and most of this sediment will be deposited in and near the upper end of the reservoir, filling channel degradation cuts that may be present.

Alternatives 1 and 3 have the least expected degradation. These alternatives have the advantage that the excavation cut is far removed from the Rocky Point area, and are at a lower elevation, resulting in being covered by reservoir water earlier in the season, thus inhibiting the growth of a headcut.

Alternatives 2 and 4 would have the excavation cut extend to Rocky Point, and therefore have the most expected channel degradation. Alternative 5 stabilizes the channel from Rocky Point up, and prevents project-related cutting from occurring.

The amount of channel downcutting with Alternatives 1 to 4, as well as baseline conditions, is highly dependent on the hydrology. After a series of dry years, with Alternatives 1 to 4 in place, particularly if annual or 5-year maintenance excavation proceeds at the described schedule (54,000 cubic yards per year for Alternatives 1 and 2, and 270,000 cubic yards every 5 years for Alternatives 2 and 4) the channel at Rocky Point could degrade to a level approaching 13 feet. A series of wet years would likely produce aggradation with all alternatives in place. The probable long-term average given in Table 9 provides the results of an attempt to quantify the average lowering of the bed elevation that would occur with the alternatives in place.

Because of the effect of dry years, it is recommended that with Alternatives 1 to 4, the maintenance excavation schedule be modified to limit annual sediment removal to the amount delivered by the previous year.

Table 9 Summary of Expected Channel Degradation at Rocky Point

Alternative	Depth Of Degradation At Rocky Point, In Feet	Degradation Distance Upstream Of Rocky Point, In Feet
Short-Term (One Year) Impact		
Baseline Conditions	3	1,200
Alternative 1	7	1,335
Alternative 2	7	1,335
Alternative 3	7	1,335
Alternative 4	11	
Alternative 5	3	
Probable Long-Term Average		
Baseline Conditions	0*	0
Alternative 1	3	3,300
Alternative 2	7	3,300
Alternative 3	3**	3,300
Alternative 4	11	3,300
Alternative 5	0	0
Probable Long-Term Worst Case		
Baseline Conditions	0	0
Alternative 1	13	3,300
Alternative 2	13	3,300
Alternative 3	13	3,300
Alternative 4	13	3,300
Alternative 5	0	0

All estimates rounded to the nearest foot.
* Seasonal fluctuations will occur.
** Same as Alternative 1 but more dramatic fluctuations expected.

5. REFERENCES

U.S. Army Corps of Engineers (USACE). 1989. "Sedimentation Investigations of Rivers and Reservoirs" Engineer Manual 1110-2-4000. Department of the Army, U.S. Army Corps of Engineers, Washington, DC 20314-1000.

U.S. Army Corps of Engineers (USACE). 2002. "HEC-RAS River Analysis System Hydraulic Reference Manual" U.S. Army Corps of Engineers Institute for Water Resources Hydrologic Engineering Center, 609 Second Street, Davis, California.

U.S. Geological Survey (USGS). 2005. "Surface-Water Data for the Nation." Website http://waterdata.usgs.gov/nwis/sw accessed February, 2005.

U.S. Geological Survey (USGS). 1998. "Verification of Roughness Coefficients for Selected Natural and Constructed Stream Channels in Arizona. U.S. Geological Survey Professional Paper 1584.

Woodward-Clyde Consultants. 1991. "Littlerock Dam Reservoir Restoration Project. Evaluation of Aggregates for RCC Construction. Prepared for Palmdale Water District and Littlerock Creek Irrigation District." Woodward-Clyde Consultants, 500 12th Street, Suite 100, Oakland, California.

Appendix D

Special Use Permit

FS-2700-4 (7/96)
OMB No. 0596-0082

U. S. DEPARTMENT OF AGRICULTURE Forest Service	Holder No. 1011-01	Issue Date 12/05/97	Expir. Date 12/31/37
	Type Site(s) 925-752	Authority 676	Auth. Type 20
SPECIAL-USE PERMIT	Region/Forest/District 05/01/54		State/County 06/037
Authority: Act of October 21, 1976 (Public Law 99-545); 36 CFR 251.57 et seq.	Cong. Dist. 25	Latitude 34-29-20	Longitude 118-01-125

Palmdale Water District/ Littlerock Creek Irrigation District of 2029 East Avenue "Q"
(Holder Name) (Billing Address - 1)

(Billing Address - 2) Palmdale, (City) California (State) 93550 (Zip Code)

(hereinafter called the Holder) is hereby authorized to use or occupy National Forest System lands, to use subject to the conditions set out below, on the Angeles National Forest, Valyermo Ranger District.

DEC 1997 RECEIVED

This permit covers approximately 120 acres and is located within:

San Bernardino Meridian
T.4N., R.11W., sec. 3, NE1/4NW1/4;
T.5N., R.11W., sec. 34, W1/2;
T.5N., R.11W., sec. 27, SW1/4SW1/4 and SE1/4SW1/4;

as shown on the LOCALITY AND SITE MAPS attached to and made a part of this permit, and is issued for the purpose of: Operating and maintaining the Littlerock Dam, reservoir (to high water mark at 3270 feet above mean sea level), valve house and gated valve house access road. However, this permit excludes the boat launch ramp, boat dock and concrete handicapped fisherman's access path. The following exhibits are included as part of this permit:

Exhibit "A" -- Locality Map.
Exhibit "B" -- Site Map.
Exhibit "C" -- Dam Drawings "as-built", dated June 5, 1995. [on file PWD & USFS].
Exhibit "D" -- Fire Plan.
Exhibit "E" -- Littlerock Dam Joint Powers/Lead Agency Agreement.
Exhibit "F" -- Dam Emergency Action Plan dated May, 1995. [on file PWD & USFS].
Exhibit "G" -- Bat Monitoring Plan.
Exhibit "H" -- Riparian Vegetation Mitigation and Monitoring Plan dated 2/1995.
Exhibit "I" -- Operation and Maintenance Plan.

The above described or defined area shall be referred to herein as the "permit area".

TERMS AND CONDITIONS

I. AUTHORITY AND GENERAL TERMS OF THE PERMIT

A. Authority. This permit is issued pursuant to the authorities enumerated at Title 36, Code of Federal Regulations, Section 251 Subpart B, as amended. This permit, and the activities or use authorized, shall be subject to the terms and conditions of the Secretary's regulations and any subsequent amendment to them.

B. Authorized Officer. The authorized officer is the Forest Supervisor or a delegated subordinate officer.

C. License. This permit is a license for the use of federally owned land and does not grant any permanent, possessory interest in real property, nor shall this permit constitute a contract for purposes of the Contract Disputes Act of 1978 (41 U.S.C. 611). Loss of the privileges granted by this permit by revocation, termination, or suspension is not compensable to the holder.

D. Amendment. This permit may be amended in whole or in part by the Forest Service when, at the discretion of the authorized officer, such action is deemed necessary or desirable to incorporate new terms, conditions, and stipulations as may be required by law, regulation, land management plans, or other management decisions.

E. Existing Rights. This permit is subject to all valid rights and claims of the following known third party Special Uses Authorizations existing on the date of execution of this Special Use Authorization:

Third Party	Permit Designation
Littlerock Resort	2720 Special Uses

The United States is not liable to the holder for the exercise of any such right or claim.

F. Nonexclusive Use and Public Access. Unless expressly provided for in additional terms, use of the permit area is not exclusive. The Forest Service reserves the right to use or allow others to use any part of the permit area, including roads, for any purpose, provided, such use does not materially interfere with the holder's authorized use. ~~A final determination of conflicting uses is reserved to the Forest Service.~~

G. Forest Service Right of Entry and Inspection. The Forest Service has the right of unrestricted access of the permitted area or facility to ensure compliance with laws, regulations, and ordinances and the terms and conditions of this permit.

H. Assignability. This permit is not assignable or transferable. If the holder through death, voluntary sale or transfer, enforcement of contract, foreclosure, or other valid legal proceeding ceases to be the owner of the improvements, this permit shall terminate.

I. Permit Limitations. Nothing in this permit allows or implies permission to build or maintain any structure or facility, or to conduct any activity unless specifically provided for in this permit. Any use not specifically identified in this permit must be approved by the authorized officer in the form of a new permit or permit amendment.

II. TENURE AND ISSUANCE OF A NEW PERMIT

A. Expiration at the End of the Authorized Period. This permit will expire at midnight on DECEMBER 31, 2037. Expiration shall occur by operation of law and shall not require notice, any decision document, or any environmental analysis or other documentation. On or about December 31, 2017 and on or about December 31, 2027, the authorized officer may modify the terms, conditions, and special stipulations of this permit only to reflect any new requirements imposed by the then-current Federal and State land use plans, laws, or regulations.

B. Minimum Use or Occupancy of the Permit Area. Use or occupancy of the permit area shall be exercised at least 365 days each year, unless otherwise authorized in writing under additional terms of this permit.

C. Notification to Authorized Officer. If the holder desires issuance of a new permit after expiration, the holder shall notify the authorized officer in writing not less than six (6) months prior to the expiration date of this permit.

D. Conditions for Issuance of a New Permit. At the expiration or termination of an existing permit, a new permit may be issued to the holder of the previous permit or to a new holder subject to the following conditions:

1. The authorized use is compatible with the land use allocation in the Forest Land and Resource Management Plan.
2. The permit area is being used for the purposes previously authorized.
3. The permit area is being operated and maintained in accordance with the provisions of the permit.
4. The holder has shown previous good faith compliance with the terms and conditions of all prior or other existing permits, and has not engaged in any activity or transaction contrary to Federal contracts, permits, laws, or regulation.

E. Discretion of Forest Service. Notwithstanding any provisions of any prior or other permit, the authorized officer may prescribe new terms, conditions, and stipulations when a new permit is issued. The decision whether to issue a new permit to a holder or successor in interest is at the absolute discretion of the Forest Service.

III. RESPONSIBILITIES OF THE HOLDER

A. Compliance with Laws, Regulations, and other Legal Requirements. The holder shall comply with all applicable Federal, State, and local laws, regulations, and standards, including but not limited to, the Federal Water Pollution Control Act, 33 U.S.C. 1251 *et seq.*, the Resource Conservation and Recovery Act, 42 U.S.C. 6901 *et seq.*, the Comprehensive Environmental Response, Control, and Liability Act, 42 U.S. C. 9601 *et seq.*, and other relevant environmental laws, as well as public health and safety laws and other laws relating to the siting, construction, operation, and maintenance of any facility, improvement, or equipment on the property.

B. Plans. Plans for development, layout, construction, reconstruction, or alteration of improvements on the permit area, as well as revisions of such plans, must be prepared by a qualified individual acceptable to the authorized officer and shall be approved in writing prior to commencement of work. The holder may be required to furnish as-built plans, maps, or surveys, or other similar information, upon completion of construction.

C. Maintenance. Except for recreational facilities, the holder shall maintain the improvements and permit area to standards of repair, orderliness, neatness, sanitation, and safety acceptable to the authorized officer and consistent with other provisions of this authorization. If requested, the holder shall comply with inspection requirements deemed appropriate by the authorized officer.

D. Hazard Analysis. The holder has a continuing responsibility to identify all hazardous conditions on the permit area which would affect the improvements, resources, or pose a risk of injury to individuals. Any non-emergency actions to abate such hazards shall be performed after consultation with the authorized officer. In emergency situations, the holder shall notify the authorized officer of its actions as soon as possible, but not more than 48 hours, after such actions have been taken.

E. Change of Address. The holder shall immediately notify the authorized officer of a change in address.

F. Change in Ownership. This permit is not assignable and terminates upon change of ownership of the improvements or control of the business entity. The holder shall immediately notify the authorized officer when a change in ownership or control of business entity is pending. Notification by the present holder and potential owner shall be executed using Form FS-2700-3, Special Use Application and Report, or Form FS-2700-3a, Request for Termination of and Application for Special-Use Permit. Upon receipt of the proper documentation, the authorized officer may issue a permit to the party who acquires ownership of, or a controlling interest in, the improvements or business entity.

IV. LIABILITY

For purposes of this section, "holder" includes the holder's heirs, assigns, agents, employees, and contractors.

A. The holder assumes all risk of loss to the authorized improvements within the permit area.

B. The holder shall indemnify, defend, and hold the United States harmless for any violations incurred under any such laws and regulations or for judgments, claims, or demands assessed against the United States in connection with the holder's use or occupancy of the property. The holder's indemnification of the United States shall include any loss by personal injury, loss of life or damage to property in connection with the occupancy or use of the property during the term of this permit. Indemnification shall include, but is not limited to, the value of resources damaged or destroyed; the costs of restoration, cleanup, or other mitigation; fire suppression or other types of abatement costs; third party claims and judgments; and all administrative, interest, and other legal costs. This paragraph shall survive the termination or revocation of this authorization, regardless of cause.

C. The holder has an affirmative duty to protect from damage the land, property, and interests of the United States.

C(2). The holder shall be strictly liable (liability without proof of negligence) to the United States for any injury, loss, or damage arising under this authorization. Such strict liability shall be in the amount of $1 million unless the Forest Supervisor determines at the time of issuance of this authorization that a lesser amount of strict liability is appropriate based upon a risk assessment for the use authorized by this instrument. Liability for injury, loss, or damage to the United States in excess of the prescribed amount of strict liability shall be determined under the general law of negligence.

D. In the event of any breach of the conditions of this authorization by the holder, the Authorized Officer may, following the delivery of written notice to the holder specifying the breach in sufficient detail to enable the holder to identify the actions necessary to cure the breach, and following a reasonable opportunity to do so, cure the breach for the account at the expense of the holder. If the Forest Service at any time pays any sum of money or does any act which will require payment of money, or incurs any expense, including reasonable attorney's fees, in instituting, prosecuting, and/or defending any action or proceeding to enforce the United States rights hereunder, the sum or sums so paid by the United States, with all interests, costs and damages shall, at the election of the Forest Service, be deemed to be additional fees hereunder and shall be due from the holder to the Forest Service on the first day of the month following such election.

E. With respect to roads, the holder shall be proportionally liable for damages to all roads and trails of the United States open to public use caused by the holder's use to the same extent as provided above, except that liability shall not include reasonable and ordinary wear and tear.

F. The Forest Service has no duty to inspect the permit area or to warn of hazards and, if the Forest Service does inspect the permit area, it shall incur no additional duty nor liability for identified or non-identified hazards. This covenant may be enforced by the United States in a court of competent jurisdiction.

V. TERMINATION, REVOCATION, AND SUSPENSION

A. General. For purposes of this permit, "termination", "revocation", and "suspension" refer to the cessation of uses and privileges under the permit.

"Termination" refers to the cessation of the permit under its own terms without the necessity for any decision or action by the authorized officer. Termination occurs automatically when, by the terms of the permit, a fixed or agreed upon condition, event, or time occurs. For example, the permit terminates at expiration. Terminations are not appealable.

"Revocation" refers to an action by the authorized officer to end the permit because of noncompliance with any of the prescribed terms, or for reasons in the public interest. Revocations are appealable.

"Suspension" refers to a revocation which is temporary and the privileges may be restored upon the occurrence of prescribed actions or conditions. Suspensions are appealable.

B. Revocation or Suspension. The Forest Service may suspend or revoke this permit in whole or part for:

1. Noncompliance with Federal, State, or local laws and regulations.
2. Noncompliance with the terms and conditions of this permit.
3. Reasons in the public interest.
4. Abandonment or other failure of the holder to otherwise exercise the privileges granted.

C. Opportunity to Take Corrective Action. Prior to revocation or suspension for cause pursuant to Section V (B), the authorized officer shall give the holder written notice of the grounds for each action and a reasonable time, not to exceed 90 days, to complete the corrective action prescribed by the authorized officer.

D. Removal of Improvements. Prior to abandonment of the improvements or within a reasonable time following revocation or termination of this authorization, the holder shall prepare, for approval by the authorized officer, an abandonment plan for the permit area. The abandonment plan shall address removal of improvements and restoration of the permit area and prescribed time frames for these actions. If the holder fails to remove the improvements or restore the site within the prescribed time period, they become the property of the United States and may be sold, destroyed or otherwise disposed of without any liability to the United States. However, the holder shall remain liable for all cost associated with their removal, including costs of sale and impoundment, cleanup, and restoration of the site.

VI. FEES

A. Termination for Nonpayment. This permit shall automatically terminate without the necessity of prior notice when land use rental fees are 90 calendar days from the due date in arrears.

B. The holder shall pay an annual fee of SIXTY FOUR HUNDRED Dollars ($ 6,400 for the period from JANUARY 1st, 1997, to DECEMBER 31, 1997, and thereafter annually on JANUARY 1st , SIXTY FOUR HUNDRED Dollars ($ 6,400 : Provided, charges for this use shall be made or readjusted whenever necessary to place the charges on a basis commensurate with the fair market value of the authorized use.

C. Payment Due Date. The payment due date shall be the close of business on JANUARY 1st of each calendar year payment is due. Payments due the United States for this use shall be deposited at COLLECTION OFFICER, FS, Pacific Southwest Region, P.O. Box 60000, FILE NO. 31381, San Francisco, CA 94160-1381 , in the form of a check, draft, or money order payable to "Forest Service, USDA." Payments shall be credited on the date received by the designated Forest Service collection officer or deposit location. If the due date for the fee or fee calculation statement falls on a non workday, the charges shall not apply until the close of business on the next workday.

D. Late Payment Interest. Pursuant to 31 USC 3717, and regulations at 7 CFR Part 3, Subpart B, and 4 CFR Part 102, an interest charge shall be assessed on any payment or financial statement not received by the due date. Interest shall be assessed using the most current rate prescribed by the United States Department of Treasury's Financial Manual (TFM-6-8020). Interest shall accrue from the date the payment or financial statement was due. In the event that two or more billings are required for delinquent accounts, administrative costs to cover processing and handling of the delinquent debt will be assessed.

E. Additional Penalties. In the event of permit termination pursuant to provisions VI (A), and prior to the issuance of a new permit, a penalty of 6 percent per year shall be assessed on any fee amount overdue in excess of 90 days from the payment due date. This penalty shall accrue from the due date of the first billing or the date the fee calculation financial statement was due. The penalty is in addition to interest and any other charges specified in the above paragraph.

F. Disputed Fees. Disputed fees are due and payable by the due date. No appeal of fees will be considered by the Forest Service without full payment of the disputed amount. Adjustments, if necessary, will be made in accordance with settlement terms or appeal decision.

G. Delinquent Fees.

1. Delinquent fees and other charges shall be subject to all rights and remedies afforded the United States pursuant to Federal law and implementing regulations (31 U.S.C. 3711 et seq.).

2. The authorized officer shall require payment of fees owed the United States under any Forest Service authorization before issuance of a new permit.

VII. OTHER PROVISIONS

A. Members of Congress. No Member of or Delegate to Congress or Resident Commissioner shall benefit from this permit either directly or indirectly, except when the authorized use provides a general benefit to a corporation.

B. Appeals and Remedies. Any discretionary decisions or determinations by the authorized officer are subject to the appeal regulations at 36 CFR 251, Subpart C, or revisions thereto.

C. Superior Clauses. In the event of any conflict between any of the preceding printed clauses or any provision thereof and any of the following clauses or any provision thereof, the preceding printed clauses shall control.

SUPPLEMENTAL CLAUSES

1. **Private Road, Secondary Use (for gated access road).**

[1]. All construction or reconstruction of the road shall be in accordance with plans, specifications, and written stipulations previously approved by the Forest Service.

[2]. The holder, in exercising the privileges granted by this authorization, shall comply with all applicable State and Federal laws, Orders, and rules and regulations, and shall comply with all State standards for public health and safety, environmental protection, and siting construction, operation, maintenance if in the opinion of the authorized officer those State standards are more stringent than Federal standards, and promulgation of State standards precede the date of this special use authorization.

[3]. The holder shall cut no timber except as authorized by construction stipulations or maintenance agreements.

[4]. The holder shall provide maintenance so that no damage occurs on adjacent National Forest land. The holder shall construct and maintain lead-off drainage and water barriers as necessary to prevent erosion.

[5]. The United States may use the roads without cost for all purposes, including the removal of timber cut in construction or maintnenance of the road or other incidental use, deemed necessary or desirable in connection with the protection and administration of the lands or resources of the United States; provided that the road only will be used for commercial hauling purposes, only after payment by the United States of its pro rata share of road maintenance costs.

[6]. Only the Forest Service may extend rights and privileges for use of the road constructed on the premises to other nonfederal users on the condition that such users shall pay a fair share of the current replacement cost less depreciation of the road and any reconstruction costs necessary to accommodate their use. Provided, however, that the exercise of such rights and privileges by other non-federal users shall ~~occupancy and use does~~ not unreasonably interfere with the rights granted herein.

[7]. The Forest Service retains the right to occupy and use the right-of-way. It also may issue other uses including rights-of-way, on and through the permitted area provided that the occupancy and use does not unreasonably interfere with the rights granted herein.

[8]. The Forest Service shall have the right to cross and recross the premises and road at any place by any reasonable means and for any purpose in such manner as does not unreasonably interfere with use of the road.

[9]. The holder shall maintain the right-of-way clearing by means of chemicals only after the Forest Supervisor has given specific written approval. Application for such approval must be in writing and must specify the time, method, chemicals and the exact portion of the right-of-way to be chemically treated.

2. Signs

No signs or advertising devices shall be erected on the area covered by this permit, or highways leading thereto, without prior approval by the Forest Service as to location, design, size, color, and message. Erected signs shall be maintained or renewed as necessary to neat and presentable standards, as determined by the Forest Service.

3. Insurance Clause.

The holder shall have in force public liability insurance covering: (1) property damage in the amount of **ONE MILLION** dollars ($1,000,000) and (2) damage to persons in the minimum amount of **ONE MILLION** dollars ($1,000,000) in the event of death or injury to one individual, and in the minimum amount of **THREE MILLION** dollars ($3,000,000) in the event of death or injury to more than one individual. The coverage shall extend to property damage, bodily injury, or death rising out of the holder's activities under the permit including, but not limited to, the occupancy or use of the land and the construction, maintenance, and operation of the structures, facilities, or equipment authorized by this permit. Such insurance shall also name the United States as a co-insured and provide for specific coverage of the holder's contractually assumed obligation to indemnify the United States. The holder shall send an authenticated copy of its insurance policy to the Forest Service immediately upon issuance of the policy. The policy shall also contain a specific provision or rider to the effect that the policy will not be cancelled or its provisions changed or deleted before thirty (30) days written notice to the Forest Supervisor, Valyermo Ranger District, 29835 Valyermo Rd., P.O. Box 15, Valyermo, CA 93563, by the insurance company.

4. Rider Clause (for insurance companies)

It is understood and agreed that the coverage provided under this policy will not be cancelled or its provisions changed or deleted before thirty (30) days of receipt of written notice to the Forest Supervisor, Angeles National Forest, 701 North Santa Anita Avenue, Arcadia, California 91006, from the insurance company.

5. Dam Safety

[[1]] Definitions. The following definitions apply to this clause:

Qualified Engineer. An engineer authorized to practice engineering in the field of dams in the State where the dam is located, either by professional registration as provided by State law or by reason of employment by the State or Federal Government.

Dam Failure. Catastrophic event characterized by the sudden, rapid, and uncontrolled release of impounded water. It is recognized that there are lesser degrees of failure and that any malfunction or abnormality outside the design assumptions and parameters which adversely affect a dam's primary function of impounding water may also be considered a failure.

Maintenance. Performance of work to keep structures and equipment in intended operation condition; equipment repair and minor structure repair.

Rehabilitation or Modification. Repair of major structure deterioration to restore original condition; alteration of structures to meet current design criteria, improve dam stability, enlarge reservoir capacity, or increase spillway and outlet works capacity; replacement of equipment.

Hazard Potential. The classification of a dam based on the potential for loss of life or property damage in the event of failure of the dam under clear weather breach conditions with normal base inflow and the water surface at the elevation of the uncontrolled spillway crest.

Emergency Action Plan. Formal plan of procedures to prevent or reduce loss of life and property during construction or after completion of a dam if conditions develop in which dam failure is likely. The plan does not include flood plain managment for the controlled release of floodwaters for which the project is designed.

Authorized Officer. The Forest Service official delegated authority to issue this authorization in accordance with 36 CFR 251.52. Generally, this authorization will be approved and administered by the Forest Supervisor. As used herein, the term shall include any official acting as the representative of the authorized officer or pursuant to other delegation of authority.

Holder. The individual, partnership, corporation, association, or other legal entity, which is the recipient of this authorization.

[[2]] Dam Classification

The dam constructed pursuant to this authorization shall be classified according to its height and storage capacity as well as its hazard potential as follows:

Height and Storage Capacity (A, B, C, or D): "A" @ 113' and 3500+ ac.ft.

Hazard Potential (Low, Moderate, High): HIGH.

Classification criteria are contained in FSM 7511, which the Forest Service may amend from time to time.

The provisions of paragraphs (5) and (8) apply only to dams classified as high hazard, or as otherwise may be specifically provided for in this authorization to address special or unique circumstances.

The hazard potential of the dam shall be reassessed at least every ten years by a qualified engineer retained by the holder, and this information made available to the authorized officer. The Forest Service may change the hazard potential at any time based on changed conditions or new information.

[[3]] Construction, Inspection, Certification, and Project Files.

For construction, rehabilitation or improvement, the holder shall provide for inspection by a qualified engineer to ensure adequate control of the work being performed. At a minimum, the qualified engineer shall maintain a daily inspection diary, descriptions of design changes, and records of construction material and foundation tests.

Upon completion of construction, rehabilitation, or improvement, the holder shall forward to the Forest Service a statement from the qualified engineer responsible for inspection certifying that the works were built in accordance with the approved plans and specifications, or approved revisions thereto. ~~No water shall be impounded until approval is given by the authorized officer.~~

All design notes, as-built plans, and the aforementioned diaries and records shall be maintained in a project file by the holder for the duration of this authorization, and shall be available to the Forest Service or other inspection personnel.

[[4]] Dam Operation and Maintenance Plans.

Prior to the storage of water, the holder shall have an approved plan or plans for the operation and maintenance of the dam and appurtenant structures. The plans will, at a minimum, describe operating requirements and procedures to be followed for the operation of the structure; routine or recurring maintenance required; recordkeeping to be performed for operation and maintenance; and individuals responsible for implementing the plans. The holder shall ensure the plans available to the individual responsible for plan implementation and the engineer performing any inspection, are reviewed at least at the time of the operation and maintenance inspection and are amended as conditions or requirements so warrant. No plans or amendments thereto shall be valid until approved by the authorized officer.

[[5]] Dam Emergency Action Plan.

The holder shall, prior to storage of water, prepare an emergency action plan which will include, but not be limited to:

(A) Actions to be taken upon discovery of an unsafe condition or impending failure situation to prevent or delay dam failure, and reduce damage or loss of life from subsequent failure;

(B) Procedures for notification of law enforcement, civil preparedness, and Forest Service personnel;

(C) Procedures for notifying persons in immediate danger of losing life or property;

(D) Maps delineating the area which would be inundated in the event of dam failure;

(E) The names of those individuals responsible for activating the plan and carrying out the identified actions.

In preparing the emergency action plan, the holder shall consult and cooperate with appropriate law enforcement and civil preparedness personnel, who may be responsible for implementing all or part of the plan.

[[6]] Inspection and Maintenance of Dams

The holder shall have the dam and appurtenant structures inspected by a qualified engineer or the State Division of Safety of Dams to determine the state of operation and maintenance at least every 5 years. An inspection shall also be made following earthquakes, major storms, or overflow of spillways other than the service spillway. Two copies of the inspection report shall be provided to the authorized officer within 30 days of the date of inspection.

Repairs or operational changes recommended by the inspecting engineer shall be made by the holder within a reasonable period of time following the inspection, but in no event later than one year from the inspection (unless a longer period of repairs is authorized in writing, or a shorter period is required when such repairs are deemed by the authorized officer as immediately required for reasons of public safety). Upon request by the authorized officer, the holder shall provide a plan of action outlining planned time and methods for performing said repairs or operational changes, and notify the authorized officer when actions are completed.

[[7]] Forest Service Inspection of Dams

The holder shall allow inspection of the dam and appurtenant structures at any time by the authorized officer. Any condition adversely affecting or which would adversely affect the operation of the facility; safety of the structure or the public, or surrounding lands and resources shall, upon written notice, be corrected or changed by the holder at the holder's expense. A copy of the Forest Service inspection report shall be provided to the holder.

An inspection performed by the Forest Service does not relieve the holder of the responsibility of ensuring that inspections are made in accordance with paragraph 6 of this clause.

[[8]] Dam Safety Evaluations.

Beginning in 1995 and at 5-year intervals thereafter, the holder shall have a formal dam safety evaluation performed by a qualified engineer or by the State Division of Safety of Dams to verify the safety and integrity of the dam and appurtenant structures. The evaluation will include, but is not limited to, a detailed field inspection of the dam and appurtenant structures and a review of all pertinent documents, such as investigation, design, construction, instrumentation, operation, maintenance, and inspection records. The evaluation shall be based on current accepted design criteria and practices. The holder shall provide two copies of the evaluation report to the authorized officer and Regional Engineer. Based on this report, the authorized officer may require the holder to perform additional evaluations pursuant to such standards as the officer may define and may require rehabilitation or modification of the structure within a reasonable time.

[[9]] Right of Action to Abate Emergency Situations

~~In-situations-where-the-authorized-officer-determines-on-the-available-facts-that-there is-danger-of-a-dam-failure-for-any-reason,-such-officer-may-exercise-discretionary authority-to-enter-upon-the-structure-and-appurtenances-authorized-herein-and-take-such actions-as-are-necessary-to-abate-or-otherwise-prevent-a-failure.--Such-actions-include, but-are-not-limited-to,-lowering-the-level-of-the-impounded-waters-utilizing-existing structures-or-by-artificial-breach-of-the-dam.--In-the-event-that-such-actions-are taken,-the-United-States-shall-not-indemnify-or-otherwise-be-liable-to-the-holder-for losses-or-damages,-including-losses-or-damages-to-the-structure-or-the-value-of impounded-waters.--The-failure-of-the-Forest-Service-to-exercise-any-discretion-under this-provision-shall-not-be-a-violation-of-any-duty-by-the-United-States,-and-shall-not relieve-the-holder-of-any-and-all-liability-for-damages-in-the-event-of-a-dam-failure.~~

[[10]] Liability

The activities authorized by this permit shall be deemed a high risk and occupancy. Sole responsibility for the safety of the dam and associated facilities and any liability resulting therefrom shall be on the holder and his successors, agents, or assigns. Pursuant to 36 CFR 251.56(d), as such regulation may be amended from time to time, the holder shall be liable for injury, loss or damage resulting from this authorization regardless of the holder's fault or negligence. Maximum strict liability shall not exceed $1,000,000.00 except as that amount may be changed in the aforementioned regulations.

In addition to all waivers and limitations on liability of the United States under this authorization, the provisions of 33 U.S.C. 702(c) shall apply to any damages from or by floods or flood waters at any place.

6. Construction Safety

The holder shall carry on all operations in a skillful manner, having due regard for the safety of employees; and shall safeguard with fences, barriers, fills, covers, or other effective devices, pits, cuts, and other excavations which otherwise would unduly imperil the life, safety, or property of other persons.

7. Explosives, Use of

1. Only electronic detonators shall be used for blasting.

2. In the use of explosives, the holder shall exercise the utmost care not to endanger life or property and shall comply with the requirements of the Forest Service. The holder shall be responsible for any and all damages resulting from the use of explosives and shall adopt precautions that will prevent damage to surrounding objects. The holder shall furnish and erect special signs to warn the public of blasting operations. Such signs shall be placed and maintained so as to be clearly evident to the public during all critical periods of the blasting operations, and shall include a warning statement to have radio transmitters turned off.

3. All storage places for explosives shall be marked "DANGEROUS-EXPLOSIVES." The method of storing and handling explosives shall conform to recommended procedures contained in the "Blasters Handbook", published by E.I. du Pont de Nemours and Company, and in all Federal, State, and local laws and regulations.

4. When using explosives, the holder shall adopt precautions which will prevent damage to landscape features and other surrounding objects. When directed by the Forest officer in charge, trees within an area designated to be cleared shall be left as a protective screen for surrounding vegetation during blasting operations. Trees so left shall be removed and disposed of after blasting has been completed. When necessary, and at any point of special danger, the holder shall use suitable mats or some other approved method to smother blasts.

8 Spark Arrester and Engine Mufflers

A muffler or spark arrester satisfactory to the authorized officer shall be maintained on the exhausts of all trucks and tractors or other internal combustion engines used in connection with this permit.

9. Water Pollution

No waste or byproduct shall be discharged into water if it contains any substance in concentrations which will result in harm to fish and wildlife, or to human water supplies.

Storage facilities for materials capable of causing water pollution, if accidentally discharged, shall be located so as to prevent any spillage into waters or channels leading into water, that would result in harm to fish and wildlife or to human water supplies.

10. Esthetics

The holder shall protect the scenic esthetic values of the area under this permit, and the adjacent land, as far as possible with the authorized use, during construction, operation, and maintenance of the improvements.

11. Refuse Disposal

The holder shall remove from National Forest Lands refuse located within the permit area resulting from the construction or operation of the Dam, including waste materials, garbage, and rubbish of all kinds.

12. Archaeological-Paleontological Discoveries

If, prior to or during excavation work, items of archaeological, paleontological, or historic value are reported or discovered, or an unknown deposit of such items is disturbed, the holder will immediately cease excavation in the area so affected. Holder will then notify the Forest Service and will not resume excavation until written approval is given by the authorized officer.

If it deems it necessary or desirable, the Forest Service may require the holder to have performed recovery, excavation, and preservation of the site and its artifacts at the holder's expense. At the option of the Forest Service, this authorization may be terminated at no liability by the United States when such termination is deemed necessary or desirable to preserve or protect archaeological, paleontological, or historic sites and artifacts.

13. Surveys, Land Corners

The holder shall protect, in place, all public land survey monuments, private property corners, and Forest boundary markers within the permit area. In the event that any such land markers or monuments are destroyed by the holder or others authorized by the holder, in the exercise of the privileges authorized by this permit, depending on the type of monument destroyed, the holder shall see that they are reestablished or referenced in accordance with (1) the procedures outlined in the "manual of Instructions for the Survey of the Public Land of the United States," (2) the specifications of the county surveyor, or (3) the specifications of the Forest Service.

Futher, the holder shall cause such official survey records as are affected to be amended as provided by law. Nothing in this clause shall relieve the holder's liability for the willful destruction or modification of any Government survey marker as provided at 18 U.S.C. 1858.

16. Environmental Standards

Holder shall conduct all activities associated with the Littlerock Dam and Reservoir in a manner that will avoid or minimize degradation of air, land, and water quality. In the construction, operation, maintenance, and termination of the Littlerock Dam and Reservoir, holder shall perform its activities in accordance with applicable air and water quality standards, related facility siting standards, and related plans of implementation, including but not limited to standards adopted pursuant to the Clean Air Act, as amended (42 USC 1857) and the Federal Water Pollution Control Act, as amended (33 USC 1321).

17. Water Rights

This permit confers no right to the use of water by the holder, nor does this permit affect any rights the holder may have to store or distribute water pursuant to any license from the California Water Resources Control Board.

18. Reservoir Storage Increase

~~The Forest Service reserves the right to issue additional permits to other applicants to increase the storage capacity of this site if such action proves feasible. No permit will be granted for additional facilities that will jeopardize the privileges granted by this permit. Any additional permits authorizing larger facilities will provide for payment of costs, including the cost of construction of the original project works, on a cost benefit ratio mutually agreeable to the holder and the new applicant. If the holder and applicant cannot agree on division of costs, the Forest Service shall decide on an equitable division between the old and new works.~~

19. **Reservoir Drainage**

Upon revocation of this permit for noncompliance with conditions of this permit, or for other cause, the Forest Service will have the right to require holder to drain the water from the reservoir by means of the structural control provided or by other methods in a timely manner, in accordance with holder's operational needs.

20. **Forest Service Representative**.

The Forest Service representative for this Special-Use permit is:

District Ranger
Valyermo Ranger District
29835 Valyermo Road, P.O. Box 15
Valyermo, CA 93563
(805) 944-2187

21. **Superseded Permit**

This permit supersedes a special use permit designated: Uses-Angeles, Palmdale Irrigation District, et al, Reservoir, 11/27/24 (Los Angeles 037681).

THIS PERMIT IS ACCEPTED SUBJECT TO THE CONDITIONS SET OUT ABOVE.

HOLDER NAME: Palmdale Water District/
Littlerock Creek Irrigation District

By: Leslie D. Carter
(Holder Signature)

President, Board of Directors
Palmdale Water District
(Title)

Date: November 5, 1997

U. S. DEPARTMENT OF AGRICULTURE
Forest Service

By: Michael J. Rogers
MICHAEL J. ROGERS

Angeles Forest Supervisor
(Title)

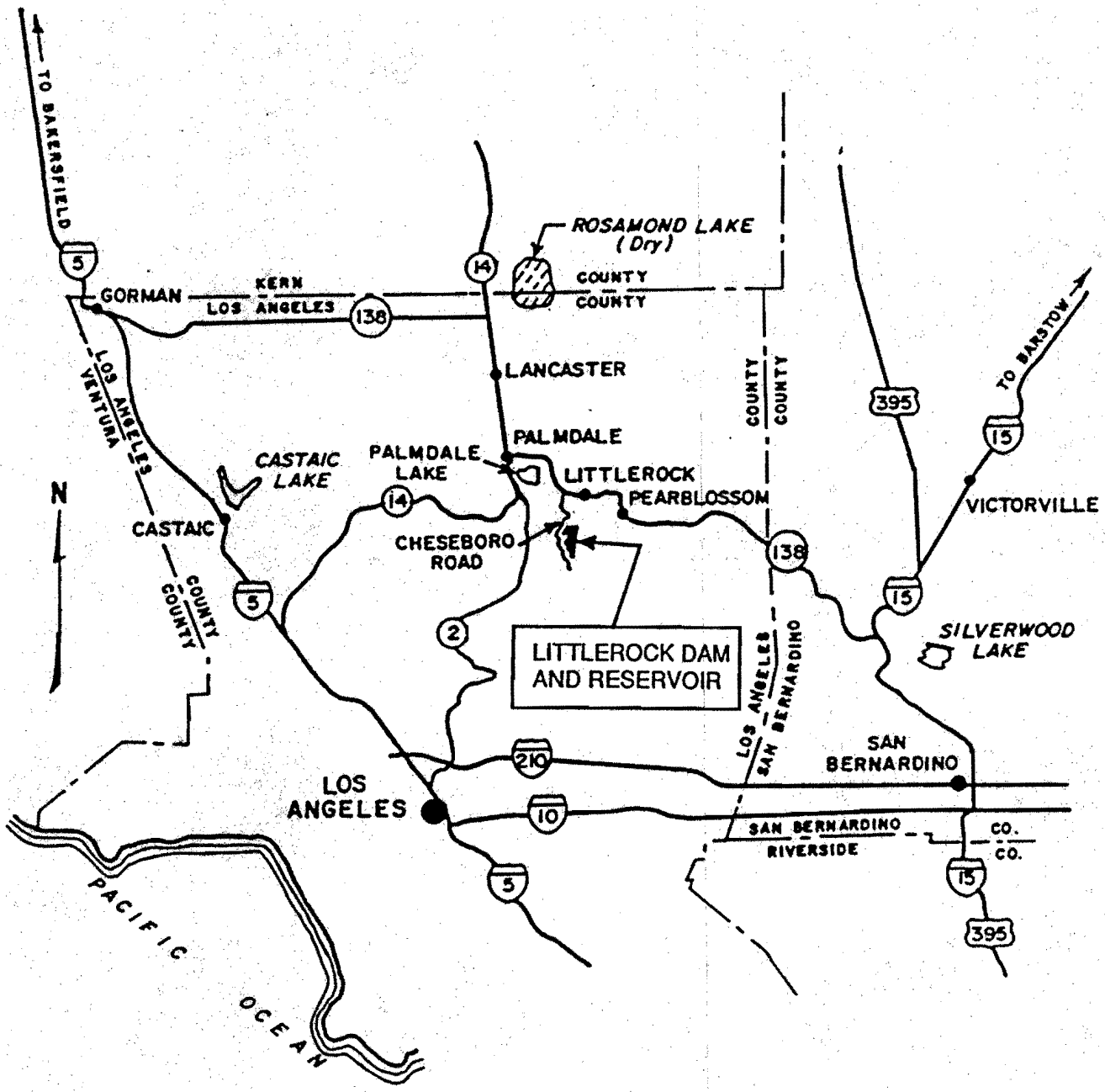
Date: 12/5/, 1997

According to the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0596-0082.

This information is needed by the Forest Service to evaluate requests to use National Forest System lands and manage those lands to protect natural resources, administer the use, and ensure public health and safety. This information is required to obtain or retain a benefit. The authority for that requirement is provided by the Organic Act of 1897 and the Federal Land Policy and Management Act of 1976, which authorize the Secretary of Agriculture to promulgate rules and regulations for authorizing and managing National Forest System lands. These statutes, along with the Term Permit Act, National Forest Ski Area Permit Act, Granger-Thye Act, Mineral Leasing Act, Alaska Term Permit Act, Act of September 3, 1954, Wilderness Act, National Forest Roads and Trails Act, Act of November 16, 1973, Archeological Resources Protection Act, and Alaska National Interest Lands Conservation Act, authorize the Secretary of Agriculture to issue authorizations for the use and occupancy of National Forest System lands. The Secretary of Agriculture's regulations at 36 CFR Part 251, Subpart B, establish procedures for issuing those authorizations.

The Privacy Act of 1974 (5 U.S.C. 552a) and the Freedom of Information Act (5 U.S.C. 552) govern the confidentiality to be provided for information received by the Forest Service.

Public reporting burden for this collection of information, if requested, is estimated to average 1 hour per response for annual financial information; average 1 hour per response to prepare or update operation and/or maintenance plan; average 1 hour per response for inspection reports; and an average of 1 hour for each request that may include such things as reports, logs, facility and user information, sublease information, and other similar miscellaneous information requests. This includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Agriculture, Clearance Officer, OIRM, Room 404-W, Washington D.C. 20250; and to the Office of Management and Budget, Paperwork Reduction Project (OMB #0596-0082), Washington, D.C. 20503.



0 5 10 15 20

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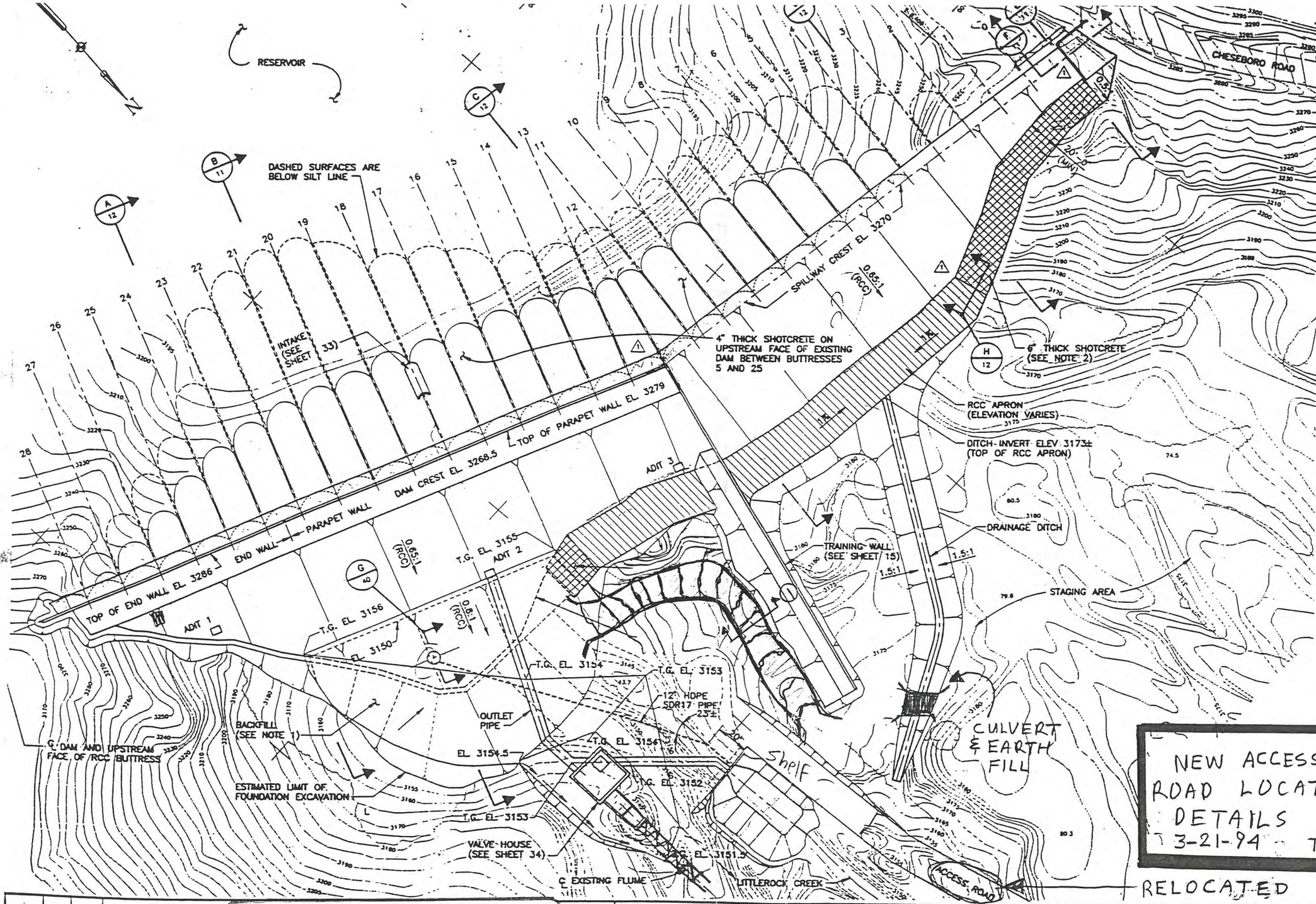
EXHIBIT A

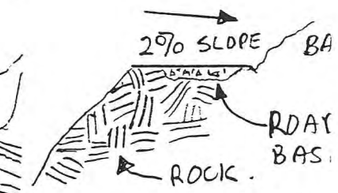
Source: DWR 1988

Project No. 8910104B	Littlerock Dam	Site Location Map	Figure 1
Woodward-Clyde Consultants			



ROAD LOCATION WAS CHANGED FOR EASE OF BUILDING, COST CONCERNS, AN BETTER ROAD PROTECTION.

12'-0" MINIMUM



TYPICAL ROAD SECTION
NTS. 1

NOTE: SLOPE OF ROAD IS 15% OR LESS.

NOTES:

1. BACKFILL TO BE SLOPED TO DRAIN
2. AREA OF SHOTCRETE, EXTENDING 20' BEYOND TOE OF SPILLWAY, TO BE APPLIED TO PREPARED ROCK FOUNDATION SURFACE.
3. T.G. EL. – TOP OF GRADE ELEVATI

REFERENCE:

1. TOPOGRAPHICAL BASE BY PICTORIAL SCIENCES, 1989.

NEW ACCESS ROAD LOCATION DETAILS 3-21-94 TM

DATE	BY	APPR.	REVISION DESCRIPTION
2/19/93	MPF	NCW	ADDENDUM 2

EXHIBIT "B"

MPF
MW
SGM

SUBMITTED: MPF 1/30/94
APPROVED: NCW 1/30/94
APPROVED:

LITTLEROCK CREEK IRRIGATION DISTRICT AND PALMDALE WATER DISTRICT

PLAN OF DAM

SCALE: AS NOTED
DATE: 12/4/92
PROJECT NO.: 8810100-00

SCALE: 1" = 30'

FROM
STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
P.O. BOX 942836
SACRAMENTO, CA 94236-0001

TO: MR DENNIS LAMOREAUX GENERAL MANAGER
PALMDALE WATER DISTRICT
2029 EAST AVENUE Q
PALMDALE CA 93550

RECEIVED JUN 1995

DWR 1235 (REV. 5/87)

DAM No 57

FILE COPY

NTRACT DRAWINGS FOR CK DAM AND RESERVOIR RESTORATION PROJECT

RECEIVED
JUNE 15, 1995

Prepared for

PALMDALE WATER DISTRICT AND ROCK CREEK IRRIGATION DISTRICT

As Constructed
June 5, 1995
Department of Safety of Dams

EXHIBIT "C"

PALMDALE WATER DISTRICT BOARD OF DIRECTORS	LITTLEROCK CREEK IRR. DIST. BOARD OF DIRECTORS
Leslie O. Carter, President	Jerry Gillin, President
John M. Sidwell, Vice President	Arthur Stout, Vice President
Nolan Neggard, Secretary	Jess Brown, Secretary
J. B. Freeman, Asst. Secretary	Charles Yingst, Treasurer
Walter M. Dahlitz, Director	Brian Okerlund, Director

JANUARY 1993

Prepared By

Woodward-Clyde Consultants

MICHAEL P. FORREST

NOEL C. WONG

REGISTERED PROFESSIONAL ENGINEER
MICHAEL PAUL FORREST
No. C 027855
CIVIL
STATE OF CALIFORNIA
Exp. 3/31/98

Exp. 3/31/94

AS-CONSTRUCTED - SHOTCRETE ONLY ⚠

December 6, 1994

AS BUILT

SHEET NO 1

12-28-98

UNITED STATES FOREST SERVICE

PACIFIC SOUTHWEST REGION

VALYERMO RANGER DISTRICT

ANGELES NATIONAL FOREST

FIRE PREVENTION AND CONTROL PLAN

Palmdale Water District
LITTLEROCK DAM AND RESERVOIR AREA

EXHIBIT "D"

DEFINITIONS

Contractor- Holder of a Special Use Permit,Rights-of-Way Permit, Easement,Federal License,or Memorandom of Understanding, entitling the holder to occupancy of National Forest lands.

District Ranger's Representative(DRR)

Person designated in writing to represent the Forest Service related to specific matters pertaining to the work to be completed within the scope of the contract. Delegations of authority are specific.

Contractor's Representative

Person designated in writing to represent the contractor related to specific matters pertaining to the work to be completed within the scope of the contract.Delegations of authority are specific.

Project Fire Guard

The person employed by the contractor soley for fire prevention and suppression purposes.

I. SCOPE

The provisions set forth below outline the channels of responsibility for fire prevention and suppression activities and establish procedure for suppression of fires within the Contract Area.The Contract Area is delineated by map in the Contract.The provisions set forth below also specify conditions under which contract activities will be curtailed or shut down.

II. RESPONSIBILITIES

A. CONTRACTOR

(1) Shall abide by the requirements of this fire plan.

(2) Shall take all steps necessary to prevent their employees,subcontractors their employees,or other persons associated with the contract from setting fires not required in completion of the contract,shall be responsible for preventing the escape of fires set directly or indirectly as a result of contract operations,shall assist in extinguishing all such fires which may escape and shall be responsible for suppression costs incurred by all agencies used in controlling such fires.When a project fire guard is not required ,the duties of the project fire guard must be assumed by the contractor or a designated representative on the project.

(3) Shall furnish to the DRR a list showing key contractor personnel,their specific responsibilities and authority,and their office and home phone numbers.Shall advise the DRR of any changes in personnel and organization as they occur.

B. Forest Service

(1) Will inspect the Project Area to assure compliance with the requirements of the fire plan.

(2) Will take immediate action to curtail hazardous fire and safety activity.

(3) Will notify the contractor to correct any discrepancies with regard to the requirements of this fire plan.

(4) Will suspend the entire operation until full compliance with the fire plan is restored.

(5) Will furnish the contractor with list of key personnel their phone numbers,and emergency phone numbers.

III. TOOLS ,EQUIPMENT,and PERSONNEL

A. Contractor

(1) Shall equip all diesel and or gasoline powered engines,both stationary and mobile,and all flues used in any contract or camp operations with spark arresters that meet Forest Service standards set forth in the Forest Service Spark Arrester guide. Spark arresters are not required on equipment powered by turbo charged engines,these are engines which all exhaust passes thru the turbo-charging unit.

(2) Shall furnish and have available for emergency use on each piece of equipment used in conjuction with performance of the contract the hand tools and or equipment listed below:

(a) One shovel,and a fully charged fire extinguisher U.L.rated at 1A,10B,C or more on each truck,personnel vehicle,grader or other heavy equipment.

(b) One shovel,one U.L.rated 1A,10B,C fire extinguisher and one back pack 5 gallon water filled tank with pump with each welder.

(c) One chemical pressurized fire extinguisher (fully charged)

for each gasoline powered tool,including, but not limited to, chain saws, soil augers, rock drills, generators, portable compactors, compressors and the like.

(3) All tools and equipment required in (1) and (2) above shall be in good working condition and shall meet the following principle Forest Service specifications for fire tools:

(a) Shovels shall meet F.S Spec.5100-000326.

(b) Fire extinguishers shall be of the type and size specified in the California Public Resources Code Section 4431 and the California Administrative Code Title 14 Section 1234.

(4) The contractor will ( ) will not (XX) be required to furnish a fire patrol truck on the contract area in good working order and meet the following specifications:

(a) The fire patrol truck may not be used for any other work on the contract.

(b) Sufficient power and traction,when equiped,to reach all portions of the Contract Area where work is being done.

(c) A tank capable of containing not less than 100 gallons of water or approved fire retardant.

(d) A pump capable of delivering 23 gallons per minute at 175 psi at sea level.

(e) 300 ft. of fire hose F.S.spec.5100-185,3/4"250#w.p.or F.S. spec.5100-186,1"400#w.p.

(f) 1 each combination fog-straight stream nozzle capable of 6 to 23 gpm delivery rates.

(g) 2 each 5 gallon back pumps filled with water or other suitable fire retardant.

(h) 3 each shovel,fire fighters F.S. spec.5100-00326.

(i) 2 each pulaski tool,F.S spec.5100-3556.

(j) 2 each mcleod tool,F.s spec.5100-353 b.

(k) 2-way radio communications from the project area,on the contractor's frequency,capable of contacting a base station where telephone communications are available.

(5) The contractor will ( ) will not (XX) be required to employ a Project Fire Guard to prevent,detect,and suppress any fires in the contract area,and who,prior to acceptance by the DR, shall be able to demonstrate the following;

(a) Knowledge of County,State,and Federal fire laws governing activities in hazardous fire areas.

(b) Skill in the operation and maintenance of fire apparatus, appliances and hand tools.

(c) Knowledge of safe wildland fire prevention and suppression practices.

The Forest Service shall make the final determination as to whether or not an individual meets the above criteria.

B. The Project Fire Guard shall perform the following duties;

(a) Will be on duty on the Contract Area whenever any activity is in progress,and shall remain on duty at least one hour after any welding,cutting,or burning operations have been terminated.

(b) Make regular inspections of all fire tools,equipment and extinguishers to assure that they are operable and meet specifications.

(c) Inspect all project equipment and vehicles to assure compliance with spark arrester and fire equipment requirements.

(d) Enforce all County,State,and Federal fire laws as they apply to the project.

(e) Maintain a daily log showing times and dates of;

1. Time on duty.
2. Inspections of equipment.
3. Violations found,to whom reported,and corrective action.
4. Predicted activity levels.

(f) Advise the Project Engineer or Superintendant of the predicted activity levels for the following day.

(g) Will make initial attack on all fires within the project area,and direct the Contractor's manpower in suppression efforts until relieved by qualified Forest Officer. all project personnel,sub-contractors,and visitors are aware of and comply with same.

(i) Accompany the DR,DRR,contractor or his representative on fire inspections of project site.

(j) Will shut down any operation not in compliance with any County,State,Federal law or regulation,or any other provisions of this fire plan.

(k) Continually monitor contractor's radio frequency.

(l) When a weather station is provided by the contractor,the fire guard shall measure and record the daily weather observations.

(m) The Fire Guard will not have any duties other than those directly related to fire prevention,detection,and suppression.

IV. GENERAL

A. State Law

The contractor must comply with all aplicable laws.These include, but are not limited to,the State Public Resource Code and the Los Angeles County Fire Code.

B. Permits Required

The contractor must secure a special written permit from the DR or designated representative before engaging in any of the activities listed below;

(1) Blasting and/or the storage of explosives or detonators.

(2) Burning

(3) Air Polution

(4) Camp,Lunch,and Warming Fires

(5) Welding or Cutting

C. Regulations for Burning

Before building or kindling any fires whatsoever,the contractor shall notify the DRR of the scope of the project.Special care shall be taken to prevent scorching or causing damage to adjacent structures,trees and shrubbery.

D. Smoking and Fire Rules

Smoking shall not be permited during the fire season,except,in a barren area or in an area cleared to mineral soil at least 10 ft. in diameter.In areas closed to smoking,special areas may be approved for smoking by the DRR.These areas shall be signed by the contractor.Under no circumstances shall smoking be permited during the fire season while personnel,sub-contractors,or visitors are operating equipment,walking or working in grass or brush covered areas.

Contractor shall post signs regarding smoking and fire rules in conspicous places for all personnel and visitors to see.Contractor and contractors representative and/or supervisory personnel are responsible for compliance with these regulations.

E. Storage and Parking Areas

All such areas must be approved in advance and in writing by the DR or the DRR.Equipment service areas,parking areas and gas/oil/diesel storage areas shall be cleared of all grass,brush or other combustible material for a radious of at least 50 ft.,and conform to local County,State or Federal Codes.Small mobile or stationary engine sites shall be cleared of combustible material for at least 15 ft. from engine.Parking and storage areas shall be maintained in a neat and orderly manner at all times.

V. Emergency Measures

An activity level is a measure of fire danger based on fuel and weather conditions in the contract area or a comparable rating area.This project shall be governed by weather data obtained at the VINCENT station or alternate VALYERMO unless the contractor exercises the option to install an approved station on site.

In the event that no weather data is available from the Forest Service weather station that governs the project site,the following pre-set Activity Levels will apply,unless otherwise notified by the DRR;

(1) End of Declared Fire Season to April 30 Level 1

(2) May 1 to July 31 Level 2

(3) August 1 to end of declared Fire Season Level 3

A. The contractor shall curtail operations for the following day to the extent shown below based on the predicted Activity Level for that area,or when notified by a Forest Officer that his activity constitutes a hazard;

Activity Levels	Limitations or Requirements for Next Day Based on Predicted Activity Level
1	(a) Minimum required by State Law (b) Furnish fire guard (if required) (c) Furnish fire patrol truck (if required)
2	(a) No burning,blasting,welding,cutting,or grinding,within 50 ft.of combustible material
3	(a) No burning,blasting,welding,cutting,or grinding within 15 ft.of cumbustible material. (b) Stop all pioneering or any other mechanical activity within 15 ft.of cumbustible vegetation at 1:00 P.M.
4	(a) Stop all burning,blasting,welding,cutting or grinding. (b) Stop all clearing,grubbing,and pioneering (c) Stop all other mechanical activity within 30 ft of combustible vegetation.

(a) Stop all project activities except those specifically authorized in writing by the DR or designated representative.
(b) The project fire guard shall patrol the project area during the normal work hours of the project.

The above requirements are cumulative and are tied directly to the activity level as it is predicted for each day.

B. The contractor may install a fire weather station on the contract area for obtaining activity level records in lieu of those provided by the Forest Service. The Forest Service will designate the actual fire weather station location. Instruments needed to obtain activity level shall meet specifications and standards in "Fire Weather Observers Handbook", which is available for inspection at the District Rangers Office.

Observations shall be taken at 10:00 am, and 1:00 pm daily as a minimum. When activity level 3 or above is reached, additional observations shall be made at 2 hour intervals. Emergency precautions for the measured activity level shall be implimented. Records of weather measurements shall be maintained and shall be available to the Forest Service on request. If the contractor exercises this option the actual activity levels from this weather station shall be used regardless of the predicted activity levels.

VI. Reporting all Wildfires

Contractor, contractor representatives, sub-contractors and visitors shall report all fires to the Forest Service Fire Dispatch Office at (818)-447-8991, or to the County Fire Department via the 911 emergency telephone system. These numbers are for fire reports and other life threatening emergencies only. All other business and/or information calls shall be directed to the DRR

PROJECT FIRE PLAN INFORMATION AND NOTIFICATION PAGE

Address all correspondence to:

Valyermo Ranger District
P.O.Box 15
Valyermo, California 93563

KEY PERSONNEL

Angeles National Forest Fire Dispatcher (818)-447-8991
Angeles National Forest Activity Level Hotline (818)446-2501
(24 hour recording)

	Name	Bus.Phone	Home Phone
Valyermo District Ranger	WILLIAM H. HELIN	805-944-2187	------
District Ranger's Rep.	STEVE CARBAUGH	805-944-2187	------
Field Fire Prev.Spec.	JEFF BRADFORD	805-944-2187	------

Others:

The 24-hour Angeles Forest Dispatch is linked to the "911" Emergency Telephone System.

The phone numbers above are for official use,to be used only in the administration of this project.

LITTLEROCK DAM

JOINT POWERS/LEAD AGENCY

AGREEMENT

BETWEEN

LITTLEROCK CREEK IRRIGATION DISTRICT

AND

PALMDALE WATER AGENCY

EXHIBIT "E"

AGREEMENT

1. IDENTIFICATION.

This Agreement is made, entered into and effective this 28th day of December, 1989 between Littlerock Creek Irrigation District ("Littlerock") and Palmdale Water District ("Palmdale"), each a public entity duly organized and existing under and pursuant to the Irrigation District Law of the State of California (Water Code Section 20500, **et seq.**).

2. RECITALS.

2.1 Littlerock and Palmdale Irrigation District, the prior name of Palmdale, entered into an agreement on or about May 2, 1922 ("1922 Agreement") pertaining to, among other things, the construction and future operation of a dam to be located in an area then known as Littlerock Rock Canyon.

2.2 Pursuant to the terms and provisions of the 1922 Agreement, the parties jointly constructed said dam which is now known as Littlerock Dam and Reservoir. Said construction was completed in about May 1924.

2.3 On or about April 30, 1925, and in furtherance of the terms, provisions, duties and obligations of the parties under the 1922 Agreement, Palmdale and Littlerock applied for and obtained issuance of a Special Use Permit relating to Littlerock Dam and Reservoir from the United States Department of Agriculture Forest Service designated as follows:

SPECIAL USE PERMIT
USES-ANGELES
PALMDALE IRRIGATION DISTRICT, ET AL
RESERVOIR, 11-27-24
(LOS ANGELES 037681)

2.4 In recent years, studies and investigations have shown that Littlerock Dam and Reservoir is now in need of renovation, strengthening and raising so as to enhance its safety and to increase its storage capactiy for the benefit of Palmdale and Littlerock.

2.5 On or about August 1, 1989, Palmdale and Littlerock jointly authorized Woodward-Clyde Consultants to prepare a feasibility engineering study for the proposed strengthening and raising of Littlerock Dam and Reservoir by use of roller compacted concrete ("Littlerock Project").

2.6 Littlerock and Palmdale have been advised by the United States Forest Service that, under existing policy,, LIttlerock and Palmdale are required to name a "lead agency" for purposes of dealing with the Forest Service in connection with the filing of

required special use permit applications, agreements, environmental documents, and other matters relating to the Littlerock project.

3. AGREEMENTS

Palmdale and Littlerock agree as follows:

3.1 **Purpose:** The purpose of this agreement is to designate a lead agency to deal with the United States Department of Agriculture Forest Service and obtain required special use permit applications, agreements, environmental documents, and other matters relating to the proposed strengthening and raising of Littlerock Dam and Reservoir.

3.2 **Method by which purposes shall be accomplished**

A. Littlerock shall be designated lead agency for dealing with the Forest Service, however, any obligations, agreements, or other documents must be approved and ratified by both boards in order for said obligations and agreements to be binding.

B. The parties (Palmdale and Littlerock) shall participate equally in contributing funds to accomplish the purposes set forth in paragraph 3.1 and each board shall approve expenditures from their respective treasuries to provide the funds.

C. The lead agency shall strictly account for all funds and provide reports of all receipts and disbursements.

D. Personnel of either party may be used as necessary to accomplish the purposes of this agreement.

E. In performing the services required and in transacting such business as may be reasonably necessary in relation to the Littlerock project with the Forest Service, Littlerock shall proceed with the expressed understanding that it will adhere to the following procedure in communicating actions and proposed actions to Palmdale and to the Boards of Directors of both Littlerock and Palmdale:

(i) Littlerock's Littlerock project representative shall deliver to each member of the Board of Directors of both Palmdale and Littlerock copies of all written materials and other documents which are transmitted to or delivered by the Forest Service regarding the Littlerock project;

(ii) Littlerock's Littlerock project representatives shall meet with the Project Committees of both Littlerock and Palmdale on a regular basis as requested and directed by said Committees, in order to advise the committees and board members on all

matters and developments and to receive instructions and counsel from board members and committee members affecting the project;

(iii) Littlerock's Littlerock project representatives shall obtain the prior approval of the Board of Directors of both Palmdale and Littlerock on all matters requiring formal action pursuant to public notice relating to the Littlerock project before such action is formally taken and notice is reported to the United States Department of Agriculture Forest Service.

3.3 **Effective date:** The effective date of this agreement shall be 28th day of December, **1989.**

3.4 **Duration:** This agreement shall be binding for the period of years or whenever the necessary applications etc. have been obtained.

3.5 **Excess property:** Any property that may be acquired as the result of this joint exercise shall inure to the benefit of both parties on an equal basis.

3.6 **Surplus money:** Upon completion of the agreement purpose, any surplus money on hand shall be returned in proportion to the contributions made.

3.7 **Application for privileges etc. to extraterritorial duties:** All of the privileges and immunities from liability, exemptions from laws, ordinances and rules, all pension relief, disability, workmen's compensation, and other benefits which apply to the activity of officers, agents or employees of the parties when performing their respective functions within the territorial limits of their districts, shall apply to them to the same degree and extent while engaged in the performance of any of their functions and duties extraterritorially under the provisions of this agreement.

4. MISCELLANEOUS

4.1 Any and all notices, demands or payments by or from Palmdale to Littlerock, or Littlerock to Palmdale, shall be in writing and shall be served either personally or by registered or certified mail. If personally served, service shall be conclusively deemed made at the time of service. If served by registered or certified mail, service shall be conclusively deemed made 48 hours after deposit thereof in the United States mail, postage prepaid and addressed to the party to whom such notice or

demand is to be given as herinafter provided. Any notice or demand to Palmdale may be given to it at:

2005 E. Avenue Q
Palmdale, California 93550

Any notice or demand to Littlerock may be given to it at:

35141 N. 87th St. East
Littlerock, California 93543

4.2 This Agreement sets forth all of the agreements and understandings between Palmdale and Littlerock relating to the designation of Littlerock as the "lead agency" for purposes of dealing with the United States Department of Agriculture Forest Service in connection with the Littlerock Project. Any change or modification must be in writing and signed by both parties.

4.3 This Agreement shall be governed by and construed in accordance with the laws of the State of California.

4.4 If any provision or provisions of this Agreement is or hereinafter adjudged to be for any reason invalid or unenforceable, the remaining provisions of this Agreement shall nevertheless continue to remain in full force and effect.

Littlerock Creek Irrigation District

By: Carol C. Oehler
President, Board of Directors

Its: John R. Enlows
Secretary, Board of Directors

Palmdale Water District

By: John W. Sidwell

Its: SECRETARY, Board of Directors

DRAFT

Provided by:
Palmdale Water District
2029 East Ave. Q
Palmdale, Ca. 93550

Bat Monitoring

Angeles National Forest Littlerock Creek

In August of 1994 the Palmdale water District completed a bat survey in response to proposed improvements to the Palmdale Ditch. The bats are utilizing approximately a 60 ft. section of concrete flume that is covered by railroad ties. The roost was identified as post-lactating Yuma myotis (Myotis yumanensis), a maternity roost. The approximate roost size is 1800 bats. The maternity season generally begins when the pregnant females converge on the roost in spring and ends when the colonies disperses in the late summer.

Although the Yuma is not listed as threatened or endangered under state or federal Endangered Species Act, large colonies of bats play a critical role in the ecosystem since they are the major controlling agent for night-flying insects, many of which are considered by man to be agricultural and health pests.

Therefore prior to and during the construction of the improvements to the Palmdale Ditch between Littlerock Creek and Littlerock Dam the Palmdale Water District proposes to protect the bat habitat that exists in the Palmdale Water District flume by constructing the new flume around the habitat area and leaving it completing undisturbed.

Stage One ,Prior to construction:

Prior to construction on the canal, the exiting bat location will be monitored for the presence of any bats. Photographs will be taken of the surrounding areas and the protected area will be zoned off limits. Approximately 480 ft. from the existing pump house is the beginning of the fenced in area following the existing concrete canal which will be by-passed when new construction starts. The fenced in area will start at the existing rock headwall, encompass the habitat and end at the southern end of the exiting fence surrounding the covered flume. See Exhitit # I .

Stage two, During Construction:

Construction is scheduled to begin near the end of September The Migrating season for bats in this area is late summer or early fall therefore no presence of bats would not be unusual. During construction the bat habitat area will be fenced off and zoned of limits.

EXHIBIT "G"

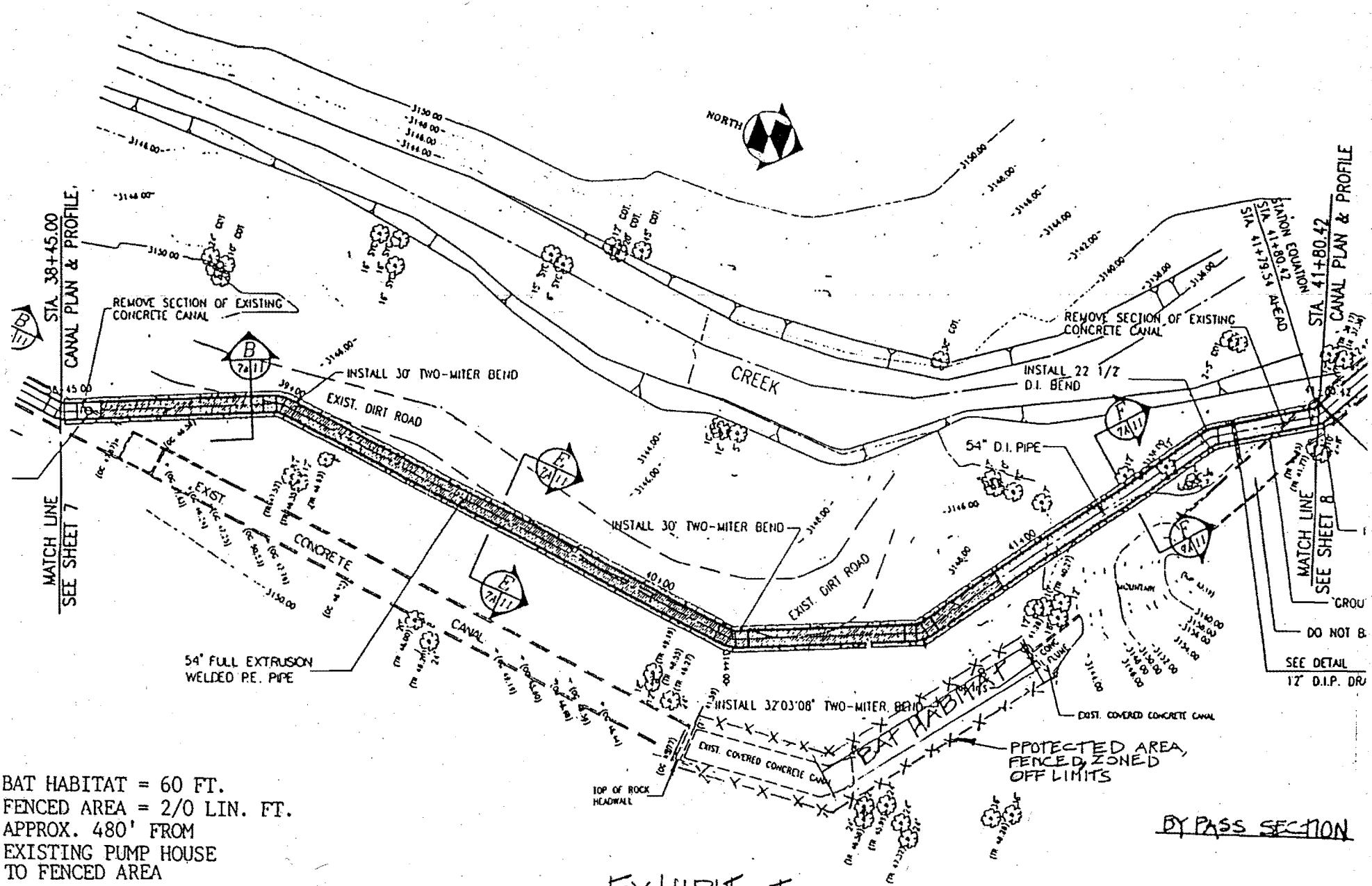
DRAFT

Stage three: After Construction:

Although the flume will be diverted around the bat habitat the viability of the riparian corridor will be maintained. Existing moisture conditions of the habitat will be duplicated by releasing water into it when moving water through Palmdale Ditch.

After Construction the bat habitat will be checked for any damage and Photographs will be taken to document the habitat's condition. A written report will be drawn up and submitted to the U. S. Forest Service.

Bat: Any of various nocturnal flying mammals of the order Chiroptera, with membranous wings extending from the forelimbs to the hind limbs or tail.



BAT HABITAT = 60 FT.
FENCED AREA = 2/0 LIN. FT.
APPROX. 480' FROM
EXISTING PUMP HOUSE
TO FENCED AREA

BY PASS SECTION

EXHIBIT I

MITIGATION AND MONITORING PLAN

FOR

IMPACTS TO RIPARIAN VEGETATION

RESULTING FROM THE LITTLEROCK CREEK

CANAL IMPROVEMENT PROJECT

FEBRUARY 1995

Prepared for:

Palmdale Water District
Palmdale, California

U.S. Department of Agriculture
Forest Service
Angeles National forest
Arcadia, California

QUAD Consultants
5500 Ming Avenue, Suite #410
Bakersfield, California 93309

EXHIBIT "H"

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1.0 INTRODUCTION

The purpose of this document is to assess the existing riparian and associated vegetation in areas potentially subject to impacts during construction of the Littlerock Creek Canal Improvement Project and to present measures to minimize and mitigate for potential impacts to waters, wetlands, and riparian vegetation resources. The following sections describe the proposed project, affected environment, potential impacts, measures to minimize impacts, and a mitigation and monitoring program for affected riparian tree species. The Palmdale Water District (PWD) is responsible for the mitigation plan, its implementation, monitoring and maintenance. The project and mitigation activities will occur on United States Forest Service (USFS) land within the Angeles National Forest.

This mitigation plan is intended to meet the regulatory requirements of the Army Corps of Engineers (ACOE), USFS, and California Department of Fish and Game (CDFG).

2.0 PROJECT DESCRIPTION

The Littlerock Creek canal improvement project will replace a deteriorating above-ground concrete canal and elevated flume structure with a debris basin, a 54 inch diameter pipe and a siphon under Littlerock Creek. A map of the project site is shown on Sheet 1 of 4. Potential impacts to riparian vegetation will occur at three different structure replacement sites. One area is shown on Sheet 2 of 4. In this area, pipe will be buried to circumvent an existing cave area. Sheet 3 of 4 details an area where the existing concrete canal has been undercut. Supported welded steel pipe (WSP) will be placed in the canal in this area to bridge over the washout areas. Sheet 4 of 4 shows the third area of potential impact to riparian vegetation. In this area, the existing elevated flume structure will be replaced with a siphon under Littlerock Creek. The three potential impact areas are approximately 300 feet, 100 feet, and 400 feet in length respectively over a total distance of approximately 0.5 miles. The project is located downstream from the Littlerock Dam. The removal of existing structures and construction of new water conveyance structures will require the expansion of existing access roads and removal of some associated riparian vegetation.

3.0 EXISTING RIPARIAN VEGETATION

Riparian vegetation downstream of Littlerock Dam is dominated by willows, cottonwoods and sycamores, and alders. Smaller areas of cattails are present along portions of the creek channel. As is typical of desert riparian vegetation, the composition of this vegetation can change dramatically from year to year. Flooding may remove substantial amounts of existing vegetation in wet years and may also alter the creek channel location.

The existing riparian vegetation was mapped during a survey on December 19, 1994. For the purpose of this survey, all trees over four (4) inches diameter at breast height (dbh) were specifically mapped and identified within determined impact areas. Tree species identified and mapped during this survey include white alder (*Alnus rhombifolia*), Fremont cottonwood (*Populus fremontii* ssp. *fremontii*), western sycamore (*Platanus racemosa*), and Goodding's black willow (*Salix gooddingii*). Additionally, general riparian vegetation was mapped including mulefat (*Baccharis salicifolia*), arroyo willow (*Salix lasiolepis*), narrow-leaved willow (*Salix exigua*), and cattails (*Typha* sp.).

4.0 IMPACTS TO RIPARIAN VEGETATION

Removal of existing water conveyance facilities and new construction below Littlerock Dam will result in impacts to existing riparian vegetation along Littlerock Creek. These impacts may be caused directly or indirectly. Direct impacts to waters, wetlands, and riparian vegetation may occur during modification of existing access roads, removal of existing structures, construction of new facilities or during vehicle and personnel movement near construction areas. Direct impacts may include removal of existing trees, shrubs and/or herbaceous vegetation, and damage to existing vegetation.

Indirect impacts may occur during any stages of removal, construction, or activity preparation in the Littlerock Creek drainage. Indirect impacts may be caused by alteration of water flow including channel disruption and water volume increase or decrease. Indirect impacts to riparian vegetation may occur by a change in water quality or alteration of soil condition which may affect existing growth patterns or may affect establishment of new vegetation.

5.0 MEASURES TO MINIMIZE POTENTIAL IMPACTS

A variety of measures will be implemented to minimize potential impacts to waters, wetlands, and riparian vegetation. These measures include the identification of staging and access areas to be utilized during construction activities. These areas are indicated on Sheet 1 of 4 located in Appendix A. Staging areas will utilize two existing staging areas that are level and devoid of vegetation. Two additional staging areas will be utilized next to existing access roads. These staging areas are located outside of the existing creek channel in areas that are primarily rocky and gravelly with little vegetation. It is anticipated that no riparian vegetation removal will occur in the identified staging areas. Access areas will utilize existing access roads. Minor modification to the existing roads including grading and expansion may be needed for equipment access. Information provided on the tree and vegetation survey maps (See Sheets 2, 3, and 4 of 4 in Appendix A) will be utilized to maximize avoidance of riparian vegetation and minimize impacts. When possible, trees will be cut-back instead of removed entirely to preserve the presence of individuals. Access areas into riparian vegetation will, to the maximum extent practicable, avoid impacts through the implementation of the following measures: 1) access routes will be designed to avoid riparian vegetation, 2) access routes will be designed to avoid trees over four inches dbh, 3) access routes will be designed to avoid marshy areas and areas with cattails or standing water, and 4) access routes crossing the creek channel will incorporate culverts and gravel to maintain water flow.

Access routes will be flagged prior to construction activities to minimize impacts to riparian vegetation. Marshy areas and areas with cattails or standing water will be flagged to avoid encroachment into these areas. The types of vegetation impacted, the acreage of impact disturbance and the numbers and species of trees over four inches dbh removed during construction activities will be presented in a brief post-construction environmental compliance report to be submitted to ACOE, CDFG, and USFS within fifteen (15) days following the completion of construction activities.

6.0 MITIGATION PLAN

This mitigation plan was developed through communication with the Palmdale Water District and coordination with the CDFG and ACOE. This discussion applies to mitigation for the Section 404 permit, the Streambed Alteration Agreement and requirements of the USFS.

6.1 Goals of Mitigation

The project will disturb some existing riparian vegetation. The goals of the mitigation are to minimize the removal of existing riparian vegetation and to offset the loss of riparian vegetation and associated quality of habitat. The proposed mitigation plan provides for replacement of trees greater than four (4) inches dbh removed during project activities.

The mitigation plan focuses on mitigation for the loss of riparian trees greater than four (4) inches dbh. Replacement of trees in appropriate ratios should fulfill the permitting requirements of the ACOE, CDFG, and USFS and meet the mitigation goals.

6.2 Determination of Replacement Plantings

The specific determination of the species and number of individuals to be planted as mitigation for impacts to riparian vegetation will occur following the completion of construction activities. Tree and vegetation survey maps produced for this document will be utilized and a post-construction survey will be conducted by a qualified botanist to assess the species and number of individuals removed. A brief report will be produced that will document the species and number of individual trees over four inches dbh lost in each of the three construction impact areas. The report will also include the replacement plantings to occur following the guidelines presented below. The report will be presented to Palmdale Water District (PWD), CDFG, and ACOE.

Replacement plantings will occur at a ratio of three (3) sycamores planted for every one (1) removed, one (1) cottonwood planted for every one (1) removed, one (1) willow planted for every one (1) removed, and one (1) alder planted for every one (1) removed. This ratio has been determined to be appropriate for mitigation for this project as was discussed with Becky Jones, CDFG.

6.3 Site Selection and Preparation

All mitigation will be accomplished on-site. Replacement trees shall be planted on-site, as close as is feasible to the removed trees for which the replacement mitigation is occurring. The individual planting sites will not be specially prepared. The site will require no modifications, it has a known potential to sustain riparian vegetation, and the use of unaltered existing sites will not result in any adverse effects to sensitive habitats. The existing soil will be utilized for all plantings since this soil is currently appropriate for riparian vegetation. Appropriate site selection will be utilized instead of extensive soil altering site preparation.

6.4 Planting Design

No areas scheduled for planting will require modification of the topsoil. The riparian tree species to be planted are suited to topsoil conditions presently found in the potential impact areas. Four tree species are included in the planting plan: Goodding's black willow (*Salix gooddingii*), Fremont cottonwood (*Populus fremontii* ssp. *fremontii*), western sycamore (*Platanus racemosa*), and white alder (*Alnus rhombifolia*). One-gallon and 5-gallon plants will be utilized for the plantings.

6.4.1 Planting Schedule

Planting of the mitigation areas will be conducted after construction activities on the site and following a quantitative assessment of impacts to mapped tree species. The planting schedule will be implemented between November and March and will be completed within 60 days of planting initiation.

6.4.2 Irrigation

Irrigation will be provided as needed for the first year after planting. the timing and quantity of irrigation will depend on the climatic and hydrological factors affecting the mitigation site during tree establishment. If rainfall and water flow are sufficient to supply the plantings during this time, irrigation will not be required. If rainfall and/or surface inundation are low during this time, irrigation will be provided by hand or truck to supplement normal water regimes in the existing riparian site.

6.4.3 Fencing and Signage

Since access to the construction and future mitigation site is restricted by gates and adjacent slope steepness and to facilitate access to wildlife and the maintenance of natural environmental conditions, no additional fencing of the area is required. Personnel with access to the area should be made aware of the mitigation activities occurring on the site. This may occur through the use of signs or notification of personnel through their regular place of employment. This notification will be the responsibility of PWD.

6.5 Mitigation Maintenance

Any maintenance requirements for the mitigation site will be determined by monitoring results conducted during the five-year monitoring/maintenance period. Actions needed to correct damage resulting from natural or human causes will be performed as needed to maintain re-establishment success. The ACOE, CDFG, and USFS will be consulted regarding any recommended maintenance activities.

6.6 Notification

The ACOE, CDFG, and USFS will be notified and their approval obtained for any changes to this mitigation plan.

7.0 MONITORING AND REPORTING

A monitoring program will be implemented to assess the success of the mitigation plan. The success of the program will be evaluated by comparing annual results with target goals. Initial quarterly reports will generally assess the effectiveness of the mitigation at the beginning of the program. Monitoring will occur for a period of five years to identify trends and to compare with target goals and assess the need for mitigation plan adjustment. Annual monitoring reports will be submitted to the ACOE, CDFG, and USFS for the duration of the program.

7.1 Monitoring Requirements

The compensatory riparian mitigation is expected to be established and self-sustaining within five (5) years. The trees will continue to mature for a substantial period following termination of the monitoring program with the target goal being establishment of similar quality habitat. The PWD will be responsible for the implementation of this mitigation plan. The following are the monitoring and reporting requirements to evaluate the success of mitigation and to determine if remedial actions are necessary. These measures are summarized in Table 7-1.

Initial monitoring will begin following planting of trees. Initial monitoring shall include the number and species of trees planted and a general map of planting locations. Monitoring will be conducted quarterly for the first two years following completion of planting and annually thereafter. The quarterly monitoring surveys will collect data on survivorship, estimated percent cover, and growth as measured by dbh and height estimates. In addition, photographs of the mitigation area will be taken from established photopoints in each monitoring period. These data, field notes and recommendations will be kept on file by PWD. Remedial actions in the form of replacement of individuals lost by disease or other causes may be required following monitoring surveys. Replacement of vegetation should occur between November and March. PWD should not be responsible for complete replacement of vegetation lost or damaged by flooding, scouring or sediment deposition. If these actions cause sufficient loss of vegetation that identified success criteria are not likely to be met, then PWD will re-plant one time at a rate of 50 percent of the individual trees lost.

Annual reports will evaluate the previous year's data. All reports will be submitted to the ACOE, CDFG, and USFS for their review and evaluation. Each annual report will address the criteria for success and, if needed, measures to meet target goals or modifications to the plan.

7.2 Criteria for Success

Criteria for success within the mitigation area will be monitored as described in Section 6.1. Quantitative measures of these criteria include percentage survival of plantings, cover estimates, and dbh and height requirements for trees. Each annual monitoring report will evaluate these criteria and if needed prescribe modifications to meet the target goals. If major plan revisions are needed, PWD will coordinate with ACOE, CDFG, and USFS.

Following the first year of monitoring, a 80 percent planting survival rate will be considered suitable for success for all tree species. Following the first year, a 100 percent survival rate is considered suitable for success. Any trees not surviving will be removed and replacements will be provided to meet the success criteria.

Success for height estimate criteria depend upon the size of containers utilized for plantings and the length of time. One-gallon plantings should reach five (5) feet after three (3) years and nine (9) feet after five (5) years. Five-gallon plantings should reach seven (7) feet after three (3) years and 13 feet after five years. These success criteria will be evaluated in annual reports and medial action determined through consultation with the California Department of Fish and Game if the target goals are not achieved. The overall guiding criterion utilized for remedial action decision making will be percent survival.

8.0 PREPARERS

This document was prepared by Scott K. Wilson, botanist, QUAD Consultants.

TABLE 7-1

MONITORING AND REPORTING REQUIREMENTS

Monitoring Report	Data Collected
Initial Monitoring	Number of species and individuals planted, map of the site, quantitative data on dbh, cover, and height estimates for plantings
Quarters 1-1, 1-2, and 1-3	Percentage survival, dbh, cover and height for plantings, site photos, recommendations
Annual 1	Summarize previous year's reports, percentage survival, dbh, cover and height for plantings, site photos, assessment of success criteria, recommendations
Semi-Annual 2-1	Percentage survival, dbh, cover and height for plantings, site photos, recommendations
Annual 2, 3 and 4	Summarize previous year's reports, percentage survival, dbh, cover and height for plantings, site photos, assessment of success criteria, recommendations
Annual 5	Summarize all previous and current annual reports, provide percentage survival, dbh, cover and height for plantings, final site photos, assessment of success criteria, recommendations, conclude monitoring program

SPECIAL USE PERMIT

EXHIBIT "I"

OPERATION AND MAINTENANCE PLAN

FOR

LITTLEROCK DAM AND RESERVOIR

OPERATION AND MAINTENANCE PLAN
FOR
LITTLEROCK DAM AND RESERVOIR

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A. Littlerock Dam Operations and Maintenance Manual
B. Certificate of Approval

I. INTRODUCTION

Statement of Purpose

Palmdale Water District (PWD) and Littlerock Creek Irrigation District (LCID) own the improvements known as Littlerock Dam and Reservoir located on Angeles National Forest lands. Palmdale Water District operates it under the agreement contained in Exhibit "E" to the Special-Use Permit. Both Districts were formed and continue to operate under Division 11 of the California Water Code as irrigation districts and as political subdivisions of the State of California. The Districts are empowered under the Water Code to own and operate facilities such as Littlerock Dam and Reservoir.

This Operations and Maintenance Plan is included as an exhibit to the Special-Use Permit for Littlerock Dam and Reservoir in accordance with the requirement of the permit. It is intended to provide the Angeles National Forest with an overview of the operations and maintenance activities anticipated within the permit area related to Littlerock Dam and Reservoir and to assure the Angeles National Forest all said activities are in compliance with applicable laws and regulations. The primary authority over the District's activities remains the statutes of the State of California. The principal objective in the operational and maintenance activities is to achieve optimal management and maximize the use of the Districts' total water resources.

Overview

The following is organized based on the operational and maintenance activities associated with Littlerock Dam and Reservoir. The maintenance activities are divided into subcategories of Littlerock Dam, Valve House, Sediment Basin, and Littlerock Reservoir. Operational activities are divided into Routine Operations, Operational Constraints, Operational Decisions, and Informational Tours. Each subcategory includes a general description along with specific information.

The Littlerock Dam Operations and Maintenance Manual is also attached as Appendix "A". It contains detailed information on operational procedures, equipment shop drawings, equipment use, and maintenance procedures. The Manual is referred to throughout the Plan. Also included as Appendix "B" is the Certificate of Approval issued on January 25, 1995 by the State of California, Department of Water Resources, Division of Safety of Dams after completion of the Littlerock Dam and Reservoir Restoration Project.

Responsibility for Implementation

The responsibility for implementing and following this Plan is with PWD for the term of the Special-Use Permit. The specific positions responsible are as follows:

General Manager
Assistant General Manager
Facilities and Operations Manager

Other positions may become involved as deemed necessary by PWD staff.

II. MAINTENANCE ACTIVITIES

Littlerock Dam

Littlerock Dam went through an extensive strengthening project in 1993 and 1994. The completed structure is fully documented by the as-built drawings contained in the permit as Exhibit "C" to the Special-Use Permit. Major components of Littlerock Dam include the reinforced and roller compacted concrete structure, outlet tower and piping, audits and interior passages, and instrumentation.

Routine maintenance for the Dam consists mostly of monitoring and inspection. This is currently done on a monthly basis or as otherwise required by the Division of Safety of Dams (DSOD). Inspections consist of interior and exterior examination. Interior inspection is done by entering the Dam and visiting all accessible areas of the interior. Entries must be conducted in accordance with the PWD Confined Space Entry Program, Cal-OSHA, and OSHA requirements. Additional monthly monitoring includes measurement of water flows from foundation drains, piezometer readings, and crackmeter readings. Exterior inspection occurs at the same time as interior inspection and includes all viewable surfaces. The upstream face of the Dam will be inspected each year when the reservoir is empty. Survey monuments are checked horizontally and vertically twice a year.

Detailed maintenance procedures for the Dam are contained in Appendix "A". These procedures include periodic clearing of the water and air passages as needed and clearing of the intake holes in the outlet tower after the reservoir is

drained in the Fall. The exterior of the Dam is posted with warning signs and will be checked for vandalism during inspections. Correction of problems caused by vandalism will be prioritized and completed in a timely manner.

Another major feature of the Dam is the new spillway. It is twelve feet higher and 2.5 times wider than the old spillway. The new height enables the reservoir to hold 3,500 acre-feet of water as opposed to 1,600 acre-feet prior to the strengthening project. The new width reduces the depth of water going over the spillway by roughly 2.5 times when compared to the old spillway. This will prevent most floating debris from being washed out of the reservoir as it was before. Therefore, maintenance activities will include removing trees, limbs, etc. left on or at the upstream face of the Dam. This work will be done after the reservoir is emptied in the Fall.

The reduced depth of water flowing over the spillway also increases public safety on the reservoir. Installation of a log boom would be another means of protecting the public, but a log boom is not practical for the reservoir. The reservoir's water surface can change very rapidly and has been known to fill from empty to spilling in less than twenty-four hours; a difference of over eighty feet. Log booms cannot readily fluctuate that extensively and would not therefore be practical in this reservoir. Based on historical records, reservoir spillage is very infrequent at Littlerock Reservoir and generally occurs during periods of low public use. The new, larger spillway will further reduce that occurrence.

Valve House

The valve house is located directly North of Littlerock Dam and contains the control valving for releasing water from the reservoir. The equipment includes a 36-inch valve, two sixteen-inch gate valves, two sixteen-inch cone valves, and control mechanisms. The 36-inch valve is used to release water into Littlerock Creek. The 16-inch valves control water released into Palmdale Ditch for delivery to the Palmdale Water Treatment Plant. The control mechanisms provide for remote operation of main valve and cone valves. This can be done from the Dam overlook or the Palmdale Water Treatment Plant.

Maintenance of the equipment will be done in accordance with the recommendations contained in Appendix "A". The exterior of the valve house will be monitored for vandalism. Correction of problems caused by vandalism will be prioritized and completed in a timely manner.

Sediment Basin

The sediment basin is attached to the North side of the valve house. It is approximately 72-feet long, 23-feet wide, and a maximum depth of 16-feet. The sediment basin receives water from the cone valves in the valve house, reduces the velocity to allow suspended particles to settle out, and then directs the water into the Palmdale Ditch. Major components include a perimeter fence. access ramp, surface skimmer, and weir.

Maintenance consists of removing and disposing of settled material from the sediment basin. This will occur at times when water is not being released into Palmdale Ditch and when several inches of material accumulate. The sediment basin will be monitored for vandalism. Correction of problems caused by vandalism will be prioritized and completed in a timely manner.

Littlerock Reservoir

Littlerock Reservoir is located South and upstream of Littlerock Dam. It has a surface area of approximately 110 acres when at the spillway elevation of the Dam, 3270, and a volume of approximately 3,500 acre-feet. Water collected in this reservoir is rain and snow runoff originating in the 64 square mile drainage area above Littlerock Dam. Average yearly flows from the drainage area are over 14,000 acre-feet. PWD and LCID have the sole right to divert water from this area. The diversion right is currently 5,500 acre-feet.

The reservoir has existed since 1924. Silt and heavier sediments regularly flowed into the reservoir over the years and reduced the storage capacity by 2,700 acre-feet or an average of 54,000 cubic yards per year. The District's maintenance plan, as contemplated in the Littlerock Dam and Reservoir Restoration Project Final EIR/EIS, is aimed at preventing the continued loss of storage volume. Therefore, the District's maintenance plan calls for the removal of an average of 54,000 cubic yards of sediment when the reservoir is empty. This activity will likely require permits from regulatory agencies such as the U. S. Army Corps of Engineers, California Department of Fish and Game, and the Lahontan Regional Water Quality Control Board.

More specifically, the majority of sediment will be removed from the area South of Rocky Point. A minor amount of material will be removed from the area surrounding the outlet tower on the face of the Dam to prevent clogging of the tower. The material will be removed using standard earth moving equipment and haul trucks and properly disposed of off Angeles National Forest lands. The trucks will access the reservoir on the boat ramp, (which was designed for this use.) Designation of the removal area, construction of cut slopes into the removal area, and removal procedures will be done in accordance with mitigation measures adopted with the Littlerock Dam and Reservoir Restoration Project Final EIR/EIS, including dust control measures.

III. OPERATIONAL ACTIVITIES

Routine Operations

Littlerock Dam and Reservoir are part of the larger water resource, treatment, and distribution system operated by PWD to provide service to customers, including LCID. The Dam and Reservoir are one of three water sources for the District. The other water sources are groundwater and the State Water Project. Decisions on which source to use and when to use it depend on factors such as availability, quality, and cost. Normally, the District meets a major percentage of its water demand with treated surface water. This comes from either the State Water Project or Littlerock Reservoir and is stored in Palmdale Lake for treatment.

Water from Littlerock Reservoir is the preferred surface water source due to cost and quality considerations. The decision to take water from the Reservoir depends on the quantity of water available. Assuming the water is available and all operational constraints are met, water is released into Palmdale Ditch through valving in the valve house. The specific procedure is described in Appendix "A". The following summarizes the routine operation during an average water year:

1) Releases into Palmdale Ditch begin when the reservoir level is between the minimum pool elevation of 3228 and the spillway elevation of 3270, usually in January or February;

2) Releases continue until reservoir elevation decreases to approximately 3240, usually in late May or June;

3) Releases into Palmdale Ditch begin again after Labor Day and continue until the reservoir is empty, usually in October.

Operational Constraints

The routine operations described above are subject constraints. The most obvious one is leaving water in Littlerock Reservoir through the summer. This constraint is a result of the Davis-Grunsky Act Grant used by PWD and LCID to partially fund the recent work to strengthen and renovate the Dam. The grant agreement required recreational development of the area and a minimum pool in the reservoir during summer months. The minimum pool is defined as 500 acre-feet in volume and 3228 reservoir elevation. The minimum pool must be left in place when the reservoir refills during the winter months and may be removed only after Labor Day.

A second constraint is the water diversion right. As previously stated, the Districts' right is 5,500 acre-feet. Release will cease when that amount of water has been reached during a calendar year. Historically, this has not affected operations because the reservoir's yield has never reached that volume.

A third constraint is available storage in Palmdale Lake. Releases into Palmdale Ditch may cease at any time if Palmdale Lake is full and the Palmdale Water Treatment Plant is not functioning.

Another constraint is the weather. Unusually wet or dry years will change the routine operations described above. Drought years, when surface water supplies are severely reduced, will override the minimum pool requirement and any water available will be taken for public consumption. Conversely, wet years will extend the periods when water is released into Palmdale Ditch.

Operational Decisions

As stated above, Littlerock Dam and Reservoir is only one part of PWD's complete water system. The water system is dynamic. Demands change hourly, daily and seasonally. Supplies must be provided to match these demands. It is within this framework that decisions are made regarding the use of Littlerock Dam and Reservoir. Water will be taken from the facility when it is needed to meet demands and is available within the various constraints listed above.

Informational Tours

Public information and education are increasingly important for issues relating to water and its use. These issues include water conservation, water quality, awareness of water sources and protection of those sources, and the wildlife and environment associated with water sources. PWD is very active with local schools in these areas. Activities include participation in the California Water Awareness Program, poster and jingle contests, water courses for teachers, water conservation education, and landscape contests.

A large part of the school program is actual tours of District facilities; namely the Palmdale Water Treatment Plant and Littlerock Dam. PWD funds the field trip costs and accompanies the classes to teach about the facilities and water. These tours occur mostly in Spring and early Summer. However, tours can occur at any time scheduled with PWD by the class. Tours to Littlerock Dam and Reservoir can vary, but typically include visiting the Dam's base and overlook. They also generally include lunch at one of the picnic areas.

APPENDIX A

LITTLEROCK DAM

OPERATIONS AND MAINTENANCE

MANUAL

APPENDIX B

CERTIFICATE

OF

APPROVAL

State of California
The Resources Agency
DEPARTMENT OF WATER RESOURCES
Division of Safety of Dams

Certificate of Approval

This Is To Certify That, pursuant to Part 1 of Division 3 of the California Water Code, the Department of Water Resources of the State of California has found that the Littlerock Dam and Reservoir, State Application Number 57, located in Sec. 27, Tp. 5 N., R. 11 W. SB B. & M., Los Angeles County, State of California, are safe to impound water; and the use of said dam and reservoir to impound water in accordance with and subject to the following terms and conditions is hereby authorized: Water may be impounded to Elevation 3270.00 USC&GS datum, the crest of the concrete ogee spillway.

This certificate of approval supersedes every previous certificate of approval or written consent for use issued by the State of California relative to said dam and reservoir.

Witness my hand and the Seal of the Department of Water Resources of the State of California

this 25th day of January 1995

Division Engineer, Reg. C. E. No. 12372