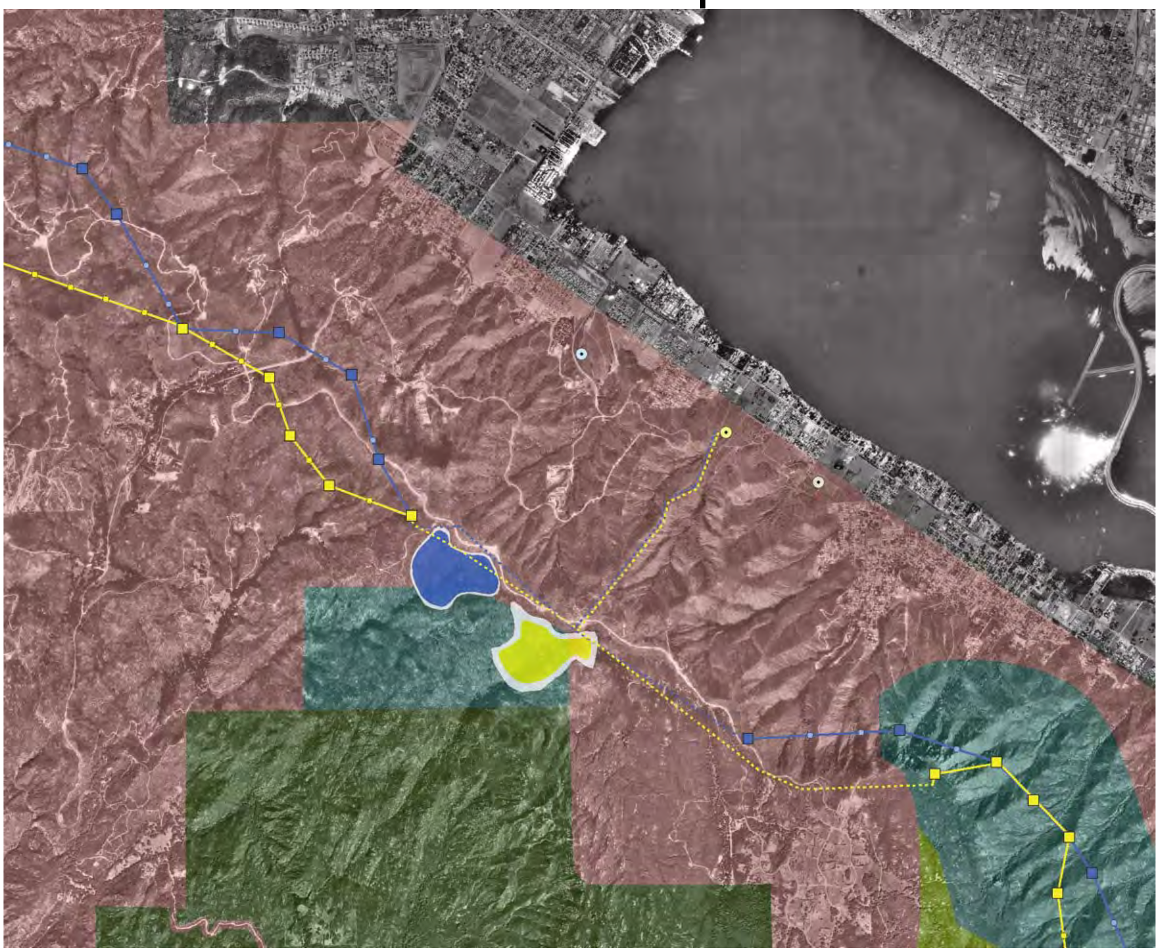
Office of
Energy
Project

January 2007

FERC/FEIS – 0191F

Final Environmental Impact Statement



Lake Elsinore Advanced Pumped Storage Project

FERC Project No. 11858

Federal Energy
Regulatory Commission
888 First Street N.E.
Washington, DC 20426

U. S. Forest Service
Trabuco Ranger District
U.S. Department of
Agriculture
1147 East 6th Street
Corona, CA 92897

Final Environmental Impact Statement January 2007 FERC/FEIS – 0191F

Lake Elsinore Advanced Pumped Storage Project – FERC Project No. 11858

Federal Energy Regulatory Commission – Office of Energy Projects

U. S. Forest Service - Trabuco Ranger District - U.S. Department of Agriculture

COVER SHEET

FEDERAL ENERGY REGULATORY COMMISSION

FINAL ENVIRONMENTAL IMPACT STATEMENT
FOR HYDROPOWER LICENSE
Lake Elsinore Advanced Pumped Storage Project
Docket No. P-11858-002

Cover Letter (and other information before the Table of Contents)

FEIS

FERC/EIS – 0191F

FINAL ENVIRONMENTAL IMPACT STATEMENT FOR HYDROPOWER LICENSE

Lake Elsinore Advanced Pumped Storage Project
FERC Project No. 11858

California

Federal Energy Regulatory Commission
Office of Energy Projects
Division of Hydropower Licensing
888 First Street, NE
Washington, DC 20426

U.S. Department of Agriculture
Cleveland National Forest
San Diego, CA

January 2007

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FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON, D.C. 20426

OFFICE OF ENERGY PROJECTS

TO THE PARTY ADDRESSED:

Attached is the final environmental impact statement (EIS) for the Lake Elsinore Advanced Pumped Storage (LEAPS) Project, located primarily on Lake Elsinore and San Juan Creek, in the city of Lake Elsinore, Riverside County, with transmission lines extending into San Diego and Orange counties, California.

This final EIS documents the view of governmental agencies, non-governmental organizations, affected Indian tribes, the public, the license applicant, U.S. Department of Agriculture, Forest Service (USFS) staff and Federal Energy Regulatory Commission (Commission) staff. It contains evaluations on Elsinore Valley Municipal Water District and Nevada Hydro Company, Inc.'s (the co-applicants') proposal and the staff alternative for licensing the LEAPS Project.

The Commission and the USFS have agreed to participate as cooperating agencies in the preparation of this EIS for the LEAPS Project. The Commission will use the EIS to determine whether, and under what conditions, to issue an original hydropower license for the project. The USFS will use the EIS to base its finding under Section 4(e) of the Federal Power Act and to decide whether to issue any necessary special use authorizations.

Before the Commission makes a licensing decision, it will take into account all concerns relevant to the public interest. The final EIS will be part of the record from which the Commission will make its decision. The final EIS was sent to the U.S. Environmental Protection Agency and made available to the public on or before (on or before January 31, 2007).

Copies of the final EIS are available for review in the Commission's Public Reference Branch, Room 2A, located at 888 First Street, N.E., Washington, DC 20426. The final EIS also may be viewed on the Internet at www.ferc.gov under the eLibrary link. Please call (202) 502-8822 for assistance.

Attachment: Final Environmental Impact Statement

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COVER SHEET

a.	Title:	Licensing the proposed Lake Elsinore Advanced Pumped Storage (LEAPS) Project in the city of Lake Elsinore, Riverside County, California, Federal Energy Regulatory Commission (Commission or FERC) Project No. 11858.	
b.	Subject:	Final Environmental Impact Statement	
c.	Lead Agency:	FERC with the U.S. Forest Service (USFS) as a cooperating agency	
d.	Abstract:	The Elsinore Valley Municipal Water District (Elsinore Valley MWD) and Nevada Hydro Company, Inc. (Nevada Hydro) filed an application for an original license for the construction and operation of its proposed Lake Elsinore Advanced Pumped Storage (LEAPS) Project, which would be located primarily on Lake Elsinore and San Juan Creek, in the city of Lake Elsinore, Riverside County, with transmission lines extending into San Diego and Orange counties, California. The USFS is reviewing an application for a special use permit for constructing the Talega-Escondido/Valley-Serrano 500-kilovolt transmission interconnection, including transmission lines associated with the LEAPS Project, as a transmission line only project.	
e.	Contact:	**FERC Staff:** James Fargo Federal Energy Regulatory Commission Office of Energy Projects 888 First Street, N.E. Washington, DC 20426 202-502-6095	**U.S. Forest Service Staff:** Virgil Mink Trabuco Ranger District Cleveland National Forest 1147 East 6th Street Corona, CA 92879 951-736-1811, ext. 3277
f.	Transmittal:	This final environmental impact statement jointly prepared by the Commission's and USFS' staff on the hydroelectric license application filed by the Elsinore Valley MWD and Nevada Hydro for the proposed LEAPS Project (FERC Project No. 11858) is being made available to the public on or before January 31, 2007, as required by the National Environmental Policy Act of 1969[1]	

[1] National Environmental Policy Act of 1969, amended (Pub. L. 91-190. 42 U.S.C. 4321-4347, January 1, 1970, as amended by Pub. L. 94-52, July 3, 1975, Pub. L. 94-83, August 9, 1975, and Pub. L. 97-258, §4(b), September 13, 1982).

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FOREWORD

The Federal Energy Regulatory Commission (Commission), pursuant to the Federal Power Act (FPA)[2] and the U.S. Department of Energy Organization Act[3] is authorized to issue licenses for up to 50 years for the construction and operation of non-federal hydroelectric development subject to its jurisdiction, on the necessary conditions:

> That the project…shall be such as in the judgment of the Commission will be best adapted to a comprehensive plan for improving or developing a waterway or waterways for the use or benefit of interstate or foreign commerce, for the improvement and utilization of water-power development, for the adequate protection, mitigation, and enhancement of fish and wildlife (including related spawning grounds and habitat), and for other beneficial public uses, including irrigation, flood control, water supply, and recreational and other purposes referred to in Section 4(e)…[4]

The Commission may require such other conditions not inconsistent with the FPA as may be found necessary to provide for the various public interests to be served by the project.[5] Compliance with such conditions during the licensing period is required. The Commission's Rules of Practice and Procedure allow any person objecting to a licensee's compliance or noncompliance with such conditions to file a complaint noting the basis for such objection for the Commission's consideration.[6]

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[2] 16 U.S.C. §791(a)-825r, as amended by the Electric Consumers Protection Act of 1986, Public Law 99-495 (1986) and the Energy Policy Act of 1992, Public Law 102-486 (1992).

[3] Public Law 95-91, 91 Stat. 556 (1977).

[4] 16 U.S.C. §803(a).

[5] 16 U.S.C. §803(g).

[6] 18 C.F.R. §385.206 (1987).

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FEDERAL ENERGY REGULATORY COMMISSION

FINAL ENVIRONMENTAL IMPACT STATEMENT
FOR HYDROPOWER LICENSE
Lake Elsinore Advanced Pumped Storage Project
Docket No. P-11858-002

Table of Contents
Pages xi through xx
FEIS

TABLE OF CONTENTS

LIST OF FIGURES

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LIST OF TABLES

ACRONYMS AND ABBREVIATIONS

APE	area of potential effects
APLIC	Avian Power Line Interaction Committee
AQMD	Air Quality Management District
BIA	U.S. Bureau of Indian Affairs
BLM	U.S. Bureau of Land Management
BMP	best management practice
ºC	degrees Celsius
Caltrans	California Department of Transportation
CARB	California Air Resources Board
CDFG	California Department of Fish and Game
CDP	Census Designated Place
CEQA	California Environmental Quality Act
cfs	cubic feet per second
CNPS	California Native Plant Society
co-applicants	Elsinore Valley Municipal Water District and Nevada Hydro Company, Inc.
Commission	Federal Energy Regulatory Commission
Corps	U.S. Army Corps of Engineers
CRAM	California Rapid Assessment Method
dBA	A-weighted decibel scale
dbh	diameter at breast height
DO	dissolved oxygen
EIS	environmental impact statement
Elsinore Valley MWD	Elsinore Valley Municipal Water District
EMF	electromagnetic field
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
ºF	degrees Fahrenheit
Flood Control District	Flood Control and Water Conservation District
FERC	Federal Energy Regulatory Commission
FPA	Federal Power Act
FWS	U.S. Fish and Wildlife Service
GIS	geographic information system
HCP	Habitat Conservation Plan
HPMP	Historic Properties Management Plan
Hz	Hertz
Interior	U.S. Department of the Interior
kV	kilovolt
L_{dn}	day-night average sound level
L_{eq}	equivalent sound level
$L_{\%}$	percentile distributions of sound levels
LEAPS	Lake Elsinore Advanced Pumped Storage
Joint Watershed Authority	Lake Elsinore and San Jacinto Watersheds Authority
LOS	level of service
MBA	Michael Brandman Associates
mG	milliGauss
mg/l	milligrams per liter
msl	mean sea level
MIS	management indicator species

Multi-Species HCP	Multi-Species Habitat Conservation Plan
MW	megawatt
MWh	megawatt-hours
National Register	National Register of Historic Places
NEPA	National Environmental Policy Act
Nevada Hydro	Nevada Hydro Company
NMFS	National Marine Fisheries Service
NOAA Fisheries	National Oceanic and Atmospheric Administration Fisheries
O&M	operation and maintenance
OHV	off-highway vehicle
PM_{10}	particulates that have an aerodynamic diameter of 10 microns or smaller
$PM_{2.5}$	particulates that have an aerodynamic diameter of 2.5 microns or smaller
R	rural
RN	Roaded Natural
ROS	Recreation Opportunity Spectrum
San Diego Water Board	San Diego Regional Water Quality Control Board
Santa Ana Water Board	Santa Ana Regional Water Quality Control Board
SCE	Southern California Edison
SDG&E	San Diego Gas & Electric Company
SHPO	State Historic Preservation Officer
SIO	Scenic Integrity Objective
SPNM	Semi-primitive, Non-motorized
SPM	Semi-primitive, Motorized
STEP	Southwest Transmission Expansion Plan
State Water Board	State Water Resources Control Board
TCP	traditional cultural properties
TE/VS Interconnect	Talega-Escondido/Valley-Serrano 500-kV Interconnect Project
TMDL	Total Maximum Daily Load
μg/l	micrograms per liter
USFS	U.S. Department of Agriculture, Forest Service
USGS	U.S. Geological Survey
V/m	volts per meter
WECC	Western Electricity Coordinating Council

COVER SHEET

FEDERAL ENERGY REGULATORY COMMISSION

FINAL ENVIRONMENTAL IMPACT STATEMENT
FOR HYDROPOWER LICENSE
Lake Elsinore Advanced Pumped Storage Project
Docket No. P-11858-002

Executive Summary
Pages xxi through xxx
FEIS

EXECUTIVE SUMMARY

On February 2, 2004, the Elsinore Valley Municipal Water District (Elsinore Valley MWD) and the Nevada Hydro Company, Inc. (Nevada Hydro), or co-applicants, filed an application for an original license with the Federal Energy Regulatory Commission (Commission or FERC) for constructing and operating the 500-megawatt Lake Elsinore Advanced Pumped Storage Project (LEAPS Project). The project would occupy 2,412 acres of federal lands, including lands managed by the U.S. Department of Agriculture, Forest Service (USFS), Cleveland National Forest; U.S. Bureau of Land Management; and the Department of Defense (Camp Pendleton). The USFS is reviewing an application for special use permit for constructing the Talega-Escondido/Valley-Serrano 500-kilovolt transmission interconnection, including transmission lines associated with the LEAPS Project, as a transmission line only project. The USFS is a cooperating agency in preparing this environmental impact statement (EIS) for the LEAPS Project (FERC No. 11858), including both the pumped-storage facilities and the transmission lines.

This final EIS evaluates the potential natural resource benefits, environmental effects, and economic costs associated with granting a FERC license for the entire LEAPS Project and granting a USFS special use permit for the transmission lines associated with the project. The alternatives examined include the following: (1) no action (likely construction of a simple-cycle combustion turbine and denial of the special use permit); (2) the co-applicants' proposed action; and (3) a staff alternative.

As described in detail in section 2.3, the co-applicants' proposed action consists of an upper reservoir in Morrell Canyon, a powerhouse at the Santa Rosa location, and a transmission line that would cross the Cleveland National Forest. The co-applicants propose numerous measures to address the potential effects of the proposed LEAPS Project on environmental resources in the project area. We describe these proposed measures in detail in section 2.3.6. The staff alternative that comprises an upper reservoir at the Decker Canyon site, a powerhouse at the Santa Rosa location, and a transmission alignment is described in detail in section 2.4.3. The staff alternative includes most of the co-applicants' protection, mitigation, and environmental measures, except for those measures associated with the Morrell Canyon upper reservoir site and the installation of fish screens. We have modified several of the co-applicants-proposed measures and added others.

The co-applicants' proposal to locate the upper reservoir in Morrell Canyon would disrupt flows in the San Juan Creek drainage, displace Lion Spring, and remove more than 20 acres of southern coast live oak riparian forest. Recreational use at this location would be adversely affected because Morgan Trail, which accesses the San Mateo Wilderness Area, would need to be relocated either temporarily or permanently depending on the final design of this facility and because two of the most-used hang gliding launch sites (E and Edwards) would be closed or subjected to use restrictions during construction. To avoid these potential adverse effects, the staff alternative would locate the upper reservoir in Decker Canyon. There would be no need to install a stream bypass conveyance system at this location because the footprint of the reservoir is situated at the very top of the watershed, with no established stream network entering the site. Only 5 acres of southern coast live oak would be affected and less off-site mitigation for habitat loss would be required, and no rare plant species would be affected. Locating the upper reservoir at the Decker Canyon location would avoid construction effects on the use of the E and Edwards hang gliding launch sites. Table ES-1 compares the potential effects at the proposed Morrell Canyon and Decker Canyon locations.

As described in the draft EIS, the co-applicants proposal to connect to the proposed underground powerhouse at the Santa Rosa location via an above-ground transmission line along the South Main Divide Road would have adversely affected the egress from the community of Rancho Capistrano in the case of a wildfire and would have precluded hang gliding activities at the USFS permitted launch sites. In the draft EIS, we included an underground powerhouse at the Ortega Oaks site and a mid-slope transmission alignment in a staff alternative to the co-applicants' proposal. The Ortega Oaks site combined with routing the transmission lines along a mid-slope alignment and west of the USFS-permitted launching sites lessened the potential effects on hang gliding opportunities and provided an opportunity to provide a formal landing area.

In comments on the draft EIS, the co-applicants and others point out that Riverside County approved a subdivision of 100 single family residential lots at Ortega Oaks in April 2004, including the 58-acre site included in the staff alternative for the powerhouse and substation. The co-applicants also filed a report on the comparative geological and geotechnical conditions at the three powerhouse sites (Genterra, 2006). This report concludes that the Ortega Oaks site offers the least desirable subsurface conditions of the three sites. Hang gliding advocates commented that the proposed 5-acre formal landing area at Ortega Oaks would be inadequate and the staff alternative would still present hazards associated with an aboveground substation and the above-ground electrical distribution lines.

In response to the draft EIS and comments on the draft EIS, the co-applicants revised their proposed transmission alignment. In response to comments on the draft EIS, we also revised the staff alternative transmission alignment and powerhouse location. Given the proximity to the existing residential community adjacent to the Ortega Oaks site, the approved subdivision of lands that comprise the site, and the fact it would not eliminate hazards to hang gliders, we have revised the staff alternative to include a powerhouse at the Santa Rosa location. Locating the powerhouse at the Santa Rosa site would avoid conflicts with existing and planned high-density residential communities at Ortega Oaks. This alternative also would provide a clear path for hang gliding from the USFS-permitted launch sites along South Main Divide Road and the existing informal landing site at Ortega Oaks and would place the above ground substation away from the existing landing site. Table ES-1 compares the potential effects of the Santa Rosa and Ortega Oaks powerhouse locations.

As described in the draft EIS, both the co-applicants’ proposed and staff alternative alignments would have created conflicts with commercial enterprises along the northern segment of the transmission alignments. Both the co-applicants’ proposed and staff alternative alignments now avoid those conflicts. Both also include underground segments of about 3 and 2.1 miles, respectively, to reduce potential effects on egress from the Rancho Capistrano community and on hang gliding activities at the USFS permitted hang gliding launch sites. The staff alternative transmission alignment also reduces conflicts with the Cleveland National Forest Land Management Plan and USFS fire suppression activities. The co-applicants' proposed alignment reduces conflicts with residential subdivisions along the southern segment and would generally be less visible to area residents. The southern segment of the staff alternative transmission alignment avoids the San Mateo Wilderness area but runs near private residential properties, including the La Cresta community. The two routes are the same along about 4 miles of the southern end of the alignment to the connection with the SDG&E line. Table ES-1 compares the effects of the co-applicants’ proposed transmission alignment and the staff alternative transmission alignment.

We considered whether to include in the staff alternative the burial of the entire 32-mile-long transmission line and the 2-mile connection to the powerhouse or burying portions along the northern and southern alignments. Burying the entire line would eliminate most of the visual effects (there would still be above ground substation connections) but would be cost prohibitive at an incremental cost in excess of $350 million. However, we recognize that there may be locations near the alignment (such as Sycamore Creek or Glen Eden Sun Club) where the acquisition of easements may displace residents and where additional underground segments may be a feasible solution.

Overall, the staff alternative transmission alignment would reduce conflicts with USFS management plan and fire suppression activities, hang gliding activities, and commercial enterprises. We recognize that the co-applicants’ proposed alignment is the less visible from key viewpoints in the wilderness area, along Ortega Highway, and from Lake Elsinore, but it would still interfere with USFS fire suppression activities in several areas and would cross back-country non-motorized areas of the Cleveland National Forest.

We estimate that the cost of building and operating either the co-applicants' proposal or the staff alternative would exceed their economic benefits during the project's first year of operation. The proposed LEAPS Project is estimated to cost $120,172,600 ($77.03/MWh) more annually than alternative power and the staff alternative is estimated to cost $124,841,500 ($80.03/MWh) more than alternative power annually. Although there are several reasons why the staff cost estimate is higher than the co-applicants' estimate, the main one is that our estimated cost to construct the project is higher than the co-applicants'. Because of the limited subsurface data available, we have significantly increased the co-applicants' cost estimate in several areas because we do not think the co-applicants' cost estimate properly accounts for the site-specific geological and groundwater conditions. During the final design process, the co-applicants' propose to conduct more detailed geotechnical studies. If the site information the co-applicants gather shows the site conditions are better than what we assumed, they may be able to build the project for less than the cost we estimate.

Despite the higher cost of the staff alternative compared to no action, it would have the benefit of allowing the co-applicants to construct and operate the project as a peak energy resource and as part of a long-term solution to southern California's transmission congestion bottlenecks. The Talega-Escondido/Valley-Serrano transmission line could provide up to 1,000 MW of import capability into the San Diego area with up to 500 MW of this imported power being supplied by the LEAPS Project during high-demand periods. Pumped storage stores power during off-peak periods that can be provided rapidly during on-peak periods, which could provide a valuable addition to the regional system.

Based on our independent analysis of the LEAPS Project, including our consideration of all relevant economic and environmental concerns, we select the staff alternative as our preferred alternative and conclude that our preferred alternative represents the best balance between developmental and non-developmental resources.

Table ES-1. Summary of key differences in the potential effects of the co-applicants' proposal and the staff alternative. (Source: Staff)

	Upper Reservoir Comparison	
Resource/Issue	**Morrell Canyon (co-applicants)**	**Decker Canyon (staff)**
Area of effect	130-acre footprint; daily fluctuations of 40 feet and weekly fluctuations of 75 feet	120-acre footprint; daily and weekly fluctuations would be on the same order of magnitude as the upper reservoir at Morrell Canyon
	2.6 million cubic yards of fill needed for dam	3.0 million cubic yards of fill needed for dam
Fill materials		Less overburden at Decker Canyon would allow easier procurement of solid rock material for fill for dam and dike construction
Groundwater	Construction of tunnels for high pressure conduits could affect groundwater; design review of collection system for Lion Spring and effects on groundwater	Construction of tunnels for high pressure conduits could affect groundwater; no collection system would be required
Seismic hazards	Faults may control surface flows at the Morrell Canyon site	No faults have been identified at the Decker Canyon site and subsurface flow does not appear to be controlled by the presence of faults
Surface water	Upper reservoir would interrupt stream flow	Same

Resource/Issue	Upper Reservoir Comparison	
	Morrell Canyon (co-applicants)	Decker Canyon (staff)
Wetland and riparian habitat	Would affect 1.7 acres of waters of the U.S. and 4.8 acres of waters of the state, including Lion Spring; loss of these waters and associated riparian habitat would affect plant diversity and wildlife species; effects on downstream areas would be minimized by the water conveyance system under the reservoir	Would affect 0.3 acre of waters of the U.S. and 0.9 acre of waters of the state; no effects on springs or seeps; smaller effects on downstream areas because drainage area is smaller
Oak woodland communities	Would convert about 20 acres of southern coast live oak forest (500 to 600 individual trees over 8 diameter at breast height [dbh]) to project use; would need to plant 20 acres to mitigate	Would convert about 5 acres of southern coast live oak forest to project use so effects would be similar to Morrell Canyon but on a smaller scale; would only need 5 acres to mitigate
Special status wildlife	Would convert 80 acres of chamise chaparral and 20 acres of southern coastal live oak to project facilities	Would convert 95 acres of chamise chaparral and 5 acres of southern coastal live oak to project facilities
Mountain lion	Would remove 100 acres of suitable mountain lion habitat from Core B; project operation and maintenance would not likely increase disturbance or risk of interaction over levels that currently result from traffic on South Main Divide Road and use of Morgan Trail	Would remove 100 acres of suitable mountain lion habitat from Core B; project operation and maintenance would represent a very small increase in disturbance, because no trails currently provide for recreation at Decker Canyon site
Munz's onion	No suitable habitat at reservoir site; however, South Main Divide Road in vicinity passes through a soil type that is known to support occurrences of this species	Same
Developed recreation facilities	Footprint would not include Morgan Trail trailhead with minimal effect on users of the trailhead during construction but trail would need to be re-routed either temporarily or permanently depending on final design	Morgan Trail would not have to be rerouted and because visitation is low, increased traffic on South Main Divide Road would have minimal effect on Morgan trailhead users
Dispersed recreation	Would affect hang gliders using the 2 most suitable of the 9 launch sites and waterside setting offered at Lion Spring	Would avoid effects on two most popular hang glider launch sites
	Would eliminate a natural looking canyon with oak woodland vegetation and replace it with a reservoir surrounded by a chain link fence; inconsistent with Retention VQO	The existing aesthetic resources within Decker Canyon are subordinate to Morrell Canyon and construction effects associated with building a reservoir in this location would be less than those at the Morrell site; development of the alternative site would not build over a mature oak-woodland riparian area (Lion Spring)
Traffic	Would achieve a balance of excavation to fill within the entire project site	Same

	Upper Reservoir Comparison	
Resource/Issue	**Morrell Canyon (co-applicants)**	**Decker Canyon (staff)**
Cultural resources	Would destroy or damage four prehistoric archaeological sites	No known sites at Decker Canyon location

	Powerhouse Site Comparison		
Resource/Issue	**Santa Rosa (Co-applicants and Staff)**	**Ortega Oaks**	**Evergreen**
Area of effect	30-acre site, 20-acre laydown, 340 depth of excavation	58 acres, inclusive of laydown; 320 depth of excavation; groundwater 30 to 70 feet	75 acres, 30-acre laydown, 290 depth of excavation
	327,500 cubic yards (includes 207,000 from the powerhouse cavern; 35,000 from the transformer gallery; 32,000 from the surge shaft; 500 from the vent shaft; and 53,000 from the powerhouse access shaft)	There will be similar values to Santa Rosa but about 33 percent more excavation for the tailrace tunnel, which would be about 86,450 cubic yards since the Santa Rosa tailrace tunnel is 65,000 cubic yards; also, the depth of excavation is slightly less than that of Santa Rosa	There will be similar values to Santa Rosa but about 10 percent less excavation for the tailrace tunnel, which would be about 58,500 cubic yards since the Santa Rosa tailrace tunnel is 65,000 cubic yards; also the depth of excavation is less than that of Santa Rosa
Special status plants	Construction of the powerhouse could affect Coulter's matilija poppy	Construction of tunnel between upper reservoir and powerhouse could affect Coulter's matilija poppy	No rare plants identified in vicinity of Evergreen powerhouse location
Wetland and riparian habitat	Would affect about 0.4 acre of waters of the U.S. and state	Same as Santa Rosa.	Would affect less than one-tenth of an acre of waters of the U.S. and state
Special status wildlife	Would affect 30 acres of coastal sage scrub and 20 acres of non-native grassland	Would affect 53 acres of non-native grassland and 5 acres of coastal sage scrub	Would affect 55 acres of non-native grasslands and 20 acres of coastal sage scrub
Future recreation use	Location of substation and above ground transmission lines from this location would affect hang gliding activities	Would affect use of hang gliding landing site during construction; would provide formal hang gliding landing site following construction	Would displace informal disperse recreational use at site
Land Use and Property values	Would permanently change use to utility and recreation use and preclude residential use specified in General Plan; would purchase, modify, and reuse adjacent private property (Santa Rosa Mountain Villa apartments) and buffer would reduce effect on property values	No effect on adjacent residential property values at Ortega Oaks	Either raze or use current Lakeland Childcare Center at the Lakeland Village Plaza for construction office resulting in displacement of child-related businesses and purchase/raze one single family home

Resource/Issue	Powerhouse Site Comparison Santa Rosa (Co-applicants and Staff)	Ortega Oaks	Evergreen
Aesthetics	The powerhouse would be underground but the substation would be visible from surrounding residential and commercial properties	The powerhouse would be underground but the substation would be visible from the heavily used Ortega Highway	Same as Santa Rosa.
Aesthetics (cont).	All construction activities within this area would conflict with the Partial Retention VQO designated by the USFS; these effects would be short term and last for the duration of the construction	Construction activity at Ortega Oaks site would be visible from the Ortega Highway and a small portion of Grand Avenue in Lakeland Village; two prominent viewpoints to commuters in the area	Similar effects on the aesthetic resources as described above with respect to the proposed Santa Rosa site
Cultural Resources	Would affect two historic sites and one prehistoric archaeological site; could affect two historic buildings (vibration) and penstock	Would directly affect one prehistoric site	No known sites at Evergreen location

Resource/Issue	Transmission Alignment Comparison Co-applicants' Proposed Alignment	Staff Alternative Alignment
Area of effect	34.1 miles in length with 10.8 miles of temporary access roads and 5.2 miles of permanent access road.	33.7 miles in length with 9.3 miles of temporary access roads and 4.1 miles of permanent access road.
Fire suppression activities	Could interfere with USFS fire suppression activities.	Would avoid interference with USFS fire suppression activities.
Special status plants	Could affect Humboldt lily (Subarea 3); passes through potential habitat for Hammitt's clay-cress (Subarea 5). Pre-construction surveys could be conducted to prevent adverse effects during construction, but temporary access roads and permanent maintenance roads would substantially increase the risk of disturbance and habitat damage during project operation, if public access is not controlled.	Could affect Humboldt lily (Subarea 3); avoids potential habitat for Hammitt's clay-cress (Subarea 5). Pre-construction surveys could be conducted to prevent adverse effects during construction, but temporary access roads and permanent maintenance roads would substantially increase the risk of disturbance and habitat damage during project operation, if public access is not controlled.
Wetland and riparian habitat	Substation could affect about 1.1 acres of waters of the U.S. and state; effects from transmission towers would be minor as towers would be placed to avoid wetland and riparian habitat, but locations of access roads are unknown.	Same.

Resource/Issue	Transmission Alignment Comparison Co-applicants' Proposed Alignment	Staff Alternative Alignment
Special status wildlife	Substations would affect 35 acres and transmission line towers would affect 30 acres of potential habitat for special status species. About 10.3 miles of temporary access roads would affect an estimated 15.7 acres, plus indirect effects of construction (edge effects) and potential for disturbance (e.g., poaching, harassment) and habitat damage during operation, if public access is not controlled. Permanent maintenance road would affect 5.2 miles (9.5 acres).	Substations would affect 35 acres and transmission line towers would affect 30 acres of potential habitat for special status species. About 9.3 miles of temporary access roads would affect an estimated 13.5 acres, plus indirect effects of construction (edge effects) and potential for disturbance (e.g., poaching, harassment) and habitat damage during operation, if public access is not controlled. Permanent maintenance road would affect 4.1 miles (7.5 acres).
Mountain lion	Would remove about 21.25 acres of suitable mountain lion habitat from Core B for about 85 towers; although mountain lions may use roads for travel, construction of 5.2 miles of permanent and 10.8 miles of temporary access roads would substantially increase the risk of disturbance (e.g., poaching, harassment) and habitat damage during project operation, if public access is not controlled. Would cross proposed linkage 1 at Temescal Wash, but tower placement should not interrupt travel corridor.	Same, except construction of 4 miles of permanent roads and 9.3 miles of temporary access roads would increase the risk of disturbance.
Bird/T-lines	Northern portion (Temescal Wash/Lee Lake) of line presents a high risk to waterfowl; central portion siting either underground or behind ridgeline would minimize risk to raptors; southern portion poses moderate risk of collision where it would cross major drainages.	Same.
Munz's onion	Would affect about 3.25 acres of potential habitat along the northern portion of the transmission line, about 23.2 acres at underground segment, and 35 acres at the northern substation. Pre-construction surveys could be conducted to prevent adverse effects during construction, but temporary access roads and permanent maintenance roads would substantially increase the risk of disturbance and habitat damage during project operation, if public access is not controlled.	Same except would affect about 15.1 acres at underground segment.

Resource/Issue	Transmission Alignment Comparison	
	Co-applicants' Proposed Alignment	**Staff Alternative Alignment**
Slender-horned spine flower, San Diego ambrosia, California Orcutt grass, San Jacinto Valley crownscale	Occurrences at Temescal Wash at Indian Creek and Alberhill (Subarea 1); vernal pool habitat may exist along southern segment of alignment (Subarea 8). Tower construction could affect about 3.25 acres of potential habitat. Pre-construction surveys could be conducted to prevent adverse effects during construction, but temporary access roads would substantially increase the risk of disturbance and habitat damage during project operation, if public access is not controlled.	Same.
Thread-leaved brodiaea	Occurrences in the vicinity of Tenaja Creek (Subarea 7). Tower construction could affect about 0.25 acre of potential habitat. Pre-construction surveys could be conducted to prevent adverse effects during construction, but temporary access roads would substantially increase the risk of disturbance and habitat damage during project operation, if public access is not controlled.	Same.
Quino checkerspot butterfly	Substation and tower construction would affect 36.75 acres within designated critical habitat and about 0.75 acre of potential habitat. Temporary access roads would substantially increase the risk of disturbance and habitat damage during project operation, if public access is not controlled.	Same.
Arroyo toad and California red-legged frog	Construction of towers at Temescal Wash (north) and Los Alamos Canyon and Tenaja Creek (south) could adversely affect about 1.25 acres of potential arroyo toad habitat; but could avoid California red-legged frog habitat through siting. No effects on critical habitat for either species, but temporary access roads would substantially increase the risk of disturbance and habitat damage during project operation, if public access is not controlled.	Same.
Southwestern willow flycatcher and least Bell's vireo	Occurrences at Temescal Wash and Tenaja Creek; construction of towers could affect about 1 acre of potential habitat. Access roads could also adversely affect habitat; temporary access roads would increase risk of disturbance and habitat damage during project operation, if public access is not controlled.	Same.

Resource/Issue	Transmission Alignment Comparison	
	Co-applicants' Proposed Alignment	**Staff Alternative Alignment**
Coastal California gnatcatcher	Construction of northern substation and towers could affect 38.5 acres of habitat within proposed critical habitat; access roads could also adversely affect habitat; temporary access roads would increase risk of disturbance and habitat damage during project operation, if public access is not controlled.	Same.
Stephens' kangaroo rat	Construction of northern substation and towers could affect over 38.25 acres of habitat within the Stephens' Kangaroo Rat Fee Assessment Area and Lake Mathews-Estelle Mountain Core Reserve; temporary access roads could also affect habitat and would increase the risk of disturbance and habitat damage during project operation, if public access is not controlled.	Same except includes access roads with northern substation and towers.
Developed recreation facilities	Would affect Wildomar OHV area and campground and these facilities would likely need to be closed during the first 2 years of construction (would be covered in the detailed site plan for construction)	Would avoid Wildomar OHV and campground locations; increased traffic due to construction would have minimal effects on users at these facilities
Dispersed recreation	Major effect on dispersed recreation would be in the vicinity of flight paths used by hang gliders; would present safety hazards; would result in considerable loss of hang gliding opportunities	Avoids some conflicts with hang gliding and USFS land classifications where transmission line construction would be inconsistent with USFS land management directives
Aesthetics	Towers and corridors would be visible in the foreground, middleground and background; construction activities within the Cleveland National Forest would result in features which conflict with the Retention and Partial Retention VQO standards	Would introduce line, colors, and textures into the landscape that do not currently exist and this would not be consistent with Retention VQO and would be slightly more visible from key viewpoints than the co-applicants' proposed alignment
	The linear features of the lines would contrast with the mountain and within the Cleveland National Forest be in conflict with the VQOs; the towers, conductors and resulting footprint of the corridor would be visible from highly traveled roadways	Same. Also because the lines would be lower down on the mountain they would be closer to Lakeland Village and more visible from the community of Lake Elsinore
Future recreation use	Transmission alignment would affect use by hang gliders of both launch and landing areas but avoids residential areas.	Would reduce conflicts with hang gliding uses.

Resource/Issue	Transmission Alignment Comparison	
	Co-applicants' Proposed Alignment	**Staff Alternative Alignment**
Roads	About 15.7 acres of temporary access roads could be revegetated; it is estimated that about 10.8 miles of road would be needed to service 32.1 miles of transmission line. About 5.2 miles (9.5 acres) would be needed for a permanent maintenance road along the underground segment.	About 13.5 acres of roads could be revegetated; public use could adversely affect habitat along 9.3 miles of road. About 4.1 miles (7.5 acres) would be needed for a permanent maintenance road along the underground segment.
Property values	Would adversely affect private property values up to 3 miles and 5 miles from where transmission alignment would cross or parallel private properties along northern portion and southern portion, respectively and would cross or be parallel within 0.25 mile about 8.6 miles of lands designated for residential development and may make these lands less desirable for development.	Would adversely affect private property values up to 4 miles and 9 miles from where transmission alignment would cross or parallel private properties along northern portion and southern portion, respectively and would cross or be parallel within 0.25 acres of about 15.9 miles of land designated for residential development under the General Plan and may make these location less desirable for development.
Land Use	Would be within 0.25 mile of 406 privately owned parcels and would cross or be adjacent to 6.1 miles of property zoned for residential use.	Would be within 0.25 miles of 452 privately owned parcels and would cross or be adjacent to 13.4 miles of property zoned for residential use.
Cultural resources	Northern segment could affect one prehistoric and two historic period archaeological sites; southern portion would not effect any known sites, but southern substation would affect one prehistoric site and sites in unsurveyed areas	Alignment has not been surveyed; could affect as yet unknown prehistoric sites

COVER SHEET

FEDERAL ENERGY REGULATORY COMMISSION

FINAL ENVIRONMENTAL IMPACT STATEMENT
FOR HYDROPOWER LICENSE
Lake Elsinore Advanced Pumped Storage Project
Docket No. P-11858-002

Section 1
Purpose of Action and Need for Power
Pages 1-1 through 1-12
FEIS

1.0 PURPOSE OF ACTION AND NEED FOR POWER

On February 2, 2004, the Elsinore Valley Municipal Water District (Elsinore Valley MWD) and the Nevada Hydro Company, Inc. (Nevada Hydro), or co-applicants, filed an application for an original license with the Federal Energy Regulatory Commission (Commission or FERC) for the construction and operation of the Lake Elsinore Advanced Pumped Storage Project (LEAPS Project) located in Riverside, San Diego, and Orange counties, California. The proposed 500 megawatt (MW) project would occupy about 2,412 acres of federal lands, including lands managed by the U.S. Department of Agriculture, Forest Service (USFS), Cleveland National Forest, U.S. Bureau of Land Management (BLM), and the Department of Defense (Camp Pendleton) (see figure 1). The USFS is reviewing an application for special use permit for the construction of transmission lines associated with the LEAPS Project as a transmission line only project. The Commission and the USFS have agreed to participate as cooperating agencies in the preparation of an environmental impact statement (EIS) for the LEAPS Project.

1.1 PURPOSE OF ACTION

The Commission must decide whether to issue an original hydropower license to the co-applicants for the project and what conditions, if any, should be placed on that license. The USFS must decide whether to issue a special use permit for the Talega-Escondido/Valley-Serrano 500-kilovolt (kV) Interconnect Project (TE/VS Interconnect Project) and to issue any necessary special use authorizations for the LEAPS Project. The TE/VS Interconnect is a high-voltage regional interconnection that would link Southern California Edison's (SCE's) Valley-Serrano 500-kV transmission line in western Riverside County with San Diego Gas & Electric Company's (SDG&E's) 230-kV Talega-Escondido transmission line in northern San Diego County. The co-applicants filed a special use permit application for the TE/VS Interconnect Project with the USFS on July 3, 2003, pursuant to the provisions of Title 5 Section 501 of the Federal Land Policy and Management Act.

In this final EIS, we assess the effects associated with the construction and operation of the proposed project as well as a staff alternative to the proposed project. In deciding whether to issue a license, the Commission must determine that the project would be best adapted to a comprehensive plan for improving or developing a waterway. In addition to the power and developmental purposes for which licenses are issued (e.g., flood control, irrigation, and water supply), the Commission must give equal consideration to the purposes of energy conservation; protection of, mitigation of damage to, and enhancement of fish and wildlife (including related spawning grounds and habitat); protection of recreational opportunities; and the preservation of other aspects of environmental quality. Under the Federal Land Policy and Management Act, the USFS must decide whether to grant an easement for rights-of-way over, across, and upon National Forest System lands for electrical poles and lines for the transmission and distribution of electrical power (see appendix A).

In this final EIS, consistent with the National Environmental Protection Act (NEPA), we analyze and evaluate the environmental and economic effects of the construction and operation of the project. The alternatives we consider include: (1) the no-action alternative; (2) the co-applicants' proposed action; and (3) a staff alternative, consisting of the co-applicants' proposed action with Commission and USFS staff's modifications. Important issues that we address include erosion, water quality, entrainment, cultural resources, recreation resources, aesthetic resources, and regional socioeconomics.

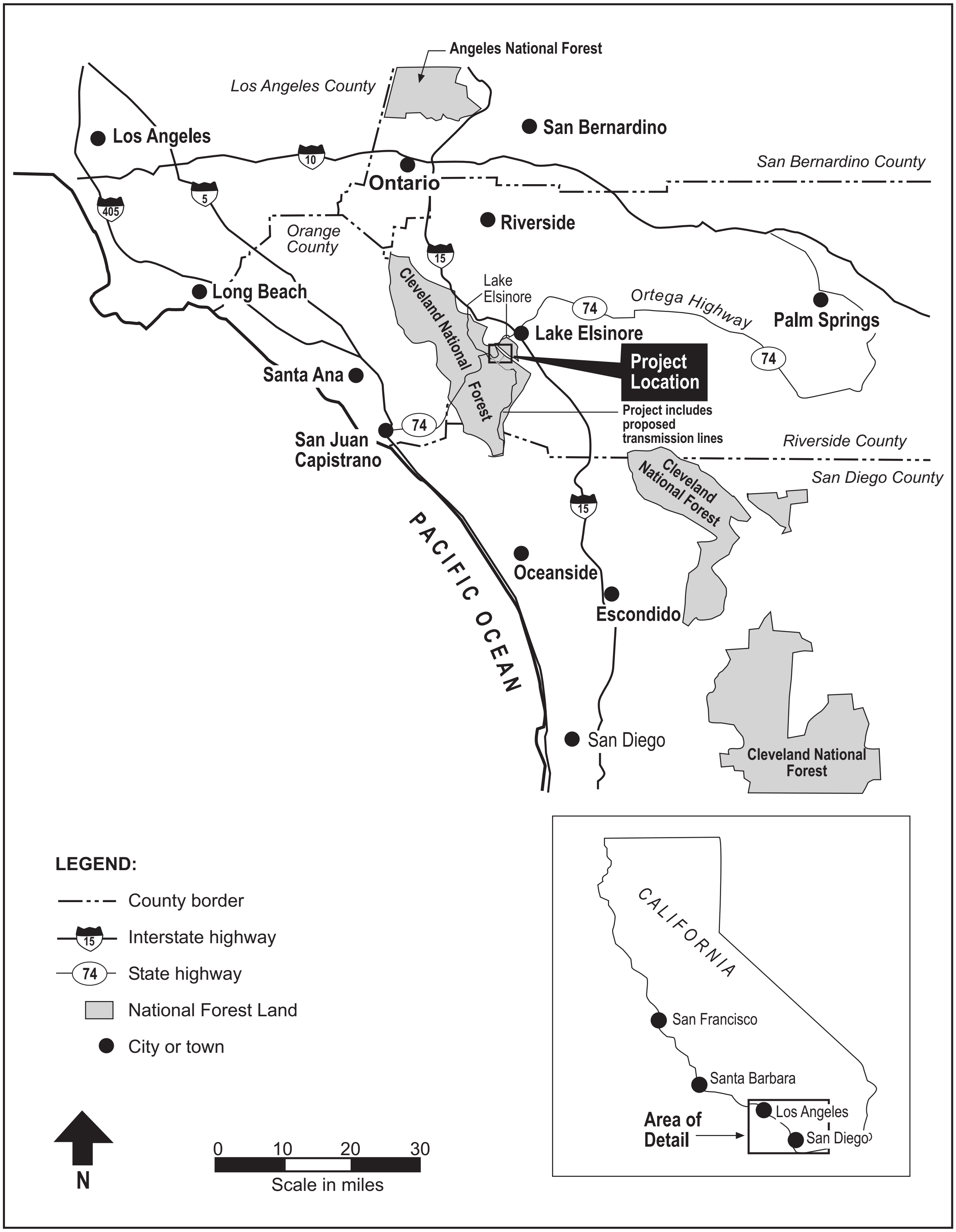

Figure 1. LEAPS Project—Location map. (Source: Elsinore Valley MWD and Nevada Hydro, 2004a, as modified by staff)

1.2 NEED FOR POWER AND TRANSMISSION

1.2.1 Power

The Commission must consider the public's need for power in its licensing decision. Because the proposed project is designed to provide peak energy, the key concern in this case is the projected need for peaking energy relative to future power requirements and planned resource additions. Additional factors to be considered in evaluating need for power from a pumped storage project include:

- availability of off-peak generation to provide pumping energy;
- effect on system reliability; and
- possible ancillary benefits including standby and reserve duties, black-station start, frequency control, and flexible reactive loading.

The project would be located within the SCE service territory. By way of comparison, the 500-MW LEAPS Project would be equivalent to almost half SCE's current total hydroelectric capacity. Hydroelectric generation accounts for 1,150 MW (written testimony of W.D. Pagel, Manager, Eastern Region, Hydro Generation, SCE, before the National Parks, Recreation, and Public Lands Subcommittee of the U.S. House Committee on Resources, on April 29, 2004) of SCE's total generation supply of 5,000 MW (Hoover's, 2004).

At a regional scale, the project would be located within the Western Electricity Coordinating Council (WECC) that includes the states west of the Rockies; portions of Texas, Nebraska, and Kansas; Alberta and British Columbia, Canada; and a portion of North Baja California. To anticipate how the demand for electricity is expected to change in the region, we looked at the regional need for power as reported by WECC (WECC, 2005). The project is located in the California-Mexico Power area of WECC.

The California-Mexico Power area, which encompasses most of California and a part of Baja California in Mexico, has a significant summer peak demand. For the period from 2005 through 2014, WECC forecasts peak demand and annual energy requirements in the area to grow at annual compound rates of 2.4 and 2.6 percent, respectively. Severe weather conditions in 1998 and 2000 affected the area, resulting in numerous curtailments of service to interruptible customers. Even with assumptions about future generation and transmission extension projects, short-term statewide and local reliability problems exist. Resource capacity margins for the California-Mexico Power area range between 13.2 and 14.8 percent of firm summer demand for the next 10 years, including allowances for projected new capacity. Winter reserves are expected to fall from 31.3 percent in 2005 to 2006 to 15.1 in 2014 to 2015. Available reserves in the California-Mexico Power area are projected to decrease below generally accepted values of 15 to 18 percent. Therefore, new capacity from this potential project could have a significant positive effect on the ability of the area to meet regional requirements for generation in both summer and winter.

Simple-cycle combustion turbines are designed to operate at lower plant factors than combined cycle combustion turbines and would likely be built to serve a similar portion of California-Mexico Power load if the LEAPS Project were not built. The projected plant factor for LEAPS is just under 36 percent (i.e., the project would generate about 500 MW for 3,120 hours out an average 8,766 hours per year). Simple-cycle combustion turbines are expected to add about 692 MW to the capacity supply between 2005 and 2014 or just over 10 percent of the total capacity growth (WECC, 2005).

WECC anticipates that 6,783 MW of new capacity would come on line within the next 10 years in the California-Mexico Power region of the WECC region. According to WECC's most recent estimates (WECC, 2005), hydroelectric generation will only account for 20 MW (0.3 percent), of the projected capacity growth of 6,783 MW in the region between 2005 and 2014. Hydro pumped storage will potentially add an additional 390 MW, accounting for 5.7 percent of projected capacity growth. The LEAPS Project is not included in this forecast.

Combined-cycle combustion turbines are forecast to account for most of the supply growth with WECC estimating nearly 15 percent[7] growth in this category. By comparison, pumped storage, even with LEAPS Project, would add just 1.5 percent of new capacity growth. Growth of firm capacity supplies in other categories including certain renewables is estimated at 45 MW between 2005 and 2014. Although there may be significant additions of wind power, such power is generally not treated as firm capacity due to the intermittent nature of wind. Wind power, however, will contribute to the overall energy supply. The value of pumped storage generation is that it transfers a significant portion of the electricity generated during off-peak hours to on-peak hours for more rapid dispatch. Building additional pumped storage would enhance the power resource mix for projects with this type of operating characteristic. We conclude that the region has a need for power over the near term and power from the proposed project could help meet that need in the future.

Trends in energy and capacity needs in California are echoed by the California Energy Commission. Utilities in southern California would likely use the electricity from the project to displace the use of gas-fired energy during on-peak hours. If the project is not licensed, utilities would still need to provide a comparable amount of capacity and energy from other resources, most likely through the operation of gas-fired generation facilities.

The California Energy Commission was created in 1974 and is responsible for forecasting future energy needs and keeping historical energy data amongst other duties. The California Energy Commission noted in its 2004 Integrated Energy Policy Report Update that "while supplies are tight during peak periods, the state has more than adequate amounts of power in the low load periods, especially at night." California utilities and generators have some options for shifting power supplies from off-peak to on-peak periods through the use of pumped-storage facilities. The co-applicants have also identified on-going development of geothermal energy resources in the Salton Sea area of southern California as another possible source of off-peak energy for overnight pumping (Elsinore Valley MWD and Nevada Hydro, 2004b).

In summary, if licensed, the power from the project would be useful in meeting a part of the regional need for on-peak power. Pumped storage generates and stores power during off-peak periods that can be provided rapidly during on-peak periods. Neither of the co-applicants has end use customers. Licensing the LEAPS Project would allow the co-applicants to compete in the power market for sale of the project's power.

1.2.2 Transmission

California's existing transmission system links power generation resources with customer loads in a complex electrical network that must balance supply and demand on a moment-by-moment basis. An efficient and robust transmission system is required not only to help deliver the lowest-cost generation to consumers but also to stimulate competitive behavior in energy markets, pool resources for ancillary

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[7] Combined-cycle combustion turbines not only contribute to over all capacity growth but also would replace a significant percentage of retirements and hence growth in combined-cycle combustion turbines exceeds overall growth rates. For example, oil fired steam generation in 2005 accounts for 0.5 percent of capacity, but this will drop to zero by 2014.

services, and provide emergency support in the event of unit outages or natural disasters. Some of the problems facing the transmission system in the area of the LEAPS Project include congestion on major paths, which prevents optimal economic operation of the system, and constraints such as power flow restrictions, which affect both the economic and reliable operation of the system, in major load centers such as San Diego.

Various state agencies and regional planning groups recently have studied the need for SDG&E to import additional electric power beginning in 2005. Of these agencies and planning groups, the Southwest Transmission Expansion Plan (STEP), SDG&E, and California Independent System Operators have conducted the most current and applicable studies.

The STEP studies conducted in 2003 indicate that a new 500-kV transmission line into San Diego would be necessary to serve future load growth. Many STEP participants believe that the existing transmission system in this area is inadequate to fully deliver all the new generation that has been developed. By enhancing the capability of the transmission system, new, clean, and efficient generation would be available to service future load growth and replace older and less efficient generation.

The STEP examined several options for routing a new transmission line into San Diego, including several alternative routes from Imperial Valley into San Diego, known as the Imperial Valley-San Diego Expansion Plan Project, as well as the proposed Talega-Escondido/Valley-Serrano transmission line associated with the LEAPS Project. Detailed analyses (power flow and stability) and economic (production costs) studies were conducted for each of these options. The STEP found that neither project had annual benefits large enough to offset its costs; however, the STEP did not analyze the strategic project benefits[8] of these projects, which could improve the projects' economic outlook.

Korinek (2003) re-enforces the need to increase San Diego's import capability, which is currently limited to 2,850 MW, to cover an estimated reliability deficiency of 291 MW in 2007. This deficiency, based on G-1/N-1[9] reliability criteria, is primarily due to the inability to permit the 500-kV Valley-Rainbow transmission line (Valley-Rainbow transmission line, which, from an electrical network viewpoint, is almost identical to the Talega-Escondido/Valley-Serrano transmission line), combined with increasing loads in San Diego.

In February 2002, the Office of Ratepayer Advocates, under the California Public Utilities Commission completed its assessment of the Valley-Rainbow transmission line and found that the project affords negligible reliability benefits in at least the next 5 years (Sierra Energy & Risk Assessment, 2002). However, it appears that after SDG&E performed additional analyses in 2003, SDG&E can justify this project as marketable in the 2010 time frame, based on its ability to relieve transmission congestion and improve power import capability into the San Diego area.

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8 Strategic benefits include reliability, load diversity, fuel diversity, access to lower cost power plants, firm power purchase, economical energy and surplus hydro purchases, power exchanges and reserve sharing.

9 Specifically, the 500-kV Valley-Rainbow Project was proposed to mitigate a CAISO reliability criteria violation that could result from an overlapping outage involving the single largest generator (G-1) and the single largest transmission line (N-1) serving the San Diego area. The problem is known technically as a G-1/N-1 violation. The G-1/N-2 violation was identified through transmission planning studies that SDG&E, the CAISO, and other parties conducted jointly as part of the CAISO grid planning process. Those studies for 2005–2010 showed that in the case of a heavy summer peak load, an outage of SDG&E's largest generation project (Encina 5 at 329 MW) followed by an outage of the Southwest Power Link would result in a generation deficiency in the San Diego area, requiring the CAISO to drop customer load.

In May 2004, Kyei (2004) completed *Comparative Reliability Evaluation for Alternative New 500-kV Transmission Lines into San Diego*, a study that evaluated the relative reliability benefits of the Talega-Escondido/Valley-Serrano transmission line and the most technically desirable alternative for a new line from Imperial Valley into San Diego (i.e., the Imperial Valley-San Diego Expansion Plan transmission line). The results of Kyei (2004) revealed that either the Talega-Escondido/Valley-Serrano transmission line or the Imperial Valley-San Diego Expansion Plan transmission line would substantially increase the capability to import electricity (from 2,850 MW to 3,600 MW with all lines in service) to the San Diego area.

A combination of the Talega-Escondido/Valley-Serrano and Imperial Valley-San Diego Expansion Plan transmission lines would provide additional benefits, such as a 3,800-MW import capability. SDG&E's long-term plan is to identify a way to connect the western end of the Imperial Valley-San Diego Expansion Plan transmission line with the southern end of the Talega-Escondido/Valley-Serrano transmission line, creating one continuous path.

Based upon our review of available documentation, it appears that the Talega-Escondido/Valley-Serrano transmission line interconnection between the SCE and SDG&E transmission systems would be an appropriate long-term solution to southern California's transmission congestion bottlenecks as well as the transmission-constrained, generation-deficient San Diego area. The Talega-Escondido/Valley-Serrano transmission line could provide up to 1,000 MW of import capability into the San Diego area with up to 500 MW of this import power being supplied by the LEAPS Project during high-demand periods. Appendix B contains our detailed assessment for the need for the LEAPS Project's Talega-Escondido/Valley-Serrano 500-kV transmission line.

1.3 INTERVENTIONS

Organizations and individuals may petition to intervene and become a party to subsequent proceedings. On January 25, 2005, the Commission issued a notice accepting the co-applicants' application to license the LEAPS Project. The notice set a deadline of March 26, 2005, for filing protests and motions to intervene.

Intervenor	Date of Filing
California Independent System Operator Corporation	April 2, 2004
Friends of the Forest	June 1, 2004
City of Lake Elsinore	June 24, 2004
Mike Hilberath	February 9, 2005
California State Water Resources Control Board	February 28, 2005
Cities of Anaheim, Azusa, Banning, Colton, and Riverside, California	March 7, 2005
County of Riverside	March 15, 2005
Jay Scott	March 17, 2005
Bill Soderquist	March 22, 2005
Elsinore Testing of Experimental Aircraft Mechanisms, Inc.	March 24, 2005
La Cresta Highlands Association	March 24, 2005
California Unions for Reliable Energy	March 25, 2005
Benjamin Grenis	March 28, 2005
Jack Burdy	March 28, 2005

Intervenor	Date of Filing
Fernandez Parties	March 29, 2005
San Diego Gas & Electric Company	March 31, 2005
Christopher Wills	April 13, 2006

In addition to the motions to intervene listed above, 157 individuals filed protests. These individuals cited concerns about the high-voltage transmission lines relative to fire suppression within the Cleveland National Forest, interference with the historical use of the site for hang gliding and parasailing, the negative visual effects of the transmission lines, the health risk of electromagnetic fields, effects on tourism, and effects on property values.

1.4 SCOPING PROCESS

Under the Commission's regulations, issuing a license decision for any project first requires preparation of either an environmental assessment or an EIS, in accordance with NEPA. Based on our review of the license application and of comments from agencies, interested parties, and the public, we issued a notice of intent to prepare an EIS on August 9, 2004.

Before preparing the draft EIS, the Commission and USFS staff conducted scoping to identify issues and alternatives. The Commission and the USFS issued Scoping Document 1 on August 9, 2004. Three scoping meetings for the LEAPS Project were conducted on September 8 and 9, 2004, in San Juan Capistrano and Lake Elsinore, California, to receive oral comment on the project. A court reporter recorded all comments and statements made at the scoping meetings, and these comments are part of the Commission's public record for this proceeding. In addition to comments provided at the scoping meetings, the following entities provided written comments:

Entity	Date of Letter
Joanne Mortensen	September 4, 2004
Sherry Kunshel	September 6, 2004
Paul Carlton	September 8, 2004
Elsinore Hang Gliding Association	September 10, 2004
Lori Lara and Jon Hernandez	September 13, 2004
Michelle Greget	September 14, 2004
Chris and Michele Lawrence	September 14, 2004
Paul Sulman	September 15, 2004
Bureau of Indian Affairs	September 16, 2004
Christopher Wills	September 17, 2004
Richard Pierce	September 18, 2004
Anna Lee	September 20, 2004
U.S. Fish and Wildlife Service	September 23, 2004
Douglas Earnhart	September 23, 2004
Harold W. Sampson	September 24, 2004
Evelyn Wolke	September 25, 2004
Scott Green	September 25, 2004

Entity	Date of Letter
Lisa McIntyre	September 27, 2004
P. Niba	September 27, 2004
Pamela Nelson	September 27, 2004
Anders Beckrot	September 27, 2004
The Nevada Hydro Company, Inc.	September 28, 2004
Bruce Heckle	September 29, 2004
Mike and Debbie Connolly	September 29, 2004
Diane Plummer	October 1, 2004
Cowan A. Plummer	October 1, 2004
Michael and Laurie Vartanian	October 3, 2004
Jeffrey Lesser	October 3, 2004
J. Stickler	October 3, 2004
William Plummer	October 4, 2004
Hans Mulyapatera	October 5, 2004
Margaret Long	October 5, 2004
Parilee Roberts	October 5, 2004
Mari Tolman	October 6, 2004
The Mead Family	October 6, 2004
Tim McIntyre	October 6, 2004
Robert Peterson	October 6, 2004
John, Gayle, Garrett, and Adam Larsson	October 6, 2004
Clarence Bostian	October 7, 2004
California State Water Resources Quality Control Board	October 8, 2004
Pacific Clay Products	October 8, 2004
U.S. Environmental Protection Agency	October 8, 2004
Center for Biological Diversity	October 11, 2004
City of Lake Elsinore	October 11, 2004
San Diego Gas and Electric	October 11, 2004
Southern California Edison	October 12, 2004
Rancho Capistrano Property Owners Association	October 12, 2004
Lake Elsinore Unified School District	October 14, 2004
John and Vera Kalachian	October 18, 2004
Michael and Linda Palmer	October 18, 2004
Hobie Burgess	October 18, 2004
Leonard and Julie Gaspusan	October 18, 2004
Keith Fletcher	October 18, 2004

Entity	**Date of Letter**
John and Donna Guzman	October 20, 2004
Mike and Elin Motherhead	October 21, 2004
National Oceanic and Atmospheric Administration Fisheries	October 22, 2004
City of Riverside	October 28, 2004
Cynthia Fry	November 1, 2004

Scoping Document 2 that addresses all of the comments presented at the scoping meetings and in letters filed subsequent to the scoping meetings was issued on January 25, 2005.

Many residents and several agencies, including the California State Water Resources Control Board (State Water Board) and the U.S. Environmental Protection Agency (EPA), expressed concerns about the potential for the project to adversely affect the water quality in the San Juan and San Mateo creeks and in Lake Elsinore. They also commented that the proposed project would affect Lion Spring, a type of aquatic resource that is relatively rare in the region. We discussed potential effects of the proposed project and action alternatives on water quality and surface water in section 3.3.2.2, *Environmental Consequences,* in *Water Resources.*

Amateur hang gliders raised concerns about the effect of the proposed project transmission lines on hang gliding opportunities in Cleveland National Forest and the city of Lake Elsinore and whether the project as proposed would eliminate these world class hang gliding opportunities. We discuss the potential effects of the proposed project and action alternatives on hang gliding in section 3.3.6.2, *Environmental Consequences*, in *Recreational Resources.*

A number of residents and agencies commented that the upper reservoir at Morrell Canyon would remove an oak-woodland community that provides important wildlife habitat and recreational opportunities. They also raised concerns about the potential for the upper reservoir to provide breeding opportunities for mosquitoes. Several agencies, including the U.S. Fish and Wildlife Service (FWS), expressed concerns about whether the transmission lines would create barriers to wildlife movement and affect raptors and migratory birds. We discuss the potential effects of the proposed project and action alternatives on oak woodlands, wildlife, and mosquito populations in section 3.3.4.2, *Environmental Consequences,* in *Terrestrial Resources.*

The National Oceanic and Atmospheric Administration Fisheries (NOAA Fisheries) expressed concerns about the effects of project construction and operation on steelhead populations. We discuss potential effects of the proposed project and action alternatives on steelhead populations in section 3.3.5.2, *Environmental Consequences*, in *Threatened and Endangered Species.*

Local school officials and residents raised concerns about the potential for flood inundation should the upper reservoir fail. We discuss this potential in section 3.3.1.2, *Environmental Consequences*, in *Geology and Soils.*

Other issues of concerned to residents and local agencies were the potential fire threat from construction and installation of the 500-kV transmission lines, the potential for traffic congestion on and damage to local roads, the potential effects of electromagnetic fields created from the generation and transmission of electricity, and the potential for the upper reservoir to create unpleasant odors. We discuss each of these issues in section 3.3.7.2, *Environmental Consequences* in *Land Use and Aesthetics.*

Numerous members of the public commented that the proposed project would affect property values in the surrounding communities. One entity suggested that the growth-inducing impacts be considered. We discuss these issues in section 3.3.8.2, *Environmental Consequence* in *Socioeconomic Resources.*

Several residents commented on the dust and noise that would be generated by the project over the construction period of several years. We discuss the potential effects of proposed project construction and operation on air quality and noise in section 3.3.10.2, *Environmental Consequences* in *Air Quality and Noise.*

1.5 AGENCY CONSULTATION

On February 28, 2005, the Commission issued a Notice for Ready for Environmental Analysis for the LEAPS Project, soliciting comments, recommendations, terms and conditions, and prescriptions. The notice set a filing deadline of April 29, 2005. In response to this notice, the following entities filed comments:

Commenting Entities	Date of Filing
U.S. Department of the Interior	April 28, 2005
U.S. Forest Service, Pacific Southwest Region	April 28, 2005
County of Riverside	April 28, 2005
San Diego Gas & Electric Company	April 29, 2005
California Department of Transportation District 8	May 3, 2005
U.S. Department of Interior, Bureau of Indian Affairs	May 19, 2005

The co-applicants filed reply comments to the comments, recommended terms and conditions, and prescriptions by letter dated June 7, 2005.

1.6 CALIFORNIA ENVIRONMENTAL QUALITY ACT

The California Environmental Quality Act (CEQA) is the California counterpart to NEPA. CEQA went into effect in 1970 for the purpose of monitoring land development in California through a permitting process. This statute, enacted to protect the health of the environment from current and future development, requires state and local agencies to identify the significant environmental impacts of their actions and to avoid or mitigate those impacts, if feasible. CEQA applies to all discretionary activities proposed to be undertaken or approved by California State and local government agencies. The State Water Board must act on the co-applicants' request for a water quality certificate for the LEAPS Project (see section 5.6.1, *Section 401 of the Clean Water Act—Water Quality Certification*). Pursuant to CEQA, the Elsinore Valley MWD has responsibilities as the lead agency under CEQA.

Under CEQA, an environmental impact report is prepared when the public agency finds substantial evidence that the project may have a significant effect on the environment. An environmental impact report is the public document used to analyze the significant environmental effects of a proposed project, identify alternatives, and disclose possible ways to reduce or avoid the possible environmental damage. CEQA guidelines state that when federal review of a project is also required, state agencies are encouraged to integrate the two processes to the fullest extent possible, which may include a joint environmental impact report/EIS. Although this document is not a joint environmental impact report/EIS, Elsinore Valley MWD has the opportunity to use this document, as appropriate, to satisfy its responsibilities under CEQA.

The content requirements for an environmental impact report under CEQA are similar to the requirements for an EIS, although an environmental impact report must contain two elements not required by NEPA. The first element needed in an environmental impact report not required by NEPA is a discussion of how the proposed project, if implemented, could induce growth. A project can be considered to have a growth-inducing effect if it directly or indirectly fosters economic or population growth or removes obstacles to population growth, strains existing community service facilities to the extent that the construction of new facilities would be needed, or encourages or facilitates other activities that cause significant environmental impacts. We discuss growth-inducing impacts of the LEAPS Project and these effects in section 3.3.8.2, *Socioeconomic Resources, Environmental Consequences.*

The second element needed in an environmental impact report, but not required by NEPA, is a discussion of a program for monitoring or reporting on mitigation measures that were adopted or made conditions of project approval. The monitoring or reporting program must ensure compliance with mitigation measures during project implementation. The program may also provide information on the effectiveness of mitigation measures. Although discussion of the mitigation reporting or monitoring program can be deferred until the final environmental impact report or, in some cases, after project approval, it is often included in the draft environmental impact report to obtain public review and comment.

In section 5.1, *Comparison of Proposed Action and Alternatives*, we list the mitigation measures and monitoring and reporting requirements we recommend for inclusion in any license issued for the LEAPS Project. See section 3, *Environmental Analysis*, for a review of the analysis of each affected environmental resource and the rationale for each recommended measure. Any conditions of a Water Quality Certification that may be issued for this project will become an enforceable part of any license issued for this project.

The Elsinore Valley MWD determined that an environmental impact report is required for the proposed LEAPS and TE/VS Interconnect Project. On September 13, 2004, Elsinore Valley MWD issued A Notice of Preparation for a draft environmental impact report. Elsinore Valley MWD conducted public scoping meetings on September 8 and 9, 2004, to receive comments from the public and other interested parties. The Notice of Preparation was reissued by Elsinore Valley MWD on June 1, 2006, inviting comments within 30 days of the date of the notice because of the length of time that has elapsed and clarification in the proposed project design.

1.7 COMMENTS ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT

The Commission issued its draft EIS for the licensing of the LEAPS Project on February 17, 2006, and requested that comments be filed by April 25, 2006. On October 3, 2006, the Commission also issued a public notice to landowners of property crossed by or near either the proposed or alternative routes for the transmission line and other interested parties to the proceeding. The maps attached to this notice showed two transmission alignments: (1) the co-applicants’ current proposal, modified in response to staff’s draft EIS and filed with the Commission on June 12, 2006; and (2) the staff alternative alignment being considered for the final EIS. The October notice invited comments within 30 days of the date of the letter. In appendix E, we summarize the comments received; provide responses to those comments; and indicate, where appropriate, how we have modified the text of the final EIS. We also include at the end of appendix E a list of the names of all the individuals who filed comments and the filing dates.

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COVER SHEET

FEDERAL ENERGY REGULATORY COMMISSION

FINAL ENVIRONMENTAL IMPACT STATEMENT
FOR HYDROPOWER LICENSE
Lake Elsinore Advanced Pumped Storage Project
Docket No. P-11858-002

Section 2
Proposed Action and Alternatives
Pages 2-1 through 2-30
FEIS

2.0 PROPOSED ACTION AND ALTERNATIVES

2.1 INTRODUCTION

In this section, we describe the alternatives analyzed in this final EIS for the LEAPS Project and compare the effects associated with each alternative. These alternatives include the no-action alternative, the co-applicants' proposal, and the staff alternative. We also describe the proposed environmental measures as well as measures that, if implemented, would mitigate certain of the adverse effects described in section 3.0, *Environmental Consequences*. We then compare the major components of the alternatives.

Alternative energy sources provide a basis for evaluating future power generation choices in the event that the proposed project license is denied. Because neither applicant is an electric utility serving end-use customers, it is likely that the LEAPS Project is the only project the co-applicants are interested in developing. Consequently, the alternatives analysis for this project focuses on a number of design alternatives identified by the co-applicants and staff to avoid or minimize environmental effects, while other likely alternative energy sources available to meet project energy needs of the region are discussed under the no-action alternative (section 2.2, *No-Action Alternative*). The no-action alternative provides information regarding the most likely scenario by which regional power needs would be met if the license for the proposed project were to be denied.

2.2 NO-ACTION ALTERNATIVE

License denial constitutes the no-action alternative. Selecting this alternative would affect both the future use of the project site and power generation and transmission in the project region. The no-action alternative describes conditions if the proposed project license is not granted. This description discussed in section 3.0 provides a baseline for comparing and contrasting the effects of the action alternatives. Under the no-action alternative, there would be no disturbance of existing environmental conditions at the sites, and electrical system generation and interconnection requirements would be addressed through other means.

There would be no special use permit issued by the USFS for the construction and operation of the upper reservoir or installation of transmission lines on lands within the Cleveland National Forest associated with the LEAPS Project. Acquisition or condemnation of lands for the construction and operation of a powerhouse would not be necessary and no subsequent transfer of cleared lands to local entities for recreational development would occur. The 5,500 acre-feet of water need for the initially filling of the upper reservoir and the annual 200 acre-feet to make up for evaporation would not be needed and would be available for other uses.

The pumped storage facility would not be built, and there would be no additional energy generated by pumped storage to meet peak energy needs. Whether the objective to provide a 500-kV north/south interconnection to carry power from the SCE Valley/Serrano transmission line south to the SDG&E Talega-Escondido transmission line would be met would depend on whether the USFS issues a special use permit for the TE/VS Interconnect Project independent of the LEAPS Project.

Licensing and subsequent development of the LEAPS Project would temporarily postpone the need for additional generating resources until such time as load growth demanded their construction. Conversely, license denial would accelerate the timing or extent of development necessary to satisfy the electrical peaking demand that would otherwise be met by the project.

Staff has determined that, in the absence of the LEAPS Project, additional power generation for peak periods would likely come from natural gas combustion turbines and combined cycle units, or power purchases from other utilities outside the region.

Combustion turbines and combined cycle units are normally installed to meet peak and intermediate loads. These are the types of loads that the LEAPS Project would displace. Gas-fired combustion turbines have the advantage of short lead times, small module size, and relatively low capital costs. The co-applicants indicate that there is currently an over-reliance on natural gas in meeting peak load and that a pumped storage project such as LEAPS would help diversify the mix of resources serving on-peak load.

Under Senate Bill 1078, major utilities in the state are now required to procure 20 percent of their retail sales via renewables by 2017. Renewable energy generation technologies are typically more expensive than conventional sources; however, recent escalation in fuel prices may increase the relative economic attractiveness of renewable resources. The operating characteristics of some renewables, such as wind, are such they cannot be relied upon for providing dependable capacity and firm power during on-peak hours since the generation source is intermittent. Sources such geothermal energy plants are more likely to operate in a base mode and cannot be directly compared to pumped storage plants. Even solar power, which is a daytime generating source, is subject to cloud cover and is also affected by the angle of the sun.

The co-applicants also discuss conservation programs that have been funded by major utilities to create energy efficiency savings to reduce the future need for power. Such programs could experience either funding cuts or growth could be higher than expected. Need for power would increase under either scenario.

In section 4.1.2, *Projected Energy Facility Costs for the No-action Alternative*, we identify a natural gas-fired simple-cycle combustion turbine as the likely alternative to the LEAPS Project because the LEAPS Project would operate at a 35.6 percent plant factor and would be dispatched in a somewhat similar manner to meet peak demand. Combined-cycle combustion turbines typically operate at much higher plant factors than simple-cycle plants and would not be an equivalent alternative. Although simple-cycle turbines can meet peak load, they require more time to be brought online and hence lack some of the flexibility that pumped storage offers. Additionally, if the co-applicants are successful in obtaining power purchase agreements for geothermal, wind, or other non-fossil based sources of energy, their pumped storage project would not depend as much on fossil fuels and would be less subject to supply disruptions.

2.3 CO-APPLICANTS' PROPOSAL

2.3.1 Description of Existing and Proposed Project Facilities

The LEAPS Project would be located on Lake Elsinore and San Juan Creek, near the city of Lake Elsinore, Riverside County, California (figures 2 and 3). The upper reservoir would be located in the headwaters of the San Juan Creek Watershed, also in Riverside County. The proposed project would consist of the following:

1. a lined upper reservoir (Morrell Canyon) with a 180-foot-high main dam and a perimeter dike ranging up to 60 feet high and a gross storage volume of 5,750 acre-feet, usable storage of 5,500 acre-feet, and a surface area of about 76 acres at a normal maximum water surface elevation of 2,880 feet;

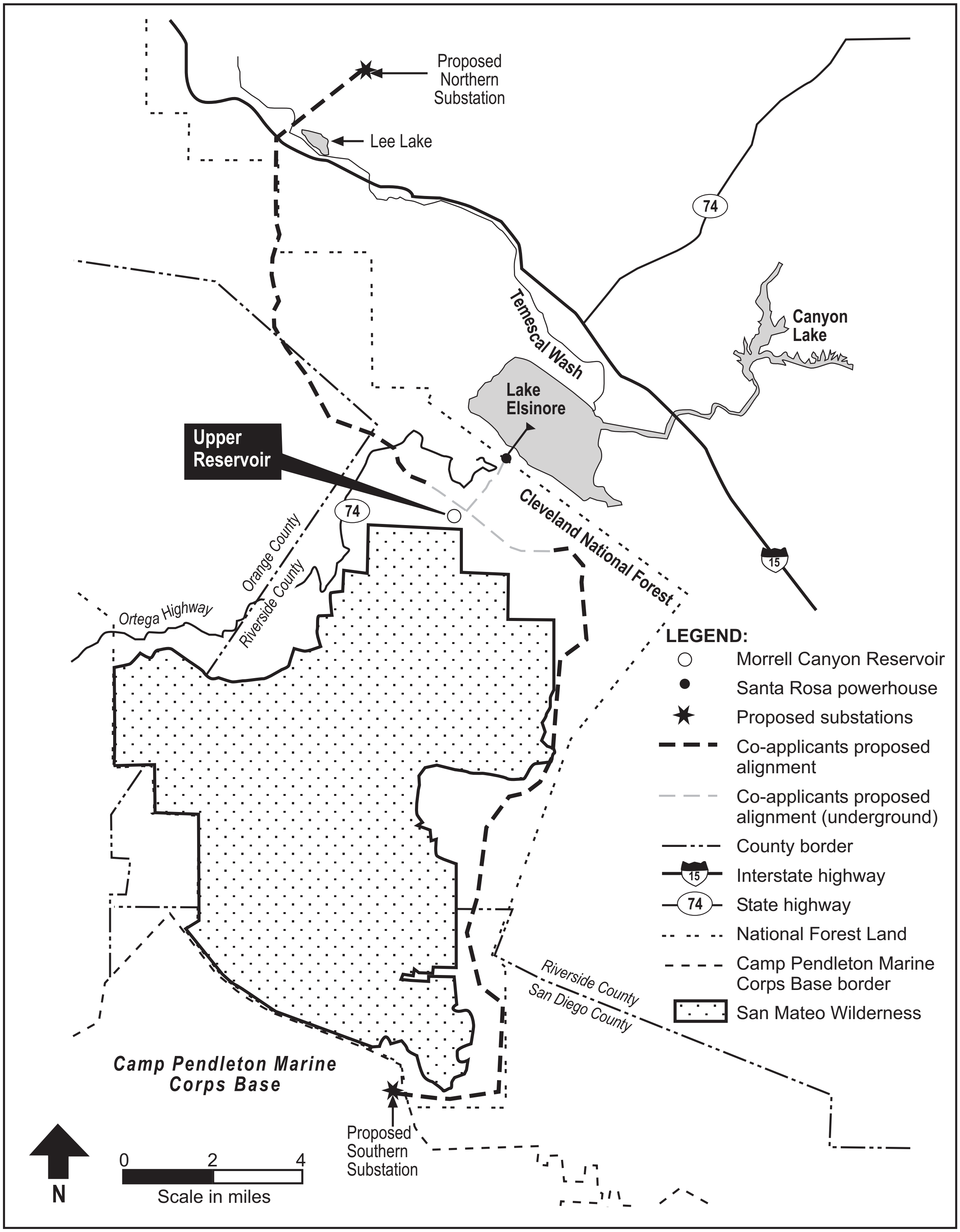

Figure 2. LEAPS Project—Proposed project facility locations. (Source: Elsinore Valley MWD and Nevada Hydro, 2004a, as modified by staff)

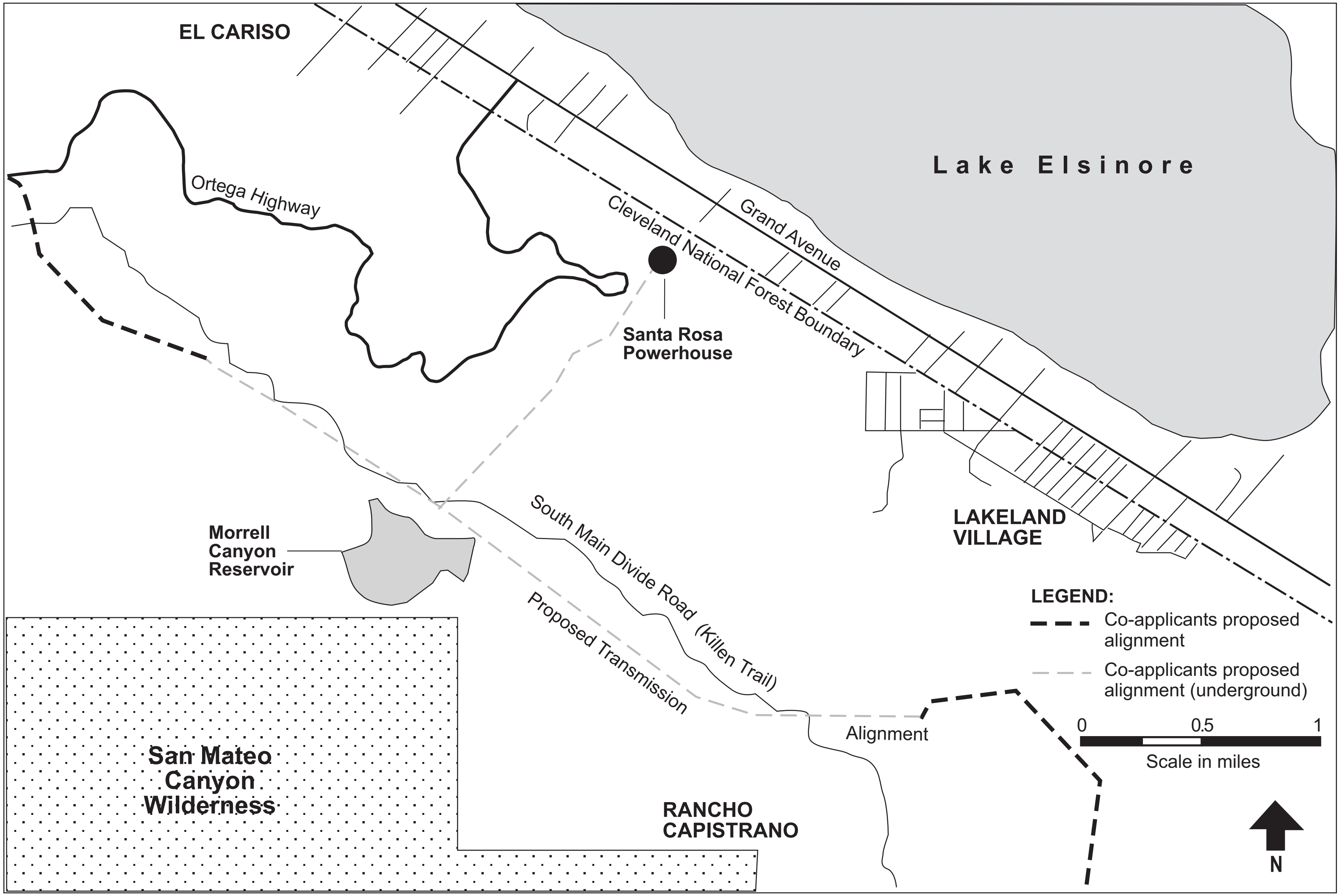

Figure 3. LEAPS Project—Proposed upper reservoir and powerhouse sites. (Source: Elsinore Valley MWD and Nevada Hydro, 2004a, as modified by staff)

2. two parallel high-pressure water conduits each consisting of a 7,890-foot-long concrete-lined power shaft and tunnel transitioning to a 250-foot-long, 12-foot-diameter steel penstock[10];

3. an underground powerhouse (Santa Rosa) containing two reversible pump-turbine units with a total installed capacity of 500 MW in the generating mode;

4. the existing Lake Elsinore to be used as a lower reservoir with a surface area of 3,319 acres and a storage capacity of 54,504 acre-feet at a normal pool elevation of 1,245 feet mean sea level (msl);

5. two 1,950-foot-long, 20-foot-wide, and 20-foot-high concrete-lined tailrace tunnels;

6. a 25-to 50-acre surface switchyard/substation;

7. about 32 miles of 500-kV transmission line connecting the project to an existing SCE transmission line located north of the proposed project and to an existing SDG&E transmission line located to the south[11]; and

8. appurtenant facilities.

In the following paragraphs, we provide further description of selected project facilities.

The upper reservoir dam and dike would have a crest elevation of 2,900 feet msl and a combined fill volume of about 2.6 million cubic yards.[12] Materials for the embankment would be obtained from excavated materials from the upper reservoir, powerhouse, and tunnel excavations. Final embankment design could call for a zoned earth and rockfill dam having a central impervious core or a concrete-faced earth and rockfill dam. The co-applicants propose that, overall, the project site would achieve a balance between excavation and fill, thereby avoiding the need to transport materials to the project site or to haul spoil materials from the project site. An exception to the excavation and fill balance would be in the case of an embankment type dam requiring an impervious core requiring low-permeability clay or clay-like material. The co-applicants have identified the Alberhill area located about 10 miles northwest of the project site as a likely source of clay; alternatively, the low-permeability material could be manufactured on site, requiring the import of bentonite to mix with on-site soils.

The dam would include a concrete-lined emergency spillway and a low-level outlet. A 20-foot-wide crushed stone roadway would be provided around the crest of the embankment to allow access for maintenance and inspection. An 8-foot-high chain-link fence would be located on the outer side of the crest roadway. The outside (downstream) face of the embankment would be seeded. The total footprint of the upper reservoir would be about 130 acres.

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[10] In response to public comments on the draft EIS, the co-applicants filed revised project descriptions that considered the use of a single 30-foot-diameter tunnel. Commission staff sought a clarification of whether the co-applicants intended to revise the project description and determined that they did not (telephone communication, between J. Fargo, Commission, Washington, DC, and D. Kates, Nevada Hydro, Vista, CA, filed on May 26, 2006).

[11] In response to public comments on the draft EIS, the co-applicants filed a revised transmission alignment on April 25, 2006, and June 12, 2006. We treat this revised alignment as the co-applicants' proposed alignment in this final EIS.

[12] The co-applicants identify the proposed upper reservoir plan in the license application as "Morrell Canyon—Alternate A.3" (Elsinore Valley MWD and Nevada Hydro, 2004).

The upper reservoir liner would be a double-liner system designed to separate upper reservoir leakage from natural groundwater seeps. The liner system would consist of the following: (1) a primary geomembrane; (2) a drainage layer under the primary geomembrane to collect and convey leakage; (3) a secondary geomembrane under the drainage layer to separate leakage from native groundwater; (4) a secondary seepage collection system under the secondary geomembrane to relieve water pressures from under the liner system and to collect and convey native groundwater from Lion Spring to San Juan Creek; and (5) subgrade preparation as needed to protect the liner system from sharp bedrock protrusions.

The water conduit connecting the upper reservoir to the powerhouse would consist of the following: (1) a gated inlet structure located in the upper reservoir with an inlet at elevation 2,760 feet msl; (2) two parallel high-pressure water conduits each consisting of (a) a 1,970-foot-long concrete-lined horizontal tunnel; (b) a 3,420-foot-long inclined tunnel with a slope of about 25 degrees; and (c) a 2,500-foot-long horizontal tunnel with a slope of about 2 percent; and (3) a 250-foot-long, 12-foot-diameter steel penstock.[13] The tunnel segments would have a finished inside diameter of 15 to 18 feet. The inclined tunnel and the horizontal tunnel segments of each water conduit would be lined or unlined, depending on actual rock and cover conditions.

The underground powerhouse would use a 30-acre site. The underground cavern would be 375 feet long, 85 feet wide, and 175 feet high. The powerhouse would include a 250-foot-long, 85-foot-diameter, concrete-lined vertical access shaft and a 250-foot-long, 8-foot-diameter vent and emergency egress shaft. The powerhouse would contain an overhead bridge crane, galleries for electrical and mechanical services, a transformer gallery, a surge shaft, and two 250-MW (generating)/300-MW (pumping) reversible Francis-type pump turbines operating at 450 revolutions per minute at an average net head (generating) of 1,588 feet.

The inlet/outlet structure at the lower reservoir would be located on the southwest shore of Lake Elsinore. The structure would extend from the portal of the tailrace tunnel to a set of trashracks at the lake shore.

In the underground powerhouse transformer gallery, the 16-kV generator voltage would be stepped up to the 500-kV transmission line voltage. Five hundred-kV oil-filled cables would run to the surface to a switchyard. The switchyard/substation would include the following: (1) a switchyard control building; (2) circuit breakers and disconnect switches; (3) switchyard busses and structures; and (4) microwave and telecommunication facilities.

The proposed 32-mile-long, 500-kV transmission line (referred to as the Talega-Escondido/Valley-Serrano transmission interconnection) would connect the LEAPS Project to two existing transmission lines: one a 230-kV SDG&E line south of the project called the Talega-Escondido transmission line and the other a 500-kV SCE line to the north called the Valley-Serrano transmission line. The proposed transmission alignment would originate at the surface switchyard/substation above the powerhouse and head uphill underground generally in line with the project's underground high-pressure water conduit (about 2 miles). The southernmost segment of the proposed transmission alignment would run westerly within an existing SDG&E right-of-way and beneath SDG&E's existing 230-kV Talega-Escondido transmission line and connect the LEAPS Project to the SDG&E system at a new interconnecting substation located within or adjacent to Camp Pendleton in northern San Diego County. The northernmost segment would interconnect with SCE's 500-kV transmission system at a new substation located about 20 miles west of SCE's Valley Rainbow substation. The line would run underground for about 3.2 miles from just north of the Decker Canyon upper reservoir site along South Main Divide Road south to a point about 0.5 mile west of the Rancho Capistrano community. The co-

[13] The co-applicants identify the proposed water conduit plan in the license application as "Morrell Canyon to Santa Rosa Site—Alternative H.3" (Elsinore Valley MWD and Nevada Hydro, 2004).

applicants' proposed transmission alignment and preliminary tower placements are shown on figures F-1 through F-4 in appendix F.

The co-applicants considered several other locations for project facilities including an upper reservoir at Decker Canyon and a powerhouse location at either near Ortega Oaks or near Evergreen Street (Evergreen). The Decker Canyon upper reservoir location is described under section 2.4.3, *Staff Alternative*. The Ortega Oaks powerhouse and Evergreen powerhouse locations are described in section 2.5, *Other Project Features Considered or Eliminated from Detailed Analysis.*

2.3.2 Construction Sequence

The project construction phase would last about 4.5 years.[14] Construction would begin with the development of a temporary access road from South Main Divide Road to the upper reservoir site and access roads from Ortega Highway and Grand Avenue to the powerhouse access portal and the intake/outlet structure in Lake Elsinore. Upper reservoir embankment locations would be cleared to receive excavation spoil, and excavation would then begin on the underground features. Also, transmission line corridor clearing, development of temporary access roads, and transmission line and switchyard installation would begin, as would construction of the cofferdam at the Lake Elsinore inlet/outlet structure. In steeply sloped areas, helicopters would be used to place equipment and install transmission towers.

During the second year of construction, excavation would continue on the tailrace tunnels, power tunnel, and powerhouse. Placement of materials for the upper reservoir embankment would continue. Installation of the transmission line and switchyards would be completed, and installation of the powerhouse crane and pump-turbine embedded parts would commence.

Construction of the intake/outlet structure at Lake Elsinore, excavation of the upper reservoir, construction of the upper reservoir inlet structure, and placement of the upper reservoir liner system would all occur during the third year of the construction period, as would installation of powerhouse equipment and development of recreational areas. The initial powerhouse unit would be commissioned near the end of the third year of construction.

During the final year of the construction period, powerhouse equipment installation would be completed, the second unit would be commissioned, and landscaping and clean up would occur.

Laydown areas would be required during construction for the placement, storage, and staging of construction equipment, trailers, materials, and worker vehicles. At the upper reservoir, there would be a 20- to 40-acre construction laydown area immediately adjacent to (northeast of) the reservoir. At the powerhouse, the construction laydown area would be located on a privately owned 20-acre site immediately northeast of the powerhouse location.

The spoil materials from the excavations would be brought to the surface and stockpiled for use in the upper reservoir embankment or, if unsuitable, for disposal. The total quantity of material produced from excavations, exclusive of the upper reservoir, would be about 776,000 cubic yards, including 173,000 from the high-head water conduit tunnels including construction adits and power shaft intake; 4,500 from the penstock excavation; 207,000 from the powerhouse cavern; 35,000 from the transformer gallery; 32,000 from the surge shaft; 53,000 from the powerhouse access shaft; 500 from the vent shaft;

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[14] In response to public comments on the draft EIS, the co-applicants propose a slightly expedited construction schedule for the TE/VS Interconnect Project. Commission staff sought a clarification of whether the co-applicants intended to revise the project construction schedule and sequence and determined that they did not (telephone communication between J. Fargo, Commission, Washington, DC, and D. Kates, Nevada Hydro, Vista, CA, filed on May 26, 2006).

6,000 from the draft tube tunnel excavation; 65,000 from the tailrace tunnel; and 200,000 cubic yards from the lower reservoir intake excavation.

The co-applicants indicate that the fill quantities would total about 2,839,000 cubic yards, including 2,653,000 for the upper reservoir embankment and 186,000 for intake backfill at the lower reservoir. To achieve the proposed balance between excavation and fill, approximately 2,063,000 cubic yards of excavated material would be needed from the upper reservoir footprint to complete the embankment. To the extent that excavated materials are unsuitable for backfill or embankment construction, the amount required from the upper reservoir excavation would increase. For reference, staff calculated that the 2,063,000 cubic yards of embankment material needed from the upper reservoir equates to an excavation about 10 feet deep over the entire 130-acre upper reservoir footprint.

Project construction would be accompanied by drilling and blasting. All construction activities would be limited to daylight hours.

2.3.3 Proposed Project Boundary

If licensed, the project boundary would include sufficient lands for the construction and operation of an upper reservoir in Cleveland National Forest, a powerhouse on private lands within the Congressional boundary of the Cleveland National Forest, Lake Elsinore, which would serve as the lower reservoir, and linear corridors for the water conduits and transmission lines. The co-applicants propose a shoreline buffer zone around Lake Elsinore between elevations 1,240 and 1,263.3 feet msl and indicate that they would cooperate with Riverside County and the city of Lake Elsinore to identify any changes in existing land use regulations that may be appropriate to establish and maintain a shoreline buffer zone. No shoreline buffer zone is proposed for the upper reservoir, which would be located on National Forest System lands and would be fenced to prevent public access.

2.3.4 Description of Proposed Project Operations

The LEAPS Project would operate primarily as an energy storage facility by pumping water out of Lake Elsinore (the lower reservoir) in the storage mode and allowing the water to flow back into Lake Elsinore in the generating mode (figure 4).

The project also would be capable of operating in various secondary modes to benefit the regional electrical system. The project would be operated from a control room in the powerhouse, and load dispatching would be coordinated with participating utilities and the California Independent System Operators.

In its primary energy storage operating mode, the project would pump water from Lake Elsinore to the upper reservoir during nights and weekends using off-peak, less valuable energy and would generate high-value energy to meet peak system demands during weekdays. This cycling operation would be accompanied by typical upper reservoir water-level fluctuations of about 40 feet on a daily basis and by water-level fluctuations of 75 feet during the course of a full-week cycle. In the lower reservoir (Lake Elsinore), the typical daily water-level fluctuation would be 1 foot, with the lake level fluctuating about 1.7 feet during the course of the full-week cycle.

The precise operating scenario, which could vary during the life of the project, would depend on market conditions, contract requirements, and owner preferences. The co-applicants have identified two normal operating scenarios. Both are based on a weekly generation cycle, as described above, and would result in similar daily and weekly water-level fluctuations. One scenario (Time of Use Operation Scenario) would involve 16 hours of on-peak generation each weekday using one unit, supplemented by the second unit during a 2-hour super-peak period. Both units would pump for 8 hours at night to refill.

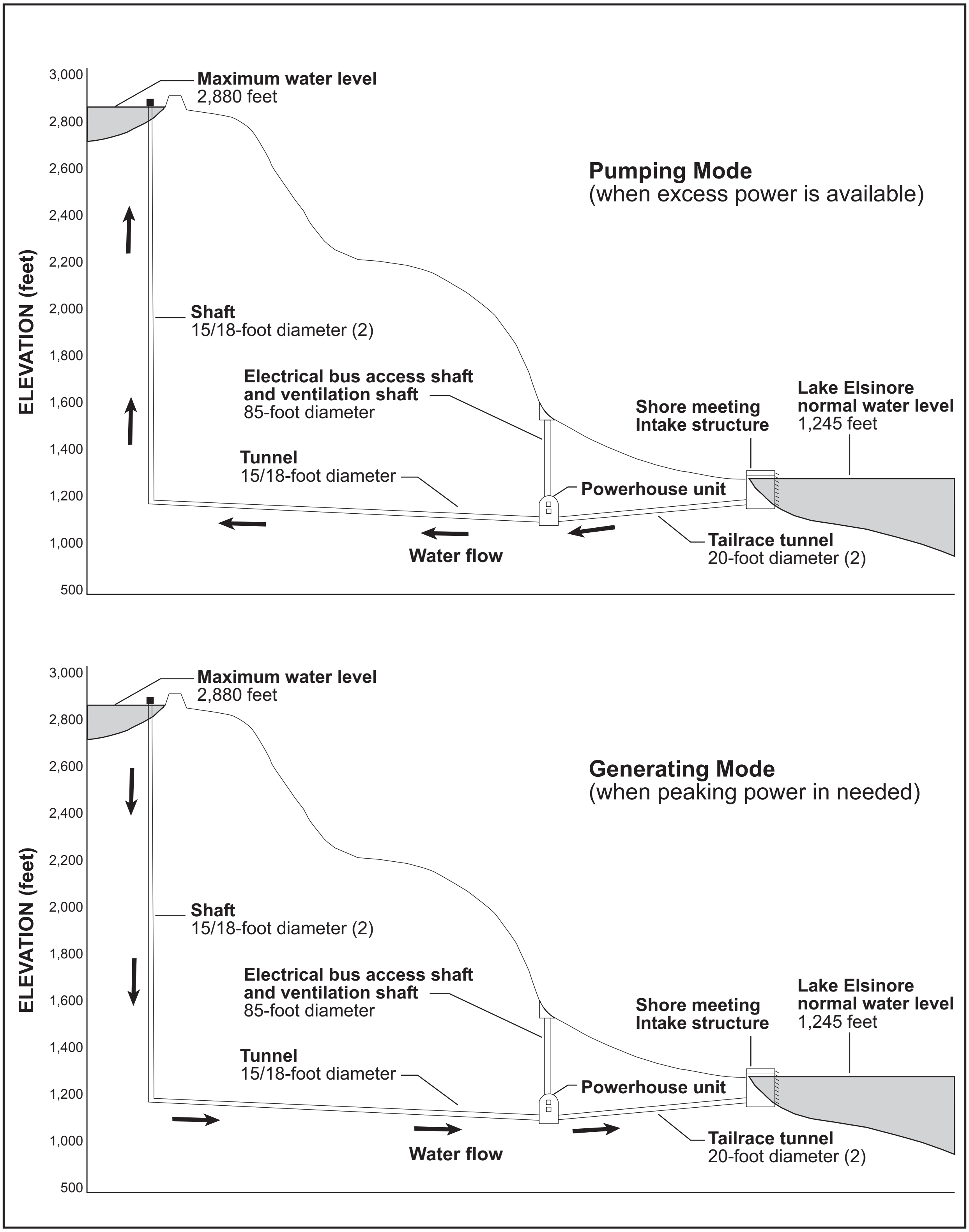

Figure 4. Proposed operation of the LEAPS Project in pumping and generating modes. (Source: Elsinore Valley MWD and Nevada Hydro, 2004a, as modified by staff)

This scenario would result in generation of about 22,500 megawatt-hours (MWh) per week. The second operating scenario (Maximum Generation Scenario) would involve using both units for 12 hours each weekday, with both units pumping to refill. This scenario would result in weekly generation of about 30,000 MWh.

The maximum pumping load to refill the upper reservoir would be about 600 MW with typical operation closer to 500 MW, generally consumed during off-peak periods at night and on weekends. The co-applicants identified the second scenario as the basis for model assumptions (Elsinore Valley MWD and Nevada Hydro, 2005). Under such a scenario, the project would produce 1,560,000 MWh of energy per year. Pumping energy would consume 1,872,000 MWh per year. Pumping energy requirements would exceed generation, resulting in an average annual net generation deficit of about 312,000 MWh. In this operating mode, the project would be used to provide regional system benefits, including reactive compensation, rapid load change capability, system load and frequency control, and emergency startup capability during blackout conditions. The co-applicants have not identified the anticipated specific sources of power for operating in the pumping mode, but they have provided information from the California Energy Commission indicating that such power would be available.

2.3.5 Project Safety

As part of the licensing process, the Commission staff would inspect the licensed project both during and after construction. Special articles would be included in any license issued, as appropriate. Commission inspection during construction would concentrate on adherence to Commission-approved plans and specifications, special license articles relating to construction, and accepted engineering practices and procedures. Operational inspections would focus on the continued safety of the structures, identification of unauthorized modifications, efficiency and safety of operations, compliance with the terms of the license, and proper maintenance. In addition, any license issued would require an inspection and evaluation every 5 years by an independent consultant and submittal of the consultant’s safety report for Commission review.

2.3.6 Proposed Environmental Measures

The co-applicants propose the following protection, mitigation, and enhancement measures.

Geology and Soils

- Retain a board of three or more qualified independent engineering consultants experienced in critical disciplines, such as geotechnical, mechanical, and civil engineering, to review the design specifications and construction of the project for safety and adequacy.
- Conduct additional geotechnical studies.
- Develop an erosion control plan prior to construction.
- Implement erosion control measures during construction.
- Develop and implement a plan for the design and construction of a system that would automatically detect conduit or penstock failure and, in the event of such a failure, immediately shut off flow in the conduit or penstock at the headworks.
- Develop and implement plans for clearing the upper reservoir area and re-vegetating disturbed areas with native plant species beneficial to wildlife prior the start of any land-disturbing or land-clearing activities at the project.

Water Resources

- Develop and implement an upper reservoir and water conduit monitoring program to assess the effects of the upper reservoir liner and seepage collection systems, shafts, and tunnel on groundwater levels and water quality, including the installation of perimeter wells designed to establish groundwater levels and water quality prior to construction and to detect changes in groundwater levels and water quality after construction.
- Develop and implement a plan for installing drainage and flood control measures and any water detention structures to control storm run-off over the term of any license issued for the project.
- Pay an annual lake management fee to Elsinore Valley MWD for make-up water to maintain Lake Elsinore at elevation of 1,240 feet msl, or above.[15]
- Develop and implement a dam safety monitoring program.[16]
- Prepare a hazardous substances spill prevention and control plan.
- Develop and implement a plan to monitor dissolved oxygen (DO) and temperature downstream of the tailrace in Lake Elsinore and in Temescal Wash during project operation.

Aquatic Resources

- During construction drawdown, remove or reduce the existing fish population via netting or rotenone poisoning.
- Retain a qualified biologist or natural resource specialist to serve as an environmental construction monitor to ensure that incidental construction effects on biological resources are avoided or limited to the maximal feasible extent.
- Establish appropriate setbacks from streams, avoid sediment discharge, and implement BMPs identified by the USFS to avoid any effects on the existing steelhead recovery efforts in the San Mateo Watershed as part of the erosion control plan.
- Design and install physical barrier screens consistent with National Marine Fisheries Service (NMFS) criteria in areas of underwater intakes to prevent impingement and entrainment.
- Establish limits of flow velocity rates of underwater intakes of less than 1.5 feet per second to reduce entrainment of fish.
- Conduct monitoring for one year to determine the extent of fish entrainment and mortality at the Lake Elsinore intake/outlet structures, and implement and test behavioral avoidance devices if entrainment is significant.

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[15] The co-applicants estimate this fee at $1.8 million per year and indicate that it is subject to further negotiation with Elsinore Valley MWD.

[16] This co-applicants' proposed measure is an administrative measure and would be coordinated with the Commission's Division of Dam Safety and Inspection and the California Department of Water Resources.

Terrestrial Resources

- Employ a qualified biologist or natural resource specialist to monitor construction activities and help prevent adverse effects on sensitive species or habitats.
- Conduct wetlands delineations and prepare habitat mitigation and management plans in consultation with the U.S. Army Corps of Engineers (Corps), the California Department of Fish and Game (CDFG), and the USFS.
- Develop and implement a plan to prevent and control noxious weeds and exotic plants of concern in project-affected areas.
- Design and construct the transmission line to the standards outlined in 1996 by the Avian Power Line Interaction Committee (APLIC).
- Consult with the USFS and Interior to identify appropriate parcels for mitigation of habitat losses including 2:1 replacement ratio for about of 20 acres of oak woodlands and 1:1 replacement of 31 acres of coastal sage scrub.
- Provide compensation of $500 per acre to Riverside County for project effects within Stephens' Kangaroo Rat Fee Assessment Area.

Recreational Resources

- Develop and implement a detailed site plan of construction sites and laydown areas relative to existing recreational facilities and contingencies for restricting public access to these areas and provision of alternative facilities**.**
- Install fencing around the upper reservoir.
- Provide interpretive signage at the upper reservoir.
- Provide the USFS with an ancillary structure that would complement the fire fighters' memorial along Ortega Highway.
- Grade, contour, and revegetate with native plants to return the site to pre-construction conditions or prepare site at the construction laydown area for the upper reservoir or another site for future development by the USFS or for another entity as determined by the USFS.
- Relocate portions of the Morgan Trail (Forest Route 7-s-12) if the upper reservoir is located in Morrell Canyon.
- Develop and implement a recreation plan, including the construction of a botanical garden, and provision of powerhouse tours and other amenities at the Santa Rosa or Evergreen powerhouse site.
- Develop a hang glider landing site, provide for a community park, and public tours of the powerhouse if the powerhouse is located at the Ortega Oaks site and a northern mid-slope transmission alignments is used.
- Develop an annual fish stocking program for Lake Elsinore in consultation with FWS, CDFG, and the Lake Elsinore and San Jacinto Watersheds Authority (Joint Watershed Authority).

Land Use and Aesthetic Resources

- Acquire and modify the multi-family residences nearest the proposed powerhouse site (the Santa Rosa Villas in the case of the Santa Rosa powerhouse site and a single family home and the Lakeland Village Plaza in the case of the optional Evergreen powerhouse site), provide relocation assistance, use properties for construction purposes or retain in vacant condition, and return to the regional housing inventory upon completion of construction to address potential adverse effects on residents during construction.
- Acquire fee simple or leasehold interests in lands needed for project purposes by voluntary sale or conveyance to the extent possible.
- Prepare a plan to avoid or minimize disturbances to the quality of the existing visual resource of the project area.
- Consult with the Riverside Flood Control and Water Conservation District (Flood Control District) and formulate and implement plans to avoid adversely affecting existing drainage facilities and to control any project-related drainage.
- Achieve a balance of excavation and fill materials at the project site by using excavated materials from the intake, powerhouse, penstock, tunnel, and upper reservoir excavations in the construction of upper reservoir dam and embankments.
- Participate in the installation of a traffic signal at the Grand/Ortega intersection.
- If the Ortega Oaks powerhouse location is selected, dedicate and improve any additional right-of-way along Ortega Highway that would be required to accommodate existing or anticipated future traffic volumes.
- Develop and implement traffic management and control plans to address construction traffic and access to and from active construction sites.
- Install temporary roads on the National Forest System lands only with USFS approval and according to USFS policies, and remove, re-contour, and re-vegetate roads following construction except where the USFS authorizes continued use of the roads for transmission line maintenance.
- Conduct all construction activities in accordance with the noise element of the County of Riverside Comprehensive General Plan, city of Elsinore construction noise standards and any applicable codes or standards.

Cultural Resources

- Consult with the State Historic Preservation Officer (SHPO) at least 180 days prior to commencement of any land-clearing or land-disturbing activities within the project boundaries, other than those specifically authorized in the license, including recreational development at the project.[17]
- If previously unidentified archaeological or historic properties are discovered during the course of constructing or developing the project works or other facilities at the project, stop

[17] If activity is on National Forest System lands, also consult with the USFS at least 180 days prior to commencement of any land-clearing or land-disturbing activities within the project boundaries, other than those specifically authorized in the license, including recreational development at the project.

all land-clearing and land-disturbing activities in the vicinity of such properties and consult with the SHPO.[18]

- Implement measures proposed in the draft historic properties management plan (HPMP) developed in consultation with the SHPO and the USFS and filed with the Commission, including provisions for the following: (1) completing pre-construction archaeological surveys in the area of potential effects (APE), (2) determining the need for intensive surveys, (3) monitoring archaeological sites and buildings during construction, (4) appointing a Tribal liaison, (5) studying the potential effects of ground acceleration on historic buildings, (6) developing a program to monitor archaeological sites for 5 years, and (7) developing a public interpretation program.
- Conduct paleontological monitoring of earth-moving activities on a part-time basis in locations that are sensitive for paleontological resources.
- Prepare any recovered fossil remains to the point of identification, and prepare them for curation by the Los Angeles County Museum or San Bernardino County Museum.

2.4 MODIFICATION OF THE CO-APPLICANTS' PROPOSED ACTION

2.4.1 Agency and Other Interested Party Recommendations

Under Section 10(j) of the Federal Power Act (FPA), each hydroelectric license issued by the Commission must include conditions based on recommendations provided by federal and state fish and wildlife agencies for the protection, mitigation, and enhancement of fish and wildlife resources affected by the project. The Commission is required to include these conditions unless it determines that they are inconsistent with the purposes and requirements of the FPA or other applicable laws. Before rejecting or modifying an agency recommendation, the Commission is required to attempt to resolve any such inconsistency with the agency, giving due weight to the recommendations, expertise, and statutory responsibilities of such agency.

Interior included 10(j) recommendations in its comments dated April 22, 2005, for measures to address effects on nesting shorebirds, effects on fish species in San Juan Creek, and consistency with existing and proposed habitat conservation plans (HCPs). Table 56 in section 5.4 lists each of the recommendations subject to Section 10(j) and whether Commission staff recommends the measure for adoption under the staff alternative. Recommendations that Commission staff consider outside the scope of Section 10(j) have been considered under Section 10(a) of the FPA. All recommendations are addressed in the specific resource sections of this final EIS.

2.4.2 Environmental Conditions

2.4.2.1 Federal Land Management Conditions

Section 4(e) Conditions

The USFS filed preliminary Section 4(e) terms and conditions for the project on April 27, 2005, including 35 conditions for the LEAPS Project. The USFS filed revised preliminary Section 4(e) conditions on June 23, 2006, in response to the co-applicants' December 15, 2005, filing, suggesting

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[18] Also consult with the USFS, if archaeological site or historic property is identified on National Forest System lands.

USFS adoption of alternative 4(e) conditions. We summarize the currently applicable revised preliminary Section 4(e) conditions as follows:

Conditions Nos. 1 through 25, Standard Conditions—These conditions are standard USFS administrative provisions that would require Nevada Hydro and Elsinore Valley MWD to consult with the USFS on a yearly basis regarding measures to ensure protection and use of National Forest resources affected by the project. The revised preliminary conditions now include the hazardous vegetative fuel treatment plan as a component of standard condition no. 9 and specifies that plan shall include provisions for: (1) an analysis of fuel loading on National Forest System lands that extend beyond project facilities (excluding the areas around reservoirs); (2) the identification of fuel treatment methods (thinning of small trees, removing excess brush, and reducing fuel load) to mitigate fuel hazards; (3) a map and schedule for treatments; (4) maintenance of fuel profiles within the project area; and (5) fire prevention measures that would conform to water quality protection practices consistent with the USFS' best management practices for water quality management for National Forest System lands in California.

*Condition No. 26, Road and Traffic Management Plan—*Nevada Hydro and Elsinore Valley MWD shall develop and implement a plan for the management of all USFS and unclassified road required by the co-applicants to access the project area. The plan shall include provisions for: (1) the identification of such roads; (2) a map of such roads with digital spatial data accurate to within 40 feet; (3) a description of each such road segments; (4) cooperation with the USFS in the preparation of a condition survey and proposed maintenance; (5) maintenance of roads to appropriate state or county standard; (6) appropriate authorizations for access; and (7) determination of the co-applicants' responsibility for road maintenance and repair costs commensurate with the co-applicants' and project-induced use.

Condition No. 27, Recreation Facilities and Administration—Nevada Hydro and Elsinore Valley MWD shall develop and implement a recreational facility development plan for a day-use recreational facility at the project equipment and material laydown area on National Forest System lands or for an alternative use and/or location as may be approved by the USFS.

Condition No. 28, Heritage Resources Management Plan—Nevada Hydro and Elsinore Valley MWD shall develop and implement a heritage resources management plan for the purpose of protecting and interpreting heritage resources that shall be tiered to a programmatic agreement to which the USFS will be a signatory. The plan shall be developed in consultation with the SHPO, Native American Tribes, the USFS, and other applicable agencies and communities, and shall provide measures to mitigate identified effects, including programs for monitoring, patrolling, and managing for the ongoing protection of archaeological properties. If, prior to or during ground-disturbing activities or as a result of project operations, items of potential cultural, historical, archaeological, or paleontological value are reported or discovered, or a known deposit of such items is disturbed on National Forest System land, the licensee shall cease work immediately in the area affected and follow steps to consult with the USFS and the California SHPO.

Condition No. 29, Annual Employee Awareness Training—Nevada Hydro and Elsinore Valley MWD shall provide annual employee awareness training to familiarize maintenance and operations staff with local USFS issues, including special status species, noxious weeds, procedures for reporting to the USFS, and USFS orders that pertain to the Cleveland National Forest System lands in the vicinity of the project.

Condition No. 30, Special Status Species—Nevada Hydro and Elsinore Valley MWD shall annually review the current list of special status plant and wildlife species (federally listed as threatened or endangered and USFS sensitive species), consult with the USFS on the need for new surveys, develop study plans, conduct surveys, and prepare reports as needed.

Condition No. 31, Ground Disturbing Activities—Nevada Hydro and Elsinore Valley MWD shall consult with the USFS prior to any ground-disturbing activities on or affecting National Forest System lands that were not previously addressed in the EIS to determine the scope of work, potential effects, need for additional information, and the reasonable funding of the USFS staff for activities related to the proposed activities.

Condition No. 32, Environmental Monitoring—Nevada Hydro and Elsinore Valley MWD shall develop and implement detailed monitoring and adaptive management plans in consultation with the USFS, the State Water Board, California Air Resources Board (CARB), and CDFG for environmental monitoring during construction and operation of the project.

Condition No. 33, Vegetation and Invasive Weed Management Plan—Nevada Hydro and Elsinore Valley MWD shall develop and implement a vegetation and invasive weed management plan for the purpose of controlling and containing the project-related spread of invasive weeds. The invasive weed plan shall provide for: (1) inventory and mapping of new populations of invasive weeds using USFS-compatible database and software packages; (2) weed risk assessment; (3) an integrated pest management approach for invasive weed control; (4) a schedule for control of known populations as designated by resource agencies; (5) ongoing monitoring of known populations over the term of the license; (6) strategies to prevent and control the spread of invasive weeds. The vegetation management plan shall include or address hazard tree removal; transmission line clearing to comply with electrical safety and fire clearance requirements; management of native habitat and biodiversity improvement; revegetation of disturbed sites; soil fertility and moisture analysis; use of clean, weed-free seed and approved mixes of plant native plant species; irrigation plans; and pest treatment.

Condition No. 34, Wildlife Management—Nevada Hydro and Elsinore Valley MWD shall ensure that all power lines and other facilities are constructed in conformance with the *Suggested Practices for Raptor Protection on Power Lines* by APLIC et al. (1996), including marking the power lines themselves if they are adjacent to Lake Elsinore or in a flyway where bird strikes may occur.

Condition No. 35, Surface Water Resources Management Plan—Nevada Hydro and Elsinore Valley MWD shall develop and implement a water surface resources management plan for the purpose of controlling and monitoring project-related effects on water resources on National Forest System lands. The licensees shall develop, in consultation with USFS staff: (1) an inventory of springs and other water courses within 1 mile of the upper reservoir location, and (2) a riparian vegetation and surface water monitoring plan addressing springs and other surface water courses in the canyon selected for the upper reservoir.

Condition No. 36, Groundwater Management Plan—Nevada Hydro and Elsinore Valley MWD shall develop and implement a plan for the management of groundwater and the associated surface waters on or affecting National Forest System lands for the purpose of reducing the potential for groundwater extraction or contamination to surface water resources. The licensees shall develop, in consultation with USFS staff, (1) a groundwater and aquifer characterization plan including the installation of additional exploration boreholes and monitoring wells, aquifer testing, and geophysics as deemed necessary to determine the baseline data, construction monitoring data, and post-construction monitoring data; (2) groundwater inflow criteria for tunneling; (3) a plan to monitor and control groundwater and tunnel inflow during construction of the penstocks and tunnels and for a minimum of 10 years post construction unless impacts no longer exist; (4) a groundwater testing and monitoring program for the lined reservoir to detect seepage; and (5) a groundwater testing and monitoring program for the tunnel, unless a final impervious liner is install, to detect seepage.

Condition No. 37, Scenery Conservation Plan—Nevada Hydro and Elsinore Valley MWD shall develop a scenery management plan to identify actions to minimize the project's visual disturbance to the naturally established landscape. The licensees shall incorporate into the plan the USFS' recommendations for the design of transmission lines and towers, the upper reservoir, roads, penstock pipes, and all other structures or structural elements to achieve the greatest compatibility with the Land Management Plan Scenic Integrity Objectives.

Condition No. 38, Habitat Mitigation Plan—Nevada Hydro and Elsinore Valley MWD shall develop and implement a habitat mitigation plan that would identify requirements for construction and mitigation measures necessary to meet USFS habitat objectives and standards and provide of additional enhancement measures to offset unavoidable effects that are inconsistent with the Land Management Plan. The plan must include minimum mitigation ratios for permanent loss of habitat of 1:1 for habitats that are sensitive or support listed species, coastal sage scrub, and riparian oak woodlands.

The full text of the USFS' revised preliminary 4(e) conditions is found in appendix C.

Alternative Section 4(e) Conditions under the Energy Policy Act of 2005

On December 15, 2005, the co-applicants' filed alternative 4(e) conditions in response to the USFS' preliminary conditions under the interim final rule for resource agency procedures for conditions and prescriptions in hydropower licenses.[19] The proposed revisions to the project-specific USFS preliminary 4(e) conditions would add language to clarify that the measures should adhere to the 2005 Cleveland National Forest Land Management Plan, only apply to National Forest System land within the project boundary, allow for the option of providing a recreation facility in the vicinity of the upper reservoir, and allow for development of the HPMP through the NEPA process. USFS' revised Section 4(e) conditions included some but not all of the language changes requested by the co-applicants. The co-applicants state that they support the revised preliminary 4(e) conditions filed by USFS on June 23, 2006, subject to their request for reasonable limits to the projects indemnification and liabilities for damages, costs, and expenses (letter from P. Lewandowski, President, Nevada Hydro, Vista, CA, to T. Terrell, Forest Supervisor, Cleveland National Forest, Corona, CA, dated August 14, 2006).

2.4.2.2 Section 18

Section 18 of the FPA states that the Commission shall require the construction, maintenance, and operation by a licensee at its own expense of such fishways as may be prescribed by the Secretary of Commerce or the Secretary of the Interior, as appropriate. By letter dated April 22, 2005, the U.S. Department of the Interior (Interior) reserved its authority to amend prescriptions. The Secretary of Commerce did not file any fishway prescriptions for this project.

2.4.2.3 Water Quality Certification

By letter dated March 16, 2005, the co-applicants applied to the State Water Board for Water Quality Certification for the LEAPS Project, pursuant to Section 401 of the Clean Water Act. On March 1, 2006, the co-applicants withdrew and refiled individual requests for water quality certifications for both the LEAPS and the TE/VS Interconnect projects. The Water Quality Certification is now due on March 1, 2007.

[19] 70 CFR 69,808 issued on November 17, 2005, jointly by the U.S. Department of Agriculture, the U.S. Department of the Interior, and the U.S. Department of Commerce (NOAA).

2.4.3 Staff Alternative

2.4.3.1 Project Facilities

As stated earlier, the co-applicants considered several other locations for project facilities, including an upper reservoir located in Decker Canyon. The Commission staff and USFS staff alternative action consists of:

1. an upper reservoir at the Decker Canyon location (Decker Canyon reservoir),
2. a powerhouse at the Santa Rosa site (Santa Rosa powerhouse), and
3. a transmission line that follow an alignment either along the co-applicants' proposed alignment or slightly east of the co-applicants' proposed alignment (figures 5 and 6 and figures F-1 through F-4 in appendix F).

The co-applicants have indicated that they would seek the most direct feasible route for the water conduits between the Decker Canyon reservoir and the Santa Rosa powerhouse, if these locations were selected. The Decker Canyon reservoir site is northwest of the co-applicants' proposed Morrell Canyon site. The Decker Canyon site would consist of a lined upper reservoir with a 240-foot-high main dam (60 feet higher than the proposed Morrell Canyon site) and a perimeter dike ranging up to 50 feet high (10 feet lower than Morrell Canyon).[20] It would have the same usable storage as the proposed Morrell Canyon site, 5,500 acre-feet. The reservoir surface area would be 80 acres at a normal maximum water surface elevation of 2,830 feet msl (compared to 76 acres at 2,880 feet for Morrell Canyon). The Decker Canyon reservoir dam and dike would have a crest elevation of 2,860 feet msl and a combined fill volume of about 3 million cubic yards (compared to 2.6 million for the proposed Morrell Canyon site).

Similar to the proposed Morrell Canyon site, material for the dam and dike could be obtained from excavated materials from the upper reservoir, powerhouse, and tunnel excavations or exclusively from the upper reservoir excavation. Final embankment design could call for a zoned earth and rockfill dam or a concrete-faced rockfill dam. The dam would include a concrete-lined emergency spillway and a low-level outlet. A 20-foot-wide crushed stone roadway would be provided around the crest of the embankment to allow access for maintenance and inspection. An 8-foot-high chain link fence would be located on the outer side of the crest roadway. The outside (downstream) face of the embankment would be seeded. The total footprint of the upper reservoir would be about 120 acres (compared to 130 acres for the proposed Morrell Canyon site).

The water conduits from the Decker Canyon upper reservoir to the Santa Rosa powerhouse location would be the same as proposed by the co-applicants, except that the gated inlet structure would be located at elevation 2,720 feet msl and the first segment of the two high-pressure water conduits would be 3,270 feet long as compared to 1,970 feet long in the co-applicants' proposal.[21]

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[20] The co-applicants identify the alternative upper reservoir plan in the license application as "Decker Canyon—Alternate B.2" (Elsinore Valley MWD and Nevada Hydro, 2004).

[21] The water conduit connection between the Decker Canyon upper reservoir and the Santa Rosa powerhouse that equates to the co-applicants' proposed water conduit configuration between the Morrell Canyon upper reservoir and the Santa Rosa powerhouse is described in the license application as "Decker Canyon to Santa Rosa Site—Alternate H.3" (Elsinore Valley MWD and Nevada Hydro, 2004).

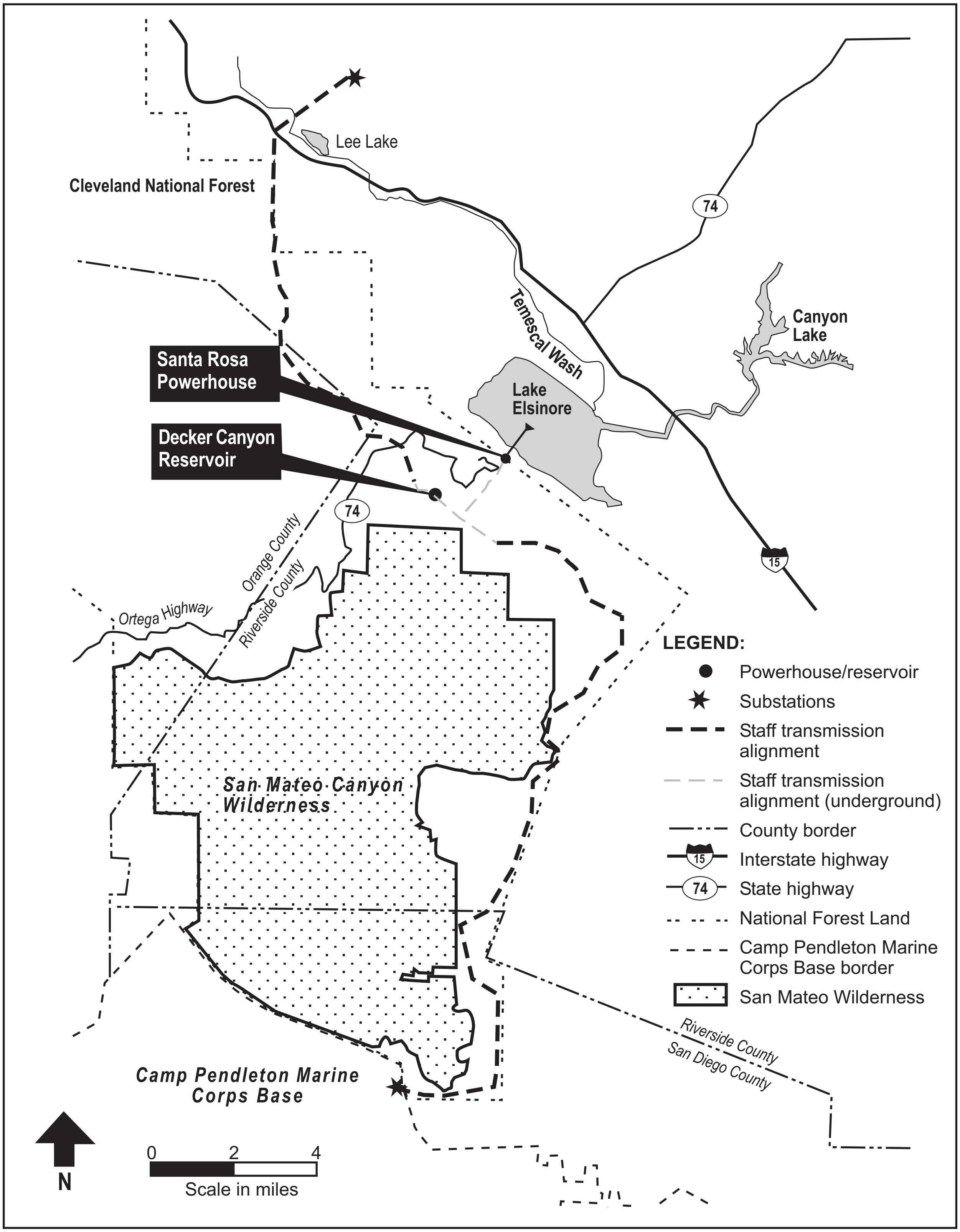

Figure 5. Staff alternative project facility locations. (Source: Elsinore Valley MWD and Nevada Hydro, 2004a, as modified by staff)

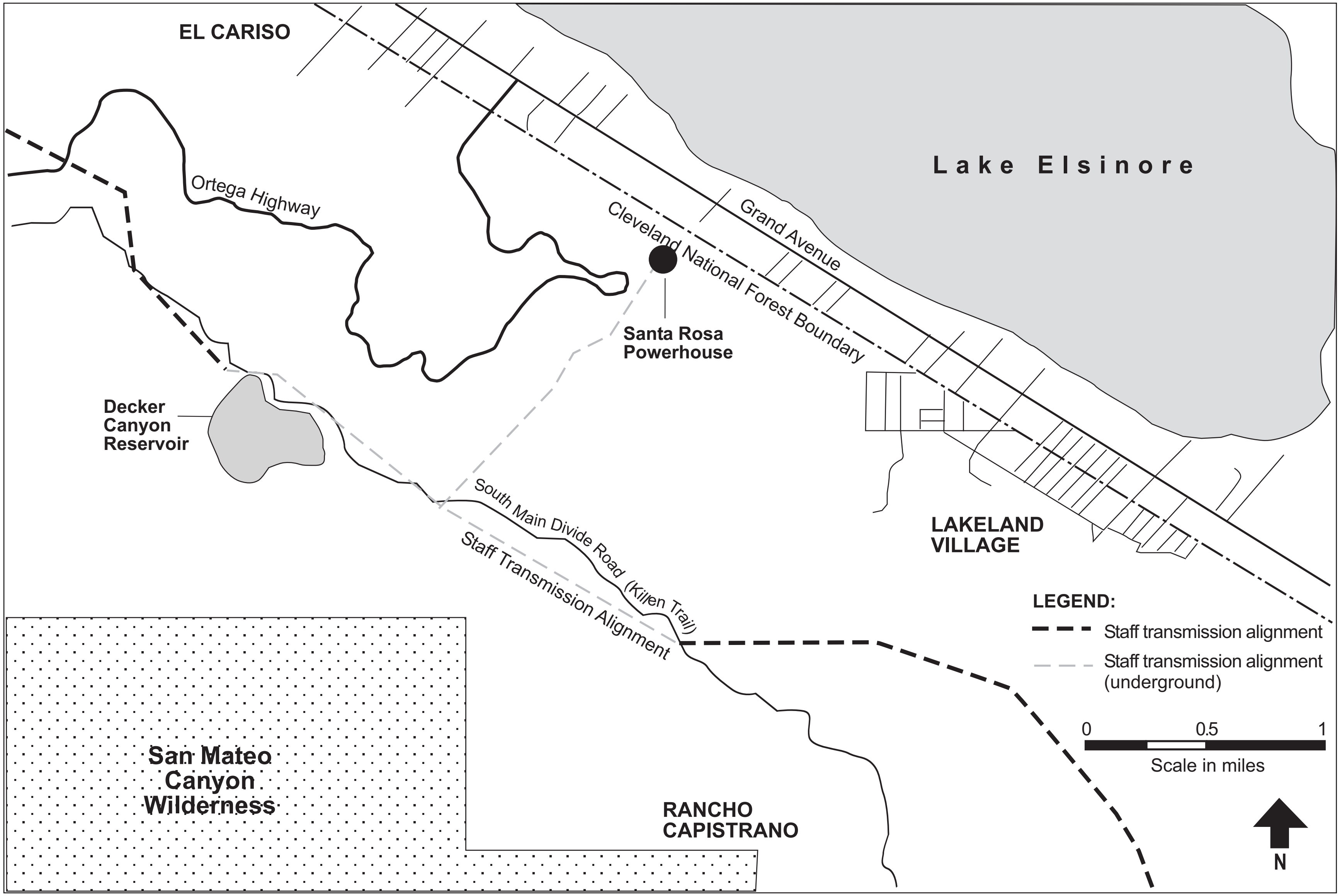

Figure 6. Staff alternative showing the location of Decker Canyon upper reservoir and Santa Rosa powerhouse site. (Source: Elsinore Valley MWD and Nevada Hydro, 2004a, as modified by staff)

Our alternative includes the same powerhouse and tailrace configuration and dimensions as described in the co-applicants' proposal. As with the co-applicants' proposed transmission alignment, the staff alternative transmission alignment would be a 500-kV single circuit transmission line that would connect the LEAPS Project powerhouse to SCE's existing 500-kV Valley-Serrano transmission line to the north and SDG&E's 230-kV Talega-Escondido transmission line to the south. The staff alternative transmission alignment, however, would be located eastward of the co-applicants' proposed alignment to avoid back-country areas in the Cleveland National Forest. The staff alternative transmission alignment also avoids crossing private inholdings in the Cleveland National Forest. Figures 5 and 6 and F-1 through F-4 (appendix F) show the staff alternative transmission alignment. The staff alternative transmission alignment would include a shorter (2.1 miles) below-ground segment in the vicinity of the hang gliding launch areas and the same below segment (about 2 miles) to connect with the Santa Rosa powerhouse as proposed by the co-applicants.

The northern segment of the staff alternative transmission alignment from the SCE substation to the Cleveland National Forest boundary would be the same as proposed by the co-applicants. Within the Cleveland National Forest, the staff alternative transmission alignment would be generally parallel from 0.2 to 0.7 mile east at various locations. The southern portion of the staff alternative transmission alignment would be about 18.9 miles long with almost its entire length located within the Trabuco Ranger District of the Cleveland National Forest or on other federal lands (i.e., Camp Pendleton and/or BLM lands). From the northern segment described above, the staff alternative transmission alignment would continue westward until just crossing the South Main Divide Road. Here it would turn south and run underground parallel with South Main Divide Road for approximately 1.45 miles. Once beyond the primary hang gliding launch sites, it would turn eastward back downhill and would then generally run parallel to the co-applicants' proposed southern alignment for about 3 miles at a distance of 0.2 to 1.0 mile east (downslope) of the co-applicants' proposed alignment. Then it would depart from the co-applicants' proposed alignment and continue in a southeasterly direction until it intersects with the Cleveland National Forest boundary. The staff alternative transmission alignment would then extend southwest following along inside the Cleveland National Forest boundary southward past the Tenaja Ranger Station, swerving southwest out and around the wilderness boundary east of Miller Mountain. Then it would turn in a southeasterly direction and match the co-applicants' proposed alignment. From here, the southern portion of the staff alternative transmission alignment would meander south, avoiding designated wilderness areas until it reached the Cleveland National Forest's southern boundary. From there, it would turn and follow the boundary west and connect with SDG&E's 230-kV system at the intersection of the Cleveland National Forest boundary and Camp Pendleton. Figures F-1 through F-4 (appendix F) show the two alignments as well as preliminary tower placements along the co-applicants' proposed and the staff alternative transmission alignment.

2.4.3.2 Environmental Measures

The staff alternative includes the implementation of co-applicants' proposed measures as described in section 2.3.6, *Proposed Environmental Measures,* except for their proposed recreation measures associated with the Morrell Canyon upper reservoir site, the measure to remove or reduce the existing fish population via netting or rotenone poisoning during construction, and design and installation of fish screens. We also have modified several co-applicant-proposed measures, including measures for erosion control, water quality monitoring of the conveyance system, habitat mitigation ratios, noxious weed control, avian protection, habitat mitigation, construction monitoring in aquatic and terrestrial environments, entrainment monitoring, recreation measures at the powerhouse location, and traffic control and management plans. The staff alternative would include the following modified and additional measures.

Geology and Soils

- Include specific provisions in the proposed erosion control plan that applies erosion control measures and BMPs to all construction locations, including the upper reservoir, drainage and flood control locations, penstock tunnels, powerhouse, tailrace, inlet/outlet structure, transmission lines, and all associated construction laydown areas and temporary on-site borrow areas for all subsequent ground disturbing activities over the term of any license issued for the project.

Water Resources

- Develop and implement a revised lake operating plan for Lake Elsinore, addressing increased minimum lake levels, flood control implications, and water supply issues.
- Develop and implement a surface water resources manage plan to control and monitor project-related effects on water resources that support riparian vegetation on National Forest System lands.
- Include specific remediation measures in the upper reservoir and water conduit monitoring program to allow immediate action to be taken if water or non-native aquatic species are released from the upper reservoir into the San Juan Creek drainage.
- Include specific provisions in the upper reservoir and water conduit monitoring program to explore the groundwater and characterize the aquifer, to consult on groundwater inflow criteria, and to monitor groundwater levels during construction and operation of the water conduits including the tunnels and penstocks that convey water between the upper reservoir and the powerhouse for 10 years or longer if necessary, specifying remedial actions if monitoring reveals changes in groundwater levels or seepage into the tunnels.

Aquatic Resources

- Develop and implement a detailed plan specifying activities, locations, methods and schedules that the qualified environmental construction monitor will use to monitor construction in aquatic environments.
- Conduct entrainment monitoring for 1 year and once every 5 years over the term of any license issued to the project to determine the extent of fish entrainment and mortality at the Lake Elsinore intake/outlet structures and provide the monitoring results to CDFG, FWS, the State Water Board, and the Joint Watershed Authority, and, based on the results of entrainment monitoring, develop and implement a plan to mitigate for entrainment losses through measures, such as enhancing nearshore fish habitat or stocking fish, that would aid in establishment of naturally sustaining population of desirable sport fish.

Terrestrial Resources

- Develop and implement a detailed plan specifying the activities, locations, methods, and schedule that the qualified environmental construction monitor would use to monitor construction activities in terrestrial environments
- Develop and implement a vegetation and invasive weed management plan to prevent and control noxious weeds and exotic plants of concern in project-affected areas during construction and over the term of any license issued for the project.
- Develop and implement a Lake Elsinore monitoring and remediation plan to address potential project-related effects on nesting shorebirds, waterfowl, and other birds.

- Implement an avian protection plan consistent with APLIC and FWS (2005) guidelines and over the term of any license issued for the project.
- Conduct additional pre-construction special status plant and animal surveys at transmission line tower sites and along transmission alignment access roads to ensure compliance with Western Riverside County Multi-species Habitat Conservation Plan (Multi-Species HCP).
- Prepare a habitat mitigation plan in consultation with the USFS, Interior, CDFG, and Riverside County to identify appropriate mitigation of habitat losses including a 1:1 replacement ratio for about 5 acres of oak woodlands, about 32 acres of coastal sage scrub, and about 216 acres of chaparral and grasslands.
- Consult with the USFS annually to review the list of special status species and survey new areas as needed.
- Develop and implement an annual employee awareness training program regarding special status plants and animals.
- Consult with FWS during the process of developing final design drawings on measures to protect fish and wildlife resources.

Recreational Resources

- Develop and implement a safety during project construction plan, identifying potential hazard areas near public roads, trails, and recreation areas and facilities, and measures necessary to protect public safety and conduct daily inspections on National Forest System lands for fire plan compliance, public safety, and environmental protection.
- Consult with the USFS to develop and implement a recreation development facility plan for a day-use recreation facility at the construction laydown area used during the construction of the upper reservoir on National Forest System lands or for an alternative use and/or location.
- Develop and implement a recreation plan that provides for transferring of cleared land off National Forest System lands to a local entity and developing recreational facilities at the powerhouse location and operation and maintenance (O&M) funding sufficient to operate the facilities.

Land Use and Aesthetics

- Develop and implement a plan to determine the toxicity of sediments in Lake Elsinore lakebed that would be disturbed by construction of the intake/outlet structure and to provide for appropriate handling and disposal if toxins are identified in the lakebed sediment prior to beginning construction of the intake/outlet structure in Lake Elsinore.
- Prepare and implement a scenery conservation plan to achieve the greatest consistency possible with the High Scenic Integrity Objectives of the Cleveland National Forest Land Management Plan.
- Achieve the balance of excavation and fill material at the upper reservoir site (through additional excavation) and dispose of other excavation materials from the construction of project facilities (except the upper reservoir) off site.
- Include in the proposed road and traffic management plan applicable to National Forest System lands provisions addressing road construction, realignment, maintenance, use, and closure and identifying the co-applicants’ responsibility for road maintenance and repair costs.

- Include in the proposed road and traffic management plan applicable on non-National Forest System lands provisions addressing road construction, realignment, maintenance, use, and closure, as well as land management policies and practices associated with project-related roads during both construction and operations.

- Develop and implement a transmission tower placement plan.

Cultural Resources

- Revise the draft HPMP in consultation with the SHPO, Tribes, U.S. Bureau of Indian Affairs (BIA), the Lake Elsinore Historical Society, and the USFS and file a final HPMP for Commission approval within 1 year of any license issuance.

Finally, Commission staff notes that the staff alternative includes all of the site-specific revised preliminary 4(e) conditions specified by the USFS as described in section 1.6, *USFS Section 4(e) Conditions.* We would supplement the following measure:

- Ensure all transmission facilities conform to APLIC et al. (1996) guidelines, including power lines to reduce risks of bird strikes. The co-applicants should conform to the April 2005 avian protection plan guidelines.

2.5 OTHER PROJECT FEATURES CONSIDERED OR ELIMINATED FROM DETAILED ANALYSIS

2.5.1 Powerhouse Location

The co-applicants considered optional locations for the powerhouse at the Ortega Oaks and Evergreen sites. The Ortega Oaks site would include 58 acres located southwest of the intersection of Grand Avenue and Ortega Highway, and the construction lay-down areas would be located within the 58 acres. The Evergreen site would include 75-acres and a construction laydown area of 30 acres immediately to the northeast, between the Evergreen powerhouse site and Grand Avenue (figure 7). The estimated depth of excavation to construct the Ortega Oak powerhouse would be 320 feet and the depth of excavation to construction the Evergreen powerhouse would be 290 feet (compared to 340 feet for the proposed Santa Rosa powerhouse site). The tailrace tunnel length from the optional Ortega Oaks powerhouse site would be longest of the potential sites (2,785 feet) and the tailrace tunnel excavation would be the most. The tailrace tunnel length from the optional Evergreen powerhouse site would be the shortest of the potential sites (1,770 feet) and tailrace tunnel excavation would be the least (about 10 percent less than for the proposed Santa Rosa powerhouse site). The tailrace tunnel for these optional sites would pass under Grand Avenue to Lake Elsinore. While not part of a complete alternative, we analyze the potential environmental effects of locating a powerhouse at the optional Ortega Oaks or Evergreen site in section 3, *Environmental Consequences*.

2.5.2 Water Conduit Routes

The co-applicants also described various routes and configurations for the water conduit connecting the upper reservoir to the powerhouse. The route for any conduit is defined by the combination of upper reservoir site and powerhouse site. With two potential upper reservoir sites and three potential powerhouse locations, there are 6 alternative route combinations (see table 1). For each of the six routes, the co-applicants have identified three potential configurations. The configurations vary by the proportion of vertical shaft, concrete-lined horizontal tunnel, concrete-lined inclined tunnel, and steel-lined tunnel comprising the overall conduit system.

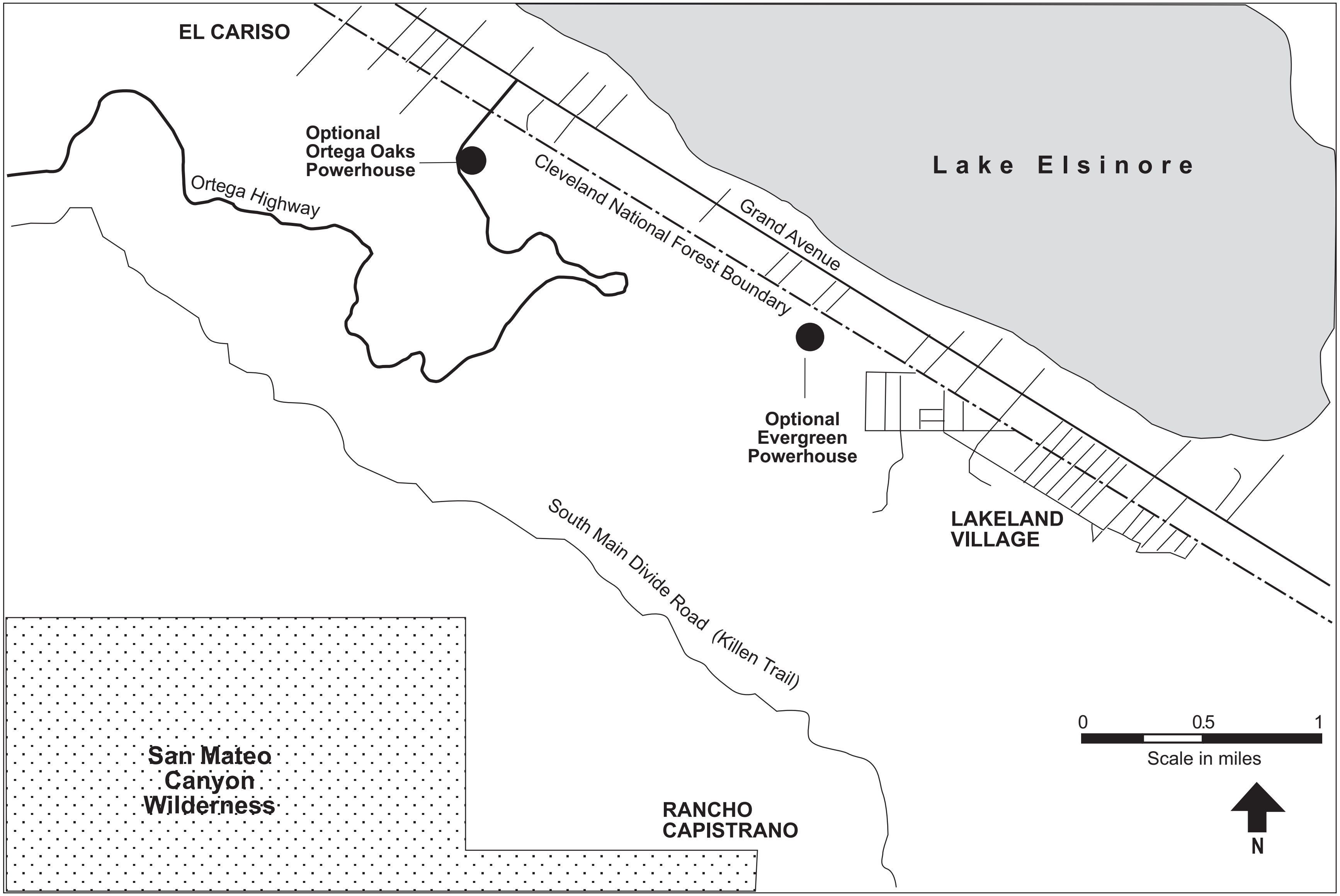

Figure 7. LEAPS Project—Location of optional Ortega Oaks and Evergreen powerhouse sites. (Source: Elsinore Valley MWD and Nevada Hydro, 2004a, as modified by staff)

Table 1. Excavation quantities for penstock alternatives (per conduit).

Site	Alter-native	Lengths of Shafts and Tunnels for Penstock Alternatives					Excavation Quantities for Penstock Alternatives (Assumed 16-foot Inside Diameter)			
		Vertical Shaft Length (LF)	Concrete-Lined Horizontal Tunnel (LF)	Concrete-Lined Inclined Tunnel (LF)	Steel-Lined Tunnel (LF)	Total Lengths (LF)	Concrete-Lined Tunnel (CY)	Concrete-Lined Inclined Tunnel (CY)	Steel-Lined Tunnel (CY)	Total Volume (CY)
Morrell Canyon to Santa Rosa Site	H.1	1,400	5,100	NA	2,500	9,000	44,400	0	21,760	66,160
	H.2	50	2,150	3,250	2,500	7,950	18,720	28,300	21,760	68,780
	H.3	NA	1,970	3,420	2,500	7,890	17,150	29,780	21,760	68,690
Morrell Canyon to Evergreen Site	H.1	1,405	4,320	NA	3,040	8,765	37,610	0	26,470	64,080
	H.2	50	1,370	3,250	3,040	7,710	11,930	28,300	26,470	66,700
	H.3	NA	1,180	3,450	3,040	7,670	10,270	30,040	26,470	66,780
Morrell Canyon to Ortega Site	H.1	1,400	6,710	NA	2,180	10,290	58,420	0	18,980	77,400
	H.2	50	3,910	3,100	2,180	9,240	34,040	26,990	18,980	80,010
	H.3	NA	3,210	3,400	2,180	8,790	27,950	29,600	18,980	76,530
Decker Canyon to Ortega Site	H.1	1,390	4,520	NA	2,180	8,090	39,350	0	18,980	58,330
	H.2	50	1,720	3,100	2,180	7,050	14,970	26,990	18,980	60,940
	H.3	NA	1,020	3,400	2,180	6,600	8,880	29,600	18,980	57,460
Decker Canyon to Santa Rosa Site	H.1	1,390	6,400	NA	2,500	10,290	55,720	0	21,770	77,490
	H.2	50	3,450	3,250	2,500	9,250	30,040	28,300	21,770	80,110
	H.3	NA	3,270	3,420	2,500	9,190	28,470	29,780	21,770	80,020
Decker Canyon to Evergreen Site	H.1	1,390	6,410	NA	3,040	10,840	55,800	0	26,470	82,270
	H.2	50	3,460	3,250	3,040	9,800	30,120	28,290	26,470	84,880
	H.3	NA	3,270	3,450	3,040	9,760	28,470	29,770	26,470	84,710

Notes: CY – cubic yard

LF – linear feet

NA – not available

The route of the water conduit will be defined by the selection of the upper reservoir and powerhouse combination, with the alignment following the most direct route between the upper reservoir and the powerhouse. For the defined route, the exact configuration would be determined in the course of the project's final design. The primary differential environmental impact of the route and configuration selection would be associated with the relative quantities of excavated material that would be available for use in the upper reservoir embankment or that would need to be hauled off site. The comparative excavation quantities (per conduit) range from 57,460 to 84,880 cubic yards (table 1). We use these order of magnitude quantities in our analysis of traffic effects in section 3.3.7.2, *Environmental Consequences, Land Use and Aesthetics.* However, because the co-applicants indicated that they would seek the most direct route between the upper reservoir site and the powerhouse locations, whichever site or location is selected, we do not provide any further analysis of the water conduit routes in section 3, *Environmental Consequences.*

2.5.3 Transmission Alignments

The co-applicants identified either of two single-direction 500-kV transmission line variations in lieu of an interconnecting system running both north and south. One variation follows a northern route that would connect only to SCE's 500-kV Talega-Escondido transmission line, and the other is a southern route that would connect only to SDG&E's 230-kV Valley-Serrano transmission line. The routes for these single-direction alignments are identical to the northern and southern portions of the transmission alignment proposed by the co-applicants as described section 2.3.1, *Description of Existing and Proposed Project Facilities.* Neither of these two single-direction alternatives would meet the co-applicants' objective to provide a north/south interconnection of the transmission grid in southern California, and therefore they are not presented as separate alternatives in this final EIS. However, while not part of a complete alternative, the effects of construction and operation of both of these alignments are fully disclosed in section 3, *Environmental Consequences* as the northern and southern portions of the co-applicants' proposed transmission alignment.

In addition to the single-direction alignments (just the northern portion of the co-applicants' proposed alignment or just the southern portion of the co-applicants' proposed alignment), the co-applicants also identified several other variations on their proposed transmission alignments. These short segments represent minor modifications to the proposed alignment, as shown on figure 8. At Alberhill, Alignment 1 continues northeast through the Cleveland National Forest to SCE's existing transmission line. This alignment has been eliminated from further analysis because it would interfere with USFS fire suppression activities. Alignment 2 was included as the northern most portion of the staff's mid-slope transmission alignment that was analyzed in the draft EIS. Alignment 3 is similar to the portion of the mid-slope transmission alignment analyzed in the draft EIS that was routed behind the hang gliding launch sites. Alignments 4 is now included in the co-applicants' proposed alignment and alignment 5 is now included in both the co-applicants' and the staff alternative transmission alignments.

Commission staff also considered several variations in the transmission alignments for installing portions of the transmission line underground to avoid effects on hang gliding activities. We considered placing the transmission line underground in the vicinity of either the proposed Santa Rosa or the Ortega Oaks powerhouse location to the connection with either the proposed or mid-slope transmission alignments in the draft EIS. We also considered an underground alignment going west, up the slope, from the powerhouse to the upper reservoir parallel to the water conduits. These underground variations reduced some of the potential effects on hang gliding activities but at considerable cost and we did not include these variations in our detailed analysis in the draft EIS. In response to comments on the draft EIS, both the co-applicants and the staff modified the transmission alignments to include underground segments between the powerhouse and the connection with the north/south segments and along South Main Divide Road near the hang gliding launch sites. In developing the revised staff alternative alignment, we also considered whether to bury the entire 32-mile-long line and the 2-mile-long connection to the powerhouse. Burying the entire line would eliminate most of the visual effects (there would still be above ground substation connections) but would be cost prohibitive at an incremental cost in excess of $350 million. However, we recognize that there may be locations in proximity to the alignment (such as Sycamore Creek or Glen Eden Sun Club) where the acquisition of easements may displace residents and where additional underground segments may be a feasible solution. Finally, we considered whether to bury the line along this southern segment and concluded that the reduced effects on the visual resources (see figure F-4) did not justify the incremental cost of about $170 million.

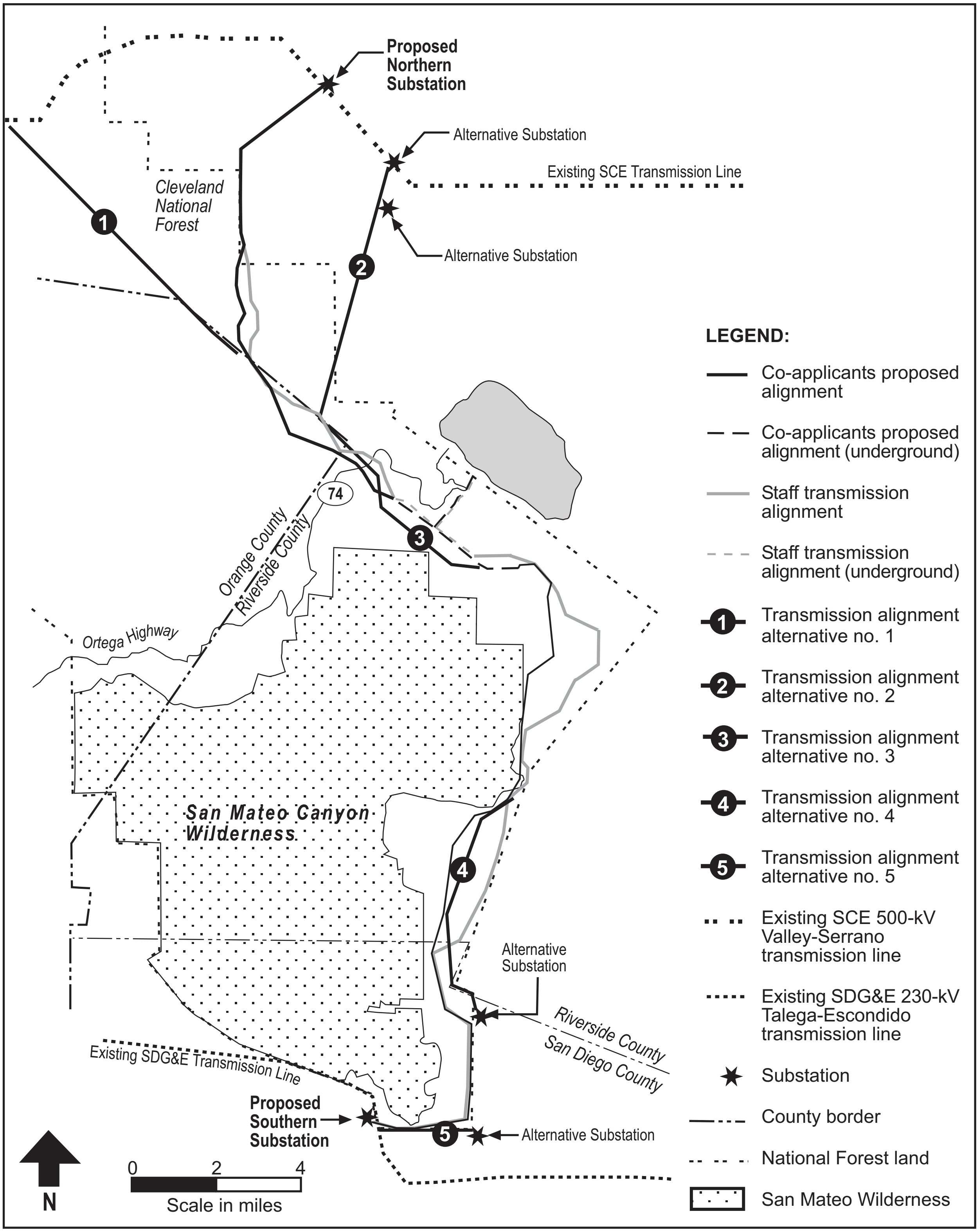

Figure 8. LEAPS Project—Transmission alignments (1–5) considered but eliminated from detailed analyses. (Source: Elsinore Valley MWD and Nevada Hydro, 2004a, as modified by staff)

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COVER SHEET

FEDERAL ENERGY REGULATORY COMMISSION

FINAL ENVIRONMENTAL IMPACT STATEMENT
FOR HYDROPOWER LICENSE
Lake Elsinore Advanced Pumped Storage Project
Docket No. P-11858-002

Section 3
Environmental Analysis
Pages 3-1 through 3-254
FEIS

3.0 ENVIRONMENTAL CONSEQUENCES[22]

3.1 GENERAL SETTING

The majority of the hydroelectric facilities of the proposed project would be located within the San Jacinto River Basin with other associated structures and transmission lines in adjacent watersheds. The San Jacinto River Basin is located in southern California, about 20 miles inland from the Pacific Ocean and covers more than 780 square miles of widely varying terrain. The river basin is bounded by north-south mountains: the Santa Ana Mountains (including the Elsinore Mountains, Santa Margarita, and the Santa Rosa Plateau) to the west and the more distant San Jacinto to the east. Lake Elsinore is easily accessible via Interstate 15. The Ortega Highway connects San Juan Capistrano to Interstate 15 on the east side of the Santa Ana and Elsinore mountains.

The proposed project location typically experiences warm, dry summers and mild, wet winters. The general climate is characterized as Mediterranean, with a mean annual temperature of 64 degrees Fahrenheit (°F). Most precipitation occurs during winter months with a mean annual precipitation of 11.7 inches. Precipitation increases sharply with rising elevations in the Santa Ana Mountains, such that the seasonal mean precipitation is about 25 inches only 1.5 miles from the shore of Lake Elsinore. Air quality in the area is good, and the area experiences a generally moderate eastward wind and weather pattern flow.

Lake Elsinore is a natural low point in the San Jacinto River Basin; it does not connect with the Santa Ana River in normal rainfall conditions. In high precipitation and runoff years, the San Jacinto River flows through Lake Elsinore to the Santa Ana River via Temescal Wash, a natural drainage system that extends about 28 miles from Lake Elsinore to the Santa Ana River, which eventually drains to the Pacific Ocean. Most of the river basin comprises chaparral vegetation and farming/ranching type land uses with increasing urban/residential and commercial land uses close to Lake Elsinore. Most of the mountain ranges are forested with major land uses including recreation, conservation, and residential housing. As one travels west toward the coast, land uses are predominately urban.

The transmission lines would be located in portions of the San Jacinto River Basin north of Lake Elsinore and would travel southwardly along the eastern side of the Santa Ana Mountains connecting to existing transmission lines near Camp Pendleton Marine Corp Base. Climate and topography along this route are similar to the Lake Elsinore/San Jacinto River Basin area as described above. Vegetation along this route largely consists of oak woodland-sage brush/chaparral, common in southern California coastal mountains. Primary land uses for this area are related to recreation, residential, conservation, and U.S. Department of Defense property.

3.2 CUMULATIVELY AFFECTED RESOURCES

According to the Council on Environmental Quality's regulations for implementing NEPA (§1508.7), a cumulative effect is the effect on the environment that results from the incremental effect of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over time to include hydropower and other land and water development activities.

[22] Unless otherwise indicated, all information is from Elsinore Valley MWD and Nevada Hydro (2004).

Based on the information contained in the license application, agency comments, other filings, comments from the scoping process, and preliminary staff analysis, we[23] identified water quantity, water quality, fisheries, federally listed plants and wildlife, wetlands, and riparian habitat as resources that could be cumulatively affected by the construction and operation of the LEAPS Project in combination with other activities in the San Juan Creek River Basin. We used the resource area to determine the geographical and temporal scope of the final EIS analysis.

3.2.1 Geographic Scope

The geographic scope of the analysis defines the physical limits or boundaries of the proposed action's effect on the resources. Because the proposed action would affect the resources differently, the geographic scope for each resource may vary.

For water resources, we consider cumulative effects in the San Juan Creek River Basin from the location of the upper reservoir to the downstream influence of project releases.

For fisheries, we consider the cumulative effects on Lake Elsinore relative to the programs of the city of Lake Elsinore to remove carp populations and restructure the fish community in Lake Elsinore to provide a sport fishery.

For federally listed plants and wildlife, we consider cumulative effects within their range in southern California. For waters, wetlands, and riparian habitat, we would consider cumulative effects in the San Juan Creek Watershed as well as in the San Mateo Creek Watershed for the southern portions of the proposed and staff alternative transmission alignments.

3.2.2 Temporal Scope

The temporal scope of our cumulative analysis in the final EIS includes past, present, and future actions and their possible cumulative effects on each resource. Based on the license term, the temporal scope will look 30 to 50 years into the future, concentrating on the effects on the resources from reasonably foreseeable future actions. The historical discussion will, by necessity, be limited by the amount of available information for each resource.

3.3 PROPOSED ACTION AND ACTION ALTERNATIVES

3.3.1 Geology and Soils

3.3.1.1 Affected Environment

Regional Geology

The proposed project area spans the boundary between two geologic environments—an actively subsiding fault-bounded basin containing Lake Elsinore and a more stable mountain block underlain by minor metamorphic rocks and undivided granitic rocks of the Peninsular Ranges Batholith. Both geologic environments are a part of the Peninsular Ranges Geomorphic Province of Southern California.

Elsinore Basin

The Elsinore Basin is located in the southeast part of the Los Angeles Basin. The Los Angeles Basin is a region of alluvial outwash, encompassing most of Los Angeles and Orange counties, as well as western Riverside and San Bernardino counties. The Los Angeles Basin is considered part of the

[23] Throughout section 3, "we" refers to both the "Commission and FS staff."

Peninsular Ranges Geomorphic Province of Southern California. This province is a well-defined geologic and physiographic unit, characterized by elongated ranges and fault-formed and alluvial-filled valleys with a general northwesterly trend.

The Elsinore Basin is a down-faulted (trough) portion of the earth's crust about 8 miles long and between 2 and 3 miles wide. The long axis of the valley parallels the northwesterly regional structural trend, and rugged hills and mountains border the basin on all but the southeastern side. The lowest portion of the basin floor is a broad, relatively flat area known as "La Laguna," which is partially occupied by Lake Elsinore. La Laguna forms the terminus for the San Jacinto River, which flows into the Elsinore Basin from the northeast. To the southwest, are the steep slopes of the Elsinore Mountains. The northeastern edge of the basin is bordered by the Sedco and Cleveland Hills, part of the Temescal Mountain range. The Glen Ivy fault parallels the base of the Cleveland Hills and marks the structural edge of the basin in this area. The southeastern end of the basin is formed by a low alluvial divide built up by streams draining the Elsinore Mountains.

The geology of the Elsinore Valley comprises essentially three major units. At the surface lies alluvium from a variety of sources. Underneath the surface alluvium is the sedimentary Pauba Formation, and under that lies the "basement rocks" of the Peninsular Ranges Batholith. The alluvial formation covers the lower portions of the valley and can be divided into alluvial fan deposits, floodplain deposits, and recent lacustrine deposits.

Santa Ana Mountains/Elsinore Mountains

The Elsinore Mountains are a portion of the Santa Ana Mountain Range, which form the northernmost range of the Peninsular Ranges Province. The proposed transmission lines—both to the north and to the south—would pass through the Santa Ana Mountains, and the conduit and reservoir would be constructed within this geologic environment. The Peninsular Ranges Province is characterized by a northwest-striking geologic fabric (faulting and folding) influenced by the San Andreas tectonic regime. The northern Peninsular Ranges Province is divided (in terms of physiography) into three major fault-bounded blocks: the Santa Ana, Perris, and San Jacinto. The westernmost of the three, the Santa Ana block, extends eastward from the coast to the Elsinore fault zone. Tertiary sedimentary rocks (Paleocene through Pliocene in age) lie under the western portion of the Santa Ana block, while to the east of these Tertiary rocks lay the highly faulted Santa Ana Mountains. The anticlinal structure of these mountains is cored by a basement assemblage of Mesozoic metasedimentary and Cretaceous volcanic and batholitic rocks. Over the top of this basement assemblage is a thick section of primarily upper Cretaceous marine rocks and Paleocene marine and nonmarine rocks. In the southern part of the Santa Ana Mountains, the anticlinal nature of the mountains transitions into an expansive, nearly horizontal erosional surface that is partly covered with Miocene basalt flows.

Both the proposed Morrell Canyon upper reservoir site and the Decker Canyon site are located in the headwaters of San Juan Creek within the Cleveland National Forest boundary. The proposed Morrell Canyon site is bounded to the west by a ridge inside the Cleveland National Forest, to the east by a ridge partially within Morrell Ranch, and to the northeast by South Main Divide Road. Decker Canyon is the next drainage immediately north of Morrell Canyon and, in terms of hard-rock geology, is geologically similar. The Decker Canyon site is bounded by Morgan Hill on the south, a ridge to the north, and South Main Divide Road to the east. The rugged, mountainous terrain of the Santa Ana Mountains is characteristic of both the proposed and alternative reservoir sites.

The geologic units at the proposed Morrell Canyon and Decker Canyon upper reservoir sites comprise granitic bedrock, alluvium, and slopewash[24]. The bedrock is typically light gray, medium- to coarse-grained, and moderately fractured. Weathering of the granitic rock is variable near the surface as evidenced by field observations and aerial photographs analyzed for the license application.

Recent alluvium occupies the valley floor of Morrell Canyon. The alluvium is derived from nearby granitic rock and comprises brownish medium- to coarse-grained sand. These materials are generally loose in the upper 10 to 15 feet of the alluvium, as evidenced by geophysical survey data supplied in the license application. The loose alluvium is underlain by 25 to 45 feet of dense alluvium, with crystalline bedrock underlying the alluvium.

Thin (less than 3 feet) deposits of slopewash exist along much of the Morrell Canyon site and along the majority of hillslopes in the area. These deposits are not mapped on U.S. Geological Survey (USGS) or other published geologic maps. Site investigations discovered a thicker deposit of slopewash on the south-facing slope in a portion of Morrell Canyon near South Main Divide Road and Lion Spring. This deposit is greater than 5 feet deep and is estimated (but unconfirmed) to be no more than 15 feet thick. Lion Spring is located approximately 200 to 250 feet west of South Main Divide Road. In May 2003, the spring was observed to provide surface flow to the stream; however, that surface flow went subsurface and surface flow became intermittent downstream. Such intermittent flow is consistent with relatively permeable surficial geology consisting of slopewash underlain by alluvium. Additional indications of the existence of groundwater and soil moisture come from discernable vegetation patterns. Larger oaks and some riparian species (i.e., sycamore) that all have relatively high soil moisture requirements exist in the lower, flatter portions of the Morrell Canyon site, while the side slopes are restricted to more drought tolerant chaparral species that can survive in drier, less productive sites.

Although the rock units observable in Decker Canyon are the same as in Morrell Canyon, surface alluvium and thick accumulations of slopewash are largely absent from the site. The erosion gullies into the sideslopes and base of Decker Canyon show only a minor amount (less than 2 inches) of soil development overlying intact bedrock. No evidence of groundwater near the surface was noted during geologic reconnaissance.

The proposed penstocks connecting the proposed Morrell Canyon and Decker Canyon upper reservoir sites with the proposed powerhouse sites would run through the eastern edge of the Elsinore Mountains. It is expected that the penstocks would be excavated into granitic bedrock similar to that described for the upper reservoirs and in the regional geology section. Because of the nature of such large expanses of bedrock and the characteristics of the Elsinore Mountains, faults, joints, fractures, and groundwater probably would be encountered during excavation of the penstock and tunnel system.

Base of the Elsinore Mountains

The proposed Santa Rosa and Ortega Oaks and Evergreen powerhouse sites are located between the base of the steep, east face of the Elsinore Mountains and Lake Elsinore. The geologic conditions at the two northernmost sites (Ortega Oaks and Santa Rosa) are relatively similar, while the more southern site (Evergreen) has substantially different conditions.

The Ortega Oaks and proposed Santa Rosa powerhouse sites are both located in areas with substantial surface alluvium. This material is a relatively young alluvial fan deposit of mostly gravel-sized sediment. Because of the location at the base of a steep mountain side (a location heavily

[24] Slopewash is the down-slope accumulation of material (outside a confined channel) transported by gravity and or sheet flow. It is roughly synonymous with colluvium, with the addition of the assistance of water as a secondary transport mechanism.

influenced by gravity-induced erosion from upslope), these sites are expected to contain a substantial amount of larger cobble- and boulder-sized clasts as well. Geophysical survey data summarized by the co-applicants for the Ortega Oaks powerhouse site indicate that 10 to 20 feet of loose alluvial soils is underlain by 20 to 50 feet of dense, unsaturated alluvial soils, which in turn are underlain by 70 to 90 feet of saturated alluvial soils and/or weathered bedrock. Crystalline bedrock was encountered at depths ranging from 120 to 145 feet below the ground surface. From this, we infer that depth to groundwater is approximately 30 to 70 feet below the ground surface. Geophysical survey data for the proposed Santa Rosa powerhouse site indicate 10 to 30 feet of loose alluvial soils underlain by 60 to 125 feet of dense, unsaturated alluvial soils and/or weathered bedrock. Crystalline bedrock was encountered at depths ranging from 70 to 140 feet below the ground surface; therefore, from the data the co-applicants infer that groundwater was not encountered at the site.

Surface exposures of granitic bedrock characterize the optional Evergreen powerhouse site. This rock is similar to that found at the Morrell Canyon and Decker Canyon upper reservoir sites (described above). An existing above-ground reservoir (tank) is currently located neat the site and is founded on granitic bedrock. No additional subsurface data are available for this site.

Lake Elsinore Shoreline and Vicinity

Lake Elsinore water surface elevations have historically experienced significant fluctuations due to periods of flooding followed by prolonged dry periods. Lake Elsinore is a historically ephemeral lake, with the main sources of water being direct natural runoff from the surrounding mountains and drainage from the San Jacinto River.

The proposed tailrace tunnel would extend eastward from any of the powerhouse sites. The surficial geology of this area is characterized by a transition from the alluvial fans found at the toe of the Elsinore Mountains out to the floodplain and lacustrine sediments of La Laguna. The exact location of the proposed tailrace tunnel and intake structures would vary (from north to south) in accordance with the selection of a powerhouse site, but in general would cross through this transition zone. The tailrace tunnel would exit the powerhouse, which is expected to be founded on granitic bedrock, and head east toward Lake Elsinore. Leaving the bedrock, the tunnel would likely be excavated through loose and dense alluvium (saturated and unsaturated) and weathered bedrock. Between the powerhouse sites and Lake Elsinore are portions of the active Elsinore Fault Zone (discussed in additional detail in subsequent sections). The Willard fault is located near the base of the Elsinore Mountains and runs roughly under or between the proposed Santa Rosa and Ortega Oaks and Evergreen powerhouse sites and Lake Elsinore (figure 9). The Wildomar fault is mapped within the limits of Lake Elsinore; however, its exact location is unknown. We suspect that this fault crosses the alignment of the tailrace tunnel. Because the intake structure is located within the sediment of Lake Elsinore, it is expected that a portion of the tailrace tunnel would be constructed in soft or loose saturated alluvium and/or lacustrine sedimentary deposits.

Soils

Lake Elsinore Shoreline[25]

Most of the soils in Elsinore Valley surrounding Lake Elsinore are of the Hanford-Tujunga-Greenfield association. These soils are generally sandy loams, loamy sands, although some areas contain loams and coarse sandy loams with gravel and cobble. Erosivity of these soils generally ranges from slight to moderate; however, wind-caused erosion can be high in some areas. Permeability is generally moderate to rapid, and the shrink-swell potential is low. Soil depths range can reach 60 inches.

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[25] Information in this subsection is derived from SCS (1971).

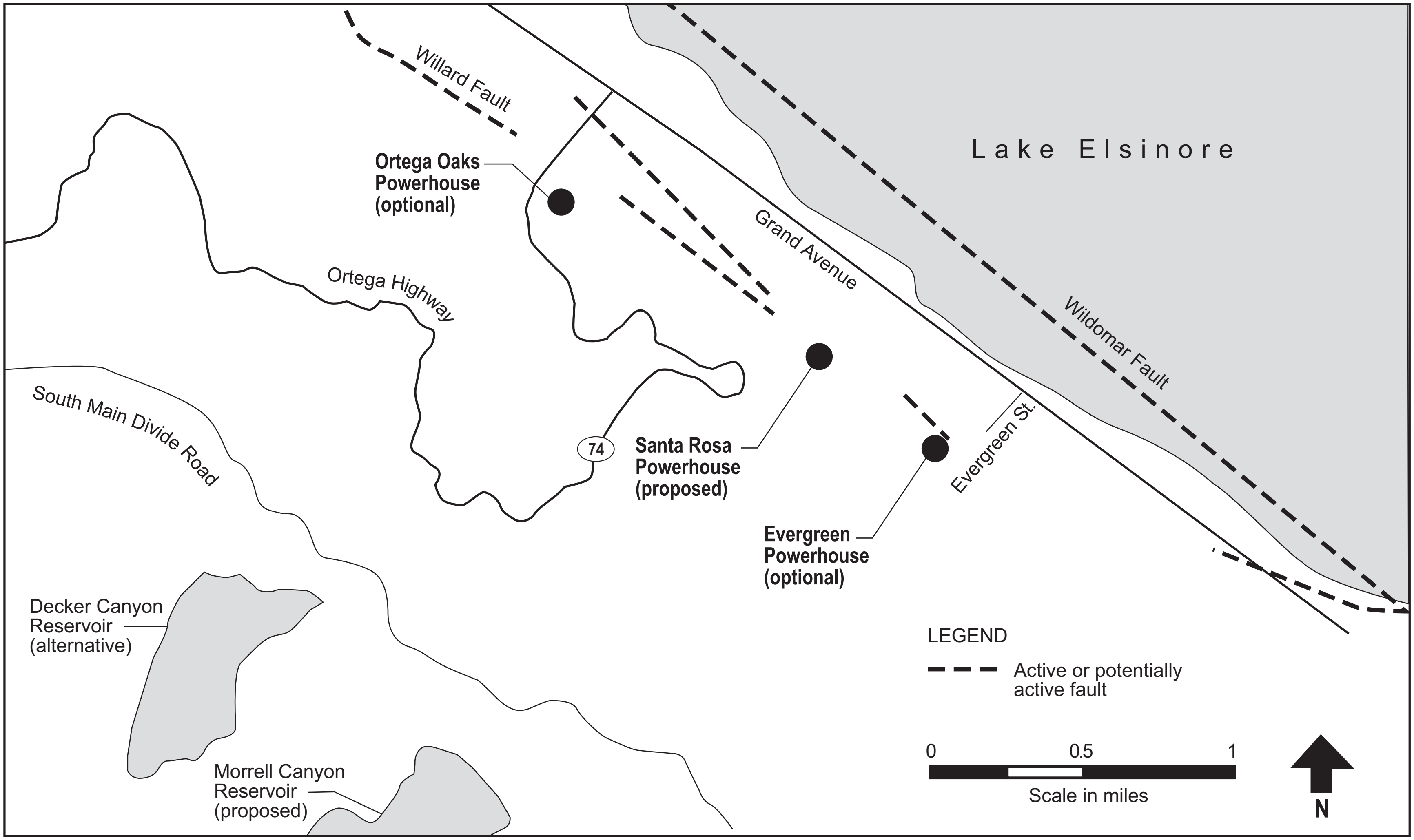

Figure 9. LEAPS Project—Fault zones in the project area. (Source: Elsinore Valley MWD and Nevada Hydro, 2004a)

The soils in the back basins of Lake Elsinore are primarily Waukena loamy fine sand and Willows silty clay with some Traver loamy fine sand. All three of these soils are saline-alkali soils because of the repeated wetting and drying of these lake bed soils, as well as accumulation of salts because the lake is a natural sink. Wind-caused erosion of these finer (silt and clay) soils is assumed to be moderate to high.

Base of the Elsinore Mountains

Soils to the west of Lake Elsinore at the location of the proposed powerhouse sites, as well as the laydown areas for these sites, are Hanford sandy loams. These soils are generally well-drained soils on alluvial fans and alluvial plains formed of granitic alluvium. Permeability is moderate, and, if the soil is bare, runoff is slow to moderate and the erosion hazard is slight to moderate.

Santa Ana Mountains/Elsinore Mountains

The proposed Morrell Canyon upper reservoir site area has three distinct soil types. The area of Lion Spring, the adjacent area, and the downstream riparian areas comprise well-drained sandy loam, forming within granitic alluvium. Permeability is moderate to rapid, and, if the soil is bare, runoff is slow to moderate and the erosion hazard is moderate. The areas running upslope of the canyon floor comprise shallow sandy loam soils over weathered granite with rock outcrops. These soils are somewhat excessively drained soils, and permeability is moderately rapid. Bare soil is susceptible to rapid runoff, and the erosion hazard is high. The terrace areas adjoining these slopes comprise well-drained coarse sandy loam and can include rock outcrops. Permeability is moderately rapid and if the soil is bare, runoff is rapid to very rapid, and the erosion hazard is high to very high.

The soils in the area of the Decker Canyon upper reservoir site are much the same as the proposed Morrell Canyon site, with the exception of the addition of gabbro bedrock as parent material and additional bedrock outcrops. The area directly adjacent to South Main Divide Road contains well-drained gravelly loam soils derived from gabbro parent material with a dark red clay subsoil 18 inches thick. The soil has moderately slow permeability, and, if the soil is bare, runoff is rapid and the erosion hazard is high. The areas following the stream channel southward include well-drained coarse sandy loams with steep side slopes and rock outcrops. Permeability is moderately rapid, and, if the soil is bare, runoff is rapid to very rapid, and the erosion hazard is high to very high.

Most of the 32 miles of transmission alignments (both north and south) would cross mountainous or hilly terrain. Soil conditions can vary markedly between specific sites; however, along these alignments the dominant soil series include the Cieneba and Friant series. The Friant Series consists of somewhat excessively drained soils that formed in the mountains from material weathered from fine-grained metasedimentary rock. Slopes are generally steep and range from 30 to 70 percent. A typical Friant soil is a shallow, gravelly fine sandy loam with rock outcrops. Permeability is moderately rapid and if the soil is bare, runoff is rapid and the erosion hazard is high. The Cieneba Series comprises shallow, somewhat excessively drained sandy loams on steep to very steep slopes. Some soils in this series are only 5 to 15 inches deep over bedrock. Gullies cut through these soils, and intermittent drainage channels and small landslides are common. Bare soil is susceptible to rapid runoff, and the erosion hazard is high.

San Juan Creek Drainage Downstream of Proposed Upper Reservoir Sites

The soils found in proximity to Ortega Highway as it parallels San Juan Creek include calcareous[26] loamy sands and fine sandy loams soils that are on nearly level ground, alluvial fans, and

[26] Soils containing calcium carbonate, commonly known as white chalk.

floodplains, along with pockets of moderately well-drained sandy loams with a strongly developed subsoil occurring on terraces and level to moderately steep ground.

Geologic Hazards

Potential geologic hazards at the proposed project area include ground rupture from active faulting, strong ground motions from earthquakes, landslides or rockfalls (induced by earthquake, rainfall and saturation, or other triggers), liquefaction and seismic settlement, and debris flows.

Seismicity

As previously described, the Elsinore Valley is a complexly faulted trough formed by the movement along a series of parallel northwest-trending faults. This Elsinore fault zone is a part of the Whittier-Elsinore fault system. The parallel series of faults within this zone includes the Willard, Rome Hill, Wildomar, Lake, Burchkhalter, Sedco, Glen Ivy, and Freeway faults. The three main faults within the Elsinore Valley are the Willard, Wildomar, and Glen Ivy faults. These faults appear very young in age, evidenced by features such as the steep northeast side of the Elsinore Mountains to the southwest of Lake Elsinore. At its northern end, the Elsinore fault zone splays into two segments, the Chino fault and the Whittier fault. At its southern end, the Elsinore fault is cut by the Yuha Wells fault from what amounts to its southern continuation, the Laguna Salada fault.

The Elsinore fault zone separates the upthrown and tilted block of the Santa Ana Mountains west of the fault zone from the Perris block to the east. Internally, both blocks themselves are relatively stable. This is evidenced by the presence of widespread erosional surfaces of low relief. There are, however, faults within the Elsinore block, which are discussed below.

Most faults within the Elsinore fault zone are normal in type and nearly parallel to the general trend of the trough or intersect each other at an acute angle. Vertical displacement generally exceeds horizontal, and several periods of activity are recognized. Research studies have been conducted to assess faulting on most of the sections and have documented Holocene activity for the length of the fault zone with a slip rate around 4 to 5 millimeter per year. Multiple events have only been dated on the Whittier fault and Glen Ivy North fault strand, so interaction between faults and adjacent sections is not well-known (USGS, 2005a).

One of the largest fault zones in southern California, the active Elsinore fault zone is more than 125 miles long and is a major element of the right-lateral strike-slip San Andreas fault system. The southeastern extension of the Elsinore fault zone (the Laguna Salada fault) ruptured in 1892 in a magnitude 7 earthquake, as measured on the Richter scale; however, the main trace of the Elsinore fault zone has only seen one historical event greater than magnitude 5.2, a magnitude 6 earthquake near Temescal Valley on May 15, 1910, northwest of Lake Elsinore, which produced no known surface rupture and did little recorded damage.

The principal structural element of the Elsinore trough is a system of faults (see figure 9) that can be divided into two major groups: piedmont or longitudinal faults, forming the northeast and southwest boundaries of the trough; and internal or transverse faults, which are between the faults of the first group and intersect them.

In addition, a number of major and minor faults are located within the Santa Ana-Elsinore Mountain block. No major faults are located near the proposed reservoir sites. Minor faults near the proposed reservoir sites include the Stuart Fault, a relatively short fault trace (about 3 miles long) beginning about 2 miles south of the proposed reservoir sites and trending north-northwest by south-southeast. The Fault Activity Map of California (California Department of Conservation, California Geological Survey, 1994) shows the Stuart Fault, as well as the nearby San Juan and Harris faults as “older faults”—those that are older than 1.6 million (pre-Quaternary). The Aliso and Teneja faults, located about 10 miles south-southeast of the proposed reservoir sites, are also classified "older faults." Work by the California Department of Conservation, California Geological Survey (personal communication, E. Ginney, Senior Geomorphologist, Louis Berger, Chico, CA, with D. Stickney, California Geology Society, filed on October 24, 2006) states that none of the faults in the Elsinore Mountains near the proposed reservoir sites (within approximately 8 miles) are indicated as active (active within the last 11,000 years before present) or potentially active (active between 11,000 years before present and 1.6 million years before present).

Liquefaction

Under certain conditions, strong ground motions can cause loose, sandy soils to liquefy and settle. These soft, fine-grained sediments can lose strength under such strong ground motions. The fine-grained sediments associated with the young lake deposits of Lake Elsinore could have the potential for liquefaction and seismic settling. Because all proposed alternative sites for the intake and tailrace structures are located on the shores of Lake Elsinore, segments of these project components could be founded on materials susceptible to liquefaction and seismic settling. The Ortega Oaks powerhouse site could contain such soils in the relatively thick overburden layer.

Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Earthquake Fault Zoning Act was passed by the California State Legislature following the 1971 San Fernando earthquake. The purpose of the act is to regulate land development near active faults[27] in an effort to mitigate the hazard of surface fault rupture. The Alquist-Priolo Earthquake Fault Zoning Act's main purpose is to prevent the construction of buildings used for human occupancy on the surface trace of active faults. The act only addresses the hazard of surface fault rupture and is not directed toward other earthquake hazards. The Seismic Hazards Mapping Act, passed in 1990, addresses non-surface fault rupture earthquake hazards, including liquefaction and seismically induced landslides. The Alquist-Priolo Earthquake Fault Zoning Act requires the State Geologist to establish "earthquake fault zones" around the surface traces of active faults and issue appropriate maps. These maps are then used by local, county, and state agencies for planning and controlling development and redevelopment activities. The act dictates that local agencies must regulate activities within earthquake fault zones as defined by the appropriate setback from the fault trace.

The California Department of Conservation, Division of Mines and Geology, has not yet prepared Alquist-Priolo earthquake fault zone maps for those portions of the proposed project located within the Cleveland National Forest (which includes portions of the proposed and alternative transmission alignments and the proposed and alternative upper reservoir sites), within and adjacent to the Santa Rosa Plateau, and in San Diego County. However, maps of lands outside the Cleveland National Forest boundary show that the proposed northern transmission alignment would cross a designated Alquist-Priolo earthquake fault zone just south of Highway 71 in Temescal Valley

Landslides/Debris Flows

Areas prone to debris flows are frequently identified based on observed relationships between precipitation and specific landscape characteristics. If threshold values for precipitation duration and intensity are met, debris flows may initiate on certain landscapes, particularly on and below steep slopes. Most debris flows stop moving as they reach more gentle slopes; however, some debris flows will reach the base of the hillside and can potentially travel a considerable distance (a mile or more) if confined by a

[27] Active faults are defined in the act as faults along which surface displacement has occurred within Holocene time (during the last 11,000 years).

channel. Debris flows moving through populated areas or locations with infrastructure can cause injury or death and produce extensive damage.

USGS has developed a generalized debris flow hazard map that includes the project area. Areas with slopes of 26 degrees or greater are highlighted on the map and correspond with slopes capable of producing debris flows given critical rainfall conditions. The areas indicated to have potential for debris flows in the area of proposed project facilities include a contiguous band along the steep eastern slopes of the Elsinore Mountains above the southwestern shores of Lake Elsinore. The mapping is general, but indicates the potential for debris flow to affect the proposed sites for the powerhouse and the proposed powerhouse laydown areas. Surficial instability in the form of slopewash and the accumulation of colluvium[28] was observed during geologic reconnaissance.

Evidence of deep-seated landsliding was not observed during review of aerial photographs and geologic reconnaissance.

3.3.1.2 Environmental Consequences

The co-applicants propose to build a lined upper reservoir with a 180-foot-high main dam, a perimeter dike as tall as up to 60 feet, a stream bypass system for the creek that flows through Morrell Canyon, and potentially an upstream detention basin. Final embankment design could call for a zoned earth and rockfill dam having a central impervious core or a concrete-faced earth and rockfill dam. The surface area of the proposed reservoir would be about 76 acres; the total footprint of the upper reservoir would be about 130 acres. Construction laydown areas would require approximately 20 to 40 acres. The material needed for this construction would be supplemented by material from excavation of other project components. Two parallel high-pressure water conduits each consisting of a 7,890-foot-long concrete-lined power shaft and tunnel transitioning to a 250-foot-long, 12-foot-diameter steel penstock would be constructed using a combination of tunnel boring machine technology and more conventional blasting and cut-and-cover techniques. An underground powerhouse, and two 1,950-foot-long, 20-foot-wide, and 20-foot-high concrete-lined tailrace tunnels would be constructed using both tunnel boring machine and traditional techniques. A 25- to 50-acre surface switchyard/substation would be located adjacent to the proposed powerhouse. About 32 miles of 500-kV transmission line would connect the project to an existing SCE transmission line located north of the proposed project and to an existing SDG&E transmission line located to the south. The proposed transmission alignment also would include construction/maintenance access roads.

The potential adverse effects of project construction and operation on geological and soil resources include disturbance of sediment, erosion, and sedimentation of project waters. We also evaluate the effects of various geologic hazards on development of the project and any potential adverse effects of the proposed actions on geologic hazards (for instance, project operations potentially increasing debris flows).

The co-applicants propose a number of mitigation measures to address potential adverse effects of these actions on geological and soil resources. The proposed board of three or more qualified independent engineering consultants would assess the geology of the project site and surroundings; the design, specifications, and construction of the dike(s), dam(s), spillways(s), powerhouse(s), electrical and mechanical equipment, and emergency power supply; instrumentation; the filling schedule for the reservoir(s) and plans and surveillance during the initial filling; and construction procedures and progress. The proposed erosion control plan would be developed in consultation with the agencies and would include the following: (1) a description of area soils, hydrology, and vegetation; (2) a narrative discussion

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[28] Loose, incoherent, eroded material at the base of a hillslope, moved downslope primarily under the force of gravity alone.

of the co-applicants' proposed erosion control measures; and (3) topographic map locations and functional design drawings of the control measures.

The proposed plan for the design and construction of a system that will automatically detect a conduit or penstock failure and immediately shut off flow in the conduit or penstock at the headworks in the event of such a failure would include the following: (1) design drawings; (2) a schedule for installation and testing of the system prior to operation of the project; (3) a schedule for annual testing of the system for the life of the project; and (4) a description of contingency measures to manually close off the conduit or penstock when the system is not operational.

The proposed reservoir clearing plan would include the following: (1) topographic maps identifying the location and acreage of lands to be cleared; (2) descriptions of the vegetation to be cleared; (3) descriptions of any resource management goals related to fish and wildlife enhancement through vegetative clearing or retention; (4) descriptions of the disposal methodologies and disposal location of unused timber, brush and refuse, and maps identifying the location of disposal sites; and (5) an implementation schedule. The proposed plan to revegetate disturbed areas with plant species beneficial to wildlife would describe the location of the areas to be revegetated and would include a description of proposed plant species and densities; fertilization and irrigation requirements; an effectiveness monitoring program; and an implementation schedule.

The USFS specifies in revised preliminary 4(e) condition no. 3, *Forest Service Approval of Final Design*, that before any new construction occurs on National Forest System lands, the co-applicants should obtain prior written approval of the USFS for all final design plans for project components, which the USFS deems as affecting or potentially affecting National Forest System resources. The co-applicants should follow the schedules and procedures for design review and approval as specified in the 4(e) conditions and in the Special Use Permit. As part of such written approval, the USFS may require adjustments to the final plans and facility locations to preclude or mitigate impacts and to ensure that the project is either compatible with on-the-ground conditions or approved by the USFS, based on agreed upon compensation or mitigation measures to address compatibility issues. If such necessary adjustments are deemed by the USFS, the Commission, or the co-applicants to be a substantial change, the co-applicants shall follow the procedures of Article 2 of the license. Any changes to the license made for any reason pursuant to Article 2 or Article 3 shall be made subject to any new terms and conditions of the Secretary of Agriculture made pursuant to Section 4(e) of the FPA.

The USFS specifies in revised preliminary 4(e) condition no. 15, *Erosion Control Plan*, that the co-applicants provide an erosion control plan before undertaking any new construction or non-routine maintenance projects with the potential for causing erosion and/or stream sedimentation on or affecting National Forest System lands. The USFS specifies that the plan include measures to control erosion, stream sedimentation, dust, and soil mass movement, including the following: (1) a description of the actual site conditions; (2) detailed descriptions, design drawings, and specific topographic locations of all control measures; (3) measures to divert runoff away from disturbed land surfaces; (4) measures to collect and filter runoff over disturbed land surfaces, including sediment ponds at the diversion and powerhouse sites; (5) revegetating disturbed areas in accordance with current direction on use of native plants and locality of plant and seed sources; (6) measures to dissipate energy and prevent erosion; and, (7) a monitoring and maintenance schedule. Additionally, the USFS specifies in revised preliminary 4(e) condition no. 31, *Ground Disturbing Activities* that ground-disturbing activities may commence only after the appropriate NEPA analysis and documentation. If the co-applicants propose new activities that were not previously addressed in the Commission's NEPA analysis processes, the co-applicants, in consultation with the USFS, should determine the scope of work, the potential project related effects, and whether additional information would be required to proceed with the planned ground-disturbing activity. Upon the USFS' request, the co-applicants should enter into an agreement with the USFS under which the co-applicants should fund USFS' staff time and expenses for staff activities related to the analysis and documentation of the proposed activities.

The USFS includes two new conditions in its revised preliminary 4(e) conditions to protect water, and indirectly, soil resources. The first, condition no. 35, *Surface Water Resources Management Plan*, states that within 6 months after license issuance, the co-applicants would file with the Commission a surface water resources management plan to protect groundwater-related surface water and other groundwater dependent resources. The plan would be approved by the USFS, for the purpose of controlling and monitoring the project-related effects to water resources on National Forest System lands, which are related to project activities. We discuss this plan in section 3.3.4.2, *Environmental Consequences, Waters, Wetlands, and Riparian Habitat* in *Terrestrial Resources.* The second, condition no. 36, *Groundwater Management Plan*, states that within 1 year of license issuance, the co-applicants would file with the Commission a plan to reduce the potential for groundwater extraction or contamination and related effects to surface water resources. The plan would be approved by the USFS for the management of groundwater and the associated surface waters on or affecting National Forest System lands. We discuss this plan in greater detail in section 3.3.2.2, *Environmental Consequences, Water Quantity* in *Water Resources*.

Effects of Construction on Erosion and Sedimentation

Co-applicants' Proposal—The proposed Morrell Canyon site (which encompasses Lion Spring) would include a 180-foot-high dam and a 60-foot-high perimeter dike. A patrol road would extend around the entire reservoir, atop the dam and dikes. The proposed Morrell Canyon site contains extensive deposits of slopewash, with thicker deposit of slopewash on the south-facing slope in a portion of Morrell Canyon near South Main Divide Road and Lion Spring. This deposit is from 5 feet to more than 15 feet thick. In the area of the proposed dam site, the thickness of alluvium may range from 25 to 50 feet atop sound bedrock. The proposed Morrell Canyon site would interrupt streamflow of the headwaters of this creek (totaling approximately 560 acres), and an instream collection structure would be constructed at the point where the perimeter dike would intercept Morrell Creek flows. A bypass conduit would transport Morrell Creek flows under the reservoir (and the reservoir liners) to an energy dissipater and monitoring station downstream of the dam. The co-applicants also indicate that they may install a detention basin upstream of the perimeter dike.

A collection structure and similar conduit would collect and transport Lion Spring discharge and transport this discharge to a point downstream of the dam. Hillslope drains would be installed and tied to the Lion Spring discharge system. The co-applicants indicate that excavation would be required to shape and engineer the hillslopes of the reservoir area to accept the liner and to prepare the base of the dam/dike. The dam and dike would have crest elevation of 2,900 feet msl and a combined fill volume of approximately 2.6 million cubic yards and a total footprint of approximately 130 acres.

The proposed underground Santa Rosa powerhouse would use a 30-acre site. Because it is located below a vertical shaft, the powerhouse cavern would likely be constructed via conventional drill-and-shoot excavation techniques. An approximately 20 acre laydown area would be required during construction. The estimated depth of excavation to construct the proposed Santa Rosa powerhouse would be 340 feet, and the powerhouse cavern excavation volume would be about 207,000 cubic yards.

The proposed tailrace tunnels would be constructed between the powerhouse and the intake/outlet structure to be located on the bed of Lake Elsinore. The tunnel would be built underground as it leaves the powerhouse, and would breach through to the ground surface under the waters of Lake Elsinore at elevation 1,200 feet msl. While the co-applicants indicate in construction schedules that tunnel boring machine technology would be used to construct part of the tailrace/intake tunnels, the proposed tailrace/intake structures would also necessitate in-lake construction operations for the intake/outlet end of the structure that surfaces in the bed of the lake. Construction for this in-lake work would take place within a cofferdam constructed prior to any excavation for the intake/outlet structure (Elsinore Valley MWD and Nevada Hydro, 2004b). Therefore, because excavation would occur in an area physically separated from Lake Elsinore by the cofferdam, the potential to disturb sediments and adversely affect water quality through increasing turbidity and suspended sediments would be reduced.

The total volume of excavated material associated with the powerhouse (including the powerhouse cavern as well as the high-head water conduit tunnels, construction adits, power shaft intake, penstock, transformer gallery, surge shaft, powerhouse access shaft, vent shaft, draft tube tunnel, tailrace tunnel, and lower reservoir intake excavation) would be about 776,000 cubic yards.

The proposed transmission alignment (figure 4) would cross mostly National Forest System lands on relatively inaccessibly, rugged, and steep terrain of the Elsinore Mountains and surrounding foothills. Laydown areas (dispersed along the corridor) as well as construction and maintenance roads would be necessary for the proposed transmission alignment. Construction activities would take place over the first and second year of construction.

As previously stated, the USFS specifies in revised preliminary 4(e) condition no. 15 that the co-applicants provide an erosion control plan before undertaking any new construction or non-routine maintenance projects with the potential for causing erosion and/or stream sedimentation on or affecting National Forest System lands. In addition, the USFS specifies in revised preliminary 4(e) condition no. 31 that ground-disturbing activities may commence only after the appropriate NEPA analysis and documentation. The USFS' revised preliminary 4(e) condition nos. 35 and 36 would have the co-applicants develop a surface water resources plan and a groundwater management plan, respectively, to control and monitor project-related effects on water resources on National Forest System lands.

Effects Analysis

The co-applicants' proposal would require substantial amounts of earthmoving, both to clear and prepare the dam and dike foundations and to transport from a storage/staging area (as yet to be determined) the material excavated from other project components that is to be used for construction of the dam and dikes. Excavation of hillslopes could cause soil erosion on hillslopes in the area of the upper reservoir during construction. The source of this erosion could be from gravity, wind, or water (direct precipitation, surface runoff, or groundwater seepage). Excavated material for use in the dam and dike(s) is also susceptible to such erosion both during storage and while being placed as dam/dike embankment (i.e., prior to final, finish-grade erosion control treatments). Excavation of the high-pressure conduit would be undertaken using tunnel boring machine techniques and should not result in surface erosion.

Methodologies for construction (including exact techniques and sequencing of hillslope excavation, channel interception, Lion Spring excavation, etc.) would be included in the final designs. Excavation and installation of the Lion Spring seepage collection system at the proposed Morrell Canyon upper reservoir site presents the potential for additional erosion because the extent and character of groundwater has not yet been fully characterized or quantified. As reservoir excavation and contouring proceed, the potential for interception of groundwater increases and could lead to substantial dispersed flow and erosion. This could present constructability complications in addition to those erosion issues noted above. Including provision for groundwater exploration and aquifer characterization in the upper reservoir and water conduit monitoring program, as specified by the USFS, would provide a means to identify and plan for where construction activities are likely to encounter groundwater.

The proposed Morrell Canyon site would interrupt streamflow of the headwaters of this creek, hence the need for an instream collection structure at the point where the perimeter dike would intercept Morrell Creek flows and a bypass conduit under or around the reservoir. The co-applicants also may construct a detention basin upstream of the perimeter dike. Large streamflows would likely be carrying sediment and debris, and that material would also need to be transported under or around the reservoir, resulting in the need for a very large conduit (see also section 3.3.2.2, *Environmental Consequences, Water Quantity* in *Water Resources)*. The co-applicants' potential detention basin would need to be designed and constructed to ensure it would not adversely affect the downstream perimeter dike.

Unmitigated, all construction activities at the proposed Morrell Canyon upper reservoir site would have the potential to discharge sediment into the waters of San Juan Creek. Conceptual designs suggest that sediment discharges from the San Juan Creek Watershed as a result of project construction and operation would be minimal. The co-applicants would develop plans to address erosion associated with all aspects of project construction via an erosion control plan. The erosion control plan and erosion control measures would be developed in response to more-detailed final project designs. The plans and proposed actions would undergo review by the appropriate resource agencies, the co-applicants' board of engineering consultants, and by the Commission and, therefore, should provide an adequate degree of protection for geological and soil resources.

The proposed high-pressure water conduit system would be aligned through the east side of the Elsinore Mountains. Constructed using a combination of tunnel boring machine technology and more conventional blasting and cut-and-cover techniques, the total excavation quantity is estimated to be 173,000 cubic yards for the high-head water conduit tunnels including construction adits and power shaft intake, and 4,500 cubic yards for the penstock excavation. Additional geotechnical and groundwater information for the alignment would be collected prior to the start of construction. A system that would automatically detect conduit or penstock failure and, in the event of such a failure, immediately shut off flow in the conduit or penstock at the headworks would ensure the avoidance of catastrophic flooding due to conduit failure.

At the proposed Santa Rosa powerhouse site, excavation would occur in an isolated location, and after surface preparations, would continue entirely below the ground surface. If adequate erosion mitigation measures are incorporated into construction techniques, erosion during construction at the surface would not adversely affect geological and soil resources. Erosion below ground surface should not be an issue because all material would be contained within the excavation itself. Groundwater could be encountered at the proposed Santa Rosa powerhouse site, and could lead to construction difficulties that exacerbate erosion; however, if soil erosion within the excavation is increased because of wet material, all such eroded material would be captured within the excavation for subsequent removal to the staging site. Storage and transfer of excavated material to the staging area and subsequently to the dam/dike sites affords the opportunity for erosion from either wind or water (direct precipitation, surface runoff, or groundwater seepage). Again, the use of proper erosion control techniques would mitigate any adverse effects on the resource.

Characterization of lakebed sediments and final design drawings of the tailrace structure would be completed prior to the start of construction. The co-applicants indicate that about 200,000 cubic yards of sediment would be displaced from the lakebed. Some lakebed sediments would be disturbed to prepare the construction area for "dry" construction (placement of a cofferdam). Construction of the intake/outlet structure would have relatively short-term effects on the disruption (displacement) of lakebed sediments and concurrent short-term effects on water quality (see section 3.3.2.2, *Environmental Consequences, Water Quality*).

Because of the inherent nature of the design (lines suspended above the ground surface), the construction of the majority of the transmission lines is anticipated to produce relatively little effect on erosion and sedimentation. However, erosion control measures would need to be developed in response to site-specific conditions and included in the erosion control plan. The more-important aspect of the construction of the proposed transmission alignment would be underground segments and the construction of the anticipated 10.8 miles of temporary access (assuming 1.5 miles for every mile of transmission line in areas with slopes less than 15 percent) and any permanent maintenance roads. Road stream crossings (culverts, bridges, or low-water crossings) and trenching for underground segments have the potential to have a greater effect on erosion and sedimentation than the lines themselves. The co-applicants have not delineated any road options for such construction, and because of grade requirements (resulting in switchbacks and contour-hugging alignments), it is conceivable that stream crossings for the roads would far out number those of the linear transmission lines. This is particularly the case because smaller “unmapped” intermittent or ephemeral stream channels are numerous in the Elsinore Mountains. These stream types are typically just as adept at moving sediment as perennial streams, and because they are often steeper and higher in elevation, they can also offer additional potential for debris flows.

Although the southern segment of the proposed transmission alignment and any related access roads would cross San Mateo Creek and its tributaries at a number of locations, establishment of appropriate setbacks from streams, avoidance of sediment discharge to those streams, and implementation of BMPs including, but not limited to, those road, building site, and watershed BMPs identified in USFS’ *Water Quality Management for Forest System Lands in California—Best Management Practices* (USFS, 2000), would ensure that construction activities would not result in sediment discharge to the San Mateo Creek Watershed. Further, the *Cleveland National Forest Land Management Plan* (USFS, 2005a) limits road construction to slopes under 15 percent.[29] Final designs and sediment control plans and measures are proposed for appropriate agency and Commission approval. At this time, it is anticipated that through design and mitigation measures, all resources would be adequately protected during project construction. These same practices should be applied to any subsequent maintenance or ground-disturbing activities over the term of any licenses issued.

Staff Alternative—The Decker Canyon site would include a 240-foot-high dam, a dike 50 feet high, and a patrol road around the reservoir. The rock units observable in Decker Canyon are the same as Morrell Canyon; however, surface alluvium and thick accumulations of slopewash are largely absent from this upper reservoir site. Soil development is shallow (reportedly less than 2 inches) and overlies intact bedrock. The location and configurations of the proposed reservoir at Decker Canyon encompass the upper end of the creek in Decker Canyon, as shown on USGS topographic maps. Therefore, because the Decker Canyon upper reservoir site is at the top of the watercourse, no stream bypass system would be required. It is presumed that a liner system for this site would require mechanical preparation of the hillslopes to accept the geosynthetic liner. Dam and dike construction would require excavation for foundations, and a perimeter patrol road would be built into the hillslope in areas where natural topography forms the side of the reservoir. The upper reservoir dam and dike would have a combined fill volume of approximately 3 million cubic yards (compared to 2.6 million for the proposed Morrell Canyon site) and a total footprint of about 120 acres (compared to 130 acres for the proposed Morrell Canyon site).

There are 18 potential high-pressure conduit alignments between the upper reservoir sites and powerhouse sites, each with a different length (see table 1 for details on lengths and excavated volumes). The total excavation quantities range from 114,920 to 169,760 cubic yards (table 1). Staging and storage areas for boring and excavated materials have not been defined, but are ostensibly coincident with the footprint of the Decker Canyon upper reservoir site, the Santa Rosa powerhouse site, and their respective staging areas. Implementation of erosion control measures during construction of the conduits would be expected to provide an adequate degree of protection from erosion and sedimentation.

All elements of the construction site and laydown area for the Santa Rosa powerhouse would be the same as that of the co-applicants’ proposal, as would be the effects of construction.

For the most part, effects associated with the construction of the staff alternative transmission alignment would be the same as those described above for the proposed transmission alignment. Assuming that 1.5 miles of temporary access road would be constructed for every mile of transmission line occurring on slopes less than 15 percent, the staff alternative transmission alignment would require approximately 9.3 miles of temporary access road.

[29] USFS staff indicated that road construction would probably not be allowed in areas with greater than 15 percent slope.

Optional Ortega Oaks or Evergreen Powerhouse—The Ortega Oaks powerhouse site would be 58 acres, with the construction laydown area located within the 58-acre site. The estimated depth of excavation to construct the Ortega Oaks powerhouse site would be 320 feet, compared to 340 feet for the proposed Santa Rosa powerhouse site. Unconfirmed[30] geophysical survey data suggest that groundwater is approximately 30 to 70 feet below the ground surface at this site. The effects of construction at the Ortega Oaks powerhouse site would be similar to the proposed Santa Rosa site, and the proper use of erosion control measures would mitigate any effects on geology and soils.

The Evergreen powerhouse site would be a 75-acre site. The construction laydown area would be 30 acres immediately to the northeast, between the Evergreen powerhouse site and Grand Avenue. The estimated depth of excavation to construct the Evergreen powerhouse would be 290 feet, compared to 340 feet for the proposed Santa Rosa powerhouse site. The effects of construction at the Evergreen powerhouse site would be similar to the proposed Santa Rosa site, and the proper use of erosion control measures would mitigate any effects on geology and soils.

Effects of Operations on Erosion and Sedimentation

Co-applicants' Proposal—Operations would involve the cycling of water between Lake Elsinore and the upper reservoir by generating power with releases from the upper reservoir to Lake Elsinore and then returning water to the upper reservoir by operating the project in a pumped storage mode. This cycling operation would be accompanied by typical upper reservoir water-level fluctuations of about 40 feet on a daily basis and by water-level fluctuations of 75 feet during the course of a full-week cycle. Emergency outlets (spillway and low-level outlet) would only be used when rainfall or other phenomenon might cause overtopping and failure of the dam.

Water from the upper reservoir would be cycled to and from Lake Elsinore via the proposed tailrace and intake/outlet structure. Water velocities entering and exiting the intake/outlet structure could entrain sediment. These potential effects are primarily related to generation of water turbidity and are discussed and analyzed in section 3.3.2.2, *Environmental Consequences, Water Quality*.

Once constructed, the proposed transmission alignment would operate largely without frequent inputs of human contact or visitation. In spite of infrequent visitation, any permanent maintenance roads must be maintained to provide access at any time. In addition, although the co-applicants do not propose to clear vegetation under the transmission line, fuel management in the future may require manipulation of the landscape to reduce the risk of fire. Methods selected for fuel management would depend on site-specific factors (e.g., vegetation type, slope, aspect, access), and could include grazing, prescribed fire, or mechanical means to create and maintain firebreaks. Existing firebreaks that intersect the proposed alignment would also be maintained.

Effects Analysis

Rapid and frequent drawdown of the upper reservoir surface could have adverse effects on shoreline erosion and stability of an earth fill dam with inadequate protection on the upstream slope.

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[30] The presence or absence of a water table has a significant bearing on the difficulty and potential hazards associated with underground works. Seismic refraction data alone are insufficient to quantify groundwater depths or even the presence or absence of groundwater. There are significant unexplained differences between the subsurface seismic survey profile interpretations in the co-applicants' application. The seismic profile interpretations in the license application have not been confirmed ("proofed") by boreholes, down-hole logs, and geologic information, all critical elements in limiting the range of uncertainties present in seismic survey profile interpretations.

These effects are in addition to the risk of settlement and cracking of the structure. The co-applicants propose to install a geosynthetic reservoir liner to protect the wetted portion of the reservoir, which includes the upstream slope of the dam. The final design of the embankment and calculations would be submitted to the Commission with the final designs and specifications. The design must be in accordance with the Commission's Engineering Guidelines and sound engineering practice. These documents would be prepared under the review of the board of three or more qualified independent engineering consultants and be reviewed by the Commission's Division of Dam Safety and Inspections.

Spills from the spillway are not anticipated and would only be used under emergency situations. Erosion from flows in the spillway would be mitigated through the use of concrete revetment on the spillway and an energy dissipater at the terminus of the channel. If a low-level outlet is incorporated into the reservoir design, a similar energy dissipater would mitigate erosion as it dispersed water into the natural stream channel. No mitigation is proposed for any resulting erosion within the downstream stream channel under emergency discharge from these structures.

Operations at the proposed Santa Rosa powerhouse site would not produce erosion or sedimentation.

Operation of the project at Lake Elsinore would result in daily lake level fluctuations of about 1 foot and weekly lake level fluctuations of about 1.7 feet. This amount of fluctuation, in combination with wind waves and boat wakes, would produce a wave action effect, not unlike the rising and falling action of ocean tides, moving the sediments up and downslope across the relatively flat shoreline. The daily fluctuation of 1 foot would affect about 79 acres along the lake margin and the weekly fluctuation of 1.7 feet would affect an additional 55 acres (Anderson, 2006). Depending on the location and shoreline configuration, these water surface elevation changes would result in lateral shoreline migration as short as 8 feet (Elsinore Valley MWD and Nevada Hydro, 2004a) to, potentially, distances of hundreds of feet (Anderson, 2006) in some shallow embayments along the southern shore of the lake. The effect would be more of a re-working of sediments than erosion of sediments. Erosion and sedimentation effects of operating the proposed transmission alignment are related to maintenance. The clearing of vegetation itself could produce erosion depending on the method of removal (ranging from none if herbicide is applied to substantial if removed manually with a bulldozer or masticator). Regardless, all maintenance activities would require roads unless helicopter transportation is employed. Road maintenance should include provisions to ensure that surface grading is undertaken in a way that would not exacerbate erosion.[31] All road maintenance and vegetation management techniques would be developed in conjunction with appropriate agency and Commission review; as such, all techniques are anticipated to provide an adequate level of resource protection.

Staff Alternative—Operations at the Decker Canyon upper reservoir site also would involve the cycling of water between Lake Elsinore and the upper reservoir by generating power with releases from the upper reservoir to Lake Elsinore and then returning water to the upper reservoir by operating the project in a pumped storage mode. Consequently, the effects on the Decker Canyon upper reservoir site would be the same as described above for the proposed Morrell Canyon site.

The effects associated with the proposed Santa Rosa powerhouse site would be the same as under the co-applicants' proposal. Effects associated with the staff alternative transmission alignment would be the same as previously described for the proposed transmission alignment.

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[31] Road surface maintenance activities can result in undesirable conditions such as the concentration of water in inboard ditches and the burial of cross road drains, rendering them ineffective.

The costs pertaining to the erosion control plan are presented in section 4.0, *Developmental Analysis*; and measures included in the staff alternative are discussed in section 5.2, *Discussion of Key Issues.*

Optional Ortega Oaks or Evergreen Powerhouse—As with the proposed Santa Rosa powerhouse site, operations at either the Ortega Oaks or Evergreen powerhouse site would not produce erosion or sedimentation.

Effects of Construction Related to On- and Off-Site Borrow

Co-applicants' Proposal—The proposed Morrell Canyon upper reservoir could call for a zoned earth and rockfill dam having a central impervious core or a concrete-faced earth and rockfill dam. Either option would require substantial material for its construction (see table 2). The co-applicants' propose that, overall, the project site would achieve a balance between excavation and fill, thereby avoiding the need to transport materials to the project site.[32]

Table 2. Fill quantities for upper reservoir alternatives. (Source: Elsinore Valley MWD and Nevada Hydro, 2004a, exhibit E, appendix E-10, as modified by staff)

Upper Reservoir Site	**Alternative**	**Fill Volume (million cubic yards)**
Morrell Canyon	A.1	3.0
	A.2	2.5
	A.3	2.6
Decker Canyon	B.1	5.0
	B.2	3.0

Based on the co-applicants' proposed project configurations (where the Morrell Canyon alternative A.3 reservoir configuration requires 2.653 million cubic yards and the quantities of material obtained from other project component includes 333,500 cubic yards for the proposed Santa Rosa powerhouse site [including the powerhouse cavern, transformer gallery, surge shaft, powerhouse access shaft, vent shaft, and draft tube tunnel excavation], 177,500 cubic yards for the high-pressure conduit [alternative H.3] and penstock, and 265,000 cubic yards for the tailrace tunnel and intake structure [less the 186,000 cubic yards needed for backfilling]), a deficit of approximately 2.063 million cubic yards would remain in order to build the proposed Morrell Canyon A.3 reservoir configuration. Further, this scenario assumes that all of the material excavated would be suitable for placement in the dam/dike(s)—an unlikely event based on the preliminary information related to soft-grained soils at the site of the proposed tailrace structure and the fact that if a tunnel boring machine is employed, the size of the rock spoil would be too small for rock fill. Therefore, the deficit would likely be larger.

The deficit could be made up via material excavated on site (to prepare the site for the dam/dike foundation and from the reservoir floor, as needed); however, this assumes that all of the material excavated would be suitable for placement in the dam/dike(s). Substantial on-site (within the reservoir footprint area) sorting of excavated material may be needed to create either dam option (zoned earth and

[32] An exception to the excavation and fill balance would be in the case of a dam requiring an impervious core requiring low-permeability clay or clay-like material.

rockfill dam with central impervious core, or concrete-faced earth and rockfill dam). In addition, one of the designs needs low-permeability material (clay) for the central core areas of the dam/dike(s). The co-applicants have identified a readily available source of clay in the Alberhill area (Pacific Clay Products, Inc.), located about 10 miles northwest of the project site. The Alberhill area, in the northern part of the Lake Elsinore quadrangle and at the southeast end of the Temescal Valley, contains the largest known high-aluminous clay deposits in southern California.

Off-site borrow would not be necessary for the construction of any of the proposed powerhouse or proposed transmission alignments.

Effects Analysis

The shaft, tunnel, and powerhouse cavern excavations would not result in appreciable quantities of excavated rock, requiring that the remaining material required for dam construction be obtained at the reservoir site itself. Consequently, suitable material at the dam site would have to be developed to provide the remaining dam fill. Based on the relatively substantial amount of overburden at the Morrell Canyon site (from 5 to 50 feet), development of on-site fill material is an option but would substantially increase the estimated unit cost for earth and rock fill proposed by the co-applicants. In addition, excavating material from the reservoir footprint to achieve the remaining fill would likely have substantively different effects from that related to site clearing and grading and contouring the reservoir for the liner (which would happen subsequent to material excavation/dam construction and would entail only grading activities). These different effects include the double handling[33] associated with sorting, crushing, and developing soil and rock material as on-site fill material, increased duration (and potentially the magnitude) of noise and diesel emissions, and the increased costs of these activities.

It is anticipated that final designs and work sequences would establish a system for sorting that would use portions of the overburden to create a final, smooth surface for the reservoir liner and other portions for zoned earth and rock fill.

Clay can apparently be obtained from an existing source (the Alberhill area). Although volume estimates and product availability at the proposed off-site location do not appear on the record, the adverse effects of clay excavation would appear to be minimal based on the fact that a developed source exists and infrastructure is likely to be already in place.

Staff Alternative—Construction of a dam and dike (alternative B.2 from table 2) at the Decker Canyon site would use material from within the reservoir footprint to achieve a balance of exaction and fill material at the upper reservoir site. Excavation materials from the shaft, tunnel, and powerhouse cavern would be disposed of off site. The on-site material requirements for the B.2 alternative at Decker Canyon are more than for the proposed Morrell Canyon A.3 alternative; however, procurement of sound rock material at Decker Canyon would be far easier because of the lack of substantial overburden. Because the overburden is quite thin at Decker Canyon, there would not be a need for as much "sorting" of overburden to separate out usable material for the dam from that which is suitable only for re-contouring. Instead, material for placement as dam fill will be immediately available upon excavation from within the reservoir footprint.

On-site and off-site borrow would not be necessary for the construction the Santa Rosa powerhouse site; however, off-site disposal would be required.

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[33] Double handling consists of moving soil or rock material more than one time between just two locations. In this instance, material would be excavated and taken to a sorter and/or crusher, then again hauled to either its final placement in the dam or temporary storage location where the material would await placement as re-contouring material.

On-site and off-site borrow would not be necessary for the construction of the staff alternative transmission alignment because the excavated material from installing tower pads and trenching underground segments would be used as fill.

Optional Ortega Oaks or Evergreen Powerhouse—On-site and off-site borrow would not be necessary for the construction the optional Ortega Oaks or Evergreen powerhouse site.

Effects of Operation Related to On-site and Off-site Borrow

Because on- and off-site borrow is only related to construction of the project, there are no operational effects related to off-site borrow.

Effects of Construction on Geologic Hazards

Construction of the LEAPS project could be influenced by two types of geologic hazards: those related to seismicity (including the potential for liquefaction and existing Alquist-Priolo Earthquake Fault Zones) and those related to landslides and debris flows.

Seismicity (Liquefaction, Alquist-Priolo Earthquake Fault Zones)

Faulting in the Lake Elsinore area has been relatively well documented. The Willard fault zone has been tentatively classified as active, however; the position of the fault zone is uncertain. Genterra Consultants (2003) indicate that the (single) fault lies between the proposed powerhouse and Lake Elsinore, and would be crossed by the tailrace tunnel(s). However, the description of the fault zone indicates that several fault strands are involved, and that surface expressions occur at elevation 1,450 feet msl, about elevation 1,700 feet msl, elevation 1,850 feet msl, and elevation 2,100 feet msl. The proposed Santa Rosa underground powerhouse is centered on the elevation 1,420 feet msl ground surface contour, which would place it between the lowest surface expression of the Willard fault strands and Lake Elsinore, and the series of fault strands would be crossed by the high pressure tunnel(s). The other alternative powerhouse sites appear to be either directly on (figure 5) or above the fault, indicating that the tailrace structure would need to cross the series of faults. Faults near the upper reservoir site are mapped and indicated as inactive.

The Wildomar fault is classified as active. The latest USGS mapping shows its possible position beneath Lake Elsinore as being a short distance from the southwestern shore. The potential lateral displacement of this fault in a magnitude 7 to 7.5 earthquake as measured on the Richter scale[34] is estimated to be in the order of 5 to 16 feet (Berger, 1997). The tailrace structure for the proposed and alternative powerhouse sites would likely cross this fault.

Related to ground surface rupturing, California Division of Mines and Geology mapping indicates the northern segment of the proposed transmission alignment would cross a designated Alquist-Priolo earthquake fault zone just south of Highway 71 in Temescal Valley.

Effects Analysis

It is very unlikely that any of the activities related to construction of the proposed project would induce seismic instability and result in a seismic event. This includes the effects of blasting for tunnels, penstocks, and powerhouses and the effects of groundwater disturbance.

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[34] Each whole number increase in Richter magnitude means that the ground motion of the quake is ten times greater than the previous whole number. Thus, an earthquake with a magnitude of 6.5 has ten times the ground motion of one with a magnitude of 5.5; an earthquake of 7.5 has 100 times the ground motion of the 5.5 earthquake, and so on.

Conversely, the adverse effects of a seismic event on project construction activities would be potentially substantial depending on the component of the project being worked on. These effects may include damage to project infrastructure or construction-related equipment, or injury or loss of life of construction crews. Such potential would be mitigated through adherence to Occupational Safety and Health Administration standards for workplace safety. Because of the nature of the work being performed (underground drilling, boring, and facility construction) the adverse effects of damage to project infrastructure or construction-related equipment are inherently without mitigation.

Co-applicants' Proposal—Subsurface flows at the proposed Morrell Canyon upper reservoir site may be controlled by the existence of faults that can act as barriers or conduits of subsurface flows (Berger, V., 1997).

As previously discussed, at least two faults near Lake Elsinore may directly influence project facilities in the vicinity of Lake Elsinore. As such, the proposed powerhouse, high-pressure conduit, and tailrace structure are analyzed together. Further, the northern segment of the proposed transmission alignment would cross a designated Alquist-Priolo earthquake fault zone south of Highway 71 in Temescal Valley.

Especially challenging geotechnical hazards have not been identified for the proposed Morrell Canyon upper reservoir site. Furthermore, available information suggests that even if a fault is present, it probably predates the active faults previously discussed, and is therefore more likely to be a concern from the perspective of locally poor-quality ground because of shearing/weathering rather than the possibility of movement. This would affect constructability from the perspective of a need for additional high-quality rock or soil fill (as discussed in *Off-Site Borrow Area*), rather than from a seismic safety perspective.

The direction of the Willard fault(s) is approximately parallel to the longitudinal axes of the powerhouse cavern, the transformer gallery, and the surge chamber (shaft). An active fault or extensive adjacent shear zone could not be tolerated in these excavations/facilities. Because of the lateral extent (upstream-downstream) of these facilities, positioning them to avoid the Willard fault zone may be extremely difficult, possibly requiring them to be moved deeper into the Elsinore Mountains or closer to the lake. The former move would seriously affect access, and the latter move would raise a concern as to the adequacy of the rock cover.

Although the co-applicants have not proposed them, measures are available to permit water supply tunnels to operate across active faults. These measures consist of an over-excavation through the fault zone and on each side and installation of a steel liner/pipe with lightweight cellular concrete backfill around the pipe. Although other applications of these measures have involved relatively small conduits compared to those that would be required for the proposed project, measures could conceivably be developed to allow either the high or low pressure conduits to cross the Willard fault zone, particularly if large lateral displacements are not anticipated. The feasibility of crossing the faults also depends on the extent of the ground disturbance on either side; if there are extensive shear zones, particularly if accompanied by deep weathering, then tunneling itself will be difficult.

A currently unknown depth of overburden would separate the project structures from the rupture surface of the Wildomar fault. However, a displacement of the magnitude envisioned would undoubtedly be accompanied by substantial disturbance of the overlying materials. Crossing this fault would likely result in serious damage in the event of large displacements. Accordingly, every effort should be made to determine its location and the tailrace tunnels/conduits and intake/outlet structure should be positioned to the shoreward side of the fault.

The presence or absence of a water table has a significant bearing on the difficulty and potential hazards associated with the underground components of the project in general, and the soft-ground section of the tailrace tunnel in particular. If the overburden materials are not saturated, then they cannot liquefy, regardless of the particle size and grading. However, overburden material consisting of loose unconsolidated sediment could liquefy if saturated.

Significant unexplained differences exist between the sub-surface seismic survey profile interpretations at the Santa Rosa site and optional Ortega Oaks powerhouse site. The Ortega Oaks profile shows either a water table at about where one might be expected given the presence of Lake Elsinore at about elevation 1,245 feet msl a few hundred feet from the line, or a deeply weathered bedrock zone. This feature is absent at the Santa Rosa site only 4,000 feet to the southeast. Perhaps there is an ancient northeasterly trending fault between the two sites, as suggested by the lineaments and the second stage geotechnical evaluation (Berger, V., 1997). However, this would not explain why a water table is not evident at the Santa Rosa site, not even a static water table at the level of Lake Elsinore. In summary, groundwater and subsurface geologic conditions at the Santa Rosa powerhouse site are unconfirmed. Any uncertainty related to the presence of or depth to a water table translates to an unknown degree of complication for construction at the Santa Rosa site.

The co-applicants propose to support the intake/outlet structure on piles. Whether this is an appropriate solution depends on the nature of the materials and on the depth to bedrock. If the nature of the materials and/or the potential for liquefaction is such that end-bearing piles are required to support the structure, and if the depth to bedrock is such that the piles would have to be of excessive diameter to prevent buckling, or toppling, piling would not provide a solution. A solution might not be available in such a situation.

Given the limited available information at this stage of preliminary project design and geotechnical exploration, we do not think the project, as currently proposed by the applicants, can be built at the site for the cost they estimate (see section 4, *Developmental Analysis*). The uncertainty that exists about the position of fault zones and adjacent ground conditions could require the applicants' to modify the existing design for the proposed powerhouse, conduits, tailrace tunnels/conduits, and intake/outlet structure. To address this uncertainty, additional measures may be needed to design and build the project structures at this site. We account for these measures in our estimate of the project's cost.

These additional measures would be designed prior to construction and be described in detail in the final Supporting Design Report, plans, and specifications for project construction. With these measures, the project could be constructed at the site, but at a greater cost, as presented in section 4, *Developmental Analysis*.

The northern segment of the proposed transmission alignment would cross an approximately 1,000-foot-wide (Hart and Bryant, 1997) designated Alquist-Priolo earthquake fault zone. This fault does not appear to be major, and it is anticipated that during design, accommodations can be made to either span this zone by placing the towers outside the zone or by way of designing both the towers and lines to accommodate any ground movement.

Staff Alternative—No major faults have been identified in Decker Canyon and the site does not appear to be influenced by faulting. As with the proposed upper Morrell Canyon reservoir site, especially challenging geotechnical hazards have not been identified for the Decker Canyon upper reservoir site.

The consideration and uncertainties of groundwater (and seismic) concerns at the Santa Rosa powerhouse would be the same as described for the co-applicants' proposal.

Based on available information, it appears that the staff alternative transmission alignment would not cross a designated Alquist-Priolo earthquake fault zone.

Optional Ortega Oaks or Evergreen Powerhouse—As with the Santa Rosa powerhouse site, groundwater and subsurface geologic conditions at either the Ortega Oaks or Evergreen powerhouse site are unconfirmed. Seismicity issues at this site are not quantified and would be resolved via geophysical investigations and characterizations undertaken prior to the start of construction.

Landslides/Debris Flows

Deep-seated landsliding in the project area is not evident; however, surficial instability in the form of slopewash and rocks (colluvium) accumulating at the base of slopes was observed. Projected maximum credible ground motions estimated for the project area may generate sufficient shaking to dislodge some of the slopewash and rocky materials mantling the slope.

The issues related to project construction and landslides/debris flows are discussed and analyzed relative to operational effects.

Effects of Operations on Geologic Hazards

Seismicity (Liquefaction, Alquist-Priolo Earthquake Fault Zones)

The potential effects of seismic hazards related to operation of both the co-applicants' proposal and the staff alternative are covered in our previous discussion related to construction. This is because a substantial component in determining constructability of the project entails determining the feasibility of designing project features such that they can be constructed to adequately function while subjected to a variety of seismic hazards (i.e., strong ground movements, ground rupture, and liquefaction). As such, the potential effects of seismic hazards related to operation of both the co-applicants' proposal and the alternatives would be addressed during the design (and construction) process.

Landslides/Debris Flows

Steep slopes loaded with sufficient quantities of colluvium and/or loose or weathered rock are susceptible to landslides and debris flows given sufficient initiation. This initiation could come from a seismic event, addition of water from a reservoir or penstock breach, the concentration of hillslope runoff by a project road or drainage structure onto a slope, or from a period of heavy or frequent precipitation. A landslide or debris flow also could be affected by the project through the construction of roads using side-cast fill on steep slopes (instead of full-bench construction). Transmission line towers located in steep terrain could be subjected to landslides or debris flows depending on their placement.

During the subsequent design phase of the project, existing slopewash and accumulated rocks would be evaluated as to the potential effect of site development (i.e., roads, transmission towers, and other facilities) on their stability and the potential effect on project facilities as a result of strong ground motions. This analysis and design process would also need to take into account the effect of the concentration of hillslope runoff on areas of colluvium and steep draws as related to the initiation of landslides or debris flows. This design and analysis process would be under the review and approval of appropriate resource agencies, such as the USFS, and the Commission, and is anticipated to provide adequate protection to geological and soil resources. In addition, the co-applicants would develop and implement a plan for the design and construction of a system to automatically detect conduit or penstock failure and, in the event of such a failure, immediately shut off flow in the conduit or penstock at the headworks.

Dam Breach and Dike Failure

The Commission's *Engineering Guidelines for the Evaluation of Hydropower Projects*, require that dam break studies be performed to determine the consequences of a dam failure, as well as the inflow design flood. This evaluation is known as an incremental hazard evaluation (FERC, 2000). The dam break studies are performed to determine the incremental increase due to failure under both normal pool conditions (full reservoir with normal streamflow conditions prevailing) and flood-flow conditions (dam failure during a flood) up to the point where a dam failure would no longer significantly increase the threat to life or property. For each flood condition, water surface elevations with and without dam failure, flood wave travel time, and rates of rise are determined. The inflow design flood is the flow above which the incremental increase in water surface elevation due to failure of a dam is no longer considered to present an unacceptable threat to downstream life and property. The inflow design flood is used in the design of the dam for sizing the spillway and outlet works and determining the maximum height of the dam, freeboard, and temporary storage requirements.

The co-applicants state that, because the precise location and configuration of the proposed upper reservoir has not been determined and cannot be entirely known pending the outcome of the Commission's licensing process, they have only undertaken dam break analyses for normal pool conditions and the preliminary design of the structures. The co-applicants note that an incremental hazard evaluation will be provided as part of the Emergency Action Plan, which would also examine potential inundation hazards associated with flood-flow conditions.

Effects Analysis

Because the proposed upper reservoir sites are located at the headwaters of San Juan Creek, roughly coincident with the drainage divide between that watershed and that of Lake Elsinore, a dam failure could discharge water into San Juan Creek, and a dike failure could discharge water toward Lake Elsinore. Mode of failure in the co-applicants' dam breach analyses were via a hypothetical piping failure; the hypothetical failure modes for the dike breach analyses included overtopping of the dike crest and internal erosion (piping) through the dike embankment materials.

Co-applicants' Proposal—The preliminary inundation area for the project is depicted in figure 10. The Commission's Division of Dam Safety and Inspection's San Francisco Regional Office performed a Pre-License inspection and issued a report dated January 6, 2005. Paragraph A of the Pre-license Inspection Report discusses the downstream hazard potential of the project.

The report notes that based on the dam break analyses included in the license application, a dam breach at the Morrell Canyon upper reservoir site would generate a flood wave that would cause overbank flow along San Juan Creek for about 15 miles to the Pacific Ocean. The areas subject to flooding include campgrounds, residential and commercial buildings, and Ortega Highway (State Route 74) stream crossings. The study estimates that depths could be as high as 39 feet in the narrow canyon areas. A similar study was performed to estimate inundation toward Lake Elsinore should a lower elevation dike fail. Breaching of a dike would result in flooding, however with less release of water. Structures and possibly residences in the city of Lake Elsinore would be inundated up to 14 feet for Morrell Canyon reservoir.

The report notes that observations made during the inspection confirm that the proposed project would be classified as having a high downstream hazard potential. In accordance with the Federal Guidelines for Dam Safety – Hazard Potential Classification Systems for Dams (October 1998), dams assigned the high hazard potential are those for which failure or misoperation would probably cause loss of human life.

The dam break analyses discussed in the license application was based on preliminary designs and did not include an inflow design flood condition. The design of the structures could change prior to construction which would affect the parameters used in the daybreak analyses. The inflow design flood will need to be determined for the final design of the structures as well as the finalizing the dam break analyses. The inflow design flood determination should be included in the Supporting Design Report – which would be reviewed and commented by the Commission staff prior to start of construction. The dam break analyses under both the normal and inflow design flood conditions would be included in the Emergency Action Plan, which would be submitted at least 60 days prior to initial filling of the reservoir begins in accordance with Part 12, Subpart C of the Commission's regulations.

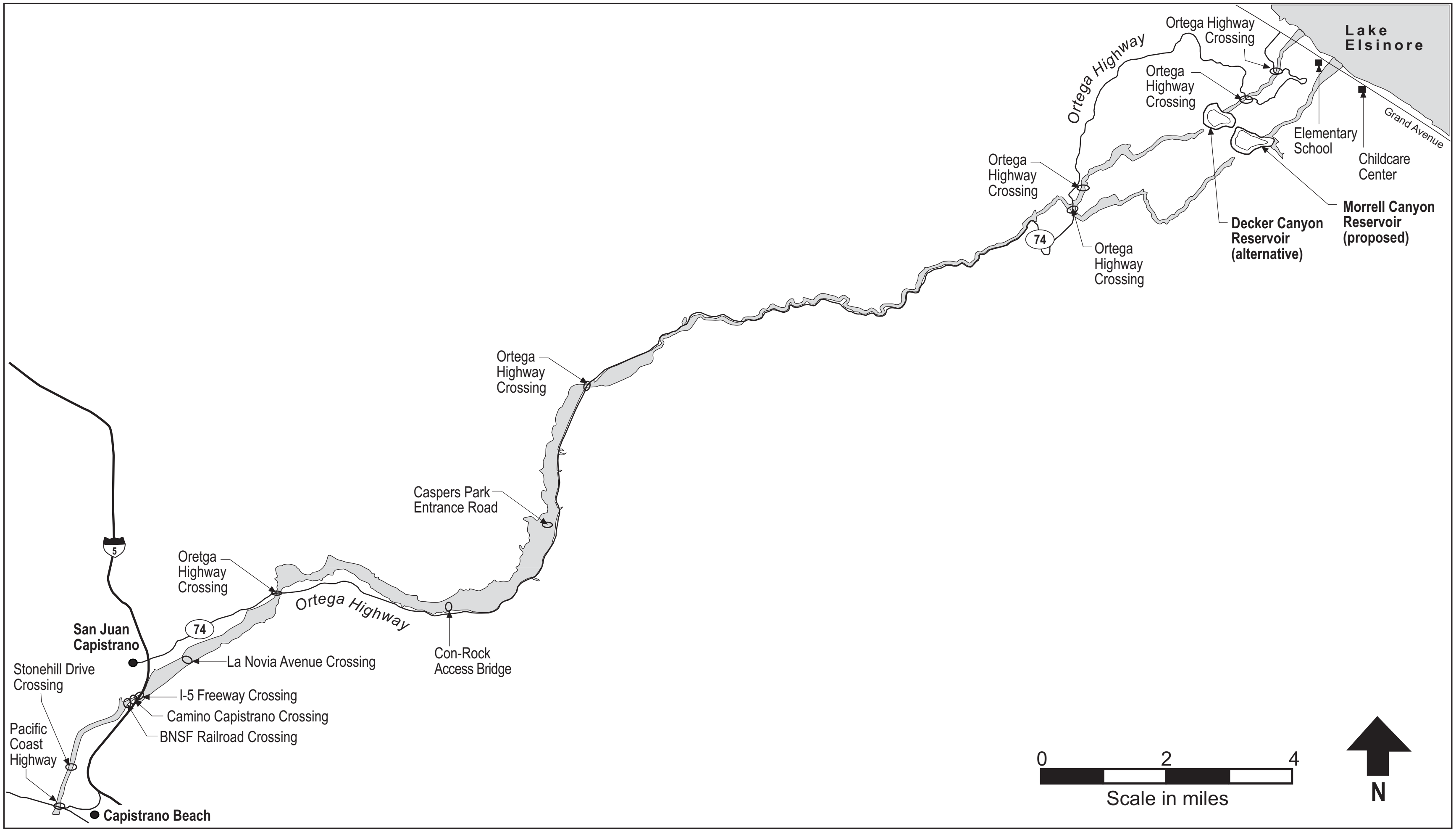

Figure 10. LEAPS Project—Extent of inundation resulting from dam/dike break. (Source: Elsinore Valley MWD and Nevada Hydro, 2004a, as modified by staff)

Staff Alternative—The preliminary inundation area for the staff alternative using the Decker Canyon upper reservoir site also is depicted in figure 10. The Commission's Division of Dam Safety and Inspection's report notes that based on the dam break analyses included in the license application, a dam breach at the Decker Canyon upper reservoir site also would generate a flood wave that would cause overbank flow along San Juan Creek for about 15 miles to the Pacific Ocean, similar to the Morrell Canyon upper reservoir site. The same areas would be subject to flooding with water depths that could be as high as 39 feet in the narrow canyon areas. Breaching of a dike would result in flooding, however with less release of water. Structures and possibly residences in the city of Lake Elsinore would be inundated up to 6 feet.

The report notes that observations made during the inspection confirm that the Decker Canyon upper reservoir would be classified as having a high downstream hazard potential. In accordance with the Federal Guidelines for Dam Safety—Hazard Potential Classification Systems for Dams (October 1998), dams assigned the high hazard potential are those for which failure or misoperation would probably cause loss of human life.

As with the Morrell Canyon upper reservoir site, the inflow design flood will need to be determined for the final design of the structures as well as the finalizing the dam break analyses.

3.3.1.3 Unavoidable Adverse Effects

The placement of a dam, dike, and reservoir at Morrell Canyon would interrupt natural streamflow and sediment transport processes. These effects would be largely unavoidable. This effect is not present at the Decker Canyon reservoir location because the reservoir would be situated at the top of the watershed and has essentially no contributing drainage area. The construction of a dam at either location would create an unavoidable adverse effect in the unlikely event that either the dam or dike fails. In addition, shoreline stabilization measures (at Lake Elsinore), placement of informative signage, and the construction and/or improvement of fisheries facilities, trails, campsites, boat ramps, and access areas, all elements of the co-applicants' proposal, have the potential to result in minor, unavoidable, short-term, localized increases in the potential for erosion.

3.3.2 Water Resources

3.3.2.1 Affected Environment

Surface Water

Lake Elsinore

Lake Elsinore is a natural lake and is about 5 miles long and 2 miles wide. The primary source of water to the lake is the San Jacinto River with a drainage area of about 723 square miles, which is the largest part of the 782 square mile drainage area to Lake Elsinore. The remaining watershed consists of smaller tributaries which flow directly into Lake Elsinore and direct rainfall on the lake surface. Canyon Lake, which has a storage capacity of about 12,000 acre-feet and a surface area of 525 acres is located along the San Jacinto River, about 3 miles upstream from Lake Elsinore. The Elsinore Valley MWD, the owner of Canyon Lake dam, operates the reservoir for water supply and storage of water purchased from the Colorado River. Spillage at the Canyon Lake dam is relatively rare except during high runoff from winter storm events due to the Elsinore Valley MWD withdrawals and small inflow values. Table 3 provides flow data for USGS Gage No. 11070500 located about 2 miles downstream from the Canyon Lake dam. Natural inflow to the lake averages 11,380 acre-feet per year.

Table 3. Daily discharge (cfs) statistics for USGS gage no. 11070500 San Jacinto River at Elsinore, California, for water years 1975 to 2004. (Source: USGS, 2005b)

Month	**Mean**	**Median**	**Maximum**	**Minimum**	**10% Exceedance**	**90% Exceedance**
Annual	23.93	0.63	8,080	0.00	4.80	0.00
October	0.44	0.36	12	0.00	0.92	0.00
November	0.69	0.65	11	0.00	1.30	0.08
December	1.14	0.94	25	0	1.80	0.36
January	41.55	1.10	4,490	0.15	8.93	0.48
February	128.84	1.45	8,080	0.17	91.30	0.68
March	93.57	1.40	5,350	0.00	237.10	0.60
April	18.01	0.96	365	0.01	63.00	0.37
May	8.13	0.57	490	0.00	18.00	0.16
June	0.93	0.26	17	0.00	2.00	0.00
July	0.28	0.10	1.90	0.00	0.99	0.00
August	0.18	0.05	1.60	0.00	0.55	0.00
September	0.26	0.16	2.10	0.00	0.55	0.00

Note: cfs – cubic feet per second

Adjacent and located to the southeast of Lake Elsinore are three other water bodies: Back Basin, Lake Alpha, and Lake Beta. Back Basin is normally dry and is separated from Lake Elsinore by a 2.5-mile-long earthen berm constructed as part of the Lake Elsinore Management Project under the auspices of the Corps, BLM, and Riverside County Flood Control District. This project was completed in the early 1990s to reduce evaporation losses from Lake Elsinore and provide additional flood storage, while improving water quality, habitat, and recreational opportunities associated with Lake Elsinore. The Back Basin berm has an overflow weir at elevation 1,262 feet msl at which point flow from Lake Elsinore enters Back Basin. Lake Alpha and Lake Beta are connected to Lake Elsinore by a 48-inch gated conduit in the levee. These two lakes form a wetland area and are effectively the low spots in the Back Basin.

An unfinished element of the Lake Elsinore Management Project was the establishment of a long-term supplemental water supply for the lake. Planners felt that recycled water would be a preferred source over using scare potable water for lake level stabilization.

To address this issue, the Elsinore Valley MWD and the city of Lake Elsinore formed a Recycled Water Task Force charged with determining public opinion on the use of recycled water to supplement Lake Elsinore, identifying the desired actions and outcomes for the use of recycled water, and preparing a white paper on the topic. The task force published its findings in 1997 and concluded that recycled water may be acceptable for supplementing the water in Lake Elsinore provided that Title 22 standards for disinfected tertiary treatment approved uses are met, nutrient removal to within the lowest natural background levels can be integrated into the next treatment plant upgrade, and a lake water quality monitoring program is implemented. Subsequently, the Elsinore Valley MWD implemented a feasibility study in support of a NPDES permit and, along with the Eastern MWD, began a pilot discharge project in June 2002. With permits to add 4,480 acre-feet of recycled water and up to 5,000 acre-feet of groundwater (from the Island Wells) each year for 2 years, the pilot discharge project was intended to increase and stabilize lake levels and to test the effects of recycled water discharge on water quality and beneficial uses of the lake. The pilot discharge project was extended through January 2005.

In July 2001, the Joint Watershed Authority filed a Notice of Intent to prepare a Program Environmental Impact Report for the Lake Elsinore Stabilization and Enhancement Project. The stated objectives of this project are the following: (1) stabilization of water level of Lake Elsinore, by maintaining the lake elevation within a desirable operating range (minimum of 1,240 feet msl to a maximum of 1, 247 feet msl); (2) improvement of lake water quality (i.e., reduce algae blooms, increase water clarity, increase DO concentrations throughout the water column, and reduce or eliminate fish kills); and (3) enhancement of Lake Elsinore as a regional aesthetic and recreational resource. The Joint Watershed Authority approved the Lake Elsinore Stabilization and Enhancement Project in September 2005.

The primary source for make-up water is Elsinore Valley MWD's Regional Reclamation Plant[35] adjacent to Lake Elsinore. Elsinore Valley MWD relies on water rights permit 30520 for an exclusive right to all water discharged from the reclamation plant. Elsinore Valley MWD also can supplement make-up water with water from its Island Wells. Elsinore Valley MWD and Nevada Hydro (2005) indicate that no water acquisition rights would be needed to purchase reclaimed water. Additionally, a March 13, 2003, Escrow Agreement manages a Lake Maintenance Fund established as part of the Lake Elsinore Comprehensive Water Management Agreement signed with the city of Lake Elsinore.

Substantial human actions in the watershed and Lake Elsinore itself affect the lake's inflow, elevation, and discharge. Water can flow out of Lake Elsinore through an outlet channel and into Warm Springs Creek and subsequently to Temescal Wash whenever the lake level exceeds 1,255 feet msl. This only occurs under torrential rainfall conditions or when an extended wet period results in abnormally high lake elevations. The bottom elevation of Lake Elsinore is 1,223 feet msl. At an elevation of 1,240 feet msl, Elsinore Lake has a surface area of 3,074 acres and stores 38,519 acre-feet. Historically, the lake elevation was highly variable and has completely dried out including years 1850, 1880, 1954, and 1959 through 1963 (Dunbar, 1990, as cited in Joint Watershed Authority, 2005). The co-applicants indicate that 1951 was also a year in which the lake went completely dry. Evaporation losses from Lake Elsinore are substantial and are estimated at 56.2 inches per year, much larger than the average annual precipitation of 11.6 inches. Such evaporation losses translate to 15,500 acre-feet per year assuming a nominal elevation of 1,245 feet msl, an elevation that corresponds to a lake area of 3,319 acres.

Temescal Wash flows about 28 miles from Lake Elsinore in a northwesterly direction to its confluence with the Santa Ana River, just upstream of Prado dam (Joint Watershed Authority, 2005). Following the construction of the Back Basin berm and other improvements of the Lake Elsinore Management Project, Lake Elsinore has a 100-year flood elevation of 1,263.3 feet msl and a combined storage of about 150,000 acre-feet, which includes the Back Basin (Joint Watershed Authority, 2005). Prior to this construction, in February 1980, a series of storms caused Lake Elsinore to rise to elevation 1,265.7 feet msl, causing substantial spill into Temescal Creek (personal communication, letter from R. Koplin, Chief, Engineering Division, S.C. Thomas, Senior Civil Engineer, Riverside County Flood Control District, dated August 15, 2003; Corps, 2003). After the flood control improvements were made, the highest peak flow recorded at USGS gage no. 11072100, Temescal Creek near Corona, about 15 miles downstream from Lake Elsinore, was 4,030 cubic feet per second (cfs) on June 9, 2006 (USGS, 2005e).

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[35] Elsinore Valley MWD's Regional Wastewater Treatment Plant provides tertiary treatment to wastewater such that it can be reused in a variety of applications and is suitable for contact recreation.

Under normal conditions when Lake Elsinore is not spilling, Temescal Wash receives discharges of highly treated tertiary effluent from the Elsinore Valley MWD Regional Plant and excess recycled water from the Eastern MWD Temescal Valley Water Reclamation Facility (MWH, 2005).

Morrell Canyon and Decker Canyon

The Morrell Canyon and Decker Canyon upper reservoir sites would be located on the west side of the Elsinore Mountains within the upper drainage of San Juan Creek which does not drain to Lake Elsinore. The Morrell Canyon site has a drainage area of 3.28 square miles upstream of the proposed dam, although most of that drainage would be bypassed around the reservoir. The Decker Canyon site is located at the headwaters of its drainage basin and would only drain about 90 acres (0.14 square mile). The San Juan Creek flows generally towards the west and has a 176 square mile drainage area when it discharges into the Pacific Ocean at Doheny State Park near Dana Point and Capistrano Beach in Orange County. Stream flows in the proposed Morrell Canyon site and Decker Canyon site are seasonal and intermittent. However, owing largely to development and urban runoff (about 35 percent of the watershed is urbanized), San Juan Creek becomes perennial near the mouth of the basin, possibly due to effluent from waste water treatment plants and similar inflows during the dry season. Streamflow in San Juan Creek since 1986 has been measured at USGS gage no. 11046530, La Novia Street Bridge near San Juan Capistrano, which has a drainage area of 109 square miles. Table 4 shows the annual stream flow data for this gage.

Table 4. Daily discharge (cfs) statistics for USGS gage no. 11046530, San Juan Creek at La Novia Street Bridge near San Juan Capistrano, for water years 1986 to 2004. (Source: USGS, 2005b)

Mean	Median	Max.	Min.	10% Exceedance	60% Exceedance
20.6	0.90	5,700	0	20	Less than 0.1

Note: cfs – cubic feet per second

Groundwater

The Elsinore groundwater basin extends under a surface area of 40.2 square miles in Elsinore Valley, which includes Lake Elsinore. The groundwater basin is bounded by the Santa Ana and Elsinore Mountains to the southwest along the Willard fault. To the southeast it adjoins the Temecula Valley groundwater basin at surface drainage divide. The Temescal subbasin of the Upper Santa Ana River Valley groundwater basin forms the northwest boundary at a constriction in the Temescal Wash. The northeast boundary is a zone of nonwater-bearing rocks in the Peninsular Ranges along the Glen Ivy fault. Lake Elsinore is underlain by layers of clay, which greatly impedes the downward movement of groundwater because clay acts as an impervious barrier. Due to the geological layout and the surrounding faults, the Elsinore groundwater basin is essentially a closed groundwater basin. The groundwater level in the basin has dropped considerably with estimates of at least a 100-foot drop having occurred in the first half of the twentieth century alone (Joint Watershed Authority, 2005). Until recently, in addition to groundwater withdrawal for irrigation and other needs, groundwater has been pumped from the Elsinore Valley MWD Island Wells, near Lake Elsinore to provide an additional source of water for Lake Elsinore under the pilot discharge project in an attempt to increase and stabilize lake levels. Currently, an ongoing deficit of 1,800 acre-feet per year is estimated (table 5).

Table 5. Estimated groundwater basin budget for Elsinore groundwater basin. (Source: MWH, 2003, as cited in Joint Watershed Authority, 2005)

Location	Average (1990–2000) (acre-feet per year)
Inflows	
Precipitation infiltration from rural areas	2,000
Precipitation infiltration from urban areas	800
Recharge from San Jacinto River	1,700
Recharge from Lake Elsinore	0
Return flows from applied water	600
Return flows from septic systems	1,000
Return flows via subsurface inflow	0
Total inflows	6,100
Outflows	
Groundwater pumping	7,900
Surface outflow	0
Subsurface outflow	0
Total outflows	7,900
Net Deficit	**1,800**

Elsinore Valley MWD developed a draft groundwater management plan for the Elsinore Basin, which was approved by its Board of Directors on March 24, 2005. The objective of the plan is to reverse the ongoing decline in groundwater levels and provide a long-term sustainable groundwater supply by recharging the basin with injection wells that would be located in the Back Basin and on the northwest side of Lake Elsinore.

The San Juan groundwater basin is a shallow basin that is essentially an underground flowing stream with limited storage capabilities. It is located under the San Juan Creek Watershed and tributary valleys in the southern part of Orange County, and is bounded to the west by the Pacific Ocean. Projects supporting groundwater recovery in the San Juan Creek groundwater basin have been initiated (Orange County, 2005).

The part of the groundwater basin near the areas of the proposed Morrell Canyon and Decker Canyon upper reservoir sites contains canyon bottomlands that are covered by alluvium and underlain by granitic bedrock. Lion Spring, where a complex of seeps rise through the subsurface, is located just above the 2,800 feet msl contour line in Morrell Canyon about 500 feet south of the South Main Divide Road. The ephemeral Morrell Creek flows towards the Lions Spring area from a southeasterly direction. During the dry seasons of most years, the surface flows from Lions Springs percolate into the canyon alluvium within a short distance of the springs. Evaporation amounts for the higher elevations associated with Morrell and Decker canyons are estimated to be 38.2 inches per year, slightly lower than the 56.2 inches per year at Lake Elsinore.

Water Quality

Lake Elsinore's morphology and location in a rapidly urbanizing area and upstream land use activities contribute to the quality of storm-water runoff that affects the water quality in the San Jacinto River and, ultimately, Lake Elsinore (Joint Watershed Authority, 2005). Consequently, the overall water quality of Lake Elsinore typically does not meet applicable water quality standards, and the Santa Ana Regional Water Quality Control Board (Santa Ana Water Board)) has listed Lake Elsinore as impaired under Section 303(d)[36] of the Clean Water Act for nutrients, organic enrichment/low DO, sedimentation/siltation, and unknown toxicity.

Surface water in the upper San Juan Creek Watershed in proximity to the proposed Morrell Canyon and Decker Canyon upper reservoir sites is intermittent and directly related to precipitation. Lions Spring is a length of streambed where perched groundwater surfaces into the canyon drainage for portions of the year. Because of the natural setting, surface flows originating from the upper watershed are of good quality during the brief times there is enough to runoff; typically during winter rainy season. This contrasts with conditions in the lower watershed near the coast as creek water (limited groundwater mixed with urban nuisance flows) is strongly influenced by the expansive urban development surrounding the lower reaches and is consequently considered impaired under Section 303(d) for pathogens (specifically coliform bacteria). The San Mateo Creek Watershed (south of San Juan Creek Watershed where the southern transmission alignments would be located) is similar to San Juan Creek in that the upper, mountainous creek beds are often void of running water. The lower portion of the San Mateo Creek, which typically has some water, flows through Camp Pendleton, and it has been compromised by the Marine base's activities although not significantly enough to require listing under Section 303(d).

Lake Elsinore water quality objectives are set by the Santa Ana Water Board and published in the Santa Ana Basin Plan (Santa Ana Water Board, 1995). Both San Juan Creek and San Mateo Creek watersheds are under the jurisdiction of the San Diego Regional Water Quality Control Board (San Diego Water Board) and subject to provisions of the San Diego Basin Plan (San Diego Water Board, 1994). According to the Santa Ana Basin Plan, the existing beneficial uses within Lake Elsinore[37] include contact and non-contact recreation, warm freshwater habitat, and wildlife habitat.

The designated beneficial uses of San Juan Creek include agricultural and industrial process supply, contact and non-contact recreation, warm and cold fresh water habitat, and wildlife habitat. The designated beneficial uses of San Mateo Creek include contact and non-contact recreation, warm and cold fresh water habitat, wildlife habitat, rare, threatened or endangered species, and spawning, reproduction and/or early development habitat. Table 6 shows the beneficial use designation definitions while table 7 presents objectives for algae, temperature, DO, pH, coliform bacteria, toxicity, and physical parameters.

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[36] Under Section 303(d) of the Clean Water Act, states are required to submit a list of waters for which effluent limits will not be sufficient to meet all state water quality standards. The 303(d) listing process includes waters impaired from point and non-point sources of pollutants. States must also establish a priority ranking for the listed waters, taking into account the severity of pollution and uses. EPA regulations that govern 303(d) listing can be found in 40 CFR 130.7.

[37] In 1988, the State Water Board adopted the Sources of Drinking Water Policy (State Water Board Resolution No. 88-63) that directed the Santa Ana and San Diego Water Boards to add the Municipal and Domestic Supply (MUN) Beneficial Use for all waterbodies not already so designated, unless they met certain exception criteria. Lake Elsinore is excepted under this provision.

Table 6. Beneficial use designation definitions. (Source: Santa Ana Water Board, 1995; San Diego Water Board, 1994)

Beneficial Use	**Definition**
AGR	Agricultural Supply waters are used for farming, horticulture, or ranching. These uses may include, but are not limited to, irrigation, stock watering, and support of vegetation for range grazing.
COLD	Cold Freshwater Habitat waters support coldwater ecosystems that may include, but are not limited to, preservation and enhancement of aquatic habitats, vegetation, fish, and wildlife, including invertebrates.
IND	Industrial Service Supply waters are used for industrial activities that do not depend primarily on water quality. These uses may include, but are not limited to, mining, cooling water supply, hydraulic conveyance, gravel washing, fire protection, and oil well re-pressurization.
RARE	Rare, Threatened or Endangered Species waters support habitats necessary for the survival and successful maintenance of plant or animal species designated under state or federal law as rare, threatened or endangered.
REC1	Water Contact Recreation waters are used for recreational activities involving body contact with water where ingestion of water is reasonably possible. These uses may include, but are not limited to, swimming, wading, water-skiing, skin and scuba diving, surfing, whitewater activities, fishing, and use of natural hot springs.
REC2	Non-contact Water Recreation waters are used for recreational activities involving proximity to water, but not normally involving body contact with water where ingestion of water would be reasonably possible. These uses may include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tide pool and marine life study, hunting, sightseeing, and aesthetic enjoyment in conjunction with the above activities.
SPWN	Spawning, Reproduction, and Development waters support high-quality aquatic habitats necessary for reproduction and early development of fish and wildlife.
WARM	Warm Freshwater Habitat waters support warmwater ecosystems that may include, but are not limited to, preservation and enhancement of aquatic habitats, vegetation, fish, and wildlife, including invertebrates.
WILD	Wildlife Habitat waters support wildlife habitats that may include, but are not limited to, the preservation and enhancement of vegetation and prey species used by waterfowl and other wildlife.

Table 7. Applicable water quality objectives for waters potentially affected by the proposed project. (Source: Santa Ana Water Board, 1995; San Diego Water Board, 1994)

Parameter	Santa Ana Basin Plan Objective	San Diego Basin Plan Objective
Algae	Waste discharges shall not contribute to excessive algal growth in inland surface receiving waters.	Does not exist.
Temperature	The temperature of waters designated WARM shall not be raised above 90°F June through October or above 78°F during the rest of the year as a result of controllable water quality factors. Lake temperatures shall not be raised more than 4°F above established normal values as a result of controllable water quality factors.	Natural water temperatures of basin waters shall not be altered unless it can be demonstrated to the satisfaction of the San Diego Water Board that such alteration does not affect beneficial uses.
Turbidity	Waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses. Increases in turbidity attributable to controllable water quality factors shall not exceed the following limits: 0–50 NTUs not to exceed 20%, 50–100 NTU increases not to exceed 10 NTU, greater than 100 NTUs not to exceed 10%.	Waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses. Inland surface waters shall not contain turbidity in excess of 20 NTUs more than 10% of the time during any 1-year period.
Dissolved Oxygen	The DO content of surface waters shall not be depressed below 5 mg/l for waters designated WARM, as a result of controllable water quality factors. In addition, waste discharges shall not cause the median DO concentration to fall below 85% of saturation or the 95th percentile concentration to fall below 75% of saturation within a 30-day period.	DO concentrations shall not be less than 5.0 mg/l in inland surface waters with designated MAR or WARM beneficial uses or less than 6.0 mg/l in waters designated COLD beneficial uses. The annual mean DO concentration shall not be less than 7 mg/l more than 10% of the time.
pH	The pH of inland surface waters shall not be raised above 8.5 or depressed below 6.5 as a result of controllable water quality factors.	The pH value shall not be changed at any time more than 0.2 pH units from that which occurs naturally.
Total Inorganic Nitrogen	1.5 mg/l	Does not exist.

Notes: COLD – cold freshwater habitat

DO – dissolved oxygen

mg/l – milligrams per liter

NTUs – Nephelometric turbidity units

RWQCB – Regional Water Quality Control Board

WARM – warm freshwater habitat

As described above, Lake Elsinore is a large, shallow lake marking the terminus for flows in the San Jacinto River. Development throughout the watershed has led to stream diversions and groundwater withdrawals preventing surface flows from reaching Lake Elsinore in all but the wettest years. Its high evaporation rate (56.2 inches annual average) coupled with its low annual precipitation (11.6 inches annual average) and relatively small watershed area results in a shallow lake for most of the year (Joint

Watershed Authority, 2005). Annual precipitation and runoff vary widely, and so do lake levels along with the amount of exposed shoreline. Throughout its history, Lake Elsinore has been subject to periods of extreme flooding or drying due to the semi-arid climate and varying runoff amounts.

The quality of the lake is also a function of lake levels. As lake levels fall because of low inflow or high evaporative losses, lake constituents such as nutrients and salinity become concentrated, and DO falls as the temperature of the shallower water rises in the summer (Joint Watershed Authority, 2004, as cited by Elsinore Valley MWD and Nevada Hydro, 2004a). These conditions are accompanied by algal blooms (exacerbating DO depletion), odors, and fish kills.

Water Temperature

The Santa Ana Water Board and others have been involved in water quality monitoring since June 2002 as part of improvement projects as discussed in section 3.2, *Cumulatively Affected Resources*. Since 2002, vertical lake sample profiles were conducted at over 10 positions located throughout Lake Elsinore. Vertical profiles taken at sampling site 9 (the deepest sampling site located in the central part of the lake) show strong seasonal differences in temperature, with daytime surface summer water temperatures reaching 29 to 30 degrees Celsius (°C), while the lower water column was typically 25 to 27°C. A transition to cooler temperatures begins in the fall, with the surface temperatures cooling to approximately 20°C in October. Water column temperatures then cool further, with temperatures ranging from 12 to 14°C from November to March. The lake generally begins warming in April, with modest stratification present during this time, while strong heating and stratification were observed in late May to early June.

The co-applicants filed water temperature data for waters in Morrell and Decker canyons in the upper San Juan Creek Watershed and reported temperatures between 13.3 and 17.0°C (4 field measurements taken April 28, 2005, post precipitation event). No water temperature data were collected for waters in San Mateo Creek in the upper San Mateo Creek Watershed. Decker Canyon only experiences surface flows during precipitation events while the Morrell Canyon stream receives some contribution from Lion Spring. Sampling to date has not isolated the difference between storm water and seepage. San Mateo Creek only experiences surface flows during storm events, and temperature data do not exist for this watershed. Because Lion Spring is perched groundwater, it is likely that the average annual temperature is below 20°C.

Dissolved Oxygen

The Santa Ana Water Board has listed Lake Elsinore as impaired for failing to meet numerous Santa Ana Basin Plan objectives, including DO objectives. Measurements that are below state objectives are continually recorded throughout the water column for the majority of the year. Low DO levels in the lake result from aerobic decomposition of algae and other organic material in the bottom waters, nighttime respiration of phytoplankton, plankton blooms, and higher water temperature (warm water contains less oxygen than cold water) during summer months. The Santa Ana Water Board has developed and implemented measures from the draft Total Maximum Daily Load (TMDL) for nutrients to improve water quality and reverse the presently compromised conditions.

DO levels within Lake Elsinore exhibit spatial and temporal trends that vary with lake temperature and depth, which are dynamic throughout the year. In August 2002, oxygen was substantially depleted across the lake, resulting in a fish kill (levels recorded below 1 milligram per liter (mg/l) in the lower third of the water column). As the lake began to mix in October and November 2002, the lake generally exhibited higher concentrations but still reduced DO levels (5 mg/l) near the sediments relative to the surface (8 to 10 mg/l). This period of mixing was followed by a sharp decline in DO throughout the water column in early December 2002. Conversely, Lake Elsinore was generally well oxygenated during the winter of 2003. Historically, DO levels have been observed between 0.1 and 16 mg/l and vary greatly with season, temperature, and depth.

The co-applicants collected DO data for both Morrell and Decker canyons during two sampling events in the winter and early spring of 2004–2005 (December 5, 2004 and April 28, 2005). DO levels within Morrell Canyon around Lion Spring (including immediately upstream and downstream) averaged 8.9 mg/l, which coincided with two precipitation events. The co-applicants provided a single DO measurement of 8.9 mg/l from a sample collected from Decker Canyon in April 28, 2005. No DO data exist for waters in the upper San Mateo Creek Watershed. San Mateo Creek Watershed, due to its relative similarity (intermittent, upper-watershed setting in the same southern California mountain range) to Morrell and Decker canyons is assumed to exhibit similar water quality traits. As such, water (when present) within these upper watersheds is likely to be well oxygenated.

Nutrients

The Santa Ana Water Board recognizes that the narrative water quality objectives set to protect the beneficial uses of Lake Elsinore are not being met as a result of high nutrient concentrations stimulating excessive algae growth and compromising DO levels. As such, Lake Elsinore is listed as impaired under Section 303(d) for nutrients, and this impairment requires the establishment of a TMDL for the pollutants causing the impairment (nitrogen and phosphorus).

Lake Elsinore is technically eutrophic in that it exhibits the following characteristics: (1) large algae blooms (chlorophyll-*a* > 50 micrograms per liter [μg/l]) and common presence of blue-green algae (cyanobacteria), specifically Microcystis; (2) large seasonal and daily swings in concentrations of DO; anoxic values that have been recorded in deeper waters during most summers; (3) low water clarity; Secchi disc values less than 1 meter; (4) high concentrations of inorganic nitrogen; and (5) high concentrations of total phosphorus. These observations substantiate the pilot Lake Elsinore Recycled Water Project, an effort that enables Elsinore Valley MWD to discharge treated wastewater into Lake Elsinore to maintain higher lake levels in hope of minimizing effects from high evaporative losses and low inflow rates. This effort is designed to help restore the water quality of Lake Elsinore to meet state objectives.

Sampling results show that the total phosphorus concentration in Lake Elsinore has generally been increasing between 2002 and 2004. Total phosphorus concentrations vary with the season but were generally observed at approximately 0.3 mg/l throughout the second half of 2002 and rising to approximately 0.5 mg/l in early 2004.

Total nitrogen concentrations were variable between 2000 and 2004. Average summer concentrations were approximately 3.0 mg/l in 2000 and 2001 rising to approximately 5.0 mg/l in 2002 and 2003. Winter total nitrogen concentrations for all sampled sites from 2003 to 2004 averaged 11.8 mg/l; however, data presented by the co-applicants exhibit considerable variability between days and pronounced swings seasonally and annually.

Sampling information filed by the co-applicants indicates that the total nitrogen: total phosphorus ratio was variable since sampling began in summer 2000. From summer 2000 through the summer of 2002, there were periods of strong phosphorus limitation (ratios up to 50:1), interrupted with periods during the winter of co-limitation (~15:1) and brief periods of nitrogen limitation (~5:1). The general trend since June 2002 has been moving toward nitrogen limitation.

Field sampling to characterize the waters of Morrell and Decker canyons filed by the co-applicants report total nitrogen and phosphorus concentrations following a precipitation event. Total nitrogen concentrations for above and below the proposed Morrell Canyon upper reservoir site were reported as 5.0 and 4.4 mg/l, respectively. The total nitrogen concentration below the Decker Canyon upper reservoir site was reported at 1.4 mg/l. A single sample recorded a phosphorus concentration of

0.56 mg/l below the proposed Morrell Canyon upper reservoir site. All other samples were below the reporting limit. No samples were collected within the upper San Mateo Creek Watershed.

Algae (Chlorophyll and Transparency)

According to the Santa Ana Water Board, hypereutrophication (over enrichment of nutrients) of nitrogen and phosphorus is the most severe water quality problem in Lake Elsinore (Santa Ana Water Board, 2001). These elevated nutrient concentrations cause algae blooms that also result in low DO levels, which further result in fish kills. The presence of unsightly amounts of algae conflicts with the beneficial uses of Lake Elsinore, specifically warmwater habitat (WARM), body and non-body contact recreation (REC-1 and REC-2), and is directly linked to the implementation of the nutrients TMDL. Chlorophyll concentrations show a slight seasonal trend with peaks in the late spring-summer. The Santa Ana Water Board recorded a maximum concentration of about 400 μg/l in fall 2002; however, 200 μg/l is a more typical concentration observed since 2003. Algae blooms are known to occur in the lake and result in floating mats of algae. These blooms typically occur in the summer to fall season but could potentially occur at anytime during the year when there are sufficient nutrients and ample sunlight. Secchi depths, an indicator of the lake's transparency, have been relatively stable since June 2002 at approximately 0.2 meter.

Samples from the San Juan Creek and San Mateo Creek watersheds are not available to include in this discussion. Given the remote nature and the intermittent nature of the waters potentially affected by the proposed project, and the low nutrient concentrations observed in field samples, it is unlikely that large amounts of algae as a result of nutrient enrichment would compromise the waters.

pH

The Santa Ana Water Board sampling program has observed that the pH of Lake Elsinore has averaged slightly greater than 9 between April 2002 and June 2004, although the pH profiles show some vertical and temporal trends. The range of pH values recorded during this time period is 8.7 to 9.5. High pH values are often the result of the respiration of aquatic organisms (e.g., algae). The build up of carbon dioxide in the water leads to a chain of chemical reactions that ultimately increase the alkalinity of the water (increased pH). The co-applicants reported pH values between 7.42 and 7.65 from samples taken within Morrell and Decker canyons in December 2004 and April 2005 shortly after rain events. Information about the water quality of upper San Mateo Watershed is not available, but is likely to be similar to the waters in the upper San Juan Watershed.

3.3.2.2 Environmental Consequences

Water Quantity

Construction of the LEAPS Project may result in short-term effects on surface water quantity, including alteration to existing drainage patterns and possible effects on regional storm drainage and flood control facilities and groundwater flow patterns. Subsequent operation of the project may affect water quantity, such as evaporation, diminished spring flow, and effects on groundwater supplies, on a long-term basis. New facilities could alter runoff patterns, and the construction of new dams could increase the risk of possible inundation either from reservoir overflow or dam failure. The co-applicants have committed to fully complying with all applicable federal, state, and local requirements and regulations for the maintenance of the affected surface water and groundwater for their stated beneficial uses and are committed to working with the State Water Board, Santa Ana Water Board, and San Diego Water Board to increase or enhance those uses.

Effects of Construction on Surface Water

Co-applicants' Proposal—Before starting construction, the co-applicants propose to submit an erosion control plan as described in section 3.3.1.2, *Environmental Consequences*, in *Geology and Soils*. A detailed description of the measures to be constructed by the co-applicants is also contained therein.

The co-applicants propose to use existing roads wherever possible and to recontour and revegetate temporary roads after construction. Surface drainage would be provided around any proposed facilities to limit erosion and ponding around foundations and access roads.

The co-applicants may construct a small detention facility to temporarily accumulate storm water to control large stormwater flows. Storage in this facility would be designed to minimize uncontrolled inundation. The co-applicants also propose the following:

- Reroute or channel Lion Spring;
- Realign Morgan Trail and make subsequent plantings to stabilize the area;
- Mitigate the effects of construction on surface water quantity by managing storm water in accordance with BMPs; and
- Construct the intake-outlet structure in Lake Elsinore using dry methods.

Resource Agency Measures

The USFS specifies in revised preliminary 4(e) condition no. 15, as elements of the erosion control plan, that the co-applicants implement measures to divert runoff away from disturbed land surfaces and provide descriptions of both the actual site conditions and detailed descriptions, design drawings, and specific topographic locations of all control measures. The erosion control plan and its effects are described in greater detail in section 3.3.1.2, *Environmental Consequences*, in *Geology and Soils*. USFS revised preliminary 4(e) condition no. 35 calls for the co-applicants to consult with the USFS and develop, within 6 months of license issuance, a surface water resources management plan with a focus on riparian resources. This plan is evaluated in detail in section 3.3.4.2.

The Riverside County Flood Control District requests that effects on Riverside County Flood Control District storm drainage facilities be identified and that encroachment permits be obtained from the Riverside County Flood Control District prior to construction. Additionally, the Riverside County Flood Control District requests that effects on the West Elsinore Master Drainage Plan be assessed.

The co-applicants also indicate they would be subject to the San Jacinto Watershed Permit for storm water discharges. New developments such as the LEAPS Project are required to have storm-water pollution prevention plans, monitoring programs, and post-construction management plans that have been approved by the Santa Ana Water Board's Executive Director prior to the start of construction. Storm-water runoff must be monitored for at least three storm events per year during construction and an additional year after construction is completed. Although primarily geared toward water quality, BMPs related to drainage control during construction would be included.

Effect Analysis

Construction of the proposed project could affect the county storm drain infrastructure and flow quantities in San Juan Creek and its tributaries. The development of an erosion control plan that includes measures to control surface runoff, as proposed by the co-applicants and specified by the USFS would be necessary to identify specific BMPs and might include temporary diversion and routing facilities, temporary detention basins, and a specific approach for dealing with flood events during construction. Implementation of such measures would minimize the amount of surface runoff during construction. In developing detailed drainage plans for construction, the co-applicants would likely consult with local and county government agencies responsible for drainage and flood control. Similar measures would apply to staging areas and borrow areas throughout the project area. Construction of a new Morgan Trail alignment in the vicinity of the upper reservoir would also require drainage control measures to prevent portions of the trail from eroding away under higher water conditions. Such measures could potentially alter current runoff patterns in the basin by concentrating the flow over drainage ways as opposed to overland flow that presently occurs. These measures should also specifically address the diversion of Lion Spring during construction and describe how that water would be delivered to an area downstream of the project-affected area. Any temporary roads developed here or elsewhere in the project would be removed, recontoured, and revegetated following construction except where the USFS authorizes continued use of the roads for transmission line maintenance, eliminating long-term impacts from temporary roads. All of these measures would be expected to control and minimize the amount of surface runoff during construction. The potential effects of surface runoff on geology and soils and water quality are discussed in sections 3.3.1.2 and 3.3.2.2, respectively.

The development of a 30-acre site for the proposed Santa Rosa underground powerhouse also would likely require drainage planning during construction. As the site is cleared and graded, the runoff characteristics would change and BMPs would be necessary to control and detain drainage in the modified environment. The proposed erosion control plan would address how this would be accomplished. Implementation of drainage measures developed in consultation with appropriate drainage and flood management agencies would diminish the quantities of uncontrolled runoff and potential flood damages.

Lake Elsinore is an existing reservoir, and significant hydraulic modification has already occurred. Potential effects during construction include greater than normal drawdowns to facilitate construction. This would be a short-term measure and the drawdown elevation would largely be dictated by the hydrologic conditions present at that time.

Construction of the proposed project could affect the county storm drain infrastructure and potentially the water levels of Lake Elsinore. The development of surface runoff control measures as part of the erosion control plan for construction activities would identify specific BMPs, which could include temporary diversion and routing facilities, temporary detention basins, any necessary cofferdams, and would provide a specific approach for dealing with flood events during construction. Implementation of an erosion control plan, including measures to control surface runoff, would minimize the potential for increased or uncontrolled surface runoff entering Lake Elsinore during construction. In developing drainage plans for construction, the co-applicants would likely consult with local and county government agencies responsible for drainage and flood control. The erosion control plan also should identify storm drainage facilities that could potentially be affected by the project. The co-applicants should meet the requirements of local flood authorities for encroachment permits on flood facilities. Implementation of appropriate drainage controls and BMPs developed in coordination with local drainage authorities and incorporation of these agencies' concerns would minimize effects on the local storm drainage system.

Twenty-two stream crossings along the proposed 32-mile transmission alignment would be affected during construction. Effects may include temporary diversion during access road construction and in some instances relocation. Open streams may also be channeled through culverts over the course of construction. Some of these may be permanent as discussed below.

Transmission towers would likely be sited to avoid floodplain areas and thus minimize the potential for affecting watercourses. Access roads would likely affect watercourses where alternative routes avoiding streams could not be established. Effects from the construction of both temporary and permanent access roads would be partially mitigated by complying with both USFS and local drainage requirements as appropriate. Staging areas for temporarily storing transmission line materials would require drainage planning similar to that which the pumped storage project staging areas would require.

Staff Alternative—Construction mitigation for water quantity at the Decker Canyon upper reservoir site would be similar to the proposed Morrell Canyon upper reservoir site, except there is no need to manage flows from Lion Spring. The need for stream bypass system would be eliminated because Decker Canyon is located in the headwaters of the basin and no upstream flows are associated with that site. Side drainage for flows falling off the upstream face of the dam into the basin would still be required.

Optional Ortega Oaks or Evergreen Powerhouse—Surface drainage would be provided around the Ortega Oaks or Evergreen powerhouse facilities to limit erosion and ponding around the foundations and access roads. These measures would apply project-wide, not just in the Ortega Oaks powerhouse area, and are independent of where the powerhouse would ultimately be located.

Effects of Operation on Surface Water

Currently, there are no dams or water retention facilities in the upper reaches of San Juan Creek. Such structures are present in the Caspers Regional Park area located farther downstream. The proposed development and long-term operation of the upper reservoir fluctuating up to 75 feet on a weekly basis would change the characteristics of the upper San Juan Watershed. Operation of a pumped storage project with an upper reservoir at the proposed Morrell Canyon site and a pumped storage powerhouse at the proposed Santa Rosa site would affect water levels both at the upper reservoir and Lake Elsinore.

Project operations would directly affect the diurnal fluctuation of Lake Elsinore. Currently, lake levels vary in Lake Elsinore on a seasonal basis. In the lower reservoir (Lake Elsinore), the typical daily water-level fluctuation would be 1 foot, with the lake level fluctuating about 1.7 feet during the course of the full-week cycle.[38]

Co-applicants' Proposal—Under existing conditions, water from Lion Spring would flow through this area. The co-applicants propose to install a system to convey these waters under the reservoir. Water from a collection structure would be discharged just below the toe of the dam into San Juan Creek via an energy dissipater about 1,050 feet upstream of the northern boundary of the San Mateo Wilderness Area.

The co-applicants propose to replace the water lost to the San Juan Creek drainage from interception in the upper reservoir, if required. The co-applicants suggest that potable water might be used to make up for this loss.

The co-applicants propose to develop and implement a plan for the design and construction of a system that would automatically detect conduit or penstock failure and, in the event of such a failure, immediately shut off flow in the conduit or penstock at the headworks.

As stated previously, the co-applicants propose to operate the lower reservoir (Lake Elsinore) between 1,240 and 1,247 feet msl.

The co-applicants propose to address water quantity effects on Lake Elsinore by paying a lake management fee to Elsinore Valley MWD for make-up water necessary to maintain Lake Elsinore at the proposed project minimum operational target elevation of 1,240 feet msl or above, consistent with the goals of the Lake Elsinore Stabilization and Enhancement Project. The Joint Watershed Authority Program Environmental Impact Report prepared for the Lake Elsinore Stabilization and Enhancement Project indicates that higher, more stable lake levels could be maintained in Lake Elsinore by importing additional water (Joint Watershed Authority, 2005). The co-applicants propose to assist in the funding of

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[38] Specifically, the co-applicants indicate that a 1.7 feet drawdown could occur between 2200 hours on Friday and 1800 hours on Saturday, a period of 20 hours.

such a program, but identify the effects of adding make-up water to Lake Elsinore as outside of the scope of the proposed project. These potential effects are addressed in the Program Environmental Impact Report for the Lake Elsinore Stabilization and Enhancement Project. Specific locations for any point(s) of discharge would be determined in coordination with the Lake Elsinore Stabilization and Enhancement Project design.

The co-applicants also propose a dam safety monitoring program. A dam safety program would address the California Department of Transportation's (Caltrans') concerns about potential dam failure by ensuring the dams are designed in accordance with FERC criteria and that inundation areas of any potential dam break are clearly delineated. We describe the results of a preliminary analysis in section 3.3.1.2, *Environmental Consequences*, in *Geology and Soils*.

Resource Agency Measures

Interior recommends, in its 10(j) recommendation no. 2, that the co-applicants be required to monitor for releases of water from the upper reservoir into the San Juan Creek drainage and to take immediate steps to remedy any effect to fish and wildlife resources. Because such releases primarily affect water quality and aquatic resources, we analyze this recommendation in the water quality section below and in *Aquatic Resources* section in section 3.3.3.2, *Environmental Consequences*.

Caltrans expresses concern about downstream inundation effects on Ortega Highway in the event of a dam failure at Decker Canyon. Potential inundation effects are described in detail in section 3.3.1.2, *Environmental Consequences*, in *Geology and Soils*. It should be noted that a catastrophic release of water from any upstream reservoir site could potentially affect Ortega Highway, further highlighting the importance of dam safety and warning measures proposed in conjunction with the upper reservoir.

Effects Analysis

Co-applicants' Proposal—Construction of an upper reservoir at the proposed Morrell Canyon site would create a 76-acre reservoir in a predominately forested area that contains watercourses with intermittent flow. The reservoir would affect about 130 acres including the non-wetted portion. About 4.3 percent[39] of the Morrell Canyon Watershed area would be directly affected by the footprint of the new upper reservoir at that location. The Morrell Canyon reservoir would be built over the main intermittent stream that drains the canyon. The drainage area corresponding to this stream is approximately 560 acres. A 100-year flood from this tributary would correspond to about 2,200 cfs (Elsinore Valley MWD and Nevada Hydro, 2004b).

Approximately 1.7 acres of waters of the United States would be affected, while 4.8 acres of waters of the state of California would be affected at Morrell Canyon (MBA, 2006).

Interception of rainfall by the uncovered reservoir is expected to be minimal relative to the size of the watershed. The co-applicants estimate that precipitation over the proposed upper reservoir at Morrell Canyon could contribute as much as 135 acre-feet per year during an average year to the San Juan Creek Watershed. This amounts to about 1 percent of the average runoff as measured at the La Novia Street Bridge Gage. Construction of a new reservoir would preclude this water from flowing downstream into the San Juan Creek Watershed.

The effect of rainfall capture during extreme flood events such as the 100-year flood would reduce outflow at the lower end of Morrell Canyon by about 6 percent during such events. On a relative magnitude basis, the effect would be most pronounced close to the dam. For example, about 2 miles

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[39] Computed by dividing the 90 acres of the reservoir the flows inward by the 2,100-acre Morrell Canyon drainage area.

downstream of the dam, more than 50 percent of the flow would be affected, while approximately 5 miles downstream of the dam, only 10 percent of the flow would be affected. More extreme events centered over the drainage area above the reservoir could increase these percentages. During storm events, the co-applicants propose to route water from the upstream tributary under Morrell Canyon reservoir. It is undesirable to have uncontrolled water upstream of a dike or dam structure. The Commission normally requires that upstream water be controlled up to the probable maximum flood. Under the co-applicants' proposal controlling large hydrologic events would require either a very large pipeline (for example, to control a flow 2,500 cfs would require a 16-foot-diameter pipe if a design velocity of 12.5 feet per second were selected (maximum velocity is a function of the abrasivity of the pipe material or coating and such decisions are generally made during the development of the hydraulic design criteria for the project) or a modification to the upstream collection structure. The co-applicants also discuss a potential small detention facility upstream of the diversion structure. As discussed in section 3.3.1, *Geology and Soils*, such a detention structure may be problematic. Insufficient information was provided to fully evaluate whether such a scheme would accommodate the probable maximum flood. It is likely that some type of passive overflow structure also would be required to pass large events into the reservoir and subsequently out through the reservoir spillway. Regardless, a plan would need to be provided to describe how the co-applicants would control upstream water during a probable maximum flood if the Morrell Canyon concept were to proceed to design. We note that the co-applicants provided conceptual information on emergency spillways in their license application, but more detailed information remains to be submitted once an upper reservoir location is finalized.

It is estimated that the upper reservoir would receive about 18 inches of precipitation per year. Approximately 38.2 inches of net evaporation would occur at the upper watershed when precipitation is factored in under the proposed action. Assuming 60 acres is a typical daytime reservoir surface area, approximately 200 acre-feet of water would evaporate from the upper reservoir annually. Since the upper reservoir would be pumping from Lake Elsinore on a daily basis, any evaporation loss from the upper reservoir would be made-up under the same water replacement plan outlined for Lake Elsinore by the Joint Watershed Authority and the added cost would be included in the co-applicants' proposed payment to the Elsinore Valley MWD.

Monitoring potential releases of water from the upper reservoir and having specific remediation plans ready to implement, as recommended by Interior's 10(j) condition no. 2 could provide an early warning of problems containing the Lake Elsinore water in the upper reservoir, in addition to providing potential benefits to water quality and aquatic resources.

The long-term effects of the powerhouse site development on runoff would be mitigated by drainage design in accordance with local requirements. Such requirements would apply regardless of the powerhouse location. The co-applicants' proposal to develop and implement a plan for the design and construction of a system that would automatically detect conduit or penstock failure and provide automatic shutdown under such conditions would reduce or eliminate uncontrolled discharges in the project area. This would also have significant benefit for erosion reduction which is discussed in section 3.3.1.2, *Environmental Consequences*, in *Geology and Soils*.

Under the proposed project, water levels in Lake Elsinore would vary both on a diurnal and weekly basis. The Lake Elsinore daily drawdown would typically be 1 foot per day or 1.7 feet per week. By paying a lake management fee as they propose, the co-applicants can make sure Lake Elsinore would be at the levels needed for the LEAPS Project to be built. Under the current configuration of the lake with the Back Basin levee in place, total evaporation averages 15,500 acre-feet per year, or about 56.2 inches per year (Joint Watershed Authority, 2005) assuming a nominal elevation of 1,245 feet msl, which corresponds to a lake area of 3,319 acres. Evaporation is partially compensated for by 11.6 inches of precipitation over Lake Elsinore or about 3,200 acre-feet of inflow from direct precipitation; however, this evaporation appears to be accounted for in natural inflow estimates. Natural inflow to the lake averages only 11,380 acre-feet per year, resulting in a deficit of about 4,000 acre-feet. Additional factors, such as seepage to groundwater, have led to estimates of annual water deficit that average as high as 7,500 acre-feet per year (about a 4.5-foot drop). During drier years, the deficit can be as high as 15,000 acre-feet. Consecutive dry years can even result in a dry lake condition. A 4-foot drop in Lake Elsinore water surface elevations (from proposed high reservoir level of 1,249 feet msl to a typical reservoir level of 1,245 feet msl, for example) results in 93 acres of exposed shoreline; a drop of 9 feet (to the lowest expected reservoir level of 1,240 feet msl) exposes 338 acres.

Implementation of the Lake Elsinore Stabilization and Enhancement Project, as supported by the lake management fee would provide make-up water needed to maintain lake levels necessary for project operations and would eliminate the occurrence of undesirable low water levels below 1,240 feet msl. According to Joint Watershed Authority (2005), dry lake conditions would be eliminated entirely, whereas, under current conditions, lake levels are below elevation 1,225 feet msl (close to empty) 20 percent of the time. Under the Lake Elsinore Stabilization and Enhancement Project, the amount of recycled water used for make-up water (in lieu of well water) would be phased in between now and 2020. The projected response of Lake Elsinore from current conditions through 2020 is summarized in table 8. The anticipated frequency of various Lake Elsinore elevations in the year 2020 is summarized in figure 11. Although daily and weekly fluctuations could be greater than under current conditions, the lake would become more stable over a longer time frame. For example, evaporation losses alone could cause the lake to drop 9 to 11 inches in a given month (Corps, 2003). This effect would accumulate over several months. Under the Lake Elsinore Stabilization and Enhancement Project, the lake would be above elevation 1,244 feet msl more than 60 percent of the time and never drop below elevation 1,240 feet msl. The lake would be stabilized over a 5-foot range from elevation 1,242 feet msl to 1,247 feet msl nearly half the time. Without the Lake Elsinore Stabilization and Enhancement Project, the lake would fall below elevation 1,240 feet msl over 58 percent of the time and below elevation 1,247 feet msl 72 percent of the time.

Table 8. Projected Lake Elsinore response to proposed sources of make-up water. (Source: Joint Watershed Authority, 2005)

	Recycled Water[a]			**Island Wells**			**Lake Elevation**	
Year	**Flow to Lake (mgd)**	**Target Elevation for Water Addition**	**Percent of Time Used**	**Water to Lake (mgd)**	**Target Elevation for Water Addition**	**Percent of Time Used**	**Minimum Elevation (feet msl)**	**Percent of Time Exceeding 1,240**
Base-line	0.0	NA	0	0.0	NA	0	1,223.0	58
2005	4.5	1,247.0	65	3.2	1,247.0	65	1,235.6	88
2010	5.9	1,247.0	61	3.2	1,247.0	61	1,240.0	100
2015	6.4	1,247.0	63	3.2	1,244.4	39	1,240.0	100
2020	7.00	1,247.0	63	3.2	1,242.7	23	1,240.0	100

Notes: mgd – million gallons per day

msl – mean sea level

[a] Recycled water supply is the projected effluent from the Regional Plant less 0.5 mgd, which is discharged to Temescal Wash.

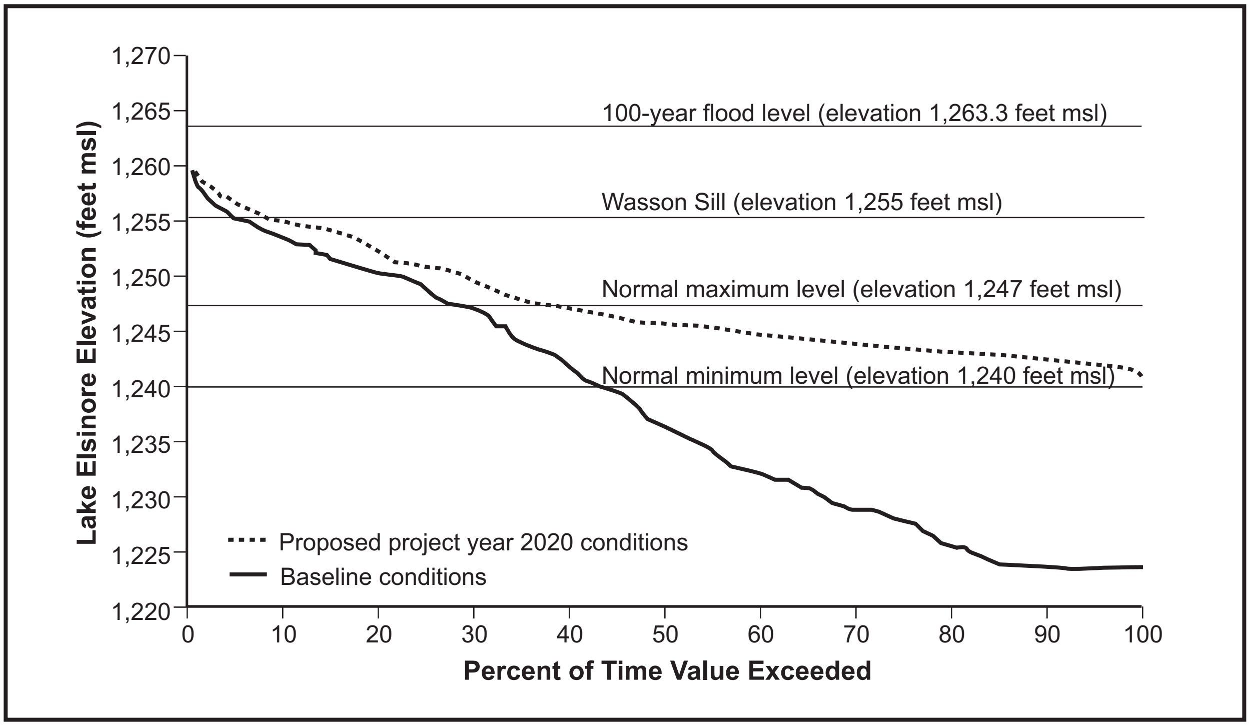

Figure 11. Projected frequency of Lake Elsinore lake elevations under current conditions (baseline) and proposed 2020 conditions with make-up water. (Source: Joint Watershed Authority, 2005)

Another projected effect of higher lake levels is a greater increase in the frequency of spills into Temescal Wash and Back Basin. Currently, Temescal Wash spills occur 43 months during a 74 year simulation period, while Back Basin spills occur twice in the same period. Under 2020 conditions with augmentation in place, Temescal Wash spills would rise to 72 months during a 74-year simulation period, and Back Basin spills would increase to 3 months in 74 years. The magnitude of Temescal Wash spills would not change; however, the Back Basin spills would increase from a maximum monthly spill of 61,123 acre-feet to 85,432 acre-feet (Joint Watershed Authority, 2005).

Staff Alternative—The co-applicants did not provide estimates for the 100-year flood in the 646-acre drainage area associated with the Decker Canyon upper reservoir. We estimate that the 100-year flood for this area would be about 2,500 cfs based on the drainage area relative to Morrell Canyon.

Approximately 0.3 acre of United States waters and 0.9 acre of state waters would be affected at the Decker Canyon alternative site (MBA, 2006). Water level fluctuations and evaporation effects at the Decker Canyon upper reservoir site would be comparable to those effects determined for proposed Morrell Canyon site.

Interception of rainfall by the uncovered reservoir would be expected to be minimal relative to the size of the watershed. Because the Decker Canyon reservoir would be a similar size as the Morrell Canyon reservoir, we estimate that precipitation over the upper reservoir at Decker Canyon could contribute as much as 135 acre-feet per year during an average year to the San Juan Creek Watershed. This amounts to about 1 percent of the average runoff as measured at the La Novia Street Bridge Gage. Construction of a new reservoir would preclude this water from flowing downstream into the San Juan Creek Watershed. Because of the similar size and hydrology, the effects during extreme events at the Decker Canyon site would be similar to those anticipated at the proposed Morrell Canyon site.

Effects similar to the proposed transmission alignment would occur for the staff alternative transmission alignment.

The development and implementation of a revised lake operating plan for Lake Elsinore would ensure that the effects related to higher lake water levels, flood control, and water supply in combination would not produce unexpected consequences. Consultation with the Corps and local flood control authorities during the development of this plan would ensure coordination among agencies that have a role in managing water inflow and outflow from Lake Elsinore.

Optional Ortega Oaks or Evergreen Powerhouse—The effects of operations at the Ortega Oaks or Evergreen powerhouse site would have similar effects on Lake Elsinore and upper reservoir water surface fluctuation as with the proposed Santa Rosa site. The long-term effects of site development on runoff would be mitigated by drainage design in accordance with local requirements. Such requirements would apply regardless of the powerhouse location.

Groundwater

Effects of Construction on Groundwater

Excavation activities to construct the upper reservoir dam/dike foundations, to install the seepage collection system at Lion Spring (and for other as-yet unmapped groundwater, as shown by typical "subdrain laterals" on design drawings), and to develop tunnels for the conveyance of water from the upper reservoir to the Santa Rose powerhouse and from the powerhouse to Lake Elsinore could encounter and release groundwater.

Co-applicants' Proposal—The co-applicants propose to develop and implement an upper reservoir and water conduit monitoring program to determine effects on groundwater levels and water quality. The program would include a baseline groundwater monitoring system installed prior to site development designed to avoid any adverse effects of any groundwater on aquifers during construction. The system would include perimeter wells around the facility and a network of wells down-gradient of the perimeter wells to observe groundwater levels and facilitate collection of water quality samples.

The co-applicants propose to grout and seal observed seeps that are encountered during tunneling operations. This would be done prior to the installation of either the concrete or steel tunnel liners. The co-applicants also propose to perform remedial grouting after construction if excessive seepage is discovered to occur.

Resource Agency Measures

USFS in its revised preliminary Section 4(e) condition no. 36 includes specific provisions in the upper reservoir and water conduit monitoring program for groundwater exploration and aquifer characterization, consultation on groundwater inflow criteria, and monitoring groundwater levels during the construction and operation of the water conduits including the tunnels and penstocks that convey water between the upper reservoir and the powerhouse for 10 years or longer, if necessary, specifying remedial actions if monitoring reveals changes in groundwater or seepage into the tunnels. Specifically revised preliminary condition no. 36, *Groundwater Management Plan*, recommends the following:

Within 1 year of license issuance the licensee would file with the Commission a plan approved by the USFS for the management of groundwater and the associated surface waters on or affecting National Forest System lands. The purpose of the plan would be to reduce the potential for groundwater extraction or contamination and related effects to surface water resources. At a minimum, a groundwater management plan would include:

1. a groundwater exploration and aquifer characterization plan that includes the use of existing data as well as installation of additional exploration boreholes and monitoring

wells, aquifer testing (which includes water quality) and geophysics as deemed necessary to determine baseline data, construction monitoring data and post construction monitoring data for the area potentially impacted by the project.

2. the identification of groundwater inflow criteria for tunneling.

3. a plan to monitor and control groundwater levels and tunnel inflows for the duration of the construction of the penstocks and tunnels and for a minimum of 10 years post construction unless it can be determined that construction related impacts no longer exist. This plan may include, but is not limited to, the development and use of a groundwater model as well as the installation and use of in-tunnel piezometers, monitoring wells, and seepage collars (or other means to control longitudinal flows along the tunnel).

4. a groundwater testing and monitoring program for the lined reservoir and the tunnel (unless a final impervious liner is installed prior to commissioning) that will detect seepage from the reservoir into the groundwater and riparian areas. This monitoring program would remain in place for the life of the permit project.

Effects Analysis

Because of the inherently linked nature of the powerhouse gallery, tailrace structure, and the high-pressure conduit these project components are analyzed together. Groundwater has not been characterized for the conduit alignments through the Elsinore Mountains, at the powerhouse locations, or the tailrace area; however, based on its location below the water surface of Lake Elsinore, it is expected to be encountered during construction of the tailrace structure. Groundwater may be encountered in the Elsinore Mountains during construction of the high-head tunnels. To facilitate work in a safe environment, this water may be temporarily drained from the tunnel during construction; however, once the tunnels are lined with concrete we do not anticipate that the tunnels will have adverse effects on groundwater.

Excavation for reservoir construction and the placement of a seepage collection system could destabilize localized artesian groundwater. Groundwater extent (depth to aquifer, hydrostatic pressures, etc.) has not been surveyed or characterized. Additionally, there are approximately 600 residents living downstream near the Ortega Highway-San Juan Creek crossing. The water source of these residents is presumably dominated by groundwater supplies. The effect on these water sources (particularly as related to the known groundwater system tied to Lion Spring) has not been quantified.

Groundwater and soft soils may produce problematic construction conditions for the tailrace tunnels and intake/outlet structure; however, the effect of any dewatering (groundwater pumping for construction) is likely to be localized and only for a relatively short duration until a shaft casing could be installed. Based on the aspects of project construction and the regional geologic setting, long-term effects on the local and regional groundwater (i.e., a lowering of the piezometric surface) are not anticipated for the proposed powerhouse and tailrace structure; however, this assessment could change based on the co-applicants' proposed groundwater level monitoring and geotechnical studies prior to the start of construction.

Following geologic investigations, the Commission would require a plan be submitted explaining the possible effects of project construction and operations on groundwater. In particular, the plan would describe the upper reservoir and water conduits monitoring program to determine groundwater levels and water quality and any expected impacts on groundwater sources used by nearby residents. The plan would also include a description of the proposed measures proposed by the co-applicants that would be taken during construction and project operations to prevent adverse impacts on the local water supply. The safety and adequacy of design specifications and construction measures such as a dewatering plan would also be developed prior to construction by the co-applicants' design engineer under the oversight of the board of three or more qualified independent engineering consultants and be reviewed by the Commission's Division of Dam Safety and Inspection.

There is a concern that given the uncertain nature of the geology and other subsurface conditions, there could be unanticipated effects due to construction on groundwater. Regardless of the location of the upper reservoir, an integrated approach to defining the baseline and monitoring effects on groundwater levels, as proposed by the co-applicants, over a minimum 10-year period, such as the USFS specifies under condition no. 36, would contribute to a better understanding of project effects both during and after construction and facilitate corrective actions.

Control of groundwater may involve the discharge of such water to receiving waters (surface waters) in the Lake Elsinore Basin, and the erosion control plan should address the routing of such water. It is not anticipated that groundwater run-off during construction would be a significant source of make-up water into Lake Elsinore. However, groundwater run-off could occur during construction and could affect aquifers and the habitats that rely on natural seeps or near surface groundwater from aquifers. Installation of a groundwater level monitoring system would enable the co-applicants to detect changes in groundwater level changes and to take remedial actions. The tunnel would be lined, and excessive seepage would not be expected after construction. However, should groundwater level changes be detected during construction, continued monitoring of project operations over the term of any license issued for the project would be reasonable to ensure that lining is effective in preventing seepage.

The effect of daylighting[40] and destabilizing local groundwater through road cuts and disruption of hillslope runoff has been documented in numerous wildland road studies (King and Tennyson, 1984; Reid, 1999; Wemple et al., 1996). Effects for the proposed transmission alignment would be the same, with the exact extent and location determined by final design and routing of access and maintenance roads. Analysis of individual alternatives and effects is not possible nor needed because all alternatives cross relatively similar terrain. Roads would be restricted to slopes less than 15 percent.

The main effect of daylighting a slope is the draining of the groundwater (if any) that was slowed and held in place by the soil since removed by the roadcut. In topographic draws and creek valleys, such interception of groundwater can substantially dry up the area downslope (cutting off the supply of shallow groundwater while the roadway captures surface runoff), and areas upslope realize a decline in groundwater levels as the roadcut "drains" the hillslope. In arid environments, such effects could be profound for vegetation and the species that depend upon it.

To the extent possible, BMPs and sound road design practices that are cognizant of such wildland road construction effects can mitigate partly for the inherent effects of road construction on groundwater. In certain situations, there is no cost-effective alternative or mitigation for the adverse effects of hillslope roadcuts on local groundwater. Installation of transmission towers via helicopter in areas with slopes greater than 15 percent would minimize the potential effects of road cuts.[41]

Construction of the proposed transmission alignment for placement of the towers has minimal potential to affect groundwater. Roads and their construction, with direct cuts across hillslopes and

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[40] Daylighting of groundwater occurs where the water surface or entire layer of water leaves the cover of rock or soil and is open to the atmosphere, exposing the groundwater surface or layer to the daylight. This can occur naturally (e.g., a line of seeps or springs across a hillslope), or as in this instance, in a roadcut where groundwater is exposed by removal of soil and rock from a hillslope, typically at a location where there is an increase in the slope angle.

[41] The USFS staff indicated that road construction would probably not be allowed in areas with greater than 15 percent slope.

through their capture and relatively rapid transfer of runoff to stream channels, could affect shallow groundwater.

*Staff Alternative***—**Effects associated with the alternative upper Decker Canyon reservoir site would be the same as previously described for the proposed upper reservoir site, with the exception that effects related to Lion Spring are limited to the proposed Morrell Canyon. Although no detailed groundwater data is are provided for the alternative Decker Canyon site, unlike the proposed Morrell Canyon site, the effects associated with groundwater at the Decker Canyon site should be less because there is reportedly no surface manifestation of groundwater at Decker Canyon.

The effects associated with the water conduits would be the same as previously described for the co-applicants' proposal except that the first segment of the two high-pressure tunnels would be longer under our alternative.

As with the proposed transmission alignment, localized groundwater could be encountered during the construction of foundations for the staff alternative transmission alignment and appurtenant facilities and would require controls. Effects associated with the staff alternative transmission alignment would be the same as described above for the proposed transmission alignment

Optional Ortega Oak or Evergreen Powerhouse—Effects of construction on groundwater would be the same at the Ortega Oaks or Evergreen powerhouse site as those associated with the proposed Santa Rosa site.

Effects of Operations on Groundwater

*Co-applicants' Proposal***—**The co-applicants propose to install reservoir liners at the proposed Morrell Canyon site. The liner would be a double-liner system designed to prevent upper reservoir leakage from contacting natural groundwater seeps. The liner system is described in section 2.3.1. The co-applicants propose to monitor the upper reservoir to detect any changes in groundwater levels and water quality after construction.

Resource Agency Measures

The USFS specifies in revised preliminary condition no. 36 that the co-applicants would monitor the operation of the water conduits including the tunnels and penstocks that convey water between the upper reservoir and the powerhouse for 10 years or longer, if necessary, specifying remedial actions if monitoring reveals changes in groundwater or seepage into the tunnels.

Effect Analysis

Installation of a liner system would maintain a separation between the reservoir water and the adjacent groundwater levels. Experience with liners of the type proposed shows that leakage or failure would be unlikely. However, if the liner leaks or otherwise fails, there could be a release of water originating from Lake Elsinore into the groundwater that could migrate to the San Juan Creek. Such releases could potentially affect groundwater quantity in the San Juan Basin. Measures to monitor water quality in San Juan Creek are discussed under *Water Quality* below. Installation of a double liner system should minimize the effect of upper reservoir pool levels on adjacent groundwater resources. The collection system would ensure that spring flows would continue to flow into the San Juan Creek Basin (either as groundwater or surface water). Groundwater recharge in the area directly under the upper reservoir would be eliminated unless additional water is imported. Concern about water quality effects merits careful attention to the source of such make-up water.

As geotechnical studies proceed and more information is developed, the co-applicants should better identify the quantities of such groundwater and the manner in which it can be controlled during construction.

The water conduits could affect groundwater levels. For example, if the native groundwater pressures exceed the tunnel pressures, native groundwater could seep into the tunnels and thereby lower the groundwater level if the water table lies above the penstock. Conversely, if pressure is greater inside the tunnel, water may seep into the native groundwater table and possibly raise the elevation. Because the tunnels would be lined with concrete, we would not anticipate that operation of the tunnels would have adverse effects (i.e., diversion of groundwater). However, the potential for seepage exists and the plan to monitor groundwater levels during construction and for at least 10 years after construction of the penstocks, as specified by the USFS, would be warranted.

Operation of an underground powerhouse at the proposed Santa Rosa site would have localized effects on groundwater flow patterns. The powerhouse would need to be isolated from groundwater flows by a combination of sealing and water control sumps. Groundwater may need to be pumped out of the powerhouse cavity and could potentially be redirected to Lake Elsinore at the surface.

The Lake Elsinore Stabilization and Enhancement Project would likely raise groundwater levels adjacent to the lake since the average lake level would rise (figure 11). Joint Watershed Authority (2005) concluded that pumping from Island Wells to maintain Lake Elsinore lake levels would not substantially deplete the groundwater basin because of the proposed use of recycled wastewater as an additional source of supplementation. Additionally, over time, the percentage of time that Island Wells water would be used to maintain the lake would decrease. Ultimately, as described in Joint Watershed Authority (2005), reliance on Island Wells would fall to zero as recycled waste water availability rises to meet 100 percent of the need to maintain lake levels.

The co-applicants may encounter groundwater in excavating the foundations for transmission towers and appurtenant facilities.

Staff Alternative—Similar liners would be required for the Decker Canyon upper reservoir site to prevent fugitive flows into the San Juan Creek Basin as proposed for the Morrell Canyon site. The requirements for a collection system under the upper reservoir could be eliminated since no active springs were identified in Decker Canyon. Because the Decker Canyon site is similar in size to the proposed Morrell Canyon site, it has a similar potential to affect water quantity and quality in the event of leakage and/or failure.

Construction of the staff alternative transmission alignment would affect groundwater in a manner similar to the proposed alignment.

Optional Ortega Oaks or Evergreen Powerhouse—Construction of the Ortega Oaks or Evergreen powerhouse would be expected to have effects on groundwater that are similar to those associated with the Santa Rosa powerhouse site.

Water Use

Effects of Construction on Water Use

About 5,500 acre-feet of water would be needed for the initial filling of the upper reservoir. The co-applicants propose to obtain this water from recycled water sources available to the Elsinore Valley MWD.

Effects Analysis

Because the co-applicants propose to use recycled water for the initial filling of the proposed Morrell Canyon upper reservoir, effects on local water supply would be minimal. Initial filling requirements and sources of water for the Decker Canyon upper reservoir would be comparable to those for Morrell Canyon. The co-applicants have not identified the source of water for use for fugitive dust control during construction and other construction uses of water. Reliance on recycled water would minimize the effects on local water supplies. It is important to note that the initial filling is a one-time use. Water use during construction is a short-term use, and the co-applicants would either purchase or produce the water needed.

Effects of Operations on Water Use

As discussed in *Water Quantity* above, the co-applicants propose to pay an annual lake management fee to the Elsinore Valley MWD for make-up water to maintain Lake Elsinore at 1,240 feet msl or above.

Effects Analysis

The total storage capacity of the San Juan Creek groundwater basin (location of the upper reservoir) is estimated to be 90,000 acre-feet, including surface and subsurface water in the 111,000-acre watershed. Currently, the basin is estimated to provide 5,000 acre-feet per year of usable groundwater, including 2,000 acre-feet for urban supply and 3,000 acre-feet for agricultural supply. Because the potential yield could be up to 50,000 acre-feet, any effects on groundwater supplies by the upstream reservoir (interception of precipitation which otherwise would have partially infiltrate to groundwater) are estimated to be miniscule. Precipitation for the 90-acre upper reservoir site is estimated to be 18 inches or 1.5 feet per year. Thus, if precipitation were 100 percent effective, it would amount to 135 acre-feet per year. Once evaporation losses are taken into account, the net effect would likely be considerably less than that amount.

Beneficial uses associated with the Elsinore groundwater subbasin include municipal and domestic water supplies. Groundwater extraction in the Elsinore Basin has been an ongoing problem as water demands have increased over time. Declines in the water table in excess of 100 feet have been documented. Currently, Elsinore Valley MWD must import over 48 percent of its water supply and is subject to water shortages during prolonged droughts. A groundwater management plan for the basin is under preparation. Pilot studies on Back Basin groundwater injection also have been initiated.

The co-applicants’ proposal to only operate in the pumping mode when Lake Elsinore’s elevation is higher than elevation 1,240 feet msl, and to pay an annual lake management fee to the Elsinore Valley MWD for make-up water to ensure that the lake water surface level is maintained at 1,240 feet msl, or above, would not result in any additional long-term effects on groundwater levels adjacent to Lake Elsinore, beyond the effects of implementing the Lake Elsinore Stabilization and Enhancement Project. Also under the Lake Elsinore Stabilization and Enhancement Project, the Joint Watershed Authority (2005) proposes to reduce reliance on the Island Wells over time making more use of treated wastewater.

Water Quality

In general, Lake Elsinore is a hypereutrophic lake and listed by the state of California as “impaired” per Section 303(d) of the Clean Water Act for failing to meet applicable water quality objectives for nutrients, organic enrichment/low DO, sedimentation/siltation, and unknown toxicity as described above. Construction of the proposed project could potentially increase the amount of sediment that enters the water, which would affect turbidity. Proposed project construction and operation activities and the storage of oils, fuels, and lubricants have the potential to introduce hazardous substances into project waters. Operation of the proposed project (the cycling of water between the upper reservoir and Lake Elsinore, the fluctuating shoreline, and the maintenance of facilities and transmission lines) could potentially affect multiple water quality parameters within Lake Elsinore and San Juan and San Mateo creeks.

Effects of Construction on Turbidity

Construction of the proposed project may affect the rates of erosion and sedimentation as discussed in section 3.3.1.2, *Environmental Consequences*, in *Geology and Soils*, resulting in increased turbidity and subsequent effects on water quality. Disturbed soils are susceptible to erosive processes and may be transported into project and non-project waters, compromising water quality. All construction activities related to the proposed project could increase erosion potential.

The co-applicants propose several measures to minimize the risk of increased turbidity. In addition to following all local and state regulations related to implementing appropriate BMPs, the co-applicants propose to prepare an erosion control plan with coordination and approval of regulatory agencies as discussed in section 3.3.1.2, *Environmental Consequences*, in *Geology and Soils*. The co-applicants would construct a coffer dam within Lake Elsinore to ensure all work is performed in a dry environment physically separated from the water.

Resource Agency Measures

USFS revised preliminary 4(e) condition no. 15 specifies that the co-applicants, during planning and prior to any new construction or non-routine maintenance projects with the potential for causing erosion and stream sedimentation on or affecting National Forest System lands, file with the Commission an erosion control plan for the proposed project, approved by the USFS, that includes measures to control erosion, sedimentation, dust, and soil mass movement. The USFS specifies that the plan would be based on actual-site geological, soil, and groundwater conditions. The details of the USFS measure are discussed in section 3.3.1.2, *Environmental Consequences*, in *Geology and Soils*.

Project construction could increase turbidity in area streams and Lake Elsinore through two primary pathways: (1) increased surface erosion and (2) in-water construction activities. The potential for increased surface erosion and delivery of sediments into streams adjacent to construction sites is discussed in section 3.3.1.2, *Environmental Consequences*, in *Geology and Soils*.

The co-applicants originally proposed the use of a silt curtain or turbidity barrier to mitigate the potential to adversely affect water quality through increasing turbidity and suspended sediments when conducting in-water construction. This could potentially occur during the installation of the intake/outlet structure, were it to be constructed in the wet. However, construction is proposed to take place within a cofferdam constructed prior to any excavation for the intake/outlet structure. The use of cofferdams would be more effective than a silt curtain.

The proposed construction activities would contribute to continued poor water quality (Lake Elsinore has a current water quality status of impaired for sedimentation/siltation). The incorporation of effective erosion and sedimentation control measures, including BMPs, into the proposed plans for site-specific areas would ensure the following: (1) water resources would be protected from increased turbidity resulting from project-related construction and operations, and (2) project waters would be in a better position to meet applicable state water quality objectives. The development of site-specific erosion and sedimentation control measures for each area of construction would be consistent with USFS revised preliminary 4(e) condition no.15.

Staff Alternative—Construction of the upper reservoir at the Decker Canyon site would produce the same potential effects on water quality as the proposed Morrell Canyon site.

Construction of the staff alternative transmission alignment would result in the same effects on water quality as the proposed transmission alignment.

Optional Ortega Oaks or Evergreen Powerhouses—The Ortega Oaks or Evergreen powerhouse site would exhibit the same potential to affect turbidity and suspended sediment levels in Lake Elsinore as the proposed Santa Rosa powerhouse site.

Effects of Operation on Turbidity

Daily lake levels within Lake Elsinore are estimated to fluctuate between 1 foot and 1.7 feet as water is pumped to the upper reservoir and back and the volume of water within Lake Elsinore changes. Theoretically, changing water levels can cause shoreline soils to expand and contract, asserting a stress that eventually causes the soil structure to break down to the point of failure, resulting in erosion.

Effects Analysis

Lake Elsinore is a shallow lake relative to its surface area with most shoreline slopes between 4 and 8 percent. Proposed project operations would result in daily surface elevation changes between 1 foot and 1.7 feet; these changes correspond to a 8-foot to greater than 100-foot change in exposed shoreline. As discussed in section 3.3.1.2, *Environmental Consequences, Geology and Soils*, the low slope of the shoreline around Lake Elsinore would result in the shoreline migration of sediments rather than in erosion. The daily and weekly fluctuation of the water level as a result of project operations would occur within a narrower range of elevation from 1, 240 feet msl and above. Shoreline sediments within the range of fluctuating lake elevations, as described above, are typically coarse with little organic material. Because Lake Elsinore has fluctuated more than 100 feet in the past, the erosive forces of the water on the shoreline under proposed project conditions would be equal to past and current conditions where wind and wave action increase turbidity in the nearshore environment, except that under the Lake Elsinore Stabilization and Enhancement Project the lake would be maintained at elevation 1,240 feet msl or above so that wave activity would be concentrated in a narrower band of shoreline. Over time, the shoreline would reach seasonal equilibriums as fluctuating lake levels combined with wind and wave patterns move the sands into seasonally stable formations that would generate turbidity levels similar to current conditions.

Effects of Construction on Hazardous Substances Management

Construction activities would require the storage and use of fuels, oils, lubricants, and other potentially hazardous liquids near the water resources. The release or spill of hazardous substances into waters or streams affected by construction or operation activities could have negative effects on water quality as well as terrestrial and aquatic resources. Lake Elsinore is currently listed on the State Water Board’s 303(d) list of impaired bodies for unknown toxicity. The release of additional hazardous substances would only exacerbate this condition. The upper watershed sites are currently void of noticeable negative effects due to hazardous substances.

The co-applicants propose to, and the USFS in its revised preliminary 4(e) condition no. 7 specifies, that the co-applicants prepare a hazardous substances spill prevention and control plan to prevent and minimize any effects associated with the handling of hazardous substances during project construction and operation.

Effects Analysis

In accordance with 40 CFR §112.1 of EPA’s regulations, a hazardous substances plan (also referred to as a hazardous substances spill prevention and control plan) is required to be in place for any facility where unburied storage capacity exceeds 1,320 gallons of oil or a single container has a capacity in excess of 660 gallons, which would include construction and operation areas. In addition to the on-site storage of lubricants and other oil products, transformers at the proposed powerhouse are likely oil-cooled and would be of sufficient capacity to exceed the 1,320-gallon threshold that would require a hazardous substances spill prevention and control plan to be in place independent of this licensing procedure. This plan would provide a quick reference to procedures and notifications in case of oil spills to reduce the possibility of oil or other hazardous substances reaching Lake Elsinore or the San Juan Creek drainage if a spill occurs. A hazardous substances spill prevention and control plan would help to minimize the amount of petroleum products that would enter the proposed project waters in the unlikely event of a spill. The co-applicants would store small quantities of oil and petroleum products necessary to project-related use. However, if other hazardous substances are stored, they should be included in the hazardous substances spill prevention and control plan. Implementation of the hazardous substances spill prevention and control plan would protect water quality during construction of project facilities.

Effects of Operations on Hazardous Substances Management

The storage and use of fuels, oils, and lubricants during proposed project operations could potentially affect the water quality of project waters. The co-applicants propose and the USFS specifies that the co-applicants develop and file a hazardous substances plan with the Commission.

Effects Analysis

The operation of the proposed project would require the storage of more than 1,320 gallons of petroleum products, which as stated above would require the development and implementation of a hazardous substances spill prevention and control plan. Development of the plan would be consistent with the USFS conditions described above.

Effects of Construction on Temperature, Dissolved Oxygen, and Nutrient Cycling

Construction of the proposed project could affect temperature, DO, and nutrient cycling within Lake Elsinore and other affected streams. The co-applicants and agencies do not recommend any specific measures to protect these water quality parameters during the construction phase.

Effects Analysis

Construction of the intake/outlet structure would require work to be performed in the water. This work would be conducted within the confines of a cofferdam, which would limit the interface between the construction activities and lake water. Installation of the intake/outflow structure would require the removal of about 200,000 cubic yards of lake bed material which would be replaced with the steel and concrete structure. The structure would be backfilled and secured prior to removal of the cofferdam. Once the cofferdam was removed, the lake bed would be re-submerged and the construction process would end. As such, construction is not anticipated to disturb or resuspend lakebed sediments, which in part contain nutrients in various forms. The release of nutrients from the sediments within Lake Elsinore occurs naturally; however, the construction activities as planned would limit the amount of disturbed sediments by separating the work environment from the lake, thereby minimizing the amount of nutrients released into the water column.[42] Construction effects on temperature and DO are unlikely. Effects to sediments and nutrients as a result of project operations are discussed below.

Effects of Operation on Temperature, Dissolved Oxygen, and Nutrient Cycling

Operation of the proposed project could affect the temperature, DO, and nutrient cycling occurring in Lake Elsinore. Water transferred and stored at the upper reservoir during nighttime hours could lower water temperatures beyond current observed trends in Lake Elsinore, while water returning to Lake Elsinore could experience some warming in generating mode. The pumping of water and operation of the turbines could aerate the water above existing levels, while discharges could disturb bottom sediments, increasing turbidity and could alter the nutrient cycling in the reservoir. Changing shoreline elevations could also stir up sediments, increasing turbidity and affecting the nutrient cycling.

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[42] Depending on other factors at the time of release, a large nutrient release could stimulate additional algae growth in Lake Elsinore.

The co-applicants state that operating the project as proposed would improve DO in Lake Elsinore. The co-applicants propose to monitor DO and temperature within the tailrace in Lake Elsinore.

Effects Analysis

Transferring water from Lake Elsinore at night and returning it during daylight hours could reduce the temperature of the returning flow by up to 3°C (Elsinore Valley MWD and Nevada Hydro, 2004a). Anderson (2006) states that it is unclear whether the water discharged to the lake would be warmer, cooler, or the same temperature as the water in the lake. Anderson (2006) surmises that the friction associated with moving the water through the generating units could slightly raise the temperature of the water while storage at higher elevation and transfer timing (at night) could result in slight decreases to the temperature, however the magnitude of these changes is not stated. Given that the conduits would be underground where temperatures would be much cooler than the summer time air temperatures at the lake, any gains in temperatures due to friction would likely be negated by the surrounding conditions.

Temperature differences between inflow water and Lake Elsinore water could increase mixing of the water column, an objective of the non-project related axial flow pump program. Elsinore Valley MWD and Nevada Hydro (2005) state that simple design modifications to the intake and outlet pipes could benefit lake mixing by drawing in warm, surface water into the conduit for storage in the upper reservoir where the higher elevations would decrease temperatures. Assuming the water is cooler than the water in Lake Elsinore, this colder water would be denser, and the density gradient would assist in mixing the water column depending on where (depth) the water is returned to Lake Elsinore. To maximize the benefits of returning oxygenated water to Lake Elsinore, the outflow would occur near the lake bed to oxygenate the sediment-water interface, which we discuss in more detail below. The volume of cooler water would not be substantial enough to change the mean temperature within Lake Elsinore, but it should be enough to disturb the water column, resulting in local mixing. The amount of mixing would be dependent on the temperature differences between the inflow and the lake and the distance into the lake the inflowing water would penetrate displacing the existing bottom water.

Operation of the proposed project would increase the concentration of DO in waters returning to Lake Elsinore. The activity of transferring the water through the conduit, penstock pipes, and turbines in conjunction with a greater surface area to volume ratio within the upper reservoir would allow for a greater amount of oxygen to become dissolved in the existing stream waters than under current conditions. The amount of oxygenation would depend on DO concentrations in the water upon transfer, a function of temperature, depth, and season. Water drawn from near the surface of Lake Elsinore would typically have DO concentrations between 4 and 16 mg/l, depending on the season, so additional oxygenation would be marginal as compared to water drawn from the bottom of the lake in summer, which can exhibit DO concentrations of less than 1 mg/l. Transferring water from the bottom of Lake Elsinore to the upper reservoir would provide a greater percentage increase in DO concentrations than from waters drawn at the surface; however, any increase in DO concentrations over the oxygen-deprived conditions that persist at the bottom in summer would be beneficial to the lake returning this oxygenated water to the bottom of Lake Elsinore would replace the water that typically becomes anoxic (lack oxygen) during the summer months. Oxygenation of the water near the sediment-water interface would reduce phosphate concentrations as phosphate binds to precipitates and settle into the sediments under oxic conditions. The mechanical energy exerted on the water column by the inflowing water could also disturb the water column. Improved vertical mixing would help mix high DO surface water produced as a result of photosynthesis deeper into the water column during the day, and also allow greater exchange of oxygen between the atmosphere and the entire water column (Anderson, 2006). Discharges and intakes at the outlet pipe within Lake Elsinore could stir up bottom sediments, increasing turbidity in and around the outfalls and potentially releasing dissolved nutrients sequestered at the bottom, depending on the oxygen concentrations in the water.[43] The area of effect would be concentrated around the pipe outfalls, as the fine materials would be subject to the force of the flowing water on a daily basis.

DO concentrations in the water returning to Lake Elsinore are expected to be above those in the bottom of Lake Elsinore during the summer. Lake Elsinore is currently a dynamic system far from steady-state conditions and experiences high internal sedimentation rates and internal loading of nutrients (Anderson, 2001). Joint Watershed Authority (2005), summarizing nutrient monitoring reports, states "internal recycling from lake sediments was clearly the dominant source of nutrients to the lake (87 percent of the TP and 79 percent of the TN)." As such, the disturbances of additional sediments and release of nutrients stored within those sediments would not constitute a new effect on the lake. However, because the project would run daily, the frequency of the effect may be increased in the short term and localized until the distribution of fine grained material became less sensitive to the inflow and outflow of operations. Furthermore, the purpose of undertaking the Lake Elsinore Stabilization and Enhancement Project is to promote beneficial conditions to the lake, including aeration to prevent the suspension of nutrients within the sediments. Successful implementation of the axial flow pumps and oxygenation enhancement would suppress nutrient releases from suspended sediments because the suspended sediments would be subject to oxic conditions, thereby promoting the formation of precipitates and the removal of phosphate. Depending on the amount of oxygenation the water used for generation under the proposed project receives prior to returning to Lake Elsinore, the discharge of cool, dense, oxygenated water near the bottom could provide additional benefit to the water quality of the lake.

Over time, lakebed sediments would become redistributed in response to the flow disturbances while some material could settle in the path of the flowing water when the project was not operating. The amount is expected to be greatest near the start up and diminish with time as the material would be disturbed on a daily basis. Increased re-suspension of sediment has the potential to increase overall oxygen demand within the water column lowering DO levels; however, this effect would likely be limited to project start-up and decrease over time as sediments are redistributed out of the disturbance area and the overall oxygen demand in the lake is met (Anderson, 2006).

Project operation would result in average daily fluctuations in water surface elevation between 1 to 1.7 feet vertical feet. This 1-foot to 1.7-foot fluctuation would occur within the project target range of 1,240 and 1,247 feet msl. Depending on the location and shoreline configuration, these vertical water surface elevation changes would result in lateral shoreline migration as small as 8 feet (Elsinore Valley MWD and Nevada Hydro, 2004a) to greater than 100 feet in some embayments along the southern shore (Anderson, 2006). Shoreline sediments in this area of lateral shoreline migration are typically coarse with little organic matter (Anderson, 2001). As such, the changing water levels associated with proposed project operations would not likely re-suspend dissolved nutrients sequestered in the sediments.

The embayments along the southern shore (where shoreline fluctuations could measure greater than 100 feet) are protected from wave and wind forces responsible for disturbing shoreline sediments, which would accommodate fine grained material accumulation (Anderson, 2006). The accumulation of fine-grain sediments in the embayments would result in an increase in suspended sediments and turbidity in these concentrated areas. Anderson's (2006) estimate of embayments suggests the linear extent represents less than 10 percent of the total shoreline length. The accumulation of fine grained (and

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[43] The release of nutrients (specifically phosphorus) sequestered in sediments occurs when conditions near the sediments become anoxic (and is often termed "internal loading"), which can result in algae blooms. Maintaining oxygenated water throughout the water column prevents the nutrients stored within the sediments from being released into the water column, which reduces the amount available for use by algae thus improving water quality. Over time, as additional nutrients settle they become stored in the sediments as long as oxygenated conditions persist.

possibly nutrient rich) sediments in the embayments could promote aquatic vegetation growth in these areas, which may stabilize the shoreline, buffering it from wind and wave disturbances that lead to suspended material.

The overall effect of project operations and shoreline fluctuations on lake-wide water quality are not entirely clear; however, we expect that for most of the lake, shoreline fluctuations would not resuspend sediments above any such action currently occurring because most of the material within the fluctuation zone is sand grain size or larger and any fine material in this zone at start up would be suspended and winnowed down to deeper water (Elsinore Valley MWD and Nevada Hydro, 2005). Because of the nature of the material in the fluctuation zone, operations are not expected to release additional nutrients from this area. In areas that are susceptible to fine-grain material accumulation and resuspension, the long term prognosis depends on competing factors such as the nature of the biotic community that may capitalize on the stable lake levels and circulation patterns. We discuss the effects of proposed project operations on the wetland and riparian habitat in section 3.3.4.2, *Effects of Operations on Waters, Wetlands, and Riparian Habitat.*

Over time, project operations should provide a measurable benefit to the annual mean water quality by using temperature and oxygen concentration differences between the two water bodies to promote mixing of the water column and control internal nutrient loading within Lake Elsinore; however, the proposed action alone is not expected to improve water quality to the point where water quality objectives could be met. All of the effects described here, although beneficial in isolation, would be incremental relative to the effects of the Lake Elsinore Stabilization and Enhancement Project, which includes the installation of a mechanical aeration system to improve water quality.

Internal nutrient loading studies (performed for the RWQCB TMDL development effort for Lake Elsinore [Anderson, 2001]) state that it is clear that control of both internal and during wet years, external sources of nutrients, in conjunction with lake level stabilization, is necessary before significant improvements in water quality in Lake Elsinore can be achieved. The Lake Level Stabilization and Enhancement Project, axial flow pumps, oxygen line diffuser system, and a final TMDL are strategies outside of this project that would address, either directly or indirectly, the control of nutrients and work to improve water quality. The effects associated with operations of the proposed project on sediment disturbances would be buffered by these programs. Over time, the area near the outflow pipes would become hardened as the finer sediments would be disturbed and eventually settle away from the disturbance area.

Effects of Operations on the Interbasin Water Transfer and Upper Reservoir

The storage of low quality Lake Elsinore water in the upper reservoir within the San Juan Creek Watershed could negatively affect water quality in the San Juan Creek drainage. Spills or releases from the upper reservoir or leaks in the upper reservoir liner, membrane system, water conveyance system, or subterranean diversion structure that would allow the water from the upper reservoir to reach the San Juan Creek drainage have the potential to degrade water quality in the San Juan Creek Watershed. The co-applicants propose the following: (1) develop a conveyance system to deliver inputs upstream of the reservoir to downstream of the dam; (2) line the upper reservoir with a double-liner system designed to separate upper reservoir leakage from natural groundwater seeps; and (3) monitor water quality during project operation to ensure that Lake Elsinore waters do not find their way into the San Juan Creek drainage.

Resource Agency Measures

Interior recommends (in its 10(j) recommendation no. 2) that the co-applicants develop, in consultation with the FWS and CDFG, and file for Commission approval, written monitoring, maintenance, and remediation plans incorporating agency recommendations for eliminating or reducing the release of water and non-native species from the upper reservoir into San Juan Creek drainage.

Effects Analysis

Water quality within the San Juan Creek drainage is generally superior to that of Lake Elsinore; therefore, release of water from the upper reservoir, which would be imported from Lake Elsinore, would reduce water quality within the San Juan Creek drainage. The transfer of non-native aquatic vegetation is discussed in section 3.3.3, *Aquatic Resources*. The areal extent of effect from a release or spill would depend on a number of factors including the volume of water released, the soil conditions at the time of release, existing flow conditions within the drainage, and the quality of water at the time of the release.

Implementation of the co-applicants' proposed measures would reduce the risk associated with a spill event that could deliver less desirable water in to the neighboring watershed. Although the risk of release would be reduced through implementation of the co-applicants' proposal, it would not be eliminated. The potential risk could further be reduced following monitoring and early detection system as recommended by Interior. Monitoring and early detection system measures would notify the co-applicants immediately if Lake Elsinore water would start making its way into the adjacent drainage and would allow for rapid response measures or plans to be activated.

Staff Alternative—The Decker Canyon upper reservoir would be positioned in the very extreme upper edge of the watershed. Although design plans have not been finalized for this site it is unlikely that surface waters would need to be diverted around the reservoir as there would not be any watershed positioned upstream of the reservoir. Otherwise, effects would be the same as those associated with the proposed Morrell Canyon site.

The cost estimate for the monitoring, maintenance, and remediation plan cost estimate is presented in section 4.0, *Developmental Analysis*, and measures included in the staff alternative are presented in section 5.2, *Discussion of Key Issues.*

Effects of Construction on Algae Blooms

Construction activities associated with the proposed project would be completed within the confines of a cofferdam. Because of this, they are not anticipated to stir up nutrients or result in algae blooms within Lake Elsinore. The co-applicants' proposal to install a silt curtain for all work to be performed in the lake would not be necessary.

Effects Analysis

The potential effects of construction activities on algae blooms are related to the effects of construction on nutrient cycling. The release of nutrients and the resulting availability of nutrients to trigger an algae bloom are directly related. Algae blooms typically occur when there are sufficient nutrients and sunlight, which usually occur during the summer but could occur anytime of year at the lake. The release of nutrients into an oxygenated environment would limit the bioavailability of the nutrients as the forms of nitrogen and phosphorus are related to the conditions in the water column including oxygenation concentrations. Because in-lake construction would be undertaken within the confines of a cofferdam, the release of nutrients (which are dissolved and cannot be contained by alternative methods such as silt curtains) is anticipated to be very minimal. The placement of the cofferdam pilings could disturb a very small amount of sediment displaced by the material being driven into the ground. This effect however would be localized and short term and is not expected to contribute additional sediments or nutrients to the water column triggering an algal bloom.

Effects of Operations on Algae Blooms

Currently, Lake Elsinore experiences conditions conducive for algae blooms which lead to low DO conditions and at times fish kills. Operation of the proposed project could disturb Lake Elsinore sediments releasing nutrients into the water column at rates different than under natural conditions leading to algae blooms. The co-applicants contend that the transfer of water via the proposed penstocks would generate pressures that would be effective in killing the floating algae in the water reducing the amounts of floating algae within Lake Elsinore.

Effects Analysis

Operation of the proposed project could result in changes to the oxygen and nutrient concentrations within Lake Elsinore as discussed above. Increased sheer forces near the sediment-water interface may serve to increase suspended sediments which, depending on the DO conditions at the time could release nutrients to the water column, although if oxic conditions prevail, may lower phosphate levels (Anderson, 2006). Released nutrients would be exposed to an environment with more oxygen than under current conditions, minimizing the amounts of nutrients readily available for algae to metabolize. As such, the operation of the proposed project could help to control algae blooms.

To further reduce the risk of algal blooms and to minimize the size of an occurring bloom, the co-applicants contend that the project intake structure could be designed so that water is drawn from near the surface in hopes that floating algae is captured into the conduits so that when the water is transferred between the upper and lower reservoir the increased pressures within the penstocks destroys the tiny gas vacuoles in the algae cells[44] eliminating their ability to float. Algae that can no longer float would have a very difficult time receiving sufficient sunlight required for photosynthesis, and the cells would eventually die, sinking to the bottom. The amount of floating algae collected and destroyed via this method is thought to be minimal however because it would be very difficult to design an intake structure close enough to the surface (given the lake level fluctuation) and with enough suction to draw large amounts of floating algae mats from the surface of Lake Elsinore. If these design hurdles were overcome, the prospect that significant amounts of algae would be drawn into the system at levels great enough to visibly reduce the amount of floating algae on the lake would be undermined by wind processes, which play a large role in dictating where the floating algae mats are at any given time. In general, the winds push the floating algae mats towards the lake’s shoreline. Complicating the understanding of the level of the effect is the considerable growth rate exhibited by phytoplankton (the predominant algae). Anderson (2006) concludes that the rapid reproduction rate of the phytoplankton would make it difficult to substantially lower their population in the lake under the proposed pumping schedule. The algae cells destroyed by project operations would contribute to oxygen demand in the water column, however natural mixing processes combined with the increased efficiency of the axial flow pumps, installation of the diffused aeration system and the proposed project should all help to achieve oxic conditions in the subsurface (Anderson, 2006).

In addition to the effects on the physical environment that may relate to algae blooms, project operations also could negatively affect zooplankton populations through entrainment. However, this extent of potential effect would depend on the depth of the intake. Top-down control through grazing by zooplankton has generally been limiting phytoplankton levels during 2005 (Anderson, 2006). Reductions in zooplankton populations could exacerbate algae blooms as the food web would be pushed further out of balance. Because zooplankton have slower growth rates than phytoplankton, Anderson (2006) estimates the proposed project could reduce zooplankton populations by between 3 and 13 percent.

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[44] The co-applicants suggest 2 to 3 additional atmospheres of pressure that would be achieved within the water tunnel. Note: 1 atm is equal to about 34 feet of head.

Anderson (2006) did not relate this change in population to the natural variability caused by the historically wide range of lake volumes, which at times likely diminished to zero when the lake dried up. Additionally, as the aquatic vegetation and riparian vegetation in the near shore area stabilizes with project operations, the plant communities could provide protection for the zooplankton minimizing entrainment. As such, the effects to zooplankton populations may be less variable due to lake level stabilization and project operations than under the existing conditions; however, it may be impossible to empirically separate the effects of the programs on the algae and zooplankton populations.

Staff Alternative—Effects of operations on algae blooms in Lake Elsinore would be the same as under the co-applicants' proposal.

3.3.2.3 Cumulative Effects on Water Quantity and Quality

The Santa Ana Watershed Project Authority issued its Integrated Watershed Plan, 2005 Update in June 2005. The plan is a tool for improving the sustainability of water resources and ecological health of the watershed (SAWPA, 2005). Population growth and its commensurate demands on water resources in the watershed is expected to increase from a current level of 5 million to almost 10 million people by 50 years from now. The Authority is responsible for developing and maintaining regional plans for both water supply and water quality. A key goal of the plan is to develop and adaptive approach to make the Santa Ana Basin region entirely self sufficient during drought cycles. Aspects of the strategy include identifying and describing a comprehensive mix of water resources projects and assuring that three years of groundwater storage is maintained in the Santa Ana River Basin by 2020 so that no imported water would be needed under a drought scenario. Congress recently appropriated $153.9 million to improve water quantity and quality in the region (WaterTech, 2005), including:

- Approximately $51.8 million to support a water reclamation project in Orange County;
- $50 million to perform groundwater desalination in the Chino Basin;
- $20 million develop large-scale wetlands along the Santa Ana River in the Prado Basin; and
- $40 million to develop brine lines to help discard excess water from desalination plants.

Final EPA approval of the Lake Elsinore TMDL is expected in 2006, which will define acceptable waste load allocations for phosphorus and nitrogen inputs into Lake Elsinore and associated offsets. The TMDL in conjunction with the operation of the proposed Lake Elsinore Stabilization and Enhancement Project would result in additional benefits to the water resources of Lake Elsinore.

We expect that the Lake Elsinore Stabilization and Enhancement Project would improve water quality in Lake Elsinore over time. The co-applicants' proposed project would likely cumulatively contribute to efforts to improve water quality in Lake Elsinore by improving the mixing of water in the lake and having a slight positive increase to the DO concentrations.

3.3.2.4 Unavoidable Adverse Effects

None.

3.3.3 Aquatic Resources

3.3.3.1 Affected Environment

Fish Habitat and Populations

Lake Elsinore

Lake Elsinore supports warmwater fisheries consisting primarily of threadfin shad, common carp, bluegill, and green sunfish as well as limited populations of stocked gamefish including largemouth bass. Lake Elsinore contains no native or sensitive species. Currently, Lake Elsinore is a terminal lake, and there are no existing facilities that would entrain fish.

Lake Elsinore is a hypereutrophic system, meaning that it is characterized by excessive nutrient loading resulting in high concentrations of algae and corresponding low levels of DO. High water temperatures, high alkalinity and mineral concentrations, high algae levels, and low DO levels historically have resulted in numerous fish kills. Low water levels contribute to these conditions and have resulted in the presence of an aquatic fish community that is highly tolerant of this environment (EIP Associates, 2005).

The temperature regime of the lake, which ranges from 12 to 14°C in the winter and 29 to 30°C in the summer (see section 3.3.2.1, *Surface Water*) is a determining factor in the fish assemblage present in the lake.

Lake Elsinore historically has experienced periods when the lake completely dries up (see section 3.3.2.1, *Surface Water*). Lake Elsinore receives water from the San Jacinto River only in extremely wet years or from runoff from the surrounding watershed. Historically, when Lake Elsinore refilled during wet years, it was colonized by fish from the San Jacinto River (EIP Associates, 2005).

Currently, little native riparian vegetation exists on the shore of the lake, and the lake does not support floating or submerged aquatic vegetation (EIP Associates, 2005).

Historically, Lake Elsinore was stocked with a variety of native and non-native fish. As early as the 1890s, northern largemouth bass, green sunfish, and common carp were stocked in the lake. Through the years, often following fish kills, species of bass, bullheads, sunfish, crappies, and shad also were stocked in the lake in an effort to create a recreational fishery.

Lake Elsinore was dry from 1959 through 1964. Then in 1964, the state of California purchased water from the Colorado River, and water was routed through Canyon Lake and the San Jacinto River. This event likely re-introduced common carp into the lake, likely from Canyon Lake populations.

Table 9 and the following section identify the fish populations reported in Lake Elsinore in various years and characterize the species found there.

Table 9. Fish species reported to occur in Lake Elsinore from 1964 to 2003. (Source: EIP Associates, 2005)

Common Name of Species (Scientific Name)	Year Reported or Documented in Lake Elsinore					
	1984[a]	1993[b]	2000[c]	2001[d]	2002[e]	2003[f]
Clupeidae (Herring Family)						
Threadfin shad *(Dorosoma petenense)*	X	X			X	X

Common Name of Species (Scientific Name)	Year Reported or Documented in Lake Elsinore					
	1984[a]	1993[b]	2000[c]	2001[d]	2002[e]	2003[f]
Cyprinidae (Minnow Family)						
Golden shiner *(Notemigonus crysoleucas)*	X					
Goldfish (*Carassius auratus)*						X
Common carp *(Cyprinus carpio)*	X	X			X	X
Ictaluridae (Bullhead Catfish Family)						
Black bullhead *(Ameiurus melas*)[g]						
Brown bullhead *(Ameiurus nebulosus)*		X				
Yellow bullhead *(Ameiurus natalis*)		X				
Channel catfish *(Ictalurus punctatus)*	X				X	X
Salmonidae (Salmon and Trout Family)						
Rainbow trout *(Oncorhynchus mykiss)*			X	X		
Moronidae (Striped Bass Family)						
Striped bass *(Morone saxatilis)*					X[h]	
Centrarchidae (Sunfish Family)						
Bluegill sunfish *(Lepomis macrochirus)*	X	X			X	X
Redear sunfish *(Lepomis microlophus)*	X					X
Green sunfish *(Lepomis cyanellus*	X	X				X
White crappie *(Pomoxis annularis)*	[g]					
Black crappie *(Pomoxis nigromaculatus)*	[g]	X			X	X
Largemouth bass *(Micropterus salmoides)*	X	X			X	X
Cichlidae (Cichlid Family)						
Tilapia (*Tilapia* sp.)	X					

[a] Reported in Lake Elsinore State Recreation Area General Plan (CDPR, 1984, as cited by EIP Associates, 2005).

[b] Electrofishing data from CDFG.

[c] City of Lake Elsinore trout planting records and CDFG trout planting records.

[d] CDFG trout planting records.

[e] Electrofishing and gill net data from CDFG.

[f] EIP Associates seining data.

[g] Listed in the city of Lake Elsinore's field guide titled *Sport Fishing on Lake Elsinore*, but not documented by the CDFG records or collected during sampling in 1993 and 2003.

[h] Newspaper documentation of angler harvest.

Threadfin Shad—Threadfin shad, which are native to tributaries to the Gulf of Mexico and the Mississippi River, were introduced into California in 1954. They typically inhabit open waters of reservoirs, lakes, and large ponds, and they can tolerate high salinities, although that may impair their reproduction. Threadfin shad prefer to swim near the surface, and are rarely found below 60 feet (Moyle, 2002). Threadfin shad was the most abundant fish species in Lake Elsinore in 2003, despite a massive die-off event that occurred in 1998. Optimal growth occurs when summer temperatures exceed 22 to 24°C; however, prolonged periods of cold water (4°C) will cause mortality (Moyle, 2002). The occurrence of threadfin shad in Lake Elsinore is the result of either stocking by CDFG or introduction when water from the Colorado River was transferred to Lake Elsinore from 1964 through 1966 (EIP Associates, 2005).

Goldfish—Goldfish were probably introduced to California waters and Lake Elsinore by aquarists and bait anglers. They become established in warm (>27°C), oxygen-deficient waters where winters are mild, and they thrive in polluted and disturbed habitats (Moyle, 2002), similar to those colonized by common carp. They feed on algae, zooplankton, and organic detritus.

Common Carp—The common carp, one of the first fish species planted in Lake Elsinore, is mostly likely to have recolonized the lake for the first time during the addition of Colorado River water to Lake Elsinore. The seed population likely originated in Canyon Lake. Carp are abundant in eutrophic lakes and reservoirs with silty bottoms and submerged aquatic vegetation. They are tolerant of high turbidity, high temperatures, and low DO concentrations and typically do not go below 100 feet (Moyle, 2002). It appears the majority of carp in Lake Elsinore are from a 1995 year class, and subsequent natural spawning has not produced prolific year classes. Predation by adult carp and competition for limited food supply are likely reasons for poor year-class survival (EIP Associates, 2005). The common carp is now considered a nuisance species. Following surveys in 2003, the city of Lake Elsinore implemented a carp removal program from June through September of that year. An estimated 291,000 carp were removed from the lake, most appeared to be from the 1995 year-class (EIP Associates, 2005).

Channel Catfish—The channel catfish was the third most abundant sport fish found in Lake Elsinore during surveys conducted in 2003. These fish were stocked in the lake in 2000, although few fish from this stocking effort were observed, and natural reproduction in the lake appears to be very low likely because of limited food resources. Channel catfish feed on amphipods and aquatic larvae when small and on aquatic insects and other fish and crayfish when larger. This species is tolerant of low DO, turbid, and high salinity conditions (Moyle, 2002). In streams, catfish move to shallow areas to feed at night and move to deep holes or shelters during the day, although little is known about their habitat preferences in lakes or reservoirs (Wydoski and Whitney, 2003).

Bluegill Sunfish—Bluegill sunfish prefer warm, shallow waters and can tolerate high salinities and low DO levels. They are also very temperature tolerant. They feed throughout the water column, eating a variety of aquatic insects and zooplankton, planktonic crustaceans, snails, small fish, and fish eggs, although they rarely are observed below 15 feet (Moyle, 2002). They are not common in the lake, and during seine surveys conducted in 2003, all bluegill appeared to be from the same 2000 year class. They do not appear to be reproducing successfully in the lake (EIP Associates, 2005).

Redear Sunfish—Redear sunfish prefer deeper (>6 feet deep) areas of warmwater lakes and ponds with aquatic vegetation. They are bottom-feeders, eating snails, clams, benthic insects, and aquatic plants. Only one specimen was captured in Lake Elsinore during seine surveys in 2003, and they do not appear to be reproducing successfully in the lake (EIP Associates, 2005)

Green Sunfish—In reservoirs, the green sunfish is typically found in shallow, weedy areas. This species is tolerant of high temperatures and low DO, although it is not tolerant of high salinities. The diet of the green sunfish comprises zooplankton and benthic invertebrates when small and larger aquatic insects, terrestrial insects, crayfish and fish when larger (Moyle, 2002). Little is known about current status of this species in the lake.

Black Crappie—Black crappie are often found in large warmwater lakes and reservoirs. Optimal temperatures for this species range between 27 to 29°C. Black crappie can withstand low DO levels for short periods and appear to tolerate high salinities. They can be found around large submerged objects during the day, and move offshore in the evening or early morning (Moyle, 2002). Black crappie appear to be reproducing in Lake Elsinore, and while they are not abundant, they are the most abundant sunfish found in the lake (EIP Associates, 2005).

Largemouth Bass—Largemouth bass are uncommon in Lake Elsinore; only two adults were captured in surveys conducted in 2003. They appear to prefer temperatures of 27°C, although they can persist in waters that reach to 37°C during the day and with DO levels as low as 1 mg/l. They prefer depths less than 20 feet and beds of aquatic plants (Moyle, 2002). Likely factors limiting successful reproduction are poor water quality, absences of suitable spawning habitat, limited food supply for juvenile fish, and nest destruction by common carp (EIP Associates, 2005). Largemouth bass were stocked into Lake Elsinore in 2005, and the Joint Watershed Authority intends to continue the stocking them in the future.

Rainbow Trout—Rainbow trout do not survive in Lake Elsinore for more than short periods because of unsuitable water quality and water temperature conditions. CDFG stocked rainbow trout in the lake to provide a novelty put-and-take fishery (EIP Associates, 2005). Rainbow trout are considered a coldwater species, preferring temperatures much cooler than those found in Lake Elsinore. Optimal rainbow trout habitat in lakes consists of clear water with an average summer temperature of < 22°C (Raleigh et al., 1984). The Fisheries Management Plan for Lake Elsinore does not include plans to stock Lake Elsinore with rainbow trout.

Wiper—Wipers are a sterile cross of white bass and striped bass. These fish are cultured in hatcheries and approximately 5,000 were stocked into Lake Elsinore in 2004, and 18,000 were stocked in 2005 (EIP Associates, 2005). Wipers, which are predatory on pelagic fish such as threadfin shad and young-of-the-year carp, are more tolerant of warmer water and lower DO than striped bass.

The Joint Watershed Authority developed the Fisheries Management Plan for Lake Elsinore (EIP Associates, 2005). The goal of the plan is to develop a sports fisheries enhancement and maintenance program that will improve recreational fishing in Lake Elsinore. In developing this plan, the Joint Watershed Authority identified the following factors that limit the production of game fish in Lake Elsinore: lake level fluctuations, poor water quality, carp predation and competition with other fish, poor food supply, poor feeding conditions, and poor reproduction. Joint Watershed Authority makes the assumption that actions to stabilize lake level fluctuations and water quality would be implemented, and the Fisheries Management Plan focuses it efforts on fisheries management actions. Elements of the final Fisheries Management Plan to be implemented include:

- Carp control through beach and cove seining to remove fish, and stocking large predatory striped bass, and wipers to prey on young-of-the-year carp. In 2004 and 2005, the LESWJA stocked striped bass into Lake Elsinore, and because striped bass require large, cool rivers to spawn, their populations will not reproduce in Lake Elsinore.

- Zooplankton enhancement to increase the food supply and help recruitment of juveniles to adult reproducing populations. Predator stocking to control undesirable, zooplankton-feeding threadfin shad and establishing aquatic vegetation would also help increase zooplankton abundance in the reservoir.
- Establishment of aquatic and emergent vegetation through planting along with carp exclosures to prevent plant destruction by the carp.
- Fish habitat improvement by establishing rooted vegetation, establishing shoreline vegetation by implementing erosion control methods, introducing physical habitat structures for bass and crappie, placing spawning gravels to create spawning beds, and creating diversity in the profile of the lake shoreline.
- Stocking sportfish into the lake, and potentially limiting angler harvest if fishing pressure is jeopardizing establishment of reproducing populations.

San Mateo Creek

San Mateo Creek's headwaters lie in the Santa Ana and Santa Margarita Mountains in the Trabaco Ranger District of the Cleveland National Forest (figure 12). The upper reaches are steep and rocky. Flows range from 0.5 cfs in the summer to more than 500 cfs in wet months. In the lower reaches, groundwater extractions in Camp Pendleton to support base military training operations and on-base agriculture have contributed to intermittent flow conditions, riparian vegetation has been lost, stream channel width has increased, and surficial flow has been reduced or eliminated during most of the year in some portions of the stream (50 CFR Part 224). San Mateo Creek currently supports populations of largemouth bass, green sunfish, bluegill, black bullhead, bullfrog, mosquitofish (*Gambusia affinis)*, and red swamp crayfish.

Steelhead appear to have been most abundant in the San Mateo Creek Watershed prior to 1950 and were rarely found in later years (50 CFR Part 224). There were no recorded observations between 1980 and 1998. They reappeared in surveys of San Mateo Creek in 1999. NOAA Fisheries speculates the steelhead population in San Mateo Creek was likely affected from natural episodes of sediment input from within the watershed, exacerbated by fires in the upper watershed. Southern California steelhead are state and federally listed as endangered, and are discussed further in section 3.3 5, *Threatened and Endangered Species*.

The Corps is the lead federal agency responsible for the development of a Special Area Management Plan for San Mateo Creek. With Special Area Management Plans, the Corps undertakes a comprehensive review of aquatic resources in an entire watershed, identifying priority areas for preservation, potential restoration areas, and determining the least environmentally damaging locations for proposed projects. The initial step recommended in the Special Area Management Plan is implementation of a program to remove largemouth bass, green sunfish, bluegill, black bullhead, bullfrog, mosquito fish, red swamp crayfish from the lower reaches of San Mateo Creek (Corps, 2005a). These fish are predatory to steelhead during various lifestages. The California State Coastal Conservancy allocated $800,000 in 2000 to restore the arroyo chub, partially armored stickleback, and southern steelhead fisheries to their native creeks of San Mateo Creek and its tributary Devil Canyon Creek, and San Onofre Creek in San Diego County.

San Juan Creek

The headwaters for San Juan Creek, like San Mateo Creek, lie in the Santa Ana and Santa Margarita mountains, in the Trabaco Ranger District of the Cleveland National Forest. San Juan Creek is seasonal and intermittent near the headwaters and becomes a perennial stream in downstream reaches as

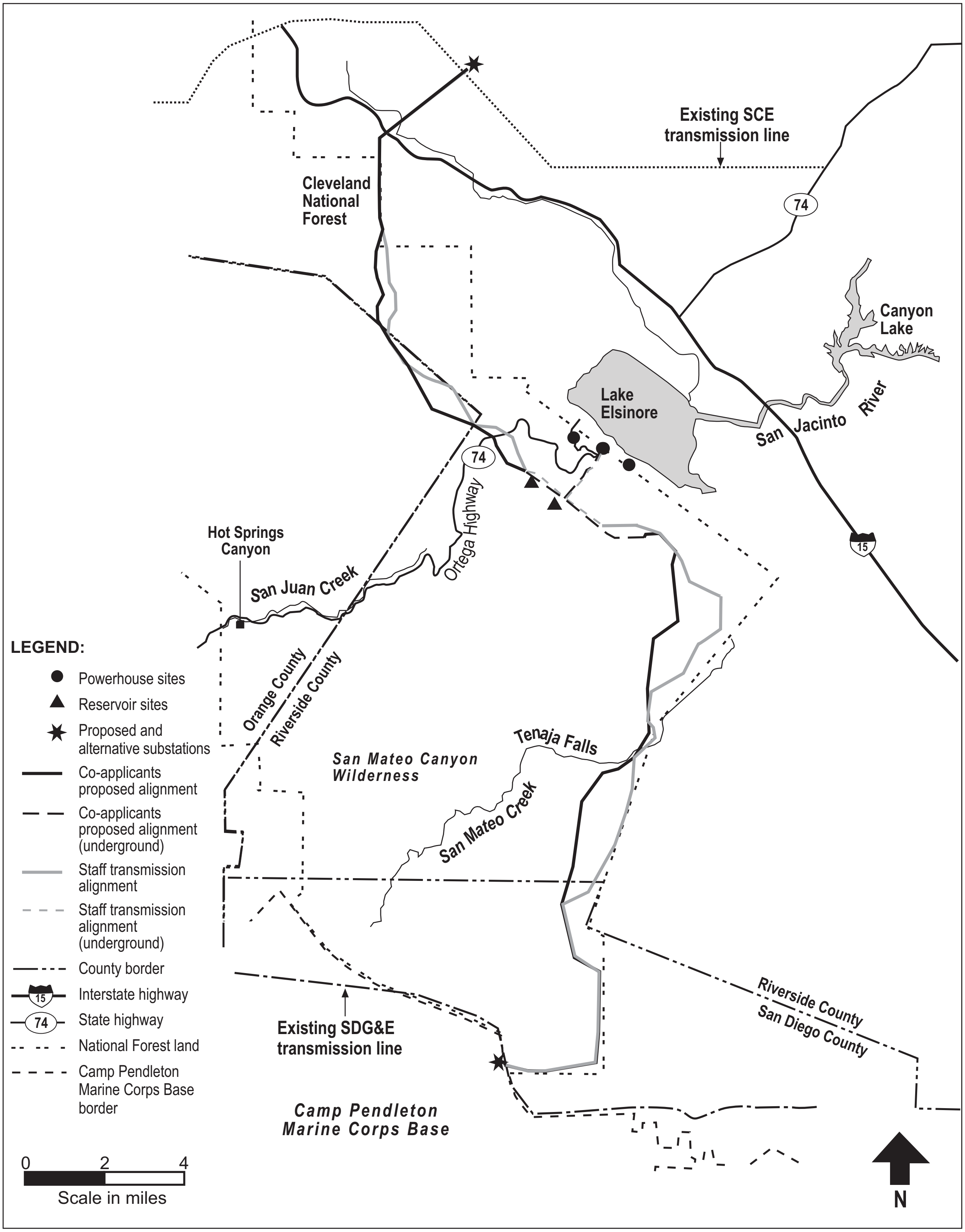

Figure 12. San Juan and San Mateo creeks near the project area. (Source: Elsinore Valley MWD and Nevada Hydro, 2004a, as modified by staff)

flows are augmented by urban runoff. The channel is braided for most of its length; there are several gradient control structures in the main channel as well as a sand and gravel mining operation. Downcutting is occurring along the entire main stem, and the lower 2.6 miles have concrete banks and an earthen bottom (CERES, 2005).

On July 25, 1996, FWS biologists surveyed San Juan Creek from Interstate 5 east to just beyond Hot Springs Canyon. During the seining, FWS collected one species of native fish, the arroyo chub (*Gila orcutti*), and several non-native species, such as mosquitofish, green sunfish, smallmouth bass (*Micopterus dolornieu*), yellow bullhead (*Ameiurus natalis*), and red shiner (*Cyprinella lutrensis*) (FWS, undated, as cited in the Elsinore Valley MWD and Nevada Hydro, 2004a, exhibit E).

Fish Species of Special Concern/Sensitive Species

Table 10 shows special status fish species that could occur or are known to occur in the study area.

Table 10. Special status fish species that may occur or are known to be present within the study area. (Source: CDFG, 2005)

Scientific Name	Common Name	Status	Location
Gila orcutti	Arroyo chub	CSC	Documented in lower reaches of San Juan Creek
Onchorhynchus mykiss irideus	Southern California steelhead	FE	Documented in lower reaches of San Mateo Creek

Notes: CSC – state special concern

FE – federal endangered

Arroyo Chub

The arroyo chub is listed as a California species of special concern because it is considered threatened in its native range. It is now most abundant in areas outside of its native range. This species is found in slow-moving or backwater sections of warm to cool (10 to 24°C) streams with mud or sand substrates. The Corps reports arroyo chub presence is in the Cañada Gorbernadora (tributary to San Juan Creek), about 10 miles downstream of the project area (Corps, 2005b). USFS biologists noted the presence of arroyo chub in lower San Juan Creek and Hot Springs Canyon during surveys for arroyo toad conducted in 1999 (USFS survey records).

Southern California steelhead are discussed in section 3.3.5, *Threatened and Endangered Species*.

3.3.3.2 Environmental Consequences

Effects of Construction on Fish Habitat and Populations

Construction of the upper reservoir could affect fish in San Juan Creek if sediments from construction activities are transported into streams that flow into San Juan Creek. Construction of transmission line towers at stream crossings could affect water quality and fish habitat in the streams that are crossed. The initial drawdown and construction of the intake/outlet and tailrace structures in Lake Elsinore could increase turbidity and affect the fish populations in the lake.

Co-applicants' Proposal—To address the potential effect of project construction on fisheries resources, the co-applicants propose to retain a qualified biologist or natural resource specialist to serve as an environmental construction monitor to ensure that incidental construction effects on biological resources are avoided or limited to the most feasible extent.

The co-applicants also propose measures to avoid or mitigate potential effects on fisheries in San Juan or San Mateo creeks during project construction. These include establishing setbacks from streams and implementing BMPs including, but not limited to, those road, building site, and watershed BMPs identified in USFS' *Water Quality Management for Forest System Lands in California—Best Management Practices* (USFS, 2000). Further, the co-applicants propose to implement BMPs identified by the USFS to avoid any effects on the existing steelhead recovery efforts in the San Mateo Watershed.

The co-applicants propose facilities for the collection and conveyance of all flows from the upstream drainage area, and all seepage emanating from Lion Spring for discharge into the stream channel downstream of the proposed upper reservoir. The monitoring plan includes continual measurement of the flows discharging from the downstream end of the conveyance system. Monitoring of flows and water quality would be continued during the preparation of the site, the construction of the dam, and the construction of the reservoir and appurtenant structures. The co-applicants propose to avoid placing transmission line towers in riparian habitat and other sensitive areas.

The co-applicants would construct the intake\outlet structures in the dry with facilities isolated from Lake Elsinore waters through construction of cofferdams.

They also propose that, during construction drawdown, they would remove or reduce the existing fish population via netting or rotenone poisoning. The co-applicants propose to develop an annual fish stocking program for Lake Elsinore in consultation with the FWS, CDFG, and the Joint Watershed Authority (see section 3.3.6.2, *Recreational Resources)*.

Resource Agency Measures

Interior recommends that the co-applicants develop and implement a San Juan Creek drainage monitoring and remediation plan to eliminate or reduce the release of non-native species from the upper reservoir into San Juan Creek.

Interior requests that the co-applicants consult directly with the FWS regarding project plans and designs for measures to protect, mitigate damages to, and enhance fish and wildlife resources.

Effects Analysis

If ground or vegetation-clearing activities are located near riparian areas, these activities could negatively affect fish populations in those streams. Removal of riparian vegetation would reduce shading and cover for fish in streams. Reduced shading could contribute to an increase in water temperatures, which could negatively affect native trout that prefer cool water temperatures. Reduced cover could make fish more vulnerable to predation from other fish and from birds. Sediments from ground-disturbing activities could be transported to the streams, potentially decreasing water quality, inundating gravel interstices with silt and fines, filling in spawning habitat and potentially decreasing spawning success. Effects on water quality are discussed in section 3.3.2.2.

Construction of the proposed Morrell Canyon upper reservoir could affect fish in the San Juan Creek Watershed if sediments from ground-disturbing activities were allowed to wash down the headwater stream to perennial portions of San Juan Creek from the base of the reservoir. Transport of sediments can negatively affect fish and the macroinvertebrates on which they prey if streambeds were to be inundated or if turbidity were to be increased.

Headwaters of San Juan Creek stream near the project area flow intermittently; and sediment transport several miles downstream to perennial portions of San Juan Creek would be unlikely. As recommended by Interior, development of a San Juan Creek drainage monitoring and remediation plan in cooperation with Interior and CDFG to eliminate or reduce release of water and non-native fish species from the upper reservoir into the San Juan Creek drainage would minimize the potential for negative effects on native fish in the San Juan Watershed.

Construction activities associated with the proposed transmission alignment would occur within the San Mateo Watershed. Aspects of constructing the proposed transmission alignment that could affect aquatic resources would result from vegetation clearing and construction near tributaries and streams. Preliminary tower locations are shown on figures F-1 through F-4 in appendix F. At least 22 stream crossings occur along the proposed transmission alignment. Construction of transmission alignment facilities could affect fish in the watershed if sediments from ground-disturbing activities were allowed to wash into headwater streams in the San Mateo Watershed. Transport of sediments could negatively affect fish and the macroinvertebrates on which they prey if streambeds were to be inundated or if turbidity were to be increased.

The co-applicants' plan to locate transmission towers outside of riparian habitat would span sensitive areas and avoid adverse effects on riparian vegetation and stream habitat. Development of measures to control erosion and surface transport of sediments as proposed by the co-applicants and recommended by the USFS to the headwater streams of San Mateo Creek during construction of the proposed transmission alignment would also help to reduce the potential for negative effects from construction on resident fish.

Development of the water quality monitoring plan as proposed by the co-applicants could help to identify project-related effects on water quality that might affect fish in San Juan Creek. Subsequent actions defined in the plan to address potential effects would reduce or mitigate for such effects on resident fish.

The Santa Rosa powerhouse site contains 0.1 acre of Corps jurisdictional waters, and 0.4 acre of California state jurisdictional waters (Elsinore Valley MWD and Nevada Hydro, 2005). However, no information has been provided on possible fish resources of these areas. If the construction of the proposed Santa Rosa powerhouse were to disturb these small streams located on the site, the co-applicants would be required to acquire permits from the Corps and CDFG, and any potential effects on fish resources that may result would need to be addressed at that time. Construction of the powerhouse at this site would not affect resources in Lake Elsinore due to its distance from the shore.

Construction of the intake/outlet structures through a dry process would disturb the lakebed. Constructing cofferdams to isolate the intake/outlet structures would isolate fish in the lake from direct effects of construction of the intakes.

The co-applicants propose to remove or reduce the existing fish population via netting or rotenone poisoning during construction drawdown. Either action would remove undesirable fish such as carp and threadfin shad from Lake Elsinore. If netting is used, the mesh size of the nets used may not capture juveniles and may capture desirable game fish as well. Rotenone poisoning of the fish population in the lake would kill desirable as well as undesirable fish, however, it would allow fisheries managers to restock the lake with desirable fish species and over the long term help to establish a desirable sports fishery.

Rotenone poisoning to remove fish is not identified as a preferred option in the Fisheries Management Plan for Lake Elsinore (EIP Associates, 2005), however, netting for carp removal is. The Fisheries Management Plan recommends controlling carp and threadfin shad populations through seining for carp and through the introduction of predators such as striped bass, wipers, or largemouth bass. The Fisheries Management Plan states the city of Lake Elsinore has already acquired equipment to conduct seining, and that seining for carp is planned annually through 2008, and biannually from 2016 through 2024. It would be appropriate for the co-applicants to coordinate measures for the removal of the existing fish population during construction activities with the city of Lake Elsinore and administrators of the

Fisheries Management Plan, the LEWSJA, to ensure their proposal does not conflict with other management actions relating to fish resources in Lake Elsinore.

Staff Alternative—Construction at the Decker Canyon upper reservoir site would have the same types of effects as those described for proposed Morrell Canyon upper reservoir site.

In addition to Temescal Wash, the northern segment of the staff alternative transmission alignment would cross three named drainages: Leach Canyon, McVicker Canyon, and Rice Canyon creeks. The southern segment of the staff alternative transmission alignment would cross the same major drainages in Alamos Canyon, Tenaja Canyon, and San Mateo Creek as the proposed transmission alignment. We anticipate that effects of the staff alternative transmission alignment would be similar to the proposed transmission alignment because the co-applicants propose to place the towers outside of riparian habitats and to implement BMPs for stream crossings.

Optional Ortega Oaks or Evergreen Powerhouse—Construction at the Ortega Oaks or Evergreen powerhouse site would not affect fish or riparian habitat because these sites are upland from the lake and contain no riparian areas or streams.

Effects of Operation on Fish Habitat and Populations

Operational effects on fish populations could include potential leakage of the upper reservoir liner that could affect water quality and fish habitat in San Juan Creek, the spread of non-native fish species from Lake Elsinore into San Juan Creek, impingement in turbines or trashracks, entrainment in turbines, or loss or degradation of fish habitat in Lake Elsinore from reservoir fluctuations.

Fish populations could be introduced to the upper reservoir either through transfer of fish through pumped water from Lake Elsinore or from introductions by the public. Fish introduced into the upper reservoir would not be expected to thrive there due to the lack of habitat structures, the magnitude of reservoir fluctuations, and the potential for entrainment in turbines through drawdown activities.

Current seasonal and annual lake level fluctuations in Lake Elsinore contribute to the limited amount of native riparian vegetation on the shore of the lake and the lack of submerged aquatic vegetation. The Joint Watershed Authority concluded that the lack of floating or submerged aquatic plants results from several factors in addition to the lake level fluctuations, including limited availability of shoreline sediments for rooting, shading by dense algal populations, turbidity caused by several mechanisms, and constant foraging by carp (Joint Watershed Authority, 2005). Shoreline vegetation that provides cover and shading for juvenile fish, and rooted shallow water vegetation that provides spawning, rearing, foraging, and cover from predators could benefit from the reduction in seasonal or annual lake level fluctuations that currently occur by establishing a more constant regime of inundation between lake level elevation 1,240 and 1,247 feet msl; however, areas of intermittent inundation would continue to occur. The proposed project operations would limit lake level fluctuations to 1 foot on a daily basis, and 1.7 feet on a weekly basis as water is pumped between the upper reservoir and Lake Elsinore, resulting in an estimated weekday shoreline migration of approximately 8 feet along the northern shore, and up "up to hundreds" of feet along the shallow southern shores of the lake (Anderson, 2006). With the proposed project in place, a long period of inundation followed by a short period of exposure would likely prevent most plant species from establishing within the zone that would be subject to weekend fluctuations, because most submersed aquatic macrophytes that would do well while inundated would not likely survive weekend desiccation. Therefore rooted shallow-water vegetation that provides spawning, rearing, foraging, and cover from predators would continue to be limited, particularly in the shallower, southern areas of the lake.

Potential project-related adverse effects on fish from operations in Lake Elsinore would include mortality from entrainment (i.e., passing aquatic organisms through pump intake valves and turbines) and impingement (i.e., trapping aquatic organisms on intake screens or trashracks). Attraction flows and/or suction caused by the intakes could be too strong for some Lake Elsinore fish to escape, particularly juvenile fish with low swimming speeds, resulting in death or injury as they are pumped through the turbines to the upper reservoir. Fish that are entrained to the upper reservoir may not survive due to direct mortality from passage through the turbines, or delayed mortality from exhaustion, suffocation, or other physical injury. Fish that may survive transport through the turbines may not survive in the upper reservoir due to a lack of habitat, a forage base for food, and high reservoir fluctuations.

Co-applicants' Proposal—To address the potential for impingement and entrainment at the intake/outlet structure, the co-applicants propose to establish limits of flow velocity rates of the underwater intakes of1.5 feet per second to 1.8 feet per second. They also propose to install fish screens that would be operated and maintained in accordance with NMFS' fish screen criteria, as outlined in the NMFS' *Juvenile Fish Screen Criteria* (NMFS, 1995) and the *Addendum Juvenile Fish Screen Criteria for Pump Intakes* (NMFS, 1996) in consultation with the FWS.

The co-applicants propose to conduct hydroacoustic monitoring for 1 year to assess the extent of fish entrainment at the pump intake screens and behind the trashracks. If the entrainment studies indicate that significant fish entrainment is occurring and is resulting in fish mortality during passage through the pump-turbines, the co-applicants would conduct additional studies to determine the level of mortality. If monitoring indicates that entrainment is significant, the co-applicants would implement and test filters or fish behavioral measures such as strobe lights, sonic devices, poppers/hammers or some combination of these devices to elicit an avoidance response.

The co-applicants also propose to develop an annual sport fish stocking program in consultation with the Joint Watershed Authority. Sports fish stocking is discussed in section 3.3.6, *Recreational Resources*.

Resource Agency Measures

Over the term of any license issued for the project, Interior recommends the development of a San Juan Creek drainage monitoring and remediation plan to eliminate or reduce release of water and non-native fish species from the upper reservoir into the San Juan Creek drainage in cooperation with CDFG. In comments filed on the draft EIS, the State Water Board recommends entrainment monitoring at the project intake/outlet structures after 1 year of project operation and once every 5 years over the term of any license issued for the project because the nature and composition of the fish in Lake Elsinore will change with implementation of the Fisheries Management Plan.

Effects Analysis

Lake Elsinore water from the proposed Morrell Canyon upper reservoir could be introduced into the San Juan drainage in the event of leakage from the reservoir or through failure of the reservoir walls. Such leakage or failure would have to be extensive enough to carry enough water to support fish survival as the water flows down the canyon in the headwater tributary, and then persist farther downstream to San Juan Creek. If non-native fish were present in the upper reservoir, however, and if they were to survive such an event, the non-native fish introduced into the San Juan Creek Watershed could compete with native species for prey and habitat, thereby negatively affecting native fish in the watershed. The co-applicants' proposal to line the reservoir with an impermeable layer would prevent leakage of water from the reservoir.

Interior's recommendation to develop a monitoring and remediation plan in conjunction with CDFG to eliminate or reduce release of water and non-native fish species from the upper reservoir into the San Juan Creek drainage would minimize the potential effects on native fish in San Juan Creek. If monitoring shows that non-native fish from the reservoir are being introduced to San Juan Creek, actions already defined in a remediation plan could be quickly implemented, thereby reducing the potential for negative interactions with native fish.

Once construction of the proposed transmission alignment towers is complete, no ongoing effects on stream or riparian habitat would be anticipated. If no roads are constructed to provide access to the proposed transmission alignment, we anticipate there would be no operational effects on riparian habitat. If roads are constructed, additional effects would occur as a result of road maintenance or runoff from roads affecting water quality of streams at stream crossings through the term of any license that may be issued. As discussed in section 3.3.1, *Geology and Soils*, implementation of the erosion control plan should prevent the transport of sediments that could affect water quality.

The Santa Rosa powerhouse site contains 0.1 acre of Corps jurisdictional waters, and 0.4 acre of California state jurisdictional waters ((Elsinore Valley MWD and Nevada Hydro, 2005). However, operation of the pumped storage facility at the Santa Rosa powerhouse location would not be expected to affect any streams that might be near the powerhouse location because the water would be pumped via closed water conduits between Lake Elsinore and the upper reservoir. The conduits are designed not to leak and would include a system that would shut down operations should a conduit or penstock failure be detected. Operations of the powerhouse at this site would not affect resources in Lake Elsinore due to its distance from the shore.

The cycling of water through the tailrace and intake structures could potentially stir up lake bed sediment if the volume and/or direction of water discharged to the lower reservoir create sufficient turbulence to reanimate sediments, nutrients, and particulates. Increasing turbidity and/or nutrient concentrations in the water column, particularly any phosphorus that is bound to the sediments, would negatively affect the water quality and could cause increased algae blooms and decreased DO, resulting in negative effects on the fish population, including fish kills.

As discussed in section 3.3.2, *Water Quality*, releasing water through the outlet structure at the bottom of the lake could benefit fish populations in the lake if it increases oxygen levels in the lake, particularly during times when DO levels in the summer at depth are very low.

The co-applicants stated that the maximum pumping velocity in the tailrace tunnels would be 1.5 feet per second to 1.8 feet per second, and the maximum discharge velocity would be 1.5 to 1.8 feet per second (Elsinore Valley MWD and Nevada Hydro, 2004b). Furthermore, they propose to install fish screens in accordance with NMFS fish screen criteria (NMFS, 1996, 1995) and in consultation with the FWS. NMFS criteria were developed for salmonids, however, and there is little information in the literature on fish screening criteria for the non-salmonids found Lake Elsinore. Assuming that the NMFS criteria of a maximum approach velocity of 0.4 feet per second (recommended approach velocity for salmonid fry less than 2.36 inches in length) were effective for Lake Elsinore fish, each 1,967 cfs-capacity intake screen for the 20-foot-diameter D-shaped tailrace tunnels at Lake Elsinore would have to be approximately 4,917 square feet (NMFS, 1996) to meet the 0.4 feet per second criteria. If the criteria for salmonid fingerlings of 0.8 feet per second were used (fish longer than 2.36 inches), the screens would need to be 2,456 square feet each to meet the velocity criteria.

The Joint Watershed Authority intends to periodically stock adult and juvenile largemouth bass, black crappie, Sacramento perch, and bluegill into Lake Elsinore beginning in 2006. In addition to adult fish, the Fish Management Plan includes stocking at different times of the year, juvenile or fingerling largemouth bass (1.5 to 2.0 inches), bluegill fingerlings (2.0 to 3.0-inch), redear sunfish fingerlings (2.0 to 4.0-inches), striped bass or hybrids (wipers) (1.5 to 2.0-inch fingerlings), and/or black crappie (2-inch fingerlings) (LESJAW, 2005). The juvenile fish stocked may not be able to avoid entrainment if the intakes are located close to shoreline habitats or close to the surface where these fish typically are found.

Bell (1991) reported darting speeds of 1-inch striped bass to be 0.5 to 1.0 feet per second, and for 2-inch striped bass to be 1.0 to 2.0 feet per second. Therefore, stocked striped bass less than 2 inches may be unable to avoid entrainment unless the intake approach velocity is reduced through screening or other measures. Adult fish that are stocked are likely to avoid entrainment or impingement in intake screens if approach velocities are within the range of the unscreened intakes at 1.5 to 1.8 feet per second. However, a study of impingement at the Peach Bottom Atomic Power Station in Pennsylvania found that channel catfish, white crappie, and bluegill were the most commonly entrained fish where the intake velocity was 0.75 feet per second or less (Mathur et al., 1977). Largemouth bass were rarely impinged.

Without more information on the exact location, distance from shore, depth and orientation of the intake/outlet structure to the surface and shore we can only generalize the potential effects on the Lake Elsinore fishery from entrainment. If the intake structure were to be placed on the shoreline where juvenile fish would encounter the intake while foraging, spawning, or cruising, the likelihood for entrainment is higher than if the structure were placed farther away from shore where they are less likely to be. Based on conceptual drawings of this structure, it could extend up to 200 feet into Lake Elsinore (see discussion in 3.3.6, *Recreational Resources*). Also, currently and in the future, many of the sport fish in the lake will originate from stocking efforts, and most will be large enough to avoid entrainment so that project effects on adult stocks are likely to be small. In addition, unlike river systems, the intake/outlet structure area is small in relation to the overall size of the lake, and fish would need to actively swim into the area in order to be vulnerable to entrainment.

The Joint Watershed Authority Fish Management Plan calls for measures to improve nearshore habitat in the lake by creating exclosures for carp, planting emergent and aquatic vegetation, creating additional habitat structures in the lake such as brush shelters, log cribs, bass spawning benches and placing spawning gravels. These enhancements would help to establish naturally reproducing populations of desirable sport fish such as largemouth bass, bluegill, and black crappie. Participation by the co-applicants in these activities would help to mitigate the unavoidable entrainment mortality of juvenile sport fish in the lake. Locating the planned habitat improvement measures away from the intake/outlet structure would help to further reduce effects on fish using these areas as they would not be attracted to the intake vicinity.

The 1-year monitoring program proposed by the co-applicants would be used to assess which species are being entrained or impinged and enable estimates of the effects of entrainment on fish that are stocked in Lake Elsinore. If monitoring indicates that entrainment is significant, the co-applicants propose to implement and test structures or fish behavioral devices to elicit an avoidance response for the species being entrained, thereby reducing potential source of fish mortality in the reservoir. Monitoring once every 5 years of the term of any license issued for the project would take into account the changing composition and structure of the fish population as a result of the implementation of the Joint Watershed Authority's Fish Management Plan.

Net barriers to prevent entrainment of adult fish are being used successfully at the Ludington Pumped Storage Project (FERC Project No. 2680) in Michigan. There the licensee has seasonally installed 2.5-mile long barrier nets for the past 17 years to screen game fish (salmonids and yellow perch) and forage fish (alewife and rainbow smelt) over 5 inches long. The nets are constructed of 0.5-inch and 0.75-inch bar mesh. For 2005, reported effectiveness for game fish was 90.2 percent and for forage fish was 92.6 percent (Consumers Energy Company and Detroit Edison Company, 2005). The co- applicants suggested but did not propose an aquatic filter barrier system might be employed to prevent entrainment of fish, fish eggs and larvae, however such systems were designed for much smaller flow rates and have not been tested for flows as high as 1967 cfs for each intake, as is proposed for Lake Elsinore. In a report filed by the co-applicants, Anderson (2006) estimated potential entrainment losses of ichthyoplankton to be 40–100 percent during spawning season. However, these results were based on operating scenarios and generalized modeling assumptions that were not detailed in the report. Nevertheless, losses from entrainment of ichthyoplankton and smaller fish in the area of the intakes would occur. As noted by Anderson, losses of larval carp would be beneficial to the Lake Elsinore fishery.

Behavioral avoidance devices such as strobe lights, sonic devices, and poppers/hammers or some combination of these to elicit an avoidance response are still considered experimental (Coutant, 2001). Effectiveness can be variable depending on individual species, species life stage, time of day, hydrology, and configuration of the system (Popper and Carlson, 1998; Coutant, 2001). Much of the research to date has involved salmonids. Low-frequency sound was found to be effective for evoking avoidance responses in migrating Atlantic salmon (Knudsen and Sand, 1994), but was not effective when tested on salmon in a navigation lock in Washington State (Goetz et al., 2001). Although strobe lights have shown some potential for repelling juvenile salmonids (Ploskey and Johnson, 2001; Amaral et al., 2001), they are still generally viewed as an experimental technology and have been evaluated in few full-scale applications. Preliminary tests on smallmouth bass showed an avoidance response to strobe lights, although further testing was recommended (Amaral et al., 2001). In sum, the application of behavioral avoidance systems in Lake Elsinore would be highly experimental and potentially costly, and would provide no guarantee of effectiveness.

The cost estimates for entrainment monitoring are presented in section 4.0, *Developmental Analysis*, and the measures included in the staff alternative are discussed in section 5.2, *Discussion of Key Issues.*

Staff Alternative—Flows at the Decker Canyon site would be handled the same way they would be managed at the proposed Morrell Canyon site, i.e., flows would be conveyed from Lake Elsinore to the upper reservoir and returned to Lake Elsinore by the same means. For this reason, we expect effects would be the same.

The potential effects of project operations on the entrainment and impingement of fish at the Decker Canyon reservoir would be similar to the effects at the Morrell Canyon reservoir.

No operational effects on fish resources or riparian habitat are anticipated at the Santa Rosa powerhouse site.

Operational effects along the staff alternative transmission alignment would be the same as those described above for the proposed transmission alignment.

Optional Ortega Oaks or Evergreen Powerhouse—No operational effects on fish resources or riparian habitat are anticipated at the Ortega Oaks or Evergreen powerhouse site.

The cost estimates for the entrainment monitoring are presented in section 4.0, *Developmental Analysis*, and the measures included in the staff alternative are discussed in section 5.2, *Discussion of Key Issues.*

3.3.3.3 Cumulative Effects

The Lake Elsinore Fisheries Management Plan proposes measures to control undesirable species and enhance populations of more desirable game fish in the lake. Funding for implementation of the Fisheries Management Plan is anticipated through the acquisition of grants from a variety of sources. The co-applicants' proposal to fund stocking fish in the lake in coordination with objectives of the Fisheries Management Plan would help ensure that the plan can be implemented as designed.

Implementation of the Lake Elsinore Stabilization and Enhancement Project would decrease the likelihood that lake elevations would drop to levels that would result in decreased water quality that result in fish kills. Operation of the proposed project would not affect implementation of the stabilization project. Aeration stations proposed as part of the Lake Elsinore Stabilization and Enhancement Project would help to increase DO at depth. Proposed project operations will also increase mixing in the lake, thereby improving water quality and benefiting the fish population. The proposed project would also not alter proposals for reconfiguring the Back Basin wetlands into treatment wetlands described in that project.

The Corps has developed a draft Special Area Management Plan (SAMP) for the San Juan Creek and Western San Mateo Creek watersheds SAMP to provide a framework for permit coverage for the San Juan Creek Watershed and the western portion of the San Mateo Creek Watershed. The proposed LEAPS

Project would not affect the development of the proposed SAMP, which is still under review by the Corps.

3.3.3.4 Unavoidable Adverse Effects

The proposed project would have some unavoidable adverse effects on fish in Lake Elsinore if they become entrained in the intake facilities. The co-applicants' proposal to monitor entrainment in consultation with the agencies would minimize this effect; however, it cannot eliminate it completely, and mortality from impingement on screens would also likely occur.

3.3.4 Terrestrial Resources

3.3.4.1 Affected Environment

Vegetation Cover Types and Special Status Plant Communities

The LEAPS study area encompasses 8,578 acres of land and water, including almost 500 acres of developed land, 310 acres of disturbed land, and about 46 acres of agricultural land. Elevations range from about 1,255 feet above msl at Lake Elsinore to about 2,900 feet at the proposed upper reservoir sites. This range of elevations supports a wide variety of habitats; the co-applicants mapped seven different vegetation cover types, or natural communities, within the study area. Table 11 shows the acreage of each community and briefly describes the habitat characteristics and dominant plant species.

Table 11. Natural communities mapped in the study area. (Source: MBA, 2004, as modified by staff)

Cover Type	Acres	General Habitat Characteristics and Dominant Plants
Chamise Chaparral	3,304	Dense shrub canopy dominated by chamise, with manzanita, laurel sumac, ceanothus, scrub oak, toyon, sugar bush and mountain mahogany also present.
Coastal Sage Scrub	173	Open shrub canopy dominated by California sagebrush, black sage, California buckwheat, and California brittlebush.
Non-native Grassland	819	Introduced annual grasses, with both native and introduced forbs. Dominant species include telegraph weed, slender oats, red brome, and hare barley.
Southern Coast Live Oak Riparian Forest	175	Broad-leaved woodland dominated by coast live oak, with some southern California black walnut intermixed. Toyon, laurel sumac, poison oak, and Mexican elderberry comprise the shrub understory, while mixed grasses and weedy forbs provide ground cover.
Southern Sycamore-Alder Riparian Forest	84	Sycamore and alder predominate. Occurs along streams and subsurface drainages. Understory shrubs include Mexican elderberry, poison oak, and blackberry.
Southern Willow Scrub	26	Dense, broad-leaved, winter-deciduous shrub thickets associated with seasonally flooded or saturated streambeds and river corridors. Characteristic species include black willow, arroyo willow, and red willow.

Cover Type	Acres	General Habitat Characteristics and Dominant Plants
Open Water	3,143	This cover type includes Lake Elsinore and portions of Corona Lake. Neither lake supports aquatic or emergent vegetation. Riparian vegetation is sparse and patchy, including a variety of native species, ornamentals, and weedy forbs and grasses.

The California Natural Diversity Database lists a number of plant communities in California that have special status because of limited distribution or vulnerability to loss or disturbance as a result of factors such as urban development, conversion to agricultural or other land use, or noxious weed invasion. Special status plant communities in the study area include southern coast live oak riparian forest, southern sycamore alder riparian forest, and southern willow scrub.

Southern Coast Live Oak Riparian Forest

Coast live oak is slow-growing and long-lived. Seedlings are often unsuccessful in competing with introduced annual grasses for moisture and nutrients, which limits regeneration at many sites and increases the risk of habitat loss. Oak woodlands provide habitat for at least 60 species of mammals and 100 species of birds. Oak woodlands in the project area occur primarily in Morrell Canyon, with a smaller stand also present in Decker Canyon.

Southern Sycamore-Alder Riparian Forest

Sycamore and alder are both fast-growing. Sycamore trees can live to be as old as 200 years, and as they age, they often develop cavities that provide nesting or denning habitat for birds or mammals. Both sycamore and alder can tolerate long periods of flooding, and are usually found along streambanks. They contribute to structural complexity in riparian zones and provide foraging opportunities for a number of bird species that eat the seeds. In the project area, southern sycamore-alder riparian forest has a patchy distribution. There are small amounts of sycamore in Morrell Canyon and at stream crossings along the proposed and alternative transmission alignments.

Southern Willow Scrub

Willows are generally fast-growing, and rapidly colonize disturbed sites. This habitat type is found along streams and rivers, where it provides important cover for wildlife. It is of special importance to species that use riparian corridors for dispersal and migration. Willow scrub occurs at Corona (Lee) Lake and at numerous stream crossings along the proposed and alternative transmission alignments, including Temescal Wash, Los Alamos Creek, and Tenaja Guard Station. Scattered willows occur along the stream channel downstream of Lion Spring.

Plant Species of Special Concern, Sensitive Species, and Management Indicator Species

Special status plants are those listed as threatened or endangered at the federal or state level, or those proposed for listing. Special status plants also include species considered sensitive by the USFS or California Native Plant Society. The co-applicants' biological consultant, Michael Brandman Associates (MBA), reviewed species lists developed by FWS, the USFS, and California Native Plant Society to identify special status plants that should be included in pre-licensing studies for the LEAPS Project. After comparing the lists with the known range of each species and the habitat that is present in the LEAPS study area, MBA determined that 61 species had a low, moderate, or high likelihood of occurrence, or had already been observed in the study area (see table 13 at the end of this section). MBA concluded that the 24 species considered to have a moderate to high likelihood of occurrence should be targeted during the field surveys. Surveys conducted during spring and summer months from 2001 to 2006 covered most of the areas that each alternative project configuration would affect. The broader survey area was divided into 12 subareas, as shown in figure 13.

Table 13 (presented at the end of this section) shows the special status plants species that may occur in the project area including the nine federally listed plants: Munz's onion, slender-horned spineflower, San Diego ambrosia, California Orcutt grass, Nevin's barberry, San Jacinto valley crownscale, San Diego thornmint, thread-leaved brodiaea, and spreading navarretia. We present additional information about these federally listed threatened and endangered species in section 3.3.5.

Most of the species shown in table 13 (at the end of this section) are addressed in the Western Riverside County Multiple Species Habitat Conservation Plan (Multi-Species HCP).[45] For certain species in certain areas, the Multi-Species HCP would require focused surveys, habitat assessments, or special planning consideration prior to development. These include narrow endemic plants (those that are highly restricted by their habitat affinities or other ecological factors) and criteria area species (those for which existing information is insufficient for permits that are administered through the Multi-Species HCP).

Some of the species shown in table 13 are designated as Management Indicator Species (MIS). The USFS uses MIS to evaluate the effects of various management actions on habitat. These species do not necessarily have special status, but are important in representing certain habitats or other species or guilds associated with such habitats. Plant MIS for the Cleveland National Forest include Engelmann oak, big cone Douglas-fir, Coulter pine, California black oak, and white fir. These species may occur as scattered individuals in the LEAPS Project area, but do not represent a substantial proportion of any cover type. We provide a detailed discussion of MIS in appendix G.

Noxious Weeds

Based on information obtained from the USFS and the California Invasive Plant Council (formerly the California Exotic Pest Plant Council) listings, the co-applicants determined that 42 noxious weeds or non-native invasive plant species could occur in the study area. Formal weed surveys were not conducted, but the co-applicants noted the presence of weeds during other field efforts, including rare plant surveys. Table 12 lists the nine species of invasive non-native plants MBA encountered in the study area, plus two others known to occur, along with the general locations of their occurrence.

Wildlife

MBA conducted general biological surveys in 2001, 2003, and 2004 and noted the occurrence of wildlife species during other field efforts that were underway between 2001 and 2006, including focused surveys for federally listed plants and animals (discussed in section 3.3.5). Surveys were performed in areas that could be affected by construction at the alternative sites for the upper reservoir, penstock, and powerhouse, and along the northern and southern transmission alignments. During these surveys, MBA documented the occurrence of 157 wildlife species, including moths, butterflies, mammals, birds, amphibians, and reptiles.

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[45] The Multi-Species HCP, completed in 2003, is intended to protect almost 150 species of plants and animals, preserve or build core habitats and linkages, and set aside open space, while allowing for planned development (Riverside County, 2003). The Multi-Species HCP includes a number of over-arching BMPs for development in sensitive areas and identifies specific measures to protect threatened and endangered species, species endemic to the region, and key planning species.

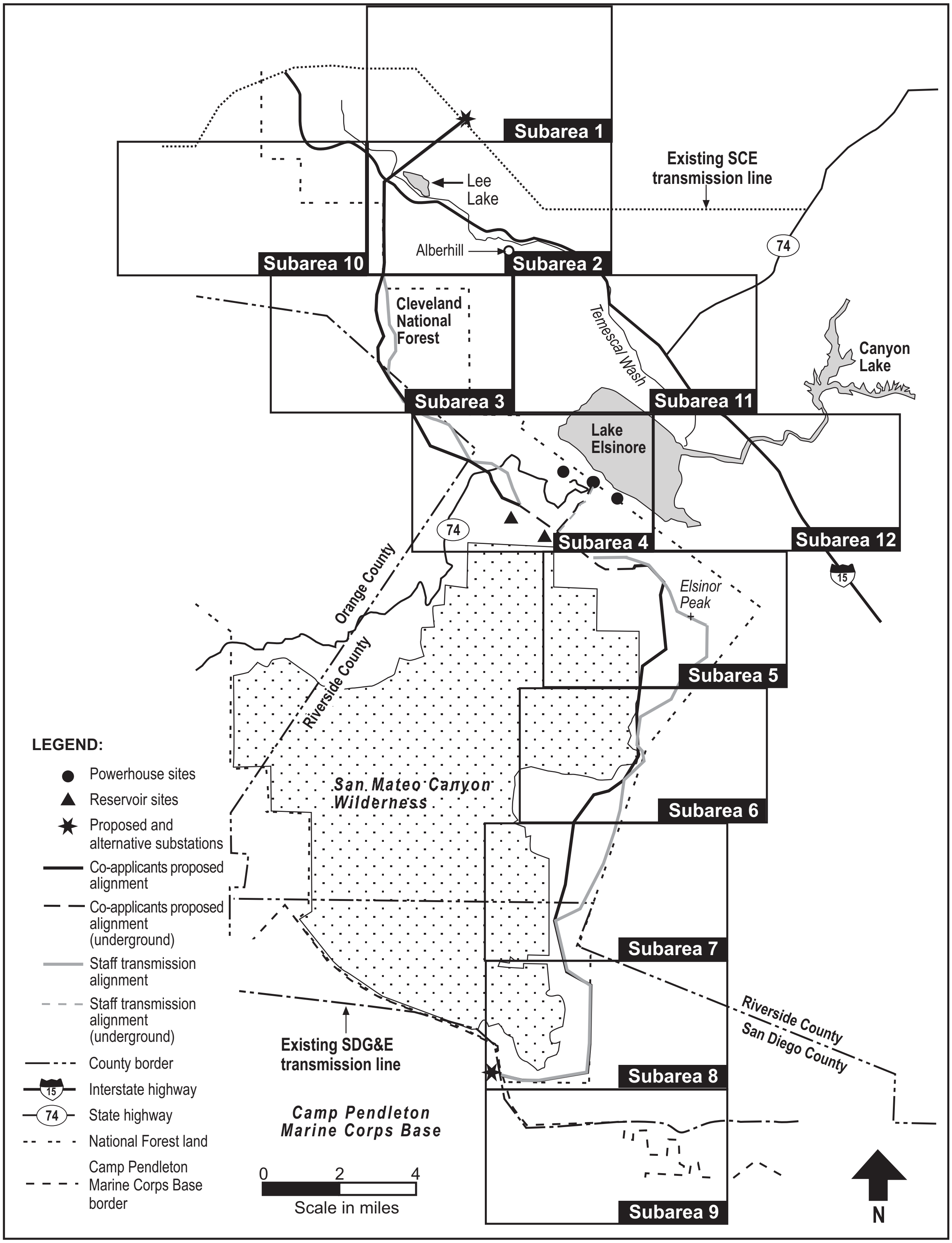

Figure 13. LEAPS Project—Habitat subarea locations. (Source: Elsinore Valley MWD and Nevada Hydro, 2004a, as modified by staff)

Table 12. Invasive non-native plants documented to occur within the study area. (Source: MBA, 2004).

Scientific Name	**Common Name**	**Cal-IPC Listing**	**General Location**
Bromus madritensis ssp. *rubens*	Red brome	A-2	All subareas, except 8 and 9
Lupinus arboreus	Bush lupine	A-2	Subarea 2
Brassica nigra	Black mustard	B	All subareas, except 8 and 9
Olea europaea	Olive	B	Subarea 4
Ricinus communis	Castor bean	B	Subareas 2 and 11
Nicotiana glauca	Indian tree tobacco	NMI	All subareas, except 8 and 9
Salsola tragus	Russian thistle	NMI	All subareas, except 8 and 9
Melilotus officinalis	Yellow sweet clover	CNL	All subareas, except 8 and 9
Picris echioides	Bristly ox-tongue	CNL	All subareas, except 8 and 9
Tamarix species	Tamarisk	A-1	Vicinity of Subarea 12 (documented in other studies)
Arundo donax	Giant reed	A-1	Vicinity of Subareas 1, 2, or 3 (field notes not specific)

Notes: A-1 – most invasive wildland pests—widespread

A-2 – most invasive wildland pest plants—regional

B – wildland plants of lesser invasiveness

Cal-IPC – California Invasive Plant Council

CNL – considered, but not listed; plants that, after review of status, do not appear to pose a significant threat to wildlands

NMI – need more information; current information does not adequately describe nature of threat to wildlands

Common mammals included mule deer, coyote, raccoon, opossum, desert cottontail, dusky-footed woodrat, and California ground squirrel. MBA observed bobcats, and based on their review of the California Wildlife Habitat Relationships Database, mountain lion, gray fox, and long-tailed weasel are also likely present.

Scrub jay, bushtit, wrentit, Nuttall’s woodpecker, ruby-crowned kinglet, yellow-rumped warbler, western meadowlark, song sparrow, and western kingbird were common in the study area. Biologists also observed a variety of raptors, including red-shouldered hawk, red-tailed hawk, Cooper’s hawk, American kestrel, great-horned owl, barn owl, California spotted owl, turkey vulture, and western screech owl.

Amphibians were not abundant, but biologists documented the California tree frog, canyon tree frog, Pacific chorus frog, coastal California newt, and western toad. By contrast, MBA observed 15 reptile species. These included Great Basin fence lizard, San Diego horned lizard, side-blotched lizard, coastal western whiptail, red-diamond rattlesnake, rosy boa, gopher snake, and striped racer.

Wildlife Species of Special Concern, Sensitive Species, and Management Indicator Species

Special status wildlife species include those listed as threatened or endangered at the federal or state level, those proposed for listing, California species of concern or fully protected species, and those considered sensitive by the USFS or BLM. The co-applicants' consultation with FWS, the USFS, BLM, and CDFG along with review of the California Natural Diversity Database initially indicated that 40 special status species could occur in the study area. However, the study area is located outside the range of some of these species, or does not contain suitable habitat for them; these species are not shown in table 14 (presented at the end of this section). Most of the animals shown in table 14 are addressed in the Multi-Species HCP.

The co-applicants selected seven species for focused surveys: Quino checkerspot butterfly, coastal California gnatcatcher, least Bell's vireo, southwestern willow flycatcher, arroyo toad, California red-legged frog, and California spotted owl. With the exception of the California spotted owl, all of these species are federally listed as threatened or endangered. We present additional information about federally listed species in section 3.3.5, *Threatened and Endangered Species*.

Several of the species shown in table 14 as having special federal or state status are also USFS MIS. MIS do not necessarily have special status, but are important in representing certain habitats or other species or guilds associated with such habitats. Wildlife MIS in the project area include mule deer, song sparrow, California spotted owl, mountain lion, and arroyo toad (USFS, 2005b).

The Cleveland National Forest uses mule deer as an indicator of healthy, diverse habitats with low to moderate levels of human disturbance (USFS, 2005b). In low-elevation mountain ranges of southern California, such as the Santa Ana Mountains, mule deer reach their highest densities in oak woodlands, riparian areas, and meadow and grassland margins. They also occur in open scrub and young chaparral. The Land Management Plan indicates that the four southern California national forests support most of the deer in the southern part of California (USFS, 2005b). The USFS (2005b) reports that Santa Ana population is estimated at about 950 deer. Based on analysis of trends between 1990 and 1996, CDFG believes that populations are stable in the South Coast Deer Analysis Unit, which includes the Santa Ana Mountains (CDFG, 1998).

The Cleveland National Forest selected the song sparrow as an MIS for the health of riparian habitat (USFS, 2005b). In California, this species breeds primarily in riparian habitat or wetlands, where it typically nests in herbaceous vegetation or shrubs. The Land Management Plan describes song sparrows as being well distributed in southern California forests; surveyors documented song sparrows at 197 out of 206 point count stations during an 8-year period of forest riparian bird count surveys. The Partners in Flight Species Assessment (Panjabi et al., 2005) indicates population trends are highly variable or unknown within the species' range, and predicts a slight to moderate decline in future suitability of breeding conditions. The Land Management Plan describes a slight downward (but insignificant) trend in populations in the California foothills (USFS, 2005b).

The California spotted owl is an MIS for montane conifer forest habitat (USFS, 2005b). The Cleveland National Forest anticipates that monitoring for this species would provide information about whether USFS management is maintaining enough mature, large-diameter, high-canopy cover stands with densely shaded understories to provide sufficient habitat for interior forest species. California spotted owls in the Santa Ana Mountains, and in other southern California forests, are clustered in islands of suitable habitat, surrounded by habitat that is not suitable (USFS, 2005b). As of 1992, surveys confirmed

114 pairs in the San Bernardino Mountains, the largest subpopulation in southern California, and 11 in the Santa Ana Mountains (Beck and Gould, 1992). The results of a 2003 report on range-wide population trends were inconclusive, but USFS (2005b) indicates there is a high risk that the southern California metapopulation will go extinct within the next 30 to 40 years.

The Cleveland National Forest chose the mountain lion as an MIS to evaluate planning and management of habitat fragmentation and habitat linkages. Mountain lions occur within all four of the southern California national forests. They are most abundant where their primary prey—mule deer—is also abundant. Beier (1993) estimates a population of about 20 mountain lions in the Santa Ana Mountains on the Cleveland National Forest. This population is isolated as a result of habitat fragmentation, and is likely to be extirpated unless adequate movement corridors are established and protected between the Santa Anas and the Palomar Range to the east.

The arroyo toad is an indicator of aquatic habitat quality. The Cleveland National Forest anticipates that long term trends in arroyo toad abundance, distribution, and habitat condition will reflect the effectiveness of protection and improvement measures for arroyo toads and other riparian dependent species. Arroyo toads occur in most of the major stream systems on the Cleveland National Forest, including San Juan and San Mateo creeks, where populations are found immediately adjacent to the national forest boundary (USFS, 2005b). However, populations are small, and the Land Management Plan notes that the species has disappeared from about 76 percent of its total historic range (USFS, 2005b). We discuss the arroyo toad in more detail in section 3.3.5, *Threatened and Endangered Species*.

Migratory Birds

Based on Audubon notes, USGS records, and incidental sightings, the co-applicants report that at least 140 species of birds have been documented to use Lake Elsinore. These include the mallard, western grebe, least sandpiper, California gull, great egret, and great blue heron. While habitat around the lake provides breeding habitat for several species, such as killdeer and vireos, many of the birds that may use the lake are migrants.

Lake Elsinore is located within the Pacific Flyway, used by birds migrating along the west coast from western Alaska, through interior California, to wintering grounds in Mexico. The lake and surrounding habitat may serve as a suitable resting and re-fueling stop, but the co-applicants suggest that poor water quality and low productivity of Lake Elsinore make it less attractive to migrating birds than other lakes in Riverside County, such as Lake Skinner, Lake Mathews, and Lake Hemet.

Mosquito Production

Participants during scoping identified the potential for the upper reservoir to support production of mosquitoes as a resource issue that should be addressed in the EIS. Mosquitoes are of concern because they can transmit diseases to and between humans, birds, and mammals. In California, West Nile virus is of particular concern. While most cases are not serious, infection can cause death in people with comprised immune systems, including the elderly. Twenty-seven deaths were associated with West Nile virus in California in 2004 (USGS, 2005c). Riverside County reported 109 cases, and one death.

Since it appeared in North America in 1999, West Nile virus has been documented in more than 200 different species of birds and mammals (Audubon, 2005). The primary host of West Nile virus appears to be birds. The species most vulnerable to infection are crows, jays, and magpies, but many others, including raptors, waterfowl, wading birds, and songbirds, have also succumbed to West Nile virus. In 2004, Riverside County reported 139 bird deaths associated with West Nile virus (USGS, 2005d).

About 52 species of mosquitoes are known to occur in California (ACMAD, 2005). All species require standing water to complete their life cycle. Development from egg to adult typically takes about a week, depending on water temperature. Given adequate water temperature, breeding success is also related to the length of time that shallow standing water is available. Factors that are conducive to breeding success in standing water include water level stability, lack of wave action, high nutrient levels, and the presence of vegetative or other cover that affords protection of the larvae from predators or desiccation (TVA, 2004).

Table 13. Special status plant species that may occur or are known to occur in the LEAPS study area. (Source: MBA, 2004; personal communication, L. Young, Cleveland National Forest, November 17, 2005; as modified by staff)

Scientific Name	**Common Name**	**Status**	**Habitat Associations**	**Likelihood of Occurrence**
Acanthomintha ilicifolia	San Diego thornmint	FT USFS SE CNPS-1B	Chaparral, coastal scrub, vernal pools (clay), valley/foothill grasslands. 30–3,000 feet.	Unlikely: not known from project vicinity; habitat in study area is marginal.
Allium munzii[a]	Munz's onion	FE USFSS ST CNPS-1B	Chaparral, coastal scrub, cismontane woodland, pinyon-juniper woodland, grasslands. 1,000–3,400 feet.	Documented during USFS surveys within proposed southern transmission alignment (Subarea 5). Critical habitat designated on Elsinore Peak. Also known from Estelle Mountain, Alberhill, and Temescal Valley.
Ambrosia pumila[a]	San Diego ambrosia	FE	River terraces, openings in coastal scrub and grasslands, occasionally near vernal pools. Sea level to 1,300 feet.	Low: known from one disjunct population northeast of Lake Elsinore.
Arctostaphylos rainbowensis	Rainbow manzanita	USFSS CNPS-1B	Chaparral. 900–2,600 feet.	Documented during surveys. One occurrence along common segment of the proposed and alternative southern transmission alignment (Subarea 6).
Astragalus deanei	Deane's milkvetch	USFSS CNPS-1B	Chaparral, coastal scrub, riparian scrub. 240–2,200 feet.	Low: not known from project vicinity; habitat in study area is marginal.
Astragalus douglasii var. *perstrictus*[b]	Jacumba milkvetch	USFSS CNPS-1B	Chaparral, cismontane woodland, valley/foothill grasslands. Rocky soils. 3,000–4,500 feet.	Low: not known from project vicinity; habitat in study area is marginal.
Astragalus oocarpus	San Diego milkvetch	USFSS CNPS-1B	Chaparral openings, cismontane woodland. 1,000–5,0000 feet.	Low: not known from project vicinity; habitat in study area is marginal.

Scientific Name	Common Name	Status	Habitat Associations	Likelihood of Occurrence
Astragalus pachypus var. *jaegeri*	Jaeger's milkvetch	USFSS CNPS-1B	Chaparral, cismontane woodland, coastal scrub, valley/foothill grassland, sandy and rocky soils. 1,200–3,000 feet.	Low: not known from project vicinity; habitat in study area is marginal.
Atriplex coronata var. *notatior*[c]	San Jacinto valley crownscale	FE CNPS-1B	Playas, chenopod scrub, grasslands, vernal pools. 1,300–1,700 feet.	Low: known from vicinity, but habitat in study area is marginal.
Atriplex parishii[c]	Parish's brittlescale	CNPS-1B	Chenopod scrub, playas, vernal pools, from about 80 to 6,200 feet.	Low: known from western Riverside County, but no habitat known in project area.
Atriplex serenana var. *davidsonii*[c]	Davidson' saltscale	CNPS-1B	Coastal bluff scrub, coastal scrub/alkaline, from about 30 to 650 feet.	Moderate: known from Alberhill vicinity.
Berberis nevinii	Nevin's barberry	FE USFSS SE CNPS-1B	Chaparral, cismontane woodland, coastal sage scrub, riparian scrub, sandy or gravelly soils. Sea level to 2,000 feet.	Low: not known from project vicinity, but study area contains suitable habitat.
Brodiaea filifolia	Thread-leaved brodiaea	FT USFSS SE CNPS-1B	Coastal scrub, cismontane woodland, grasslands, vernal pools, clay soils. Sea level to 2,800 feet.	Moderate: not known from project area, but critical habitat designated at Miller Mountain west of proposed transmission alignment and essential habitat along Tenaja Road east of proposed transmission alignment.
Brodiaea orcuttii	Orcutt's brodiaea	USFSS CNPS-1B	Chaparral, meadows, valley grasslands. Sea level to 5,300 feet.	High: known from project vicinity in Subarea 7; project area contains suitable habitat.
Calochortus dunnii	Dunn's mariposa lily	USFSS CNPS-1B	Closed-cone conifer forest, chaparral (gabbro soils). 1,200–6,000 feet.	Low: not known from project vicinity; habitat in study area is marginal.
Castilleja lasiorhyncha	San Bernardino Mountains owls' clover	USFSS CNPS-1B	Chaparral, meadows, seeps, pebble plain, upper montane conifer forest (mesic). 4,250–7,800 feet.	Low: not known from project vicinity; habitat in study area is marginal.
Ceanothus cyaneus	Lakeside ceanothus	USFSS CNPS-1B	Closed–cone conifer forest, chaparral. 700–1,900 feet.	Low: not known from project vicinity; habitat in study area is marginal.
Ceanothus ophiochilus	Buckthorn	USFSS CNPS-1B	Chaparral, coastal scrub, meadows, grassland. Sea level to 4,800 feet.	Low: not known from project vicinity; habitat in study area is marginal.

Scientific Name	Common Name	Status	Habitat Associations	Likelihood of Occurrence
Centromadia pungens ssp. *laevis*	Smooth tarplant	CNPS-1B	Chenopod scrub, meadows and seeps, playas, riparian woodland, valley and foothill grassland/alkaline, from sea level to 1,580 feet.	Low: records from Lake Elsinore area, current key populations near San Jacinto River and Murrieta areas.
Chorizanthe polygonoides var. *longispina*	Long-spined spineflower	USFSS CNPS-1B	Chaparral, coastal scrub, meadows, grasslands. Sea level to 4,800 feet.	High: known from project vicinity.
Chorizanthe procumbens	Prostrate spineflower	formerly CNPS-4	Chaparral, coastal sage scrub. Sea level to 2,600 feet.	Moderate: not known from project vicinity, but suitable habitat is present within the study area.
Clarkia delicata	Delicate clarkia	USFSS CNPS-2	Chaparral, cismontane woodland. 770–3,300 feet.	Low: not known from project vicinity; habitat in study area is marginal.
Comarostaphylis diversifolia ssp. *diversifolia*	Summer holly	CNPS-1B	Chaparral. Sea level to 2,800 feet.	High: known from project vicinity; study area contains suitable habitat.
Cupressus forbesii	Tecate cypress	USFSS CNPS-1B	Closed-cone conifer forest, chaparral. 840–4,900 feet.	Low: not known from project vicinity; habitat in study area is marginal.
Cupressus stephensonii	Arizona cypress	USFSS CNPS-1B	Closed-cone conifer forest, chaparral, riparian scrub, gabbro soils. 3,400–5,600 feet.	Low: not known from project vicinity; habitat in study area is marginal.
Delphinium hesperium Gray ssp. *cuyamacae*	Cuyamaca larkspur	USFSS CNPS-1B	Lower montane conifer forest, meadows, and seeps. 4,000–5,400 feet.	Low: not known from project vicinity; habitat in study area is marginal.
Dodecahema leptoceras[a]	Slender-horned spineflower	FE USFSS SE CNPS-1B	Sandy alluvial benches, floodplain terraces with alluvial fan sage scrub. 700–2,500 feet.	High: known from Temescal Wash.
Dudleya cymosa[b]	Canyon live-forever	USFSS CNPS-1B	Chaparral, coastal scrub. 400–1,800 feet.	Low: not known from project vicinity; habitat in study area is marginal.
Dudleya multicaulis[a]	Many-stemmed dudleya	USFSS CNPS-1B	Chaparral, coastal scrub. Sea level to 2,600 feet.	High: known from project vicinity. Study area contains suitable habitat.
Dudleya viscida	Sticky dudleya	USFSS CNPS-1B	Coastal scrub, coastal bluff scrub, chaparral. Sea level to 1,800 feet.	High: known from project vicinity. Study area contains suitable habitat.

Scientific Name	Common Name	Status	Habitat Associations	Likelihood of Occurrence
Erodium macrophyllum[c]	Large-leaf filaree	CNPS-2	Cismontane woodland, valley and foothill grassland/clay, from 50 to 3,900 feet.	High: known from Alberhill vicinity.
Eryngium aristulatum var. *parishii*	San Diego button-celery	FE SE CNPS-1B	Vernal pools, coastal scrub, grassland. Sea level to 2,000 feet.	Moderate: not known from project vicinity, but suitable habitat is present.
Fremontodendron mexicanum	Mexican flannel bush	FE USFSS SR CNPS-1B	Closed-cone conifer, chaparral, cismontane woodland, gabbroic, metavolcanics, or serpentinite soils. 320–1,600 feet.	Low: not known from project vicinity; habitat in study area is marginal.
Githopsis diffusa ssp. *filicaulis*	San Gabriel bluecup	USFSS CNPS-3	Chaparral, mesic disturbed areas. 1,500–2,300 feet.	Low: not known from project vicinity; habitat in study area is marginal.
Harpagonella palmeri	Palmer's grapplinghook	CNPS-4	Chaparral, coastal sage scrub, valley/foothill grassland. 70–3,100 feet.	Moderate: not known from project vicinity, but study area contains suitable habitat.
Hemizonia floribunda	Tecate tarplant	USFSS CNPS-1B	Chaparral, coastal scrub. 230–4,000 feet.	Low: not known from project vicinity; habitat in study area is marginal.
Hemizonia mohavensis	Mojave tarplant	USFSS CNPS-1B	Chaparral, riparian scrub. 2,780–5,250 feet.	Low: not known from project vicinity; habitat in study area is marginal.
Horkelia truncate	Ramona horkelia	CNPS-1B	Chaparral, cismontane woodland. 1,300–4,300 feet.	High: known from project vicinity.
Juglans californica var. *californica*	California black walnut	CNPS-4	Woodlands and forests below 3,000 feet.	Moderate: known from a few locations in western Riverside County; habitat present in the study area.
Lasthenia glabrata ssp. *coulteri*	Coulter's goldfields	CNPS-1B	Vernal pools, playas, marshes. Sea level to 5,000 feet.	Moderate: not known from project vicinity, but suitable habitat is present.
Lepechinia cardiophylla[c]	Heart-leaved pitcher sage	USFSS CNPS-1B	Closed-cone conifer forest, chaparral, cismontane woodland. 1,800–4,500 feet.	Documented by USFS along proposed transmission alignment in Subarea 3.
Lessingia glandulifera var. *tomentosa*	Warner Springs lessingia	USFSS CNPS-1B	Chaparral, sandy soils. 2,800–4,000 feet.	Low: not known from project vicinity; study area contains suitable habitat, but outside species' range.

Scientific Name	Common Name	Status	Habitat Associations	Likelihood of Occurrence
Lilium humboldtii var. *ocellatum*	Humboldt lily	CNPS-4	Chaparral, cismontane woodland, lower montane conifer forest/openings. 300–3,600 feet.	Documented during field surveys. One population along proposed northern transmission alignment (Subarea 3).
Lilium parryi	Lemon lily	USFSS CNPS-1B	Lower montane conifer forest, meadows and seeps, riparian scrub, upper montane conifer forest/mesic. 4,360–8,500 feet.	Low: not known from project vicinity; habitat in study area is marginal.
Limnanthes gracilis ssp. *parishii*	Parish's meadowfoam	USFSS SE CNPS-1B	Wet meadows, seeps, vernal pools. 2,000–5,800 feet.	Moderate: not known from project vicinity, but suitable habitat is present.
Linanthus orcuttii	Orcutt's linanthus	USFSS CNPS-1B	Chaparral, lower montane conifer forests in gravelly clearings. 3,000–7,000 feet.	Low: not known from project vicinity; habitat in study area is marginal.
Machaeranthera asteroides var. *lagunensis*	Laguna Mountains aster	USFSS CNPS-1B	Cismontane woodland, lower montane conifer forest. 2,600–7,850 feet.	Low: not known from project vicinity; habitat in study area is marginal.
Monardella macrantha ssp. *hallii*	Hall's monardella	CNPS-1B	Broad-leaved upland forest, chaparral, cismontane woodland, lower montane conifer forest, grassland, 2,300–7,200 feet.	High: known from project vicinity.
Monardella nana ssp. *leptosiphon*	San Felipe monardella	USFSS CNPS-1B	Chaparral, lower montane conifer forest. 4,000–6,000 feet.	Low: not known from project vicinity; habitat in study area is marginal.
Myosurus minimus ssp. *apus*[c]	Little mousetail	CNPS-3	Vernal pools. Sea level to 2,100 feet.	Moderate: not known from project vicinity, but suitable habitat is present.
Navarretia fossalis	Spreading navarretia	FT CNPS-1B	Vernal pools, clay flats, irrigation ditches, alkali grasslands, alkali playas, alkali sinks. Sea level to 4,250 feet.	Unlikely: not known from project vicinity; habitat in study area is marginal. Species thought to have very narrow geographic distribution.
Navarretia peninsularis	Baja pincushion plant	USFSS CNPS-1B	Chaparral openings, lower montane conifer forest (mesic). 4,900–7,500 feet.	Low: not known from project vicinity; habitat in study area is marginal.
Nolina cismontane	Chaparral nolina	USFSS CNPS-1B	Chaparral, coastal scrub, sandstone or gabbro soils. 500–4,200 feet.	Low: not known from project vicinity; habitat in study area is marginal.

Scientific Name	Common Name	Status	Habitat Associations	Likelihood of Occurrence
Orcuttia californica[a]	California Orcutt grass	FE SE CNPS-1B	Vernal pools. 50–2,200 feet.	Moderate: not know from project vicinity, but suitable habitat is present.
Penstemon californicus	California penstemon	USFSS CNPS-1B	Chaparral, lower montane conifer forest, pinyon and juniper woods/sandy. 3,800–7,500 feet.	Low: not known from project vicinity; habitat in study area is marginal.
Phacelia suaveolens ssp. *keckii*	Santiago Peak phacelia	USFSS CNPS-1B	Closed-cone conifer forest, chaparral. 2,000–5,250 feet.	Low: not known from project vicinity; habitat in study area is marginal.
Poa atropurpurea	San Bernardino bluegrass	USFSS CNPS-1B	Meadows and seeps. 4,500–8,000 feet.	Low: not known from project vicinity; habitat in study area is marginal.
Quercus engelmannii	Engelmann oak	CNPS-4 MIS	Chaparral, cismontane woodland, riparian woodland, valley and foothill grassland. 400–4,250 feet.	Moderate: not known from project vicinity, but study area contains suitable habitat.
Ribes canthariforme	Moreno currant	USFSS CNPS-1B	Chaparral. 1,200–4,000 feet.	Low: not known from project vicinity; habitat in study area is marginal
Romneya coulteri	Coulter's matilija poppy	CNPS-4	Chaparral, coastal scrub, often in burned or disturbed areas. 65–3,900 feet.	Documented during field surveys along proposed northern transmission alignment (Subarea 2); alternative northern transmission alignment (Subarea 2); common segment of the proposed and alternative southern transmission alignments (Subarea 8); proposed Santa Rosa powerhouse penstock alignment (Subarea 4); and the Ortega Oaks powerhouse penstock alignment (Subarea 4).
Satureja chandleri[a]	San Miguel savory	USFSS CNPS-1B	Chaparral, cismontane woodland, coastal scrub, riparian woodland, grassland. 400–3,300 feet.	High: known from project vicinity.
Senecio ganderi	Gander's ragwort	USFSS CNPS-1B	Chaparral, gabbroic and burned areas. 1,300–4,000 feet.	Low: not known from project vicinity; habitat in study area is marginal.

Scientific Name	Common Name	Status	Habitat Associations	Likelihood of Occurrence
Sibaropsis hammittii[a]	Hammitt's clay-cress	USFSS CNPS-1B	Chaparral openings, valley/foothill grasslands, clay soils. 2,360–3,500 feet.	Documented during USFS field surveys within proposed southern transmission alignment (Subarea 5).
Streptanthus campestris	Southern jewel-flower	USFSS CNPS-1B	Chaparral, lower montane conifer forest, pinyon and juniper woodland, rocky soils. 3,000–7,500 feet.	Low: not known from project vicinity; habitat in study area is marginal.
Tetracoccus dioicus	Parry's tetracoccus	USFSS CNPS-1B	Chaparral, coastal scrub. 500–3,300 feet.	High: known from project vicinity.
Thermopsis californica var. *semota*	Velvety false lupine	USFSS CNPS-1B	Cismontane woodland, lower montane conifer forest, meadows and seeps, valley and foothill grasslands. 3,400–6,100 feet.	Low: not known from project vicinity; habitat in study area is marginal.
Trichocoronis wrightii wrightii[a]	Wright's trichocoronis	CNPS-2	Meadows and seeps, marshes and swamps, riparian forest, vernal pools/alkaline, from about 16 to 1,430 feet.	Low: records from Lake Elsinore area, current key populations near San Jacinto River and Mystic Lake.

Notes: FE – federal endangered

FT – federal threatened

USFSS – U.S. Forest Service sensitive

SE – state endangered

ST – state threatened

CNPS-1B – California Native Plant Society rare, threatened, or endangered in California and elsewhere

CNPS-2 – California Native Plant Society rare, threatened, or endangered in California, but more common elsewhere

CNPS-3 – California Native Plant Society more information is needed regarding status

CNPS-4 – California Native Plant Society species with limited distribution (watch-list)

[a] These species are identified as Narrow Endemic Plant Species under the Multi-Species HCP, and focused surveys may be required in areas where construction is proposed.

[b] MBA's report does not indicate which variety of *Astragalus douglasii* was evaluated, but based on the common name, we assume MBA considered var. *perstrictus*.

[c] These species are identified as Criteria Area Survey Species under the Multi-Species HCP, and may require focused surveys in areas where construction is proposed.

[d] There are four subspecies of *Dudleya cymosa*. The USFS comments that ssp. *ovatifolia* is of particular concern. MBA's report does not indicate which subspecies were considered during their surveys; however, review of CNPS records indicates none are known from the project area (CNPS, 2005).

Table 14. Special status wildlife species that may occur or are known to be present within the study area. (Source: MBA, 2004, modified by staff)

Scientific Name	Common Name	Status	Habitat Associations	Likelihood of Occurrence
Euphydryas editha quino	Quino checkerspot butterfly	FE	Sparse sage scrub/grassland mix, with dwarf plantain and/or purple owls' clover.	High: known from project vicinity; study area contains suitable habitat.
Bufo californicus	Arroyo toad	FE MIS	Streams with sandy banks.	High: known from project vicinity; study area contains suitable habitat.
Ensatina klauberi	Large-blotched salamander	USFSS CSC	Deciduous evergreen forests, oak woodland, chaparral	Low: not known from project vicinity; habitat in study area is marginal
Rana aurora draytonii	California red-legged frog	FT CSC	Ponds, streams, permanent waterways with abundant riparian shrub or emergent vegetation.	Low: not known from project vicinity; habitat in study area is marginal.
Spea (Scaphiopus) hammondii	Western spadefoot	BLM-S CSC	Washes, floodplains, alluvial fans, playas, alkali flats.	High: known from project vicinity; study area contains suitable habitat.
Taricha torosa torosa	Coastal California newt	CSC	Coastal drainages, ponds, reservoirs, and slow-moving streams.	Documented in study area along common segment of the proposed and alternative southern transmission alignments (Subarea 7).
Aspidoscelis (Cnemidophorus) hyperythra beldingi	Belding's orange-throated whiptail	CSC	Chaparral/semi-arid areas with loose, sandy soil.	High: known from project vicinity; study area contains suitable habitat.
Charina (Lichanura) trivirgata roseofusca	Coastal rosy boa	USFSS BLM-S	Rocky shrublands, desert.	Documented in study area near common segment of proposed and alternative southern transmission alignments (Subarea 6).
Crotalus ruber ruber	Northwestern red-diamond rattlesnake	CSC	Chaparral, desert scrub, rocky alluvial fans.	Documented in study area along proposed and alternative northern transmission alignments (Subareas 1 and 2).
Diadophis punctatus similis	San Diego ringneck snake	USFSS	Rocky areas, woodpiles, stable talus.	Moderate: not known from project vicinity, but study area contains suitable habitat.
Emy (Clemmys) marmorata pallida	Southwestern pond turtle	USFSS BLM-S CSC	Permanent freshwater streams, rivers, ponds, and lakes.	Moderate: not known from project vicinity, but study area contains suitable habitat.

Scientific Name	Common Name	Status	Habitat Associations	Likelihood of Occurrence
Eumeces skiltonianus interparietalis	Coronado skink	BLM-S CSC	Chaparral, rocky habitats near streams.	High: known from project vicinity; study area contains suitable habitat.
Lampropeltis zonata pulchra	San Diego mountain kingsnake	USFSS CSC	Moist woods, conifer forest, woodland, chaparral.	Moderate: not known from project vicinity, but study area contains suitable habitat.
Phrynosoma coronatum blainvillei	Coast (San Diego) horned lizard	USFSS CSC	Sandy soil with low vegetation, openings in coastal sage scrub, chaparral, oak woodlands.	Documented in study area along alternative northern transmission alignment and common segment of proposed and alternative southern transmission alignments (Subareas 2 and 6).
Thamnophis hammondii	Two-striped garter snake	USFSS BLM-S CSC	Permanent freshwater, streams with rocky beds, willow or other riparian.	Documented in study area near common segment of proposed and alternative southern transmission alignments (Subarea 6).
Accipiter cooperii	Cooper's hawk	CSC	Mature forest, open woodlands, riparian forest.	Documented in study area along common segment of proposed and alternative southern transmission alignments (Subarea 6).
Aimophila ruficeps canescens	Southern California rufous-crowned sparrow	CSC	Coastal sage scrub, chaparral.	Documented in study area near upper reservoir sites.
Asio otus	Long-eared owl	CSC	Riparian bottomlands, live oak stands.	Moderate: not known from project vicinity, but study area contains suitable habitat.
Athene cunicularia[a]	Burrowing owl	CSC	Grasslands, agricultural lands	Moderate: known from Alberhill vicinity; study area contains suitable habitat.
Elanus leucurus	White-tailed kite	CFP	Open savannah, grasslands, fields.	High: known from project vicinity; study area contains suitable habitat.
Empidonax traillii extimus	Southwestern willow flycatcher	FE	Dry willow thickets, alders.	Moderate: not known from project vicinity, but study area contains suitable habitat.
Haliaeetus leucocephalus	Bald eagle	FT SE	Nesting in large trees near lakes, reservoirs, large rivers.	High: known from project vicinity; study area contains suitable foraging habitat.

Scientific Name	Common Name	Status	Habitat Associations	Likelihood of Occurrence
Lanius ludovicianus	Loggerhead shrike	CSC	Grasslands, coastal sage scrub, chaparral.	Documented in study area along proposed northern transmission alignment (Subarea 2).
Polioptila californica	Coastal California gnatcatcher	FT CSC	Coastal scrub, dry washes and ravines.	Moderate: not known from project vicinity, study area contains suitable habitat.
Strix occidentalis occidentalis	California spotted owl	USFSS MIS BLM-S CSC	Conifer forest, wooded canyons.	Documented in study area near proposed northern transmission alignment (Subarea 3).
Vireo bellii pusillus	Least Bell's vireo	FE SE	Riparian areas, forest edges.	Moderate: not known from project vicinity, but study area contains suitable habitat.
Antrozous pallidus	Pallid bat	USFSS CSC	Roosts in caves, tunnels, mines, buildings, tree hollows; forages in open areas and edge habitats.	Low: known from project vicinity; study area contains suitable foraging habitat.
Chaetodipus fallax fallax	Northwestern San Diego pocket mouse	CSC	Coastal scrub, chaparral, grasslands, sagebrush	High: known from project vicinity; study area contains suitable habitat.
Dipodomys stephensi	Stephens' kangaroo rat	FE ST	Annual and perennial grassland, coastal scrub, sagebrush scrub.	High: known from project vicinity; study area contains suitable habitat.
Lasiurus blossevillii	Western red bat	USFSS	Wooded areas.	Moderate: not known from project vicinity, but study area contains suitable habitat.
Perognathus longimembris brevinasus	Los Angeles little pocket mouse	USFSS CSC	Grassland, coastal scrub, fine sandy soils.	Low: known from project vicinity, but study area may not contain suitable habitat.

Notes: FE – federal endangered

FT – federal threatened

USFSS – U.S. Forest Service sensitive

MIS – U.S. Forest Service management indicator species

BLM-S – U.S. Bureau of Land Management sensitive

SE – state endangered

ST – state threatened

CSC – California species of concern

CFP – California fully protected

[a] Focused surveys may be needed for this species where suitable habitat is present within the Multi-Species HCP area.

3.3.4.2 Environmental Consequences

Vegetation

Table 15 shows the acreage, by vegetation type, that would be disturbed by construction at each of the sites associated with the Morrell Canyon or Decker Canyon reservoir and staging sites; the Santa Rosa, Ortega Oaks, and Evergreen powerhouse and staging sites; and substation sites. It also shows the acreage that would be disturbed for installing transmission towers, constructing access roads, placing equipment for stringing wires and constructing and maintaining the underground segments of each alignment. The table also shows the number of acres that could be revegetated at each site, following construction.

Effects of Construction on Vegetation

Co-applicants' Proposal—Construction of the project would require clearing of approximately 342.7 acres of existing vegetation. About 133.2 acres (including about 15.7 acres of temporary access roads) could be revegetated. As discussed in section 3.3.1.2, *Environmental Consequences*, in *Geology and Soils*, the co-applicants propose to develop and implement a reservoir clearing plan and a revegetation plan, in conjunction with their plan for erosion control. The clearing plan would identify the location and acreage of lands to be cleared, describe the vegetation to be cleared, describe resource management goals related to fish and wildlife enhancement, and describe and map disposal methods and locations. The revegetation plan would describe plant species and densities to be used, fertilization and irrigation requirements, an effectiveness monitoring program, provision for filing monitoring reports, and procedures to be followed if monitoring reveals that revegetation is not successful.

Resource Agency Measures

These plans would be consistent with USFS revised preliminary 4(e) condition no. 15 (as described in section 3.3.1.2), which calls for development of an erosion control plan. These plans would also be consistent with revised preliminary 4(e) condition no. 33, which calls for the co-applicants to develop a vegetation management plan. The plan would address transmission line clearing; native habitat and biodiversity improvement; revegetation and irrigation of disturbed sites; soil fertility, moisture analysis, grading, and amendments; soil protection and erosion control, including use of certified weed free straw; use of approved mixes of native plant species; and pest treatment, monitoring and prevention.

Effects Analysis

In addition to the removal of vegetation, clearing, grading, and excavation can damage soil structure, alter soil nutrients, and reduce the viability of existing seed banks. These changes may complicate revegetation efforts that are needed to prevent soil erosion and restore functional native plant communities. Adding a specific measure to the clearing plan to address stockpiling of topsoil as construction proceeds and replacing (and possibly amending) topsoil after construction is completed would provide additional support for re-establishment of native plant communities in native soils.

For the LEAPS Project, the co-applicants propose to develop and implement a plan that would aid in restoring vegetation to its current condition or enhancing it to improve wildlife habitat. Adding a specific measure to the revegetation plan to identify criteria for success (e.g., percent coverage of desired species at specified time intervals)

Table 15. Acreage that would be affected by construction and revegetation at proposed and alternative reservoir, powerhouse, staging, substation, transmission, and road locations. (Source: Elsinore Valley MWD and Nevada Hydro, 2005; Elsinore Valley MWD and Nevada Hydro, 2006, as modified by staff)

	Oak Woodland	Coastal Sage Scrub	Chaparral	Non-native Grassland	Disturbed[a]	Total Acres Initial Disturbed	Total Acres Revegetated	Total Acres Permanently Converted
Proposed Project Features								
Morrell Canyon	20	0	80	0	0	100	0	100
Reservoir staging[b]	0	0	40	0	0	40	40	0
Santa Rosa powerhouse	0	30	0	0	0	30	0	30
Santa Rosa powerhouse staging	0	0	0	20	0	20	20	0
North substation	0	0	0	35	0	35	0	35
South substation[a]	0	0	0	0	50	0	0	0
Overhead transmission alignment tower installation	0	1	25	4	0	30	0	30
Pulling and tensioning stations outside right-of-way	0	0	4	0	0	4	4	0
Helicopter fly yards	0	0	25	0	0	25	25	0
Overhead transmission alignment construction access roads[c]	0	0	0	0	0	15.7	15.7	0
OH/UG termination stations	0	0	5	0	0	5	0	5
Underground segment trenching and permanent maintenance road	0	2	36	0	0	38	28.5	9.5
Alternative Project Features								
Decker Canyon	5	0	95	0	0	100	0	100
Decker Canyon staging[b]	0	0	40	0	0	40	40	0

	Oak Woodland	Coastal Sage Scrub	Chaparral	Non-native Grassland	Disturbed[a]	Total Acres Initial Disturbed	Total Acres Revegetated	Total Acres Permanently Converted
Optional Ortega Oaks powerhouse (and staging)[d]	0	5	0	53	0	58	20	38
Optional Evergreen powerhouse	0	20	0	35	0	55	0	55
Optional Evergreen staging	0	0	0	20	0	20	20	0
Staff alternative overhead transmission alignment tower installation[e]	0	1	25	4	0	30	0	30
Staff alternative transmission alignment underground segment trenching and permanent maintenance road	0	2	27.9	0	0	29.90	22.4	7.5
Staff alternative transmission alignment construction access roads[c]	0	0	0	0	0	13.5	13.5	0

[a] The estimated 50 acres of land at the site of the proposed south substation is currently in a disturbed condition and would not be disturbed by construction.

[b] The USFS revised preliminary 4(e) condition calls for the co-applicants to develop a plan for a recreation facility at the staging area or at another location. In this analysis, we assume that an alternative site would be selected, and the reservoir staging area would be re-graded to natural contours and revegetated using native plants.

[c] Estimates of acres that would be disturbed for temporary road construction are not assigned to any vegetation cover type because their locations are unknown.

[d] The Ortega Oaks site does not have a separate staging area, but it is assumed that 20 acres of the site could be revegetated following construction.

[e] Area that would be disturbed for use as pulling and tensioning stations, overhead/underground termination stations, and helicopter fly yards are assumed to be the same under both alternatives.

would assist the co-applicants in achieving this goal, by providing the basis for determining which vegetation parameters to monitor as revegetation proceeds. By measuring progress at intervals as vegetation re-establishes, the co-applicants would be able to provide remediation if and when it is needed.

Limiting the scope of the clearing plan to the reservoir would leave almost half the area affected by construction without mitigation. Broadening the scope of the clearing and revegetation plans to include areas outside the reservoir area (e.g., powerhouse site, staging area, transmission towers, and access roads) and outside the Cleveland National Forest would be a useful means of minimizing overall project effects on terrestrial resources. Implementation of USFS revised preliminary 4(e) condition no. 33 would provide a systematic approach to protecting and restoring soils and vegetation that could be adversely affected by construction.

Staff Alternative—About 100 acres would be affected by construction of a reservoir at the Decker Canyon site. Assuming the Santa Rosa powerhouse site is selected, construction of the staff alternative would affect a smaller amount of vegetation (332.4 vs. 342.7 acres) than the co-applicants' proposal, and with corresponding differences in the amount of land that could be revegetated (124.9 acres, compared to 133.2 acres), primarily because of the difference in the lengths of temporary access roads and underground segments with associated permanent access roads.

Optional Ortega Oaks or Evergreen Powerhouse—Effects associated with the Ortega Oaks or Evergreen powerhouse site would be the same as they would be for the proposed Santa Rosa powerhouse site, although acreages would differ. Construction at the Ortega Oaks powerhouse site would affect about 58 acres with about 20 acres being revegetated. Construction at the Evergreen powerhouse site would affect about 75 acres, of which 20 acres would be revegetated.

Effects of Operation on Vegetation

As discussed in section 3.3.1.2, operation of the project could affect groundwater, which would in turn affect vegetation. Construction of each of the project features, with the exception of transmission towers, would likely intercept and release groundwater, could have desiccating effects in some areas, and could increase hydrologic support for others. Because native plants are adapted to existing conditions, these changes could reduce their cover, while promoting conditions that would favor invasive species. Effects of operation on groundwater at the proposed Morrell Canyon site cannot be determined until studies to characterize the local groundwater system have been completed. Discharge of reservoir water to groundwater at the proposed Morrell Canyon site would not occur because the co-applicants would install a geosynthetic liner.

Using helicopter access to maintain transmission lines where slopes exceed 15 percent would minimize the risk of effects on groundwater so that hydrologic support for native plant communities would not be interrupted.

Vegetation height under the transmission line is not expected to interfere with safety or reliability, because the proposed alignment would cross very few areas with trees. However, fuel management may be needed to minimize the risk of wildfire. Methods selected for managing fuels would depend on site-specific factors (e.g., vegetation type, slope, aspect, access) and could include grazing, prescribed fire, or mechanical means to create and maintain firebreaks. The co-applicants would maintain existing firebreaks that may intersect the proposed alignment, as needed. Fuel management to reduce the risk of wildfire would have a variety of effects on vegetation over time, depending on methods used. While some could be adverse (e.g., enhancement of conditions that support cheatgrass), others may be beneficial (e.g., increased species and age-class diversity in older chaparral). We discuss development of a fuel management plan in section 3.3.7.2, *Land Use*. Implementation of a vegetation management plan consistent with the USFS revised preliminary 4(e) condition no. 33 would provide a means of mitigating adverse effects of ground disturbance on vegetation and soils that could occur as a result of operation, as well as construction.

Staff Alternative—Effects of project operation on groundwater and the vegetation it supports at the Decker Canyon site would likely be similar to those that would occur at Morrell Canyon.

Effects on groundwater and vegetation would likely be the same for the staff alternative transmission alignment as for the proposed transmission alignment, except that the length of the underground segment would be slightly shorter (4.1 miles vs. 5.2 miles), with a slightly shorter permanent maintenance road alongside the segment. The length of temporary access roads to be revegetated would also be slightly shorter under the staff alternative transmission alignment (9.3 miles vs. 10.8 miles).

Optional Ortega Oaks or Evergreen Powerhouse—Effects of project operation on groundwater processes and vegetation at the Ortega Oaks or Evergreen powerhouse site would likely be the same as for the proposed Santa Rosa powerhouse.

Special Status Plants

Southern California is considered 1 of 25 worldwide hotspots of biodiversity because it supports an exceptional concentration of species that are found nowhere else in the world, and because these species are undergoing an exceptional loss of habitat (Myers et al., 2000). Almost 3,000 species of vascular plants occur in the mountains and foothills of southern California; nearly half of these are endemic (Stephenson and Calcarone, 1999). This region's contribution to global biodiversity highlights the importance of evaluating the potential effects of the LEAPS Project on special status plants.

Effects of Construction on Special Status Plants

Co-applicants' Proposal—The co-applicants' biological consultant, MBA, conducted special status plant surveys to cover most accessible areas of the study area between 2001 and 2005, and documented the occurrence of four sensitive plants.[46] At least 11 other species have been identified as having a high likelihood of occurrence in the habitat types that would be affected by construction, including chamise chaparral, coastal sage scrub, and southern coast live oak woodland.[47]

The co-applicants propose to employ a biologist or natural resource specialist to monitor construction activities to help prevent adverse effects on sensitive species or habitats.

Resource Agency Measures

Interior 10(j) recommendation no. 3 requests that the co-applicants demonstrate that the project is consistent with existing or proposed HCPs that encompass the project area or would be affected by certain project features. These HCPs include the Western Riverside County Multi-Species HCP, the Stephens' Kangaroo Rat HCP, and the North County Multi-Species HCP.[48]

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[46] Three of MBA's sensitive plant survey reports (MBA, 2004, 2003, and 2002) indicate that areas located on private property, those containing impenetrable shrub, or those situated in "inhospitable terrain" were considered inaccessible and were not surveyed.

[47] Recent USFS comments indicate that mesa horkelia (*Horkelia cuneata* ssp. *puberula*) is a USFSS species (and CNPS-1B) plant that should have been evaluated during the rare plant surveys. It is known from occurrences in Riverside and San Diego counties, and is associated with habitat types that occur in the project area, including chaparral and coastal shrub (CNPS, 2005).

[48] The Stephens' Kangaroo Rat HCP is a single-species HCP, which has been effectively integrated into the Multi-Species HCP (described in section 3.3.4.1). The North County Subarea HCP that is currently being developed for northern San Diego County is taking an approach that is similar to Riverside County's and would cover some of the southernmost edge of the LEAPS Project area.

The Riverside County recommends that the co-applicants conduct habitat assessments and surveys as needed to ensure compliance with the Multi-Species HCP.

Effects Analysis

Construction of an upper reservoir at Morrell Canyon and a powerhouse at the Santa Rosa site would affect a total of about 190 acres of land that could support special status plants that are associated with chamise chaparral, coastal sage scrub, and southern coast live oak forest. Construction of the north and south substations would affect, respectively, about 35 acres of non-native grasslands and about 50 acres of habitat that has already been disturbed, within the SDG&E transmission line right-of-way near Case Springs.

The co-applicants do not propose to clear vegetation beneath the entire transmission alignment, but small amounts of habitat (about 0.25 acre) would be removed for construction of each of 120 transmission line towers. Approximately 30 acres, dominated by chamise chaparral, would be affected by construction of the proposed transmission line towers (Elsinore Valley MWD and Nevada Hydro, 2006).). Additional acreage would be affected by construction of temporary access roads needed to build the overhead transmission line. To minimize slope failure and erosion, roads would not be constructed on slopes greater than 15 percent; most of the line (about 24.9 miles of the 32.1-mile route) would be constructed by helicopter. About 10.8 miles (an area of about 15.7 acres, given an estimated road width of 12 feet) of access roads would be obliterated and revegetated following construction, and the co-applicants would use helicopters for O&M.

About 38 acres would be disturbed for trenching of the underground transmission line segment. Most of this (28.5 acres) would be revegetated, but 5.2 miles of permanent road (accounting for 9.5 acres, with a 15-foot width) would be needed alongside the underground segment in order to maintain it.

Three populations of Coulter’s matilija poppy (CNPS-4) lie within areas that could be affected by the co-applicants’ proposal. One of the populations is located near the proposed Santa Rosa powerhouse site (Subarea 4; see figure 13 for subarea locations).

Two of the poppy occurrences are located within areas that could be disturbed as a result of transmission line construction, depending on tower placement and the need for access roads. One is located within the right-of-way of the proposed northern segment of the proposed transmission alignment (Subarea 2), and one is located along the southern segment (Subarea 8).

One occurrence of rainbow manzanita (USFSS, CNPS-1B) was documented within the right-of-way of the southern segment of the proposed transmission alignment (Subarea 6). Again, effects would depend on tower placement and the need for access roads.

One population of Humboldt lily (CNPS-4) was observed along the northern segment of the proposed transmission alignment in Subarea 3. Another population was noted in the same vicinity, but about half a mile west of the currently proposed transmission alignment. Effects would depend on tower placement and the need for access roads.

MBA’s 2005 survey report indicates that botanists observed Munz’s onion (FE, USFSS, ST, CNPS-1B) “adjacent to the project right-of-way (TE/VS Interconnect),” which would place the occurrence in Subarea 1 or 2 (MBA, 2005). Munz’s onion (along with Hammitt’s clay-cress, USFSS, CNPS-1B) is also known to occur near the proposed transmission line alignment in Subarea 5, southeast of Elsinore Peak (memorandum from S.D. White, Botanist, White & Leatherman Bioservices, Upland, CA, to S. Crawford, Project Manager, MBA, San Bernardino, CA, dated November 16, 2004). We discuss potential effects of the project on Munz’s onion in section 3.3.5, *Threatened and Endangered Species*.

The USFS reports one historic occurrence of heart-leaved pitcher sage (USFSS, CNPS-1B) along Horsethief Trail, in the path of the proposed transmission alignment in Subarea 3 (personal communication, L. Young, Cleveland National Forest Botanist, November 17, 2005). Effects would depend on tower placement and the alignment of any access roads.

The primary concern in protecting special status plants during project construction is to prevent effects that could occur as the result of vegetation clearing and soil compaction. By obtaining more detailed survey data and accurate mapping, it may be possible to site project features (such as access roads, transmission line towers, and substations) away from rare plant populations. If rare plant populations occur near proposed project features, detailed mapping would allow plants to be identified in the field (e.g., with flagging) and protected (e.g., with fencing) prior to the start of construction. Without such information, the co-applicants' proposal to monitor construction activities would not prevent adverse effects on sensitive plants.

Introduction and spread of noxious weeds and non-native invasive plants that could compete with special species plants is also a concern during construction, which is expected to last 4.5 years. The co-applicants' proposal to develop a management plan would help to minimize risks, and would likely be consistent with USFS revised preliminary 4(e) condition no. 33, discussed in more detail in the following section regarding noxious weeds.

Interior's 10(j) recommendation no. 3 and Riverside County's recommendation regarding consistency with existing HCPs would apply to all of the species identified above, because all are addressed in the Multi-Species HCP. To be consistent with the Multi-Species HCP, the co-applicants would need to conduct site-specific pre-construction surveys according to guidelines for protection of narrow endemics and Criteria Area Survey species in specific areas of potential effect, and would need to implement strategies to avoid, minimize, or mitigate project effects on each species. The FWS Biological Opinion on the Multi-Species HCP indicates that this approach would provide adequate conservation for heart-leaved pitcher sage, Hammitt's clay-cress and Munz's onion; that a Memorandum of Agreement with the USFS is needed to help conserve Humboldt lily; and that special objectives regarding the number of localities and number of plants within those localities must be met in order to assure the persistence of Coulter's matilija poppy and rainbow manzanita (FWS, 2004c).

Staff Alternative—Construction at the Decker Canyon site would affect habitats that may support special status species associated with chamise chaparral, coastal sage scrub, and southern coast live oak forest; however, no special status plants are known to occur in the vicinity.

Potential effects on Coulter's matilija poppy would be the same for the powerhouse site and along the northern and southern segments of the staff alternative transmission alignment. Effects could likely be avoided by siting towers away from known occurrences, and from any rare plant populations that may be detected during site-specific pre-construction surveys.

Although the staff alternative transmission alignment follows a different route at several points than the proposed alignment, the same number of towers–120–would be installed. We assume that about 25.5 miles of the 31.7-mile-route would be constructed using helicopter access, and that 9.3 miles (13.5 acres) of access roads would be needed. About 29.9 acres would be disturbed during construction of the underground segment, with 22.4 acres being revegetated following construction. A permanent maintenance road (4.1 miles) would follow alongside the underground segment, and account for about 7.5 acres. No rare plant surveys have been conducted to evaluate potential effects of road location or construction. However, site-specific pre-construction surveys could be used to collect data that would serve as the basis for road alignment to avoid rare plant populations, if any occur.

Optional Ortega Oaks or Evergreen Powerhouse—One population of Coulter's matilija poppy was observed near the route of the penstock tunnel that would be constructed between an upper reservoir at Decker Canyon and the Ortega Oaks powerhouse site. The mapped information is at a broad level of detail, but it appears this occurrence is outside any area that would be disturbed by surface construction. MBA's surveys identified no rare plants in the vicinity of the Evergreen powerhouse site.

Effects of Operation on Special Status Plants

Co-applicants' Proposal—The co-applicants do not propose any long-term measures associated with special status plants.

Resource Agency Measures

USFS revised preliminary 4(e) condition no. 29 specifies annual employee awareness training that would cover local resource issues, including special status species. According to this condition, the co-applicants would coordinate with the USFS to provide information about special status species and their locations to the co-applicants' field personnel.

USFS revised preliminary 4(e) condition no. 30 specifies that the co-applicants would consult annually with the USFS and FWS to review lists of special status species that might occur within the project boundary to determine if any new species (federally listed threatened or endangered species or USFSS) have been added, for which study or survey may be necessary. In that event, the co-applicants would conduct studies and submit draft study reports to the USFS before finalizing the reports (including recommended measures and schedules of implementation, where appropriate) and filing them with the Commission.

Effects Analysis

The main concern in protecting special status plants during long-term project operation would be to minimize the risk of damage to potential habitat or known populations that could occur during routine maintenance activities or as the result of uncontrolled public use (e.g., off-highway vehicles [OHVs], vandalism) of the estimated 7.6 miles of temporary and permanent road that would be built for transmission line access. In addition to disturbing soils and ground cover, public access often serves as a vector for the introduction and spread of noxious weeds and increases the risk of fire.

Implementation of USFS revised preliminary 4(e) condition no. 29 would ensure that the co-applicants provide training to field personnel so that staff who are responsible for project O&M are knowledgeable about the identification, location, and protection of rare plant species. By implementing USFS revised preliminary 4(e) condition no. 30, the co-applicants could be sure that their information about the status of plants in the project area, including the Morrell Canyon reservoir site, the Santa Rosa powerhouse site, the transmission line, and any access roads, is current as plants are added or subtracted from the list or as more information becomes available about their range or habitat requirements.

Implementation of these two USFS revised preliminary conditions would provide a framework for protection over the long-term. In addition, botanical resource monitoring could be incorporated into USFS revised preliminary 4(e) condition no. 26 (discussed in section 3.3.7, *Land Use*) to address specific effects that could be associated with the estimated 10.8 miles of transmission alignment temporary access roads and the 5.2-mile permanent maintenance road along the underground segment. We anticipate that effects of helicopter access along the transmission alignment for O&M would be minimal.

Staff Alternative—The anticipated effects of operation at the Decker Canyon reservoir site on special status plants would be the same as those discussed under the co-applicants' proposal.

The potential for disturbance of rare plants that may occur along temporary transmission line roads as a result of public access would affect 9.3 miles, slightly less than under the proposed alternative. Risks to rare plants could be addressed through implementation of the same measures described for the proposed alternative. Potential for disturbance along the permanent maintenance road associated with the underground segment would affect 4.1 miles, also slightly less than under the proposed alternative.

Optional Ortega Oaks or Evergreen Powerhouse—The anticipated effects of operation at the Ortega Oaks or Evergreen powerhouse site on special status plants would be the same as those discussed for the Santa Rosa site. No rare plants have been documented to date within the area that would be affected by construction, but implementation of measures regarding employee awareness and annual consultation with the USFS would assist the co-applicants in responding to changes in status or range of important species.

The costs of recommendations pertaining to special status plants are presented in section 4.0, *Developmental Analysis*, and the measures included in the staff alternative are discussed further in section 5.2, *Discussion of Key Issues*.

Noxious Weeds and Exotic Plants

Noxious weeds are a growing threat to California's environment because of their potential to degrade native plant communities, outcompete rare species, and reduce wildlife habitat values. Both federal and state laws require landowners to manage noxious weeds on their land.

Effects of Construction on the Spread of Noxious Weeds and Exotic Plants

Construction of the LEAPS Project would cause soil disturbance at several sites, including the upper reservoir, construction laydown areas, power tunnel adits, penstocks, powerhouse site, and intake at Lake Elsinore. Soil disturbance would also occur at sites where transmission line towers are constructed, along any roads needed for construction of the transmission lines, and at the northern and southern substations. Soil disturbance creates conditions that promote the establishment and spread of noxious weeds and non-native invasive plant species that may be carried into the project area by construction equipment, or in fill material.

Co-applicants' Proposal—The co-applicants propose to develop and implement plans to prevent and control weeds and revegetate disturbed areas.

Resource Agency Measures

USFS revised preliminary 4(e) condition no. 29 specifies annual employee awareness training that would cover local resource issues, including noxious weeds. According to this condition, the co-applicants would coordinate with the USFS to provide information about noxious weeds and their locations to the co-applicants' field personnel.

USFS revised preliminary 4(e) condition no. 33 specifies that the co-applicants would prepare a plan to control and contain the project-related spread of noxious weeds. The purpose of the plan would be to identify which species are present within the project area, and which are a priority for control. The plan would identify methods to control existing populations and make reasonable efforts to control entire population units, in situations where weeds within the project area are contiguous with populations outside the project boundaries. At a minimum, the USFS specifies that the plan would need to include:

- educating project staff about current infestations and how to identify species likely to occur in the project area;
- coordinating with the USFS regarding any new populations that are observed and reasonable efforts to control them;
- cleaning all construction equipment and other equipment that operate off the roads or moves soil before entering the project vicinity;
- cleaning all project vehicles and equipment that leave the project site to ensure that noxious weeds are not spread to additional sites.

- avoiding, to the extent possible, entering areas with existing populations of noxious weeds, and if not possible, working in clean areas first and then in the areas with weeds to avoid spreading weeds within the project area;
- using certified weed free straw for all construction or restoration needs, or if not available, using rice straw;
- using an approved mix of plant species native to the Cleveland National Forest for restoration and erosion control; and
- conducting an invasive non-native plant and noxious weed risk assessment as outlined in the Land Management Plan (USFS, 2005b); conducting an inventory of noxious weeds at project facilities and other possible points of introduction every 5 years, using the current list of noxious weeds of concern to the Cleveland National Forest, and using survey methods and report forms approved by the USFS. This frequency may be adjusted based on the results of these inventories.

As part of this plan, the USFS specifies that the co-applicants should coordinate with the USFS regarding which noxious weeds populations are the co-applicants' responsibility, which are USFS' responsibility, and which are a shared responsibility.

Effects Analysis

Although the co-applicants did not conduct formal weed surveys, they noted the occurrence of weeds as they performed surveys for special status plants and wildlife. MBA's reports do not give specific locations of weed sightings, instead noting that certain weeds were observed in certain subareas or are likely to occur in them. As described in section 3.3.5.1, 10 species were observed.

The proposed Morrell Canyon upper reservoir site and the proposed Santa Rosa powerhouse site are located in Subarea 4 (see figure 13). Noxious weeds observed in this subarea include red brome, black mustard, olive, Indian tree tobacco, Russian thistle, yellow sweet clover, and bristly ox-tongue. Because these species are typical of disturbed areas, they would more likely be found around the proposed powerhouse site than the proposed Morrell Canyon site, where native vegetation and soils are intact, except along the Morgan Trail. Under existing conditions, hikers, companion dogs and equestrians may serve as vectors for the spread of weeds.

In revised preliminary 4(e) condition no. 33, the USFS specified that noxious weeds presently identified as concerns for this project include giant reed, tall whitetop, and perennial pepperweed. MBA does not report the occurrence of any of these species in the vicinity of Morrell Canyon, but field notes indicate giant reed was observed during a 2003 survey for coastal California gnatcatcher. The status of this species as CalIPC List A-1 (most invasive wildland pest plants) indicates that control of any occurrences should be a high priority.

During construction, soil disturbance in uplands, wetlands, or riparian areas would create conditions that would promote the establishment and spread of weeds. Work in riparian zones also has the potential to contribute to weed spread by breaking plants into fragments that can then be transported downstream to infest new sites. Development of a plan to monitor and control weed establishment and spread would help to minimize these risks and would benefit native plant communities. It would also help to ensure the co-applicants' compliance with federal and state laws that require landowners to control weeds on their property.

Staff Alternative—As with the proposed Morrell Canyon upper reservoir site, the Decker Canyon upper reservoir site is located in Subarea 4. It is likely that weed occurrences documented in Subarea 4 were located in disturbed areas outside Decker Canyon.

During construction, the risk of weed introduction and spread would be similar to what would be likely at the proposed Morrell Canyon site, both in terms of upland and riparian-associated weeds.

The staff alternative transmission alignment would pass through the same subareas as the proposed transmission alignment. For this reason, we anticipate that effects would be similar under the staff alternative to those that would occur under the co-applicants' proposal.

Optional Ortega Oaks or Evergreen Powerhouse—As with the proposed Santa Rosa powerhouse site, the Ortega Oaks or Evergreen powerhouse site is located in Subarea 4. It is likely that weeds observed in Subarea 4 would be present at the Evergreen site because soils have been disturbed by residential, commercial, and road development and human activity.

Effects of Operation on the Spread of Noxious Weeds and Exotic Plants

Co-applicants' Proposal—Weed establishment and spread would be a continuing consideration during project operation, as a result of constructing an estimated 10.8 miles of transmission line access roads, although we assume roads would be permanently closed and helicopters would be used to perform regular maintenance on the overhead segments. Weeds would also be a continuing consideration along the 5.2-mile-long permanent maintenance road along the underground segment. Public access would difficult to prevent, once roads have been constructed through chaparral. Access by OHVs is common in such situations and could cause soil disturbance, introduce weed seeds, and promote spread of weeds. Concerns would be minimized by monitoring the effectiveness of the road closures and revegetation efforts, and implementing remedial measures (i.e., placement of boulders or pylons to prevent access; additional plantings to support re-establishment of native plant communities), if necessary. A plan for monitoring and managing weeds and non-native invasive species would be beneficial throughout the life of the project to protect habitat quality.

Staff Alternative—The anticipated effects of operation at the Decker Canyon reservoir site on the spread of noxious weeds and exotic plants would be the same as those discussed under the co-applicants' proposal, and the same measures could be implemented to address weed monitoring and control. The effects at the powerhouse site also would be the same as under the co-applicants' proposal.

The anticipated effects of operation on the spread of noxious weeds and exotic plants would be the same as those discussed under the co-applicants' proposal but would occur along an estimated 9.3 miles of temporary access roads and 4.1 miles of permanent road alongside the underground segment. The same measures described for the proposed alternative could be implemented to reduce the risks of adverse effects.

Optional Ortega Oaks or Evergreen Powerhouse—The anticipated effects of operation at the Ortega Oaks or Evergreen powerhouse site on the spread of noxious weeds and exotic plants would be the same as those discussed under the co-applicants' proposal.

The costs of measures pertaining to noxious weeds and exotic plants are discussed in section 4.0, *Developmental Analysis*, and the measures included in the staff alternative are discussed in section 5.2, *Discussion of Key Issues*.

Waters, Wetlands, and Riparian Habitat

Effects of Construction on Waters, Wetlands, and Riparian Habitat

Co-applicants' Proposal—In Elsinore Valley MWD and Nevada Hydro (2005), the co-applicants evaluated the presence and extent of jurisdictional waters and wetlands[49] that could be affected by project construction at the proposed and alternative upper reservoir and construction staging sites and at the proposed and two alternative powerhouse sites and construction staging areas, and at the proposed north and south substations sites. In 2006, the co-applicants conducted a formal jurisdictional delineation of waters and wetlands associated with the Morrell Canyon and Decker Canyon reservoir sites, and an assessment of functions and values using the California Rapid Assessment Method (MBA, 2006).

Elsinore Valley MWD and Nevada Hydro (2005) did not consider Lake Elsinore in terms of waters or wetlands. Likewise, the co-applicants did not include Lake Elsinore in the formal delineation (MBA, 2006). However, the lake is a water of the United States and supports adjacent wetlands, including those constructed by the Corps in the Back Basin.

The co-applicants propose to conduct formal jurisdictional delineations, as needed, when the final location of each project feature has been determined. When the delineations are complete, the co-applicants would prepare a habitat mitigation and monitoring plan for approval by the Corps, CDFG, and the USFS.

USFS revised preliminary 4(e) condition no. 35 calls for the co-applicants to consult with the USFS and develop, within 6 months of license issuance, a surface water resources management plan. As part of this plan, the co-applicants would conduct an inventory of springs and other water courses within 1 mile of Morrell and Decker canyons and their related riparian areas, assessing physical and chemical characteristics, flora and fauna, and the extent of riparian vegetation. The co-applicants would also develop and implement a plan to monitor riparian vegetation and surface water throughout the life of the project.

Effects Analysis

MBA (2006) indicates that construction of a reservoir at the Morrell Canyon site would affect about 1.7 acres of jurisdictional waters of the U.S. (i.e., under Corps jurisdiction), including Lion Spring, where a complex of seeps rise through subsurface fractures on the east side of Morrell Canyon, and about 4.8 acres of waters of the state (i.e., under CDFG jurisdiction) (see figure 14). The delineation indicated that no wetlands are present at the site, because the three criteria needed for a wetland determination—wetland soils, wetland hydrology, and predominance of wetland plants—are not present.

The length of the watercourse within the reservoir footprint is 4,600 feet. The area within the ordinary high water mark ranges from 10 to 30 feet wide, with an average width of 15 to 16 feet. Soils are sandy and the stream channel was dry during the evaluation (January, 2006), except for a few areas of flowing water from 10 to 100 feet in length and a few areas of ponded water at the east end, likely

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[49] Under the Clean Water Act, the Corps regulates certain activities in wetlands, lakes, ponds, and other waters, including intermittent and perennial streams, such as those that occur at Morrell and Decker Canyon. The extent of jurisdiction along such streams is usually demarcated by the ordinary high water mark. The state (CDFG) regulates certain activities in and along ephemeral, intermittent and permanent streams that contain hydrophytic vegetation, definable bed and banks, and fish or wildlife resources. CDFG jurisdiction may extend to habitats along watercourses, such as oak woodlands, that function as part of the riparian system.

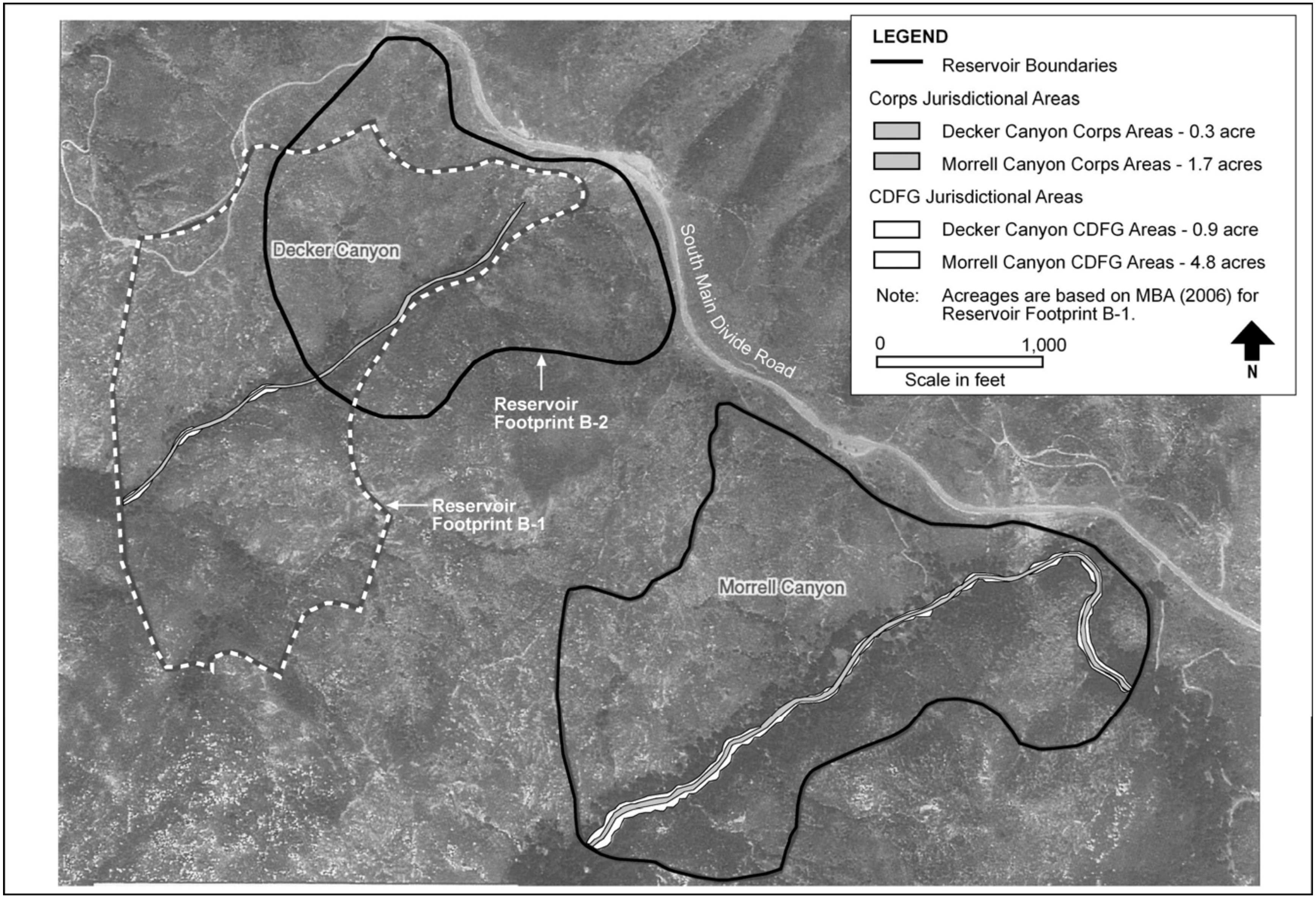

Figure 14. Jurisdictional waters of the U.S. (the Corps) and of the State of California (CDFG). (Source: MBA, 2006)

supplied as underground flow from Lion Spring. The dominant species along the watercourse include nettles, mugwort, scrub oak, and coast live oak. Other common species include fuchsia flowering gooseberry, wild rose, bedstraw, deer grass, honeysuckle and rabbit-foot grass. Bulrush, mulefat, and rushes were present, but in general, surveyors observed few hydrophytic species. Relatively high topographic relief at the Morrell Canyon site results in conditions that are shaded and moist enough to support a substantial area of oaks.

The CRAM (Collins et al., 2004) was designed to evaluate wetland functions and values. Because jurisdictional wetlands do not exist at the Morrell Canyon site, MBA conducted a modified assessment, using 19 parameters to evaluate landscape context, hydrology, physical structure, biotic structure, and stressors. They found Morrell Canyon and Decker Canyon to be very similar in terms of functions and values, with Morrell Canyon carrying more water and supporting more structural diversity (three plant layers, rather than two) than Decker Canyon. They identified one stressor on Morrell Canyon, as a result of hiking trails along the stream that could pose a risk of bank erosion. The vegetation associated with stream channel in Decker Canyon is very dense, and MBA observed no definable trail system.

The seeps, springs, streams, and associated riparian habitat in Morrell Canyon are relatively rare features in the project vicinity, in comparison to the dominant chaparral. They provide a unique microclimate and plant community, which in turn supplies unique food resources, nesting opportunities, and hiding and thermal cover for wildlife. Loss of this site to reservoir construction would likely affect a number of wildlife species with large territories or home ranges that use Lion Spring to meet some of their daily or seasonal needs (e.g., mountain lions, mule deer), in addition to animals that may be resident year-round (e.g., California quail, acorn woodpecker).

The co-applicants propose to collect flows from upstream of the new reservoir and Lion Spring, convey them under the reservoir, and return them to the channel just below the dam. Using this conveyance system, the co-applicants anticipate there would be no substantial change in flows in San Juan Creek downstream of the reservoir. This approach would minimize indirect effects on the creek and riparian habitat downstream of the reservoir.

Based on the 2005 evaluation, construction at the proposed Santa Rosa powerhouse site would affect about 0.1 acre of waters of the U.S. and 0.4 acre of waters of the U.S. of the state. Construction of the substations for the proposed transmission alignment could affect about 0.3 acre of waters of the U.S. and 1.1 acres of waters of the state at the north site near Lee Lake (also known as Corona Lake). No estimates are available for the recently-proposed south substation, but the location within the right-of-way of an existing transmission line indicates no waters, wetlands, or riparian habitats would be affected.

The co-applicants indicate that the northern segment of the proposed transmission alignment would cross about five named drainages, while the southern segment of the route would pass over about four named drainages. The co-applicants plan to locate the towers outside of riparian habitat so that the lines would span sensitive areas, avoiding adverse effects on streams, wetland vegetation and soils.

As discussed earlier in this section, helicopters would be used to construct the transmission line where slopes are greater than 15 percent to minimize the risk of slope failure and erosion. Thus, roads would be constructed in flatter areas, which are often located in floodplains (e.g., Temescal Wash). We would anticipate temporary adverse effects on streams, wetlands and riparian habitats, and the need for implementation of BMPs to protect sensitive soils and maintain proper drainage.

Based on the co-applicants' descriptions of habitat along the Lake Elsinore shoreline and our observations during the site visit, it is anticipated that construction of the pumping station would result in the clearing of a very small amount of wetland habitat, if any. However, as mentioned above, the acreage of affected waters or wetlands at Lake Elsinore has not yet been quantified.

Conducting jurisdictional delineations when the site of each project feature has been determined would provide information needed by the co-applicants to begin consultation with the federal and state agencies regarding permits for work in waters and wetlands (e.g., CWA section 404, administered by the Corps; and section 1600 Regulations, administered by CDFG). Development and implementation of a habitat mitigation and monitoring plan would help compensate for adverse effects on waters and wetlands, preferably by providing on-site, in-kind mitigation. On-site, in-kind mitigation may be possible for construction effects at the powerhouse site, at Lake Elsinore, and for any effects that may occur along at stream crossings along the transmission line and any access roads that are constructed. Mitigation of impacts at Morrell Canyon would be more difficult because of its location and the unique characteristics of Lion Spring and oak woodlands. Also, we note that the Corps' approach to alternatives analysis requires choosing the least environmentally damaging alternative that is practicable. Impacts on jurisdictional waters and associated riparian habitat at Morrell Canyon would be considerably greater than at Decker Canyon as indicated below.

Implementation of USFS revised preliminary 4(e) condition no. 35 would provide baseline information about hydrology, water quality, riparian plant communities and wildlife in Morrell Canyon, and establish a mechanism for long-term monitoring to evaluate project effects on these resources. The measure indicates that the co-applicants should conduct inventories at both reservoir sites, although if the Commission issues a license for the LEAPS Project, only one upper reservoir would be constructed.

Staff Alternative—Decker Canyon is a central drainage that supports oak woodland habitat, with several tributary drainages on the upland slopes surrounding it. MBA's jurisdictional delineation (MBA, 2006) showed that the area affected by reservoir construction at Decker Canyon would include 0.3 acre of U.S. waters and 0.9 acre of state waters (see figure 14). No springs are evident at Decker Canyon; hydrology is supplied by surface water run-off.

The drainage feature within the reservoir footprint at Decker Canyon is 3,300 feet long and ranges from 1 to 6 feet wide, with an average width of 4 feet. Sandy soils also typify this site, and the stream bed was also dry during the delineation effort. This stream is ephemeral, likely flowing only during and immediately after flood events. Surveyors observed no vegetation within the active channel. Riparian vegetation outside the ordinary high water mark is dominated by upland species, including chamise, hoary-leafed ceanothus, toyon, and coast live oak, and no hydrophytic plants were documented. Relatively flat topography and drier conditions in Decker Canyon limit oaks to the western end of the site.

As mentioned above, USFS revised preliminary revised 4(e) condition no. 35 would apply to Decker Canyon, as well as to Morrell Canyon. Implementation of a surface water management plan would provide baseline information that could be used for long-term monitoring and management.

The staff alternative transmission alignment would be about the same as the proposed alignment, in terms of stream crossings, and we anticipate that effects would be the same.

Optional Ortega Oaks or Evergreen Powerhouse—Based on the 2005 evaluation, construction at the Ortega Oaks powerhouse site would affect about 0.4 acre of streams and riparian habitat. At the Evergreen powerhouse site, construction would affect less than a tenth of an acre of waters of the U.S. or of the state.

Effects of Operation on Waters, Wetlands and Riparian Habitat

Co-applicants' Proposal—As mentioned above, the co-applicants propose to collect flows from Lion Spring, convey them beneath the reservoir at Morrell Canyon, and return them to San Juan Creek downstream of the dam. Interception of rainfall within the area occupied by the reservoir would reduce peak flows during extreme (i.e., 100-year) flood events by about 6 percent, as discussed in section 3.3.2.2. Effects would be greater just below the dam, and would diminish downstream. During most years, design features should not alter the natural hydrograph (i.e., flow volume and timing would be the same), and we do not anticipate any effects on downstream waters, wetlands, or riparian habitat to result from project operation at the proposed Morrell Canyon site.

Project operations would affect Lake Elsinore and its shoreline, which includes the Back Basin wetlands and may also include other small pockets of wetland habitat. Extensive efforts have been made to establish wetlands in the Back Basin, but success has been limited by the amount of water available to support them. The co-applicants indicate that very little riparian vegetation of any kind is present around Lake Elsinore and do not identify any areas of wetland habitat, although some pockets of willow, tule, and cattail are present. However, as mentioned above, the co-applicants did not consider Lake Elsinore as a jurisdictional water or wetland, did not conduct a preliminary assessment or formal delineation, and did not evaluate the lake's shoreline habitats.

As described in section 3.3.2, *Water Quantity*, under the proposed project operations daily water surface elevations would fluctuate more than they do under existing conditions, but the lake level would be more stable from month to month and from year to year. Prior to implementation of the Lake Elsinore Stabilization and Enhancement Project, Lake Elsinore fell below 1,240 feet msl about 58 percent of the time. Under current conditions with the implementation of the Lake Elsinore Stabilization and Enhancement Project, make-up water is used to ensure that the lake does not fall below 1,240 feet, even in dry years. Spills from the lake into Temescal Wash and the Back Basin wetlands would occur more frequently.

Increasing the frequency of spills into Temescal Wash and the Back Basin wetlands would provide additional hydrologic support to existing wetlands in those locations. A revised lake operating plan (as discussed in section 3.3.2.2, *Water Quantity*) developed in consultation with the Corps and local flood control authorities would help to ensure that such spills do not produce unintended adverse effects.

Stabilizing year-to-year and seasonal lake elevations, while allowing daily and weekly fluctuations, may have little effect on existing wetlands around Lake Elsinore, if any are present. Native hydrophytic species that persist around the shoreline, such as willows, tule and cattails, are tolerant of seasonal water level fluctuations that occur in natural systems throughout the semi-arid west and these species would likely tolerate daily fluctuations of 1 foot. Native willows such as sandbar and black willow do not require saturated soils. They typically grow in well-drained, gravelly soils on riverbanks, bars, and terraces that are periodically inundated, where their roots can make contact with the water table (Uchytil, 1989; Tesky, 1992). Cattails and tules prefer shallow standing water, but also grow in saturated soils (Uchytil, 1992). Fluctuations limited to 1 foot and occurring within a 24-hour time-frame, as proposed, should allow for soils to remain moist; these species would likely persist. We discuss the potential effects of reservoir operation within the fluctuation zone later in this section (*Habitat for Migratory Birds, Shorebirds, and Nesting Waterfowl*). Operational effects on wetlands that may be associated with Lake Elsinore would likely be minor.

Assuming access roads are permanently closed and revegetated following construction, we conclude there would be no long-term adverse effects on streams, wetlands or riparian habitats as a result of project O&M, except those that may be associated with public use of access roads.

Staff Alternative—Flows at the Decker Canyon upper reservoir site would be handled the same way they would be managed at Morrell Canyon, i.e., flows would be conveyed beneath the reservoir and returned to the drainage below the dam. Effects during extreme flood events would be similar to those that would occur at Morrell Canyon (i.e., rainfall would be intercepted by the reservoir, and peak flows downstream of the dam would be slightly smaller). For this reason, we expect effects would be the same.

Operational effects along the staff alternative transmission alignment would be the same as those described above for the proposed transmission alignment.

Optional Ortega Oaks and Evergreen Powerhouses—We do not anticipate any operational effects on streams, wetlands or riparian habitat at the Ortega Oaks or Evergreen powerhouse sites.

Oak Woodland Communities

As mentioned in section 3.3.4.1, oak woodlands are considered to have special status in the state of California. They provide high-quality habitat for a large number of birds and mammals. According to the California Oak Foundation (CalPIF, 2002), they sustain higher levels of biodiversity than virtually any other terrestrial ecosystem in the state. Several participants in scoping identified effects on oak woodlands as an important concern for both wildlife and recreation.

Effects of Construction on Oak Woodland Communities

Co-applicants' Proposal—The co-applicants' proposal to construct a reservoir at Morrell Canyon would require removal of about 20 acres of mature southern coast live oak forest. An arborist counting all oaks over 8 inches in dbh at the proposed Morrell Canyon upper reservoir site tallied approximately 670 trees, indicating that 500 to 600 of these would be affected by inundation (letter from C. McPhail, Certified Arborist, Alta Loma, CA, to P. Lewandowski, President, Nevada Hydro, Vista, CA, dated November 9, 2004, filed with Elsinore Valley MWD and Nevada Hydro, 2004b, c).

No oak woodland would be affected at the proposed Santa Rosa powerhouse site. Cover type maps of the proposed transmission line route indicate that it would pass through oak woodland at a few locations along both the northern and southern segments. No oak woodland is shown on cover type maps of sites that would be occupied by substations.

To compensate for the loss of oak woodland, the co-applicants propose to mitigate at a ratio of 2:1 for areas of direct effect.

Resource Agency Measures

Interior 10(j) condition no. 3 states that the project should be consistent with the Riverside County Multi-Species HCP, including meeting a minimum mitigation ratio of 1:1 to address direct and indirect effects of the project on lands that contribute to the plan's habitat conservation goals. Interior also recommends that the co-applicants conduct an in-depth equivalency analysis to determine adequate mitigation ratios for effects that may occur in the Multi-Species HCP area.

The USFS revised preliminary 4(e) condition no. 38 specifies a minimum mitigation ratio of 1:1 for the loss of oak woodlands. The condition also outlines priorities for mitigation as being within the project area, but if this is not possible, then within the Elsinore "Place," the Trabuco Ranger District, or the Cleveland National Forest.

CDFG's comments on the draft EIS indicate the state's standard mitigation ratio for removal of mature coast live oak trees is replacement at a ratio of 10:1.

Effects Analysis

The co-applicants' proposal to provide mitigation at a 2:1 ratio for the loss of oak woodlands would be consistent with the Multi-Species HCP (which specifies a minimum of 1:1) and with the USFS revised preliminary condition, which also identifies a 1:1 ratio as a minimum. It would not meet CDFG's standard.

Several mitigation options would be available. These include acquisition (in fee title or via conservation easement) and protection of another site where oak woodlands are threatened, planting and maintaining a new stand of oaks, or contributing to a mitigation bank (e.g., the Oak Woodlands Conservation Fund recently established by the state).

In terms of ecological benefit, on-site mitigation is clearly more effective in replacing habitat functions that are lost as a result of habitat conversion and maintaining biodiversity in the landscape. Collecting acorns from existing oaks at Morrell Canyon and starting them as seedlings to replant within the same drainage would also help to protect their genetic integrity and increase their chances of survival. However, oaks are slow-growing, and new plantings would not provide habitat functions equivalent to the existing stand for over 100 years, assuming oaks mature at about 60 to 80 years (Holland, 1988). To provide mitigation at a 1:1 or 2:1 ratio, enough trees would be planted to establish a 20 or 40-acre stand. However, finding suitable site conditions for 20 or 40 acres of oak woodland may be problematic, i.e., the current narrow distribution of oak woodlands in the vicinity may indicate that nearby sites are not suitable. Finding suitable site conditions to meet a 10:1 mitigation ratio and establish 200 acres of oak woodland would be even more difficult. However, implementation of a mitigation ratio of 1:1 of suitable and effective replacement habitat determined in consultation with CDFG, USFS, and FWS would help to ensure that habitat loss is adequately compensated, despite the length of time that will pass before the stand is capable of providing the same wildlife benefits that it provides under current conditions.

Transplanting existing trees would have more immediate benefits, in terms of maintaining biodiversity and supporting wildlife communities. Again, the challenge would be to find suitable site conditions in Morrell Canyon or the upper San Juan Creek watershed to support 700 oaks of various ages, and costs would likely be prohibitive. Implementation of a mitigation ratio of 1:1 of suitable and effective habitat would be needed to help offset the high mortality often associated with transplanting mature trees in dry settings.

Acquiring and protecting existing oak woodlands off-site would contribute to conservation of this special status habitat on a broad regional level. However, this option would not mitigate for losses to wildlife currently occupying upper Morrell Canyon. Provision of funding to a mitigation bank would have similar effects. A mitigation ratio of 1:1 of suitable and effective habitat would help compensate for the on-site loss of habitat.

Although the proposed transmission line route would pass through oak woodland at a few locations along both the northern and southern segments, Elsinore Valley MWD and Nevada Hydro (2005) do not identify any transmission towers as being located in coastal live oak woodlands. Transmission tower spacing depends to a large degree on slope, and, it may be possible to avoid effects on this cover type along the transmission line route with long spans.

Staff Alternative—Construction of a reservoir at Decker Canyon would require removal of about 5 acres of mature southern coast live oak forest. Thus, effects of construction at this site would be similar to those that would be expected at Morrell Canyon, but a much smaller area would be affected, and a much lesser amount of mitigation (at any mitigation ratio) would be needed to offset the effects.

Effects of construction of the staff alternative transmission line alignment on coast live oak woodlands would be about the same as those described above for the proposed alignment.

Optional Ortega Oaks or Evergreen Powerhouse—Construction at the Ortega Oaks or Evergreen powerhouse site would not involve removal or disturbance of oak woodlands.

Effects of Operation

Co-applicants' Proposal—We anticipate there would be no adverse effects of project operation on live oak woodlands, other than the potential for public use of temporary access roads along the transmission line right-of-way that are intended to be obliterated and revegetated following construction. As we have noted for many resources, it is difficult to control public access, and for this reason, roads would pose a long-term risk of disturbance to native plant communities, including oak woodland, as a result of OHV use, vandalism, fire hazard, and weed introduction. Development and implementation of road management measures as specified by the USFS in revised preliminary 4(e) condition nos. 11 and 26 could be used to minimize these potential effects.

Staff Alternative—No operational effects on oak woodlands are anticipated in association with the Decker Canyon reservoir site. Potential effects of roads would be the same for the staff alternative transmission alignment as described above for the proposed transmission alignment.

Optional Ortega Oaks or Evergreen Powerhouse—No oak woodlands are present at the Ortega Oaks or Evergreen powerhouse site.

The costs of the measures regarding coast live oak woodlands are presented in section 4.0, *Developmental Analysis*, and the measures included in the staff alternative are discussed in section 5.2, *Discussion of Key Issues*.

Special Status Wildlife and Management Indicator Species

The foothills and mountains of southern California support 18 species of amphibians, 61 reptiles, almost 300 birds, and more than 100 mammals (Stephenson and Calcarone, 1999). Populations of many of these species are at risk or in decline because of habitat loss, fragmentation, alteration, or disturbance. Federal and state wildlife agencies have designated these animals as having special status, indicating a need for special protection or management consideration. During consultation with the resource management agencies, the co-applicants determined that at least 30 special status species could occur in the project area and should be evaluated in terms of potential project effects. Comments on the draft EIS and recent filings by the co-applicants (December 8, 2005) indicate that several other special status species, including Bell's sage sparrow and golden eagle, have been documented in the project area.

The USFS requested that wildlife MIS for the Cleveland National Forest also be evaluated. Based on the new Land Management Plan, wildlife MIS in this vicinity include the mule deer, song sparrow, California spotted owl, mountain lion, and arroyo toad. We address project effects on the mountain lion later in this section, under Habitat Connectivity and Wildlife Movement. We address effects on the arroyo toad in section 3.3.5.2, Threatened and Endangered Species.

Effects of Construction on Special Status Wildlife

Co-applicants' Proposal—Based on Elsinore Valley MWD and Nevada Hydro (2005), construction of the LEAPS Project would affect about 336.7 acres of wildlife habitat. This estimate includes 140 acres at the proposed Morrell Canyon upper reservoir site (120 acres of chamise chaparral and 20 acres of southern coast live oak woodland); 50 acres at the proposed Santa Rosa powerhouse site (30 acres of coastal sage scrub and 20 acres of non-native grasslands); and 35 acres of non-native grasslands at the north substation. Within these cover types, the co-applicants estimate that construction of the project features would affect a total of about 2.1 acres of waters of the U.S., and about 6.3 acres of waters of the state.

The acreage estimate also includes approximately 30 acres that would be occupied by transmission line towers. As previously mentioned, the co-applicants do not propose to clear vegetation beneath the entire transmission alignment; about 0.25 acre would be removed for construction at each of about 120 transmission line towers. Transmission towers would affect about 25 acres of chamise chaparral, 4 acres of non-native grasslands, and about 1 acre of coastal sage scrub. The co-applicants would have some flexibility in locating transmission towers, and propose to avoid placing them in wetlands or riparian habitats.

Construction of temporary access roads would affect about 15.7 acres of unknown vegetation types. Assuming the roads follow the transmission lines, most of the affected acreage would likely comprise chaparral.

As described in section 3.3.1, *Geology and Soils*, the co-applicants propose to revegetate any areas that are disturbed by construction, if they are not needed for permanent project use, including all temporary roads. Approximately 40 acres of chaparral at the Morrell Canyon staging area[50], 20 acres of non-native grasslands at the Santa Rosa site staging area, and all temporary roads could be revegetated. Construction of overhead to underground transition stations, pulling and tensioning stations outside the transmission line right-of-way, and helicopter fly yards would likely be constructed in chaparral, and would affect an additional 34 acres, of which 29 acres could be revegetated following construction. Construction of the underground segment of the transmission line would cause temporary disturbance over about 38 acres (about 36 acres of chaparral and 2 acres of coastal sage scrub near the Santa Rosa powerhouse site). About 28.5 acres could be revegetated, with 9.5 acres to be converted to a permanent maintenance road. Revegetating a total of about 133.2 acres would bring the total area of habitat loss to 203.5 acres for the project, as proposed.

The co-applicants propose to employ a biologist or natural resource specialist to monitor construction activities to help prevent adverse effects on sensitive species or habitats. The co-applicants propose to provide mitigation for project effects on coastal sage scrub and southern coastal oak woodlands.

Resource Agency Measures

Interior's 10(j) recommendation no. 3 recommends the co-applicants demonstrate that the project is consistent with existing or proposed HCPs that encompass the project area or would be affected by certain project features.

The USFS preliminary revised 4(e) condition no. 38 calls for minimum of 1:1 mitigation for losses of sensitive habitats or those that support sensitive species. As mentioned above, the USFS priorities for mitigation would be on-site, followed by mitigation within the Elsinore "Place," the Trabuco Ranger District, or the Cleveland National Forest.

The Riverside County asks that the co-applicants conduct habitat assessments and surveys as needed to ensure compliance with the Multi-Species HCP.

Effects Analysis

MBA documented 10 special status wildlife species during field surveys for the LEAPS Project: Bell's sage sparrow, Cooper's hawk, California spotted owl, loggerhead shrike, rufous-crowned sparrow, coastal California newt, coast (San Diego) horned lizard, two-striped garter snake, red-diamond rattlesnake, and rosy boa. In addition to the California spotted owl, MBA reported the occurrence of two other MIS, the mule deer and song sparrow. Nine other special status species (including four federally listed species) are considered to have a high likelihood of occurrence but were not observed during the surveys. We discuss project effects on federally listed special status species and their habitat in section 3.3.5, *Threatened and Endangered Species*.

The primary direct effects of construction on special status species and MIS would be loss of habitat as native plant communities are converted to project uses, and disturbance caused by noise, traffic, and human activity during the 4.5-year construction period. Construction of temporary access roads would cause indirect effects, as well, beyond the immediate road surface.

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[50] The USFS revised preliminary 4(e) condition no. 27 specifies that the co-applicants should develop a plan for a recreation facility at the staging area or at an alternative site. For this analysis, we assume that the co-applicants would work with the USFS to identify an alternative site, and that the staging area would be re-graded to natural contours and replanted with native species.

Loss of 20 acres of southern coast live oak woodland and associated riparian habitat in upper Morrell Canyon would adversely affect Cooper's hawk and mule deer. Cooper's hawks are most often found in live oak, deciduous riparian and other forest types near water. They use oak woodlands for nesting and perching opportunities, while hunting along forest edges and over adjacent open areas, including chaparral and grasslands. Mule deer use oak woodlands for thermal and hiding cover, and rely heavily on acorns as a food resource during the fall. As mentioned in section 3.3.4.1, the Land Management Plan indicates that mule deer in the Santa Ana Mountains reach their highest densities in oak woodlands, riparian areas, and along the margins of meadows and grasslands (USFS, 2005b).

The co-applicants' proposal to provide mitigation for the loss of oak woodlands may help to offset the loss. However, the benefits to local populations would be very small, because mitigation would either occur off-site through acquisition of existing mature stands of oak woodlands; or would occur some years in the future, through re-establishment of oak woodlands on-site.

Loss of live oak woodland at Morrell Canyon would not directly affect the California spotted owl. The co-applicants' surveys did not detect California spotted owls at either of the upper reservoir sites, or along a survey route that paralleled the northern segment of the proposed transmission alignment. Noise disturbance is also unlikely; the owl site closest to the project area is located about 2 miles west of the proposed transmission alignment.

No recent survey data are available, but a 1992 report indicates a total of 11 pairs of California spotted owls have been confirmed in the Santa Ana Mountains. The Land Management Plan indicates that California spotted owls in southern California may uses home ranges as small as 98 to 243 acres when they are located in riparian/hardwood forests, because they use narrow stringers of dense forest along steep canyons in areas otherwise dominated by chaparral (USFS, 2005b). Small oak stands may also serve as important stepping stones in dispersal. For these reasons, construction at Morrell Canyon would contribute to cumulative adverse effects on the California spotted owl by reducing the area of potential habitat, and would further impede recovery of populations in the Santa Ana Mountains.

Loss of 31 acres of coastal sage scrub and 114.5 acres of chaparral would adversely affect Bell's sage sparrow, golden eagle, loggerhead shrike, southern California rufous-crowned sparrow, and the coast (San Diego) horned lizard, and would represent an additional habitat loss for mule deer. Loss of coastal sage scrub and chaparral would also reduce available habitat for Belding's orange-throated whiptail, northwestern red-diamond rattlesnake, Coronado skink, San Diego mountain kingsnake, coastal rosy boa, and northwestern San Diego pocket mouse. Although not observed during MBA's surveys, these special status species may also be present in the project area.

The co-applicants propose to provide 1:1 mitigation for construction effects on coastal sage scrub, but not for chaparral, because it is abundant in the project vicinity, or for 38 acres of non-native grasslands. Loss of non-native grasslands would further reduce the area of available habitat for mule deer. Loss of mule deer habitat could reduce local deer populations, which are already estimated to number less than 1,000 animals in the Santa Ana Mountains (USFS, 2005b). Decreases in the mule deer population would reduce the availability of prey for mountain lions, another USFS MIS.

Annual grasslands in the project area may be characterized by a high percentage of non-native plants, including invasive weed species. Nevertheless, these grasslands may also support special status species, such as the loggerhead shrike, burrowing owl, white-tailed kite, northwestern San Diego pocket mouse, and coastal (San Diego) horned lizard.

The co-applicants propose to avoid placing transmission towers in wetlands and riparian areas, which would minimize the loss of habitat for the coastal California newt, two-striped garter snake, and song sparrow. The co-applicants also propose to develop a habitat mitigation and monitoring plan to address wetland impacts. Implementation of a habitat mitigation and monitoring plan could help to offset habitat losses for song sparrows and other species that use these habitats.

A permanent maintenance road would be constructed along the underground segment of the transmission line, with a total length of 5.2 miles. Most of this road would cross chaparral, with about 0.25 mile extending through patches of coastal sage scrub near the Santa Rosa powerhouse site.

We do not know the location of any temporary access road segments and, thus, cannot quantify the acreage of potential habitat that would be removed or altered for any particular special status species or MIS. Indirect effects on habitat adjacent to roads are also difficult to quantify. Roads alter the characteristics of the habitats they cross by creating edge effects (Reed et al., 1996; Tinker et al., 1998). The distance that edge effects extend into habitat blocks varies from site to site. Animal responses to edge effects are also highly variable and may be described as occurring on a continuum from attraction to avoidance (Brehme, 2003).

Many wildlife species use narrow roads and hiking trails as travel routes. Reptiles often use them for thermoregulation, and birds may take advantage of forage plants that develop in edge habitats along road margins, and increases in small mammal populations that use them. However, roads also function as barriers to wildlife movement, and even narrow, unpaved roads with little vehicle traffic have been shown to interrupt the daily movements and seasonal dispersal of some small mammals, reptiles, and amphibians (Swihart and Slade, 1984; Weatherhead and Prior, 1992; Gibbs, 1998; deMaynardier and Hunter, 1995). Noise and traffic would cause disturbance to wildlife throughout the construction period, which is estimated to last approximately 4.5 years. Species that are mobile (e.g., rufous-crowned sparrow, song sparrow, Cooper's hawk, loggerhead shrike, mule deer) would likely avoid the immediate area. Use of nearby habitats for breeding and possibly for foraging, as well, would be limited if such areas are already occupied. Less mobile species (e.g., San Diego horned lizard, red diamond rattlesnake) would experience adverse effects as a result of clearing, grading, and excavation.

The co-applicants' proposal to employ a biologist or natural resource specialist to monitor construction activities would not be likely to provide measurable benefits. Species that are physically capable of avoiding the area would likely do so. Less mobile species typically depend on concealment to avoid danger, and for this reason, they would be difficult to detect and protect from construction effects.

Construction would affect habitat for a number of special status wildlife species that are protected as part of the Multi-Species HCP. To be consistent with the Multi-Species HCP (and with Interior's 10(j) recommendation no. 3), the co-applicants would need to evaluate project effects in terms of Multi-Species HCP guidelines to determine mitigation needs. Habitats on the Cleveland National Forest contribute to the Multi-Species HCP reserve lands, and the USFS revised preliminary 4(e) condition no. 38 indicates that mitigation requirements for project effects on National Forest System lands may be similar (i.e., a minimum of 1:1 for sensitive habitats or habitats that support sensitive species).

Staff Alternative—Construction of an upper reservoir at the Decker Canyon site would affect about the same total acreage as would be affected at Morrell Canyon, but less oak woodland (5 acres) would be affected. The same special status wildlife species would be affected, but over a smaller area. We assume that the 40-acre staging area could be revegetated following construction.

Effects on special status wildlife and MIS at the Santa Rosa powerhouse site would be as described above.

Effects associated with the staff alternative transmission alignment would be similar to those described above for the proposed transmission alignment. Construction of 120 towers for the overhead segments of the transmission line would permanently affect about 30 acres (about 1 acre of coastal sage scrub, 25 acres of chaparral, and about 4 acres of non-native grasslands. About 13.5 acres of temporary roads could be revegetated. Construction of the underground segment would temporarily disturb about 29.9 acres. About 22.4 acres atop this segment could be revegetated; the remaining acreage would be converted to a permanent maintenance road 4.1 miles in length.

Optional Ortega Oaks or Evergreen Powerhouse—Construction would affect about 58 acres at the Ortega Oaks powerhouse site, including 53 acres of non-native grasslands and 5 acres of coastal sage scrub. Although no specifics are given about the area that would be used for construction staging at the Ortega Oaks site, we assume about 20 acres could be revegetated following construction, as it would be at the Santa Rosa or Evergreen sites. At the Evergreen powerhouse site, construction would affect about 75 acres. This total would include 55 acres of non-native grasslands, and 20 acres of coastal sage scrub. About 20 acres could be revegetated following construction.

Effects of Operation on Special Status Wildlife and Management Indicator Species

Co-applicants' Proposal—USFS revised preliminary 4(e) condition no. 29 specifies annual employee awareness training that would cover local resource issues, including special status species. According to this condition, the co-applicants would coordinate with the USFS to provide information about special status species and their locations to the co-applicants' field personnel.

USFS revised preliminary 4(e) condition no. 30 specifies that the co-applicants would consult annually with the USFS and FWS to review lists of special status species that might occur within the project boundary to determine if any new species (federally listed threatened or endangered species or USFSS) have been added, for which study or survey may be necessary. In that event, the co-applicants would submit draft study reports to the USFS before finalizing the reports and filing them with the Commission.

Effects Analysis

Project operations would result in a small increase in disturbance as a result of regular maintenance activities at the reservoir. However, the incremental effect above existing disturbance caused by traffic along the South Main Divide Road and hikers and equestrians in Morrell Canyon would not likely be measurable. O&M at the powerhouse would occur in an area where traffic and human activity levels are already high, and would not likely cause additional disturbance to special status species or MIS.

The co-applicants would perform transmission line maintenance using helicopters. Helicopter activity would cause brief, high levels of disturbance. However, as mentioned above, monitoring and management would be needed to ensure there is no public access to the estimated 10.8 miles of temporary access roads, once they have been obliterated and revegetated. Uncontrolled public access often results in damage to habitat and disturbance to wildlife, as a result of OHVs, garbage dumping, target shooting, harassment, and illegal take (Gucinski et al., 2001; Joslin and Youmans, 1999).

As noted by the USFS, the existing list of special status species and MIS may be modified in the future as animals are added or subtracted from the list or as more information becomes available about their range or habitat requirements. Annual training of the co-applicants' field personnel and annual consultation with the USFS and FWS regarding special status species would help to minimize the risk of adverse effects on wildlife as status or conditions change.

Staff Alternative—Operation of an upper reservoir at the Decker Canyon site would cause the same types of effects on special status wildlife as described for the proposed Morrell Canyon upper reservoir site, as would operation of a powerhouse at the Santa Rosa site.

Operational effects would be the same for the staff alternative transmission alignment as for the proposed transmission alignment, except that the risk of public use (OHVs, in particular) could adversely affect habitat along 9.3 miles of temporary access roads, even after closure, and 4.1 miles of permanent maintenance road along the underground transmission segment.

Optional Ortega Oaks or Evergreen Powerhouse—Operation of a powerhouse at the Ortega Oaks or Evergreen site would cause similar types of effects on special status wildlife species and MIS as described for the proposed Santa Rosa powerhouse site.

The costs of the measures pertaining to special status wildlife species are presented in section 4.0, *Developmental Analysis*, and the measures included in the staff alternative are discussed in section 5.2, *Discussion of Key Issues*.

Habitat Connectivity and Wildlife Movement

Habitat connectivity allows the movement of animals across the landscape, between habitat blocks or cores. Loss of habitat connectivity can impair the ability of many species to find food, shelter, mates, and new territories. At a broader level, loss of connectivity can alter community dynamics, reduce gene flow, and increase susceptibility to disease and environmental disturbances. During scoping, several participants identified specific concerns about the effect of the LEAPS Project on habitat connectivity for mountain lions. As mentioned earlier, the Cleveland National Forest has selected the mountain lion as an MIS to evaluate habitat fragmentation.

Effects of Construction on Habitat Connectivity and Wildlife Movement

Co-applicants' Proposal—Construction of the LEAPS Project would affect several existing and proposed habitat cores and linkages that are part of the Multi-Species HCP. As defined in the Multi-Species HCP, cores provide "live-in" habitat, and linkages provide "movement" habitat. Morrell Canyon is located within Existing Core B, which comprises the Cleveland National Forest (figure 15).

The northern segment of the proposed transmission alignment would cross and then border Existing Core B and would cross Proposed Linkage 1. Proposed Linkage 1 is intended to allow for the movement of mountain lions (and other wildlife species) into the Lake Mathews/Estelle Mountain area.

The southern segment of the proposed transmission alignment would also cross Existing Core B, and then cross Proposed Linkage 9 (the Tenaja Corridor), which connects Existing Core B with the Santa Rosa Plateau. This proposed linkage is intended primarily to improve habitat connectivity for mountain lions between the Santa Ana Mountains and the Palomar Range.

Lake Elsinore comprises Existing Core E. Currently, this core is not linked to other core habitats, but core extensions and proposed linkages would improve wildlife movement to the north and east of the lake. Management priorities for Existing Core E focus on minimizing the effects of edge factors, including lighting, surface runoff, toxics, and domestic predators, that result from urban, residential, and commercial development.

Resource Agency Measures

Interior 10(j) recommendation no. 3 requests that the co-applicants demonstrate that the LEAPS Project is consistent with the Multi-Species HCP, Stephens' Kangaroo Rat HCP, and North County Multi-Species HCP. Interior identifies project effects on core reserves and linkages as being of particular concern.

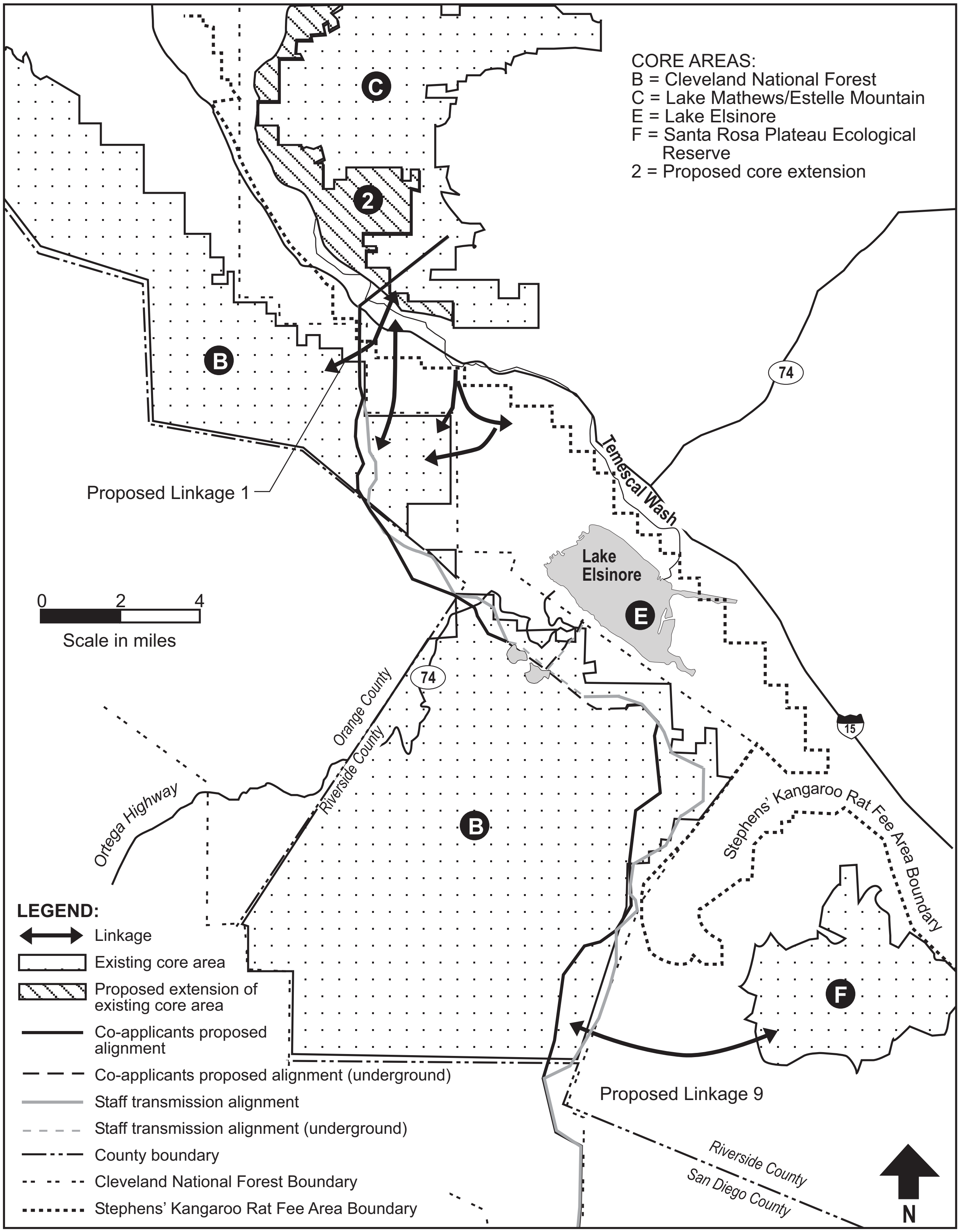

Figure 15. LEAPS Project—Habitat core areas and linkages. (Source: Elsinore Valley MWD and Nevada Hydro, 2004a, as modified by staff).

Effects Analysis

Construction at Morrell Canyon would remove about 140 acres of suitable habitat for mountain lions within Core B, with about 40 acres being revegetated following construction. Construction of the transmission alignment where it passes through Core B would disturb an additional 21.25 acres, assuming 85 towers would be needed to span this distance and that each would disturb about 0.25 acre. We estimate that about 4 miles of road would be constructed within Core B, based on the number of towers, but because Core B contains some of the roughest terrain, more of the transmission line could be constructed by helicopter, and fewer roads may be needed.

Existing Core B represents a large proportion of the remaining habitat for mountain lions in the Santa Ana Range. Modeling of the Santa Ana mountain lion population indicates it is demographically unstable and at risk of extinction, because it is isolated from other populations (Beier, 1993). Removal or disturbance of suitable habitat within Existing Core B would result in additional adverse effects on mountain lions. Reductions in mule deer populations that may also occur as a result of habitat loss in Core B would cause further adverse effects on mountain lions, because of their reliance on deer as their primary prey.

A 5-year study of mountain lions in the Santa Ana Mountains showed that two animals occupied home ranges that included sites where LEAPS Project features would be constructed (Beier and Barrett, 1993). One of these animals (a young male) was documented several times in upper Morrell Canyon. Radio tracking of both this individual and one other mountain lion (an adult female) showed frequent movements near the northern segment of the proposed transmission alignment route, parallel with the ridgeline (a northwest-southeast orientation).

Based on the Santa Ana monitoring studies, it is unlikely that the transmission line would function as a barrier to mountain lion movement or would reduce existing habitat quality in Proposed Linkage 1 or Proposed Linkage 9. The monitoring studies indicated that mountain lions are habitat generalists, and use any area with predominantly native, woody vegetation; ample prey (especially mule deer); and low density of human inhabitants (Dickson et al., 2005).

It is also unlikely that the estimated 11 miles of temporary access roads needed to construct the transmission alignment would function as barriers. The Santa Ana studies showed that mountain lions avoided two-lane, paved roads, but they did not avoid dirt roads and often used them to travel along canyon washes. They also used roads or hiking trails to move along ridgetops (Dickson et al., 2005). Assuming a minimal road design (i.e., one lane, dirt surface), the presence of transmission line access roads should not adversely affect mountain lions. However, as discussed above, it is difficult to control public access to back-country roads, and the risk of noise disturbance, harassment, and illegal take would be high. Impacts of roads on mule deer would also affect mountain lions.

The proposed Santa Rosa powerhouse site, the Lake Elsinore shoreline, segments of the transmission alignment outside Core B, and the northern and southern substations do not provide suitable mountain lion habitat. For this reason, we conclude there would be no effects on mountain lions from construction at these sites.

Staff Alternative—In comparison to Morrell Canyon, construction of an upper reservoir at the Decker Canyon site would convert a smaller area of riparian habitat to project uses, and no seeps or springs would be affected. However, the tracking studies discussed above indicate that Decker Canyon is within the home range of the same mountain lion (a young male) that used Morrell Canyon. For this reason, we would expect the effects to be similar.

The northern segment of the staff alternative transmission alignment is the same as the co-applicants' proposed route, and effects would be the same.

From either upper reservoir site, the southern segment of the staff alternative transmission alignment would continue southeast along the face of the Elsinore Range for a longer distance than the co-applicants' proposed route before turning southwest, following the edge of Core B. This adjustment keeps the alignment closer to the edge of Core B, and could reduce the need for access roads in Core B. For this reason, although the acreage affected would be the same, the staff alternative transmission alignment would have a smaller potential for effects on mountain lions.

Optional Ortega Oaks or Evergreen Powerhouse—No effects would be expected because the Ortega Oaks or Evergreen powerhouse site does not provide mountain lion habitat.

Effects of Operation on Habitat Connectivity and Wildlife Movement

Co-applicants' Proposal—Human activity can affect mountain lion behavior because mountain lions typically avoid humans. When human/mountain lion interactions occur, the result is often fatal to the animal, i.e., it is identified as an imminent threat to public safety and destroyed. Under existing conditions, hikers and equestrians along the Morgan Trail in Morrell Canyon represent an unknown level of disturbance to mountain lions. As mentioned in section 3.3.6, *Recreation*, USFS personnel indicate they observe from two to three cars parked at the trailhead on peak use weekends. USFS personnel also report that they frequently observe mountain lion tracks during hikes along the Morgan Trail (personal communication, J. Behrens, Cleveland National Forest Recreation Officer, on August 24, 2005). Long-term O&M of the upper reservoir would not be likely to increase disturbance or the risk of interaction, assuming the same numbers of people continue to use the Morgan Trail. If people avoid the trail because of its proximity to a new reservoir, disturbance to mountain lions would decrease.

The co-applicants propose to permanently close construction access roads along the transmission alignment. Monitoring and management to assure there is no public access following road closures would be needed to prevent an increase in disturbance to mountain lions. Helicopter access for routine transmission line maintenance would cause short-term, localized adverse effects.

Staff Alternative—Construction of an upper reservoir at the Decker Canyon site would not affect any existing trails or other recreation facilities. Long-term, regular, low-level activity (e.g., small numbers of personnel performing inspections and maintenance) at the Decker Canyon site would represent a small increase in the level of human disturbance within mountain lion habitat.

The effects of long-term operations and maintenance of the northern and central segments of the staff alternative transmission alignment would be the same as those for the proposed transmission alignment. The effects of these activities along the southern segment of this alignment would be smaller in comparison to the proposed alignment, owing to the alignment of the southern segment to remove it to a greater degree from Core B. Helicopter access to perform maintenance activities along the segment of the transmission line near Decker Canyon would cause short-term, localized disturbance to mountain lions, if present, but would not affect wildlife movement between Core B and existing or proposed linkages.

Optional Ortega Oaks or Evergreen Powerhouse—The Ortega Oaks or Evergreen powerhouse site is not located within mountain lion habitat, and there would be no effects.

The costs of the measures pertaining to habitat connectivity (road and traffic management plans) are presented in section 4.0, *Developmental Analysis*, and measures included in the staff alternative are discussed in section 5.2, *Discussion of Key Issues*.

Habitat for Migratory Birds, Shorebirds, and Nesting Waterfowl

Topography, soils, and land use influence the characteristics of plant communities that grow along the shorelines of lakes and reservoirs. Daily and seasonal changes in water surface elevation also affect these plant communities. Several participants in scoping for the LEAPS Project indicated concerns about whether project-related changes in lake levels would adversely affect riparian and shallow water vegetation that could provide habitat for migratory birds, shorebirds, and nesting waterfowl.

Effects of Operation on Lake Level Fluctuations

Co-Applicants' Proposal—The co-applicants propose to operate the project so that daily fluctuations in the surface elevation of Lake Elsinore would be about 1 foot. A daily fluctuation of 1 foot would affect about 79 acres along the lake margin between elevations 1,240 and 1,241 feet msl. A weekly fluctuation of 1.7 feet would affect an additional 55 acres (Anderson, 2006).

Resource Agency Measures

Interior's 10(j) no. 3 recommends that the co-applicants consult with FWS and CDFG to develop a plan to eliminate or reduce effects on nesting shorebirds. The plan would include monitoring to allow early detection of effects; immediate steps to remedy effects; timing and performance criteria; and annual reporting to FWS and CDFG.

Effects Analysis

Review of existing information (including aerial photographs supplied with the license application, the analysis provided in Elsinore Valley MWD and Nevada Hydro [2005], and staff observations during the site visit in September 2004) indicate that very little riparian vegetation of any kind grows around Lake Elsinore. The co-applicants report that where vegetation is present, it consists primarily of weedy invasive species, but native willows, cattails, and tule grow at scattered locations. Although limited in extent, these habitat patches would provide important forage and cover for waterfowl, wading birds, and songbirds.

The co-applicants report that no aquatic vegetation is present. They attribute the lack of vegetation to several factors, including seasonal and year-to-year water level fluctuations; lack of fine sediments that would support rooting; shading of light by dense algal populations; turbidity; and foraging activity of common carp across the bottom of the lake.

Information concerning current bird use of Lake Elsinore is limited. MBA compiled a list of 140 species that have been documented within 5 to 10 miles of Lake Elsinore, but because this area encompasses a variety of upland habitats, it does not serve as a good indicator of which species use the lake for breeding, foraging, resting, or overwintering. The city of Lake Elsinore staff report that black-necked stilts, avocets, and killdeer breed on undisturbed shorelines of Lake Elsinore, and at least 28 other water-associated species (e.g., western grebe, American white pelican, double-crested cormorant, pelagic cormorant, snow goose, northern shoveler, least tern, royal tern) have been spotted on the lake in recent years (letter from B. Zeid Leibold, City Attorney, City of Lake Elsinore, CA, to the Commission, dated April 25, 2006). Earlier lists (1967 and 1977) include more than 30 other species (e.g., American bittern, canvasback, common merganser, common goldeneye, pintail, redhead, ruddy duck,, common snipe, long-billed curlew, long-billed dowitcher, green heron, belted kingfisher, common loon) associated with water.

During recent spring (April) and summer (July and August) wildlife surveys conducted in the Back Basin, biologists observed many native songbirds, but no waterfowl, shorebirds, or wading birds (Frank Hovore Associates, 2003). They noted that great blue heron and great egret nest nearby, and probably forage in the Back Basin (Frank Hovore Associates, 2003).

Most of the Lake Elsinore shoreline has been developed for residential, commercial, or industrial use. Vegetation near the shore in these areas consists of ornamental trees, shrubs, and flowers used in landscaping, or non-native weedy species that take hold in disturbed soils. Vegetation growing on the 2.5-mile-long levee that forms the southeastern shoreline is very sparse and consists mainly of non-native forbs and grasses.

Undeveloped portions of the shoreline with gradual slopes may be suitable for ground-nesting birds that use uplands near water or nest in the open, such as killdeer and gulls. Shorelines are currently less suitable for ground-nesters such as mallard, pied-billed grebe, and American bittern that prefer to nest in areas with dense emergent or scrub-shrub vegetation within a few feet of the waters' edge, or to construct platforms of vegetation over the water. Under current conditions, no dense emergent or scrub-shrub vegetation grows along the shoreline that could be affected by proposed operation of the LEAPS Project.

As discussed in section 3.3.2, *Water Resources*, implementation of the Lake Elsinore Stabilization and Enhancement Project has reduced year-to-year water level fluctuations and would prevent the lake from drying up in drought years. These conditions, combined with proposed operations, would be expected to result in a stable upper shoreline at 1,241.7 feet msl, with a variable fluctuation zone that covers about 79 acres 5 days a week and an additional 55 acres during the weekend.

The initial establishment of plants within the 79-acre and/or 55-acre fluctuation zone would depend on a number of factors. Under current conditions, Elsinore Valley MWD and Nevada Hydro (2005) describes the bottom of Lake Elsinore as a desert; if no seed bank or plant propagules are present, an aquatic macrophyte community might not develop at all within the foreseeable future. If plants establish, their success would depend not only on water levels, but also on light levels and water chemistry, which would be influenced by turbidity, sediment movement and deposition, algae growth, and external nutrient loading.

With the LEAPS Project in place, a long period of inundation followed by a short period of exposure would likely prevent most plant species from establishing within the 55-acre zone that would be subject to weekend fluctuations, because most submersed aquatic macrophytes that would do well while inundated would not likely survive weekend desiccation. Some species, such as American pondweed and water stargrass, are more tolerant and could survive (Smart et al., 2006).

Emergent herbaceous plants could colonize the 79-acre fluctuation zone. Successful species would be those that can establish in standing water or in saturated soils, as well as tolerating variable moisture conditions over time, such as cattails, tule, and some sedges and rushes (Smart, et al., 2006; Uchytil, 1992; Hoag, 1994; Hoag, 2000). Species would be distributed along an elevational gradient, i.e., plants that are better adapted to inundation may occur at lower elevations within the fluctuation zone, while species that are better adapted to moist soil conditions would occur at higher elevations within the fluctuation zone. Willows could establish along the highest portions of the 79-acre fluctuation zone, as well as along the shoreline (Tesky, 1992). Plants establishing within the 79-acre fluctuation zone would provide foraging opportunities for dabbling ducks, wading birds, and songbirds, and could provide nesting opportunities for some species. However, it should be noted that land use will also affect wildlife use of any new vegetation that may establish.

With the Lake Elsinore Stabilization and Enhancement Project and LEAPS Project in place, additional riparian vegetation and possibly, some wetlands, may establish along the shoreline above the fluctuation zone. The extent of riparian vegetation and the characteristics of the riparian community that might establish would depend on other factors, such as topography, soils, and the seed bank, in addition to changes in the hydrologic regime that would result from LEAPS Project operation. If native riparian communities establish along the shoreline, implementation of a plan to monitor waterfowl and shorebird nesting would help to identify effects that may result from project operation. However, long-term lake management and adjacent land uses would also affect any new riparian habitat that might develop, and would strongly influence use by migratory songbirds, wading birds, and/or nesting waterfowl. For example, establishment of protected shoreline buffer zones could promote bird use, while intensive residential, commercial, or recreation development could preclude it.

The cost estimate for the nesting shorebird plan is presented in section 4.0, *Developmental Analysis,* and the measures included in the staff alternative are discussed in section 5.2, *Discussion of Key Issues.*

Bird Interactions with Transmission Lines

Effects of Operation

Co-applicants' Proposal—During the scoping process, participants identified concerns about the potential risk of bird electrocution or collision with the proposed power lines. Avian injuries and fatalities have been reported since the late 1800s, and as power lines have proliferated across the country, losses of birds to electrocution or collision have increased dramatically; a recent California Energy Commission report estimated that annual fatalities in the United States are between 3.5 million and 1.05 billion (Hunting, 2002a).

In addition to bird safety, participants indicated a concern that electrocuted birds could fall to the ground, igniting vegetation and causing wildfires. An electrocuted red-tailed hawk is thought to have been the cause of the 6,000-acre Foothills Fire near Los Angeles in 2004 (USFS, 2004).

The co-applicants propose to construct about 32 miles of 500-kV power lines to connect to an existing SCE transmission line north of the project area and to an existing SDG&E transmission line located to the south. Consistent with USFS revised preliminary condition no. 36, the co-applicants propose to construct the transmission alignments in accordance with current APLIC et al. (1996) guidelines to minimize the risk of avian electrocution.

Resource Agency Measures

Interior 10(a) recommendation no. 1 requests that the co-applicants coordinate with FWS regarding the completion of plans and designs for measures to protect, mitigate damages to, and enhance fish and wildlife resources.

Interior 10(a) recommendation no. 2 requests that the co-applicants take immediate action to prevent or minimize further loss if at any time situations arise where fish or wildlife are being killed. The co-applicants would immediately notify the nearest FWS office and implement, to the extent practicable, any reasonable restorative measures they recommend.

Effects Analysis

Electrocution occurs when a bird perching or nesting on a power pole or tower spans two conductors or spans between a conductor and a ground. A relatively small number of tower-related electrocutions occur on high-voltage lines (i.e., lines carrying more than 69 kV) because the spacing of hardware on the large power poles or towers associated with these lines is sufficient (or can be modified to be sufficient) to prevent birds from spanning between conductors or between a conductor and a ground (APLIC et al., 1996).

Most collision-related fatalities occur as a result of birds in flight striking the terminal ground wires (or static wires) that are installed on the lines to dissipate lightning (Hunting, 2002a). Reducing the risk of collision with power lines can be challenging because a number of physical and biological factors contribute to the relative risk of collision. These factors include weather conditions; the relationship between the transmission line route and local topography, wind patterns, land use, and vegetative cover;

and bird species, abundance, and behavior (APLIC, 1994). However, the level of risk of a particular alignment can generally be described as follows:

- Power lines that bisect flight paths (for daily movement or seasonal migration) across wetlands, waterways, and mountain passes pose a higher risk to birds in flight, especially in fog or rain, than lines that are oriented parallel to flight paths.
- Power lines located in proximity to areas of bird concentration (wetlands, lakes, agricultural lands) pose a higher risk to birds taking off and landing than lines located at least a mile away.
- Lines located above the tree line may be less visible to birds than lines located at or below the tree line.

Several bird groups appear to be highly susceptible to collision. Large, heavy-bodied birds (e.g., waterfowl) are less maneuverable in flight, and their habit of flying at high speeds and low elevations between foraging areas and nearby resting areas exposes them to collision more frequently, especially at dawn and dusk when visibility is low. The great blue heron, with its long neck, long legs, and poor vision, is a species at particularly high risk.

As a group, raptors are at a higher risk of electrocution on poorly designed transmission line towers than any other birds, but there are few reports of raptor collision with transmission lines. An analysis of avian power line interactions in Europe indicated that about 94 percent of raptor fatalities were caused by electrocution on poles or towers, while only 6 percent were the result of collision with power lines.

For purposes of this analysis, the co-applicants' proposed transmission alignment can be divided into three segments: the northern segment, from the northern terminus to Leach Canyon Creek; the central segment, from Leach Canyon Creek to the point just east of Elsinore Peak where it turns south; and from that point southward to the proposed substation (see figure 16).

The northern segment of the proposed transmission alignment would cross Temescal Wash near Lee Lake. This crossing would represent a high risk to waterfowl because of the presence of extensive wetlands and agricultural fields along the Lee Lake shoreline.

In addition to Temescal Wash, the northern segment of the proposed transmission alignment would cross four other named drainages (Cow Canyon, Horsethief Canyon, McVicker Canyon, and Leach Canyon creeks). Aerial photographs submitted as part of the license application do not cover any of these crossings, but topographic maps indicate that McVicker Canyon and Leach Canyon may support moderate amounts of riparian vegetation. For this reason, we consider these two transmission alignment crossings to pose a moderate risk of collision.

No major crossings occur along the northwest-to-southeast oriented central segment of the proposed transmission alignment. This alignment would not affect waterfowl because there is no suitable waterfowl habitat in this vicinity. It would cross the face of the Elsinore Range back from the top of the slope. Because raptors tend to soar along mid- to upper slopes and ridgelines to take advantage of thermals and updrafts, we would expect that siting the segment back from the ridgeline would interfere less with raptor flight patterns than if the alignment were to cross the Elsinore Range at a lower contour. About 5.2 miles of the transmission line would be constructed underground, including the segment extending downslope to the Santa Rosa powerhouse site, which should further reduce the risk of raptor collision.

The southern segment of the proposed transmission alignment would cross three named drainages, including Los Alamos Canyon, Tenaja, and San Mateo creeks. Review of aerial photographs and topographic maps suggest these creeks also support moderate amounts of riparian vegetation and may represent a moderate risk of collision for some waterfowl and wading birds.

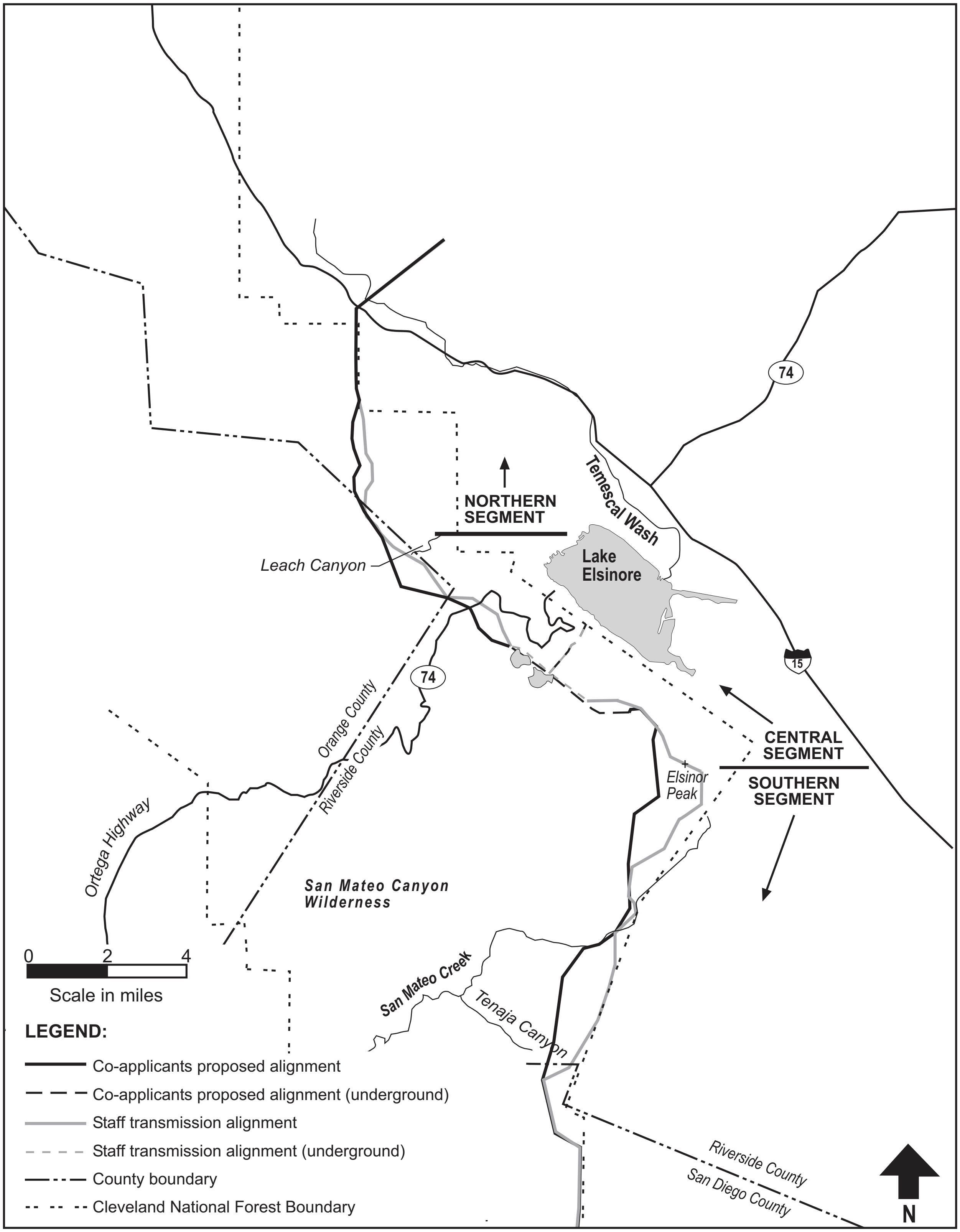

Figure 16. LEAPS Project—Transmission line segments. (Source: Elsinore Valley MWD and Nevada Hydro, 2004a, as modified by staff)

Staff Alternative—The staff alternative transmission alignment can also be divided into three segments (see figure 16). The northern segment is about the same as the co-applicants' proposed route, and would have similar potential for adverse effects on waterfowl and wading birds.

The central segment is similar in alignment to the co-applicants' proposal. It would not affect any waterfowl habitat, but would be constructed in areas that may be used extensively by raptors for hunting. Like the proposed alignment, the segment paralleling the South Main Divide Road would be constructed back from the crest of the slope, which should allow it to be visible to raptors as they move up the slope and over the top, and about 4.1 miles of it would be underground, including the segment descending to the Santa Rosa powerhouse site.

The southern segment of the staff alternative transmission alignment travels southwestward closer to the Cleveland National Forest boundary than the proposed alignment, meeting up with the proposed alignment at two points. One of these is located at the Los Alamos Canyon Creek, and the other just north of Tenaja Canyon. The southern segment of the staff alternative transmission alignment would cross the same drainages as the proposed transmission alignment. We would anticipate the same level of risk to occur at crossings on Los Alamos Canyon Creek, Tenaja Creek, and San Mateo Creek.

The costs of measures pertaining to protection of birds from adverse interactions with power lines are presented in section 4.0, *Developmental Analysis*, and the measures included in the staff alternative are discussed in section 5.2, *Discussion of Key Issues*.

Mosquito Production

Effects of Operation

Co-Applicants' Proposal—As mentioned in section 3.3.4.1, *Terrestrial Resources*, participants during scoping identified the potential for the upper reservoir to support production of mosquitoes as a resource issue that should be addressed in the EIS. Comments on the draft EIS indicated a concern about the potential effects of project operation on mosquito production in Lake Elsinore, as well. Mosquitoes are of concern because they can transmit diseases to and between humans, birds, and mammals.

Resource Agency Measures

USFS 4(e) condition no. 14 specifies that the co-applicants should obtain permission from the USFS before applying pesticides to control undesirable insects on National Forest System lands and that any pesticides should be registered by EPA for that specific purpose.

Effects Analysis

Mosquitoes breed in shallow standing water, or lay their eggs in moist soils adjacent to standing water, especially where vegetation or other cover provides protection from predators and desiccation. As larvae develop, they breathe through siphons they extend from the water surface. Water level fluctuations and wave action interrupt their ability to breathe.

The upper reservoir would fluctuate about 40 feet daily and up to 75 feet through the weekly cycle. It would be lined with geomembrane and would not contain soils or support any riparian or emergent vegetation. The characteristics of the reservoir and its proposed operation would make it an inhospitable environment for mosquitoes. Lake Elsinore would also be unlikely to support mosquitoes because of daily and weekly water level fluctuations and wave action caused by wind and boating. During project operation, the lake's surface elevation would fluctuate about 1 foot daily (1.7 feet between Friday night and Saturday afternoon) so that moist soils left exposed during the night as water is pumped to the upper reservoir would be inundated the following day when water is released back into Lake Elsinore. As mentioned above, mosquito larvae need still water or moisture conditions in order to breathe, and would be unable to tolerate a daily cycle of desiccation and inundation. Therefore, there would be no risk of mosquito production associated with construction or operation of the proposed project.

Staff Alternative—Effects on the Decker Canyon upper reservoir site would be the same as described above for the proposed Morrell Canyon site.

3.3.4.3 Cumulative Effects

Participants in scoping identified concerns about the LEAPS Project's cumulative effects on waters, wetlands and riparian habitat. Based on the analysis presented in section 3.3.4.2, construction of a reservoir at either Morrell or Decker canyon would not affect wetlands, but would contribute to past, ongoing, and future losses of coast live oak woodland riparian habitat in southern California. Most of these losses have occurred (or will occur) as a result of human population growth. As discussed in section 3.3.7, *Land Use and Aesthetic Resources*, the population of Riverside County was predicted to grow by almost 70 percent between 2000 and 2020 (SCAG, 1998). The construction of homes, businesses, services, and infrastructure to serve this population is likely to adversely affect jurisdictional waters, including intermittent and ephemeral streams, despite federal, state, and county regulations that require protection, because substantial amounts of development are likely to occur in small increments that are difficult to regulate.

Construction at Morrell Canyon would affect a total of 6.5 acres of waters of the U.S. and the state over a stream length of about 4,400 feet, and would inundate Lion Spring. Construction at Decker Canyon would affect a total of 1.2 acres of waters of the U.S. and the state over a stream length of about 3,300 feet. Construction at Lake Elsinore and long-term operation of the project may contribute further to cumulative effects on waters and wetlands. Project effects on waters of the U.S. and state could be reduced by selecting the no action alternative, or by selecting Decker Canyon as the site of the upper reservoir. Under any action alternative, the project's contribution to cumulative effects could be reduced by implementing BMPs during construction, providing on-site, in-kind mitigation where possible, and by providing off-site mitigation where necessary.

Construction of a transmission line should not add to cumulative effects on these resources, because transmission towers would be located outside waters, wetlands, and riparian habitats. Access roads have not yet been sited, and their cumulative effects on waters and wetlands are therefore unknown.

Live oak woodlands are also at risk of loss as a wildlife resource, because their aesthetic qualities make parcels containing mature oaks especially attractive for human use (Giusti et al., 2004). Over 30,000 acres of oak woodlands in California are annually converted to residential and commercial uses (Standiford and Scott, 2001, as cited in Giusti et al., 2004). Recent legislation (California Senate Bill 1334, signed into law in January, 2005) is designed to protect oak woodlands, but the effectiveness of the bill is, as yet, unproven. Based on the Multi-Species HCP, the Plan Area currently supports 6,660 acres of coast live oak woodland, which accounts for about 0.5 percent of the existing vegetation cover types. Construction at the Morrell Canyon site would affect 20 acres of coast live oak. At Decker Canyon, the area of coast live oak woodland affected would be 5 acres.

During the terrestrial resource analysis, we concluded the project would contribute to cumulative effects on other important habitats, as well, including coastal sage scrub and chaparral. Neither of these are designated as having special status, but both (and coastal sage scrub in particular) support very high levels of biodiversity, including plants and wildlife that are endemic to the region. The Multi-Species HCP indicates the Plan Area supports about 159,000 acres of coastal sage scrub, and almost 363,000 acres of chaparral. Construction of the LEAPS Project as proposed would affect 31 acres of coastal sage scrub and 119.5 acres of chaparral. The alternative project configuration would affect about the same amount of coastal sage scrub and about 135.5 acres of chaparral.

Cumulative adverse effects on oak woodlands, coastal sage scrub and chaparral would in turn contribute to cumulative effects on the California spotted owl, an MIS that is rapidly declining in southern California forests, although range-wide populations may be stable (USFS, 2005b). The loss of habitat and increased disturbance would also adversely and cumulatively affect other special status species associated with these habitat types, including southern California rufous-crowned sparrow, Bell's sage sparrow, golden eagle, loggerhead shrike, and the coast (San Diego) horned lizard, which are known to occur in the project area, as well as others (e.g., Belding's orange-throated whiptail, northwestern red-diamond rattlesnake, Coronado skink, San Diego mountain kingsnake, coastal rosy boa, and northwestern San Diego pocketmouse) that are also likely to be present.

The cumulative effects of the LEAPS Project on mountain lions, an MIS, would be of particular concern. Habitat loss within Core B for mountain lion and their primary prey, the mule deer (also an MIS), would contribute to adverse effects on a population that is already at risk of extirpation in the Santa Ana Mountains.

Again, selection of the no-action alternative would have the least impact, and selection of Decker Canyon as the upper reservoir site would have less effect on the habitat that would be hardest to replace—coast live oak woodland. Implementation of mitigation measures outlined in section 5.2.6 would reduce the project's contribution to cumulative effects on special status species by providing on-site mitigation, where possible, and by acquiring and protecting off-site habitat, where on-site mitigation opportunities are unavailable or where on-site mitigation efforts would not likely be successful.

3.3.4.4 Unavoidable Adverse Effects

Project construction at Morrell Canyon would result in the loss of 20 acres of southern coast live oak woodlands, which probably could not be replaced on site. Construction of the upper reservoir at Decker Canyon would reduce but not eliminate the loss of southern coast live oak, affecting 5 acres that probably could not be replaced on site. Construction of approximately 32 miles of transmission lines would increase the risk of avian collision. Risks can be minimized by proper siting and marking but cannot be eliminated. Although access roads would be obliterated and revegetated following construction, public access is difficult to control, once a road has been built. Implementation of a road management plan and a noxious weed management plan would reduce, but not completely eliminate, the risks of illegal entry, and there still might be some OHV activity that could cause trampling of vegetation and compaction of soils; increased dust that could smother vegetation; and increased risk of wildfire. OHV use can also promote the introduction and spread of noxious weeds and invasive exotic plants that have the potential to outcompete native species and reduce wildlife habitat quality.

3.3.5 Threatened and Endangered Species

3.3.5.1 Affected Environment

Listed Species

Based on consultation with FWS and the USFS, 11 federally listed plant species and 8 federally listed wildlife species could occur or have been documented to occur in the LEAPS study area. Surveys were conducted for all of these species, except the Stephens' kangaroo rat and the bald eagle. The co-applicants assume the project would affect habitat for the Stephens' kangaroo rat and propose to provide mitigation for effects on an acreage basis, consistent with the existing HCP for this species. The co-applicants concluded that no surveys for bald eagles were needed because of the low likelihood of project effects. None of these listed species were observed during field surveys conducted in the study area between 2001 and 2005.

The final EIS serves as the biological assessment for these federally listed species, for purposes of consultation with FWS under Section 7 of the Endangered Species Act (ESA).

Fish

Southern California Steelhead (Endangered)—In August 1997, NMFS listed the Southern California steelhead (*Oncorhynchus mykiss*) evolutionarily significant unit as an endangered species (62 FR 43937). At the time of listing, NMFS believed Malibu Creek to the north represented the southernmost extent of the range of anadromous steelhead in southern California. In 1999 and in subsequent surveys, steelhead were reported in lower reaches of San Mateo Creek. These findings led NMFS in 2002 to extend the southern evolutionarily significant unit boundary to include Mateo Creek (67 FR 21586).

This steelhead evolutionarily significant unit is a winter-run steelhead that spawns in streams whose lower reaches flow through coastal plains (Moyle, 2002). In San Mateo Creek, only the lowermost 6 to 7 stream miles are reported to be accessible to southern steelhead trout in the main stem and tributaries. The cliffs of Tenaja Falls, on the main stem of the San Mateo (see figure 12), present an impassible barrier to the upstream extent of historical and potential steelhead migration. Similarly lower reaches in the creek are available to anadromous steelhead only when significant precipitation events make these areas accessible to steelhead for spawning.

Plants

San Diego Thornmint (Threatened)—San Diego thornmint is an annual of the mint family, currently known only from San Diego County. It occurs in openings within coastal sage scrub, chaparral, and native grasslands on heavy clay soils. The species is also associated with gabbro soils, those derived from igneous rock and calcareous marine sediments. The nearest known historic occurrence is from Oceanside, about 15 miles south of the proposed southern terminus of the transmission line. The nearest known existing occurrence is located about 25 miles south of that point. Because of its very narrow habitat requirements and narrow geographic distribution, it is unlikely to occur in the project area.

Munz's Onion (Endangered)—Munz's onion is a small perennial that occurs in grasslands and grassy openings in coastal sage scrub, chaparral, and juniper woodland on clay soils between approximately 1,000 and 3,000 feet. It is strongly associated with clay soil series or soil series of sedimentary or igneous origin with clay subsoil; alluvial soil series of sedimentary or igneous origin; and terrace escarpment soils found as part of alluvial fans (70 FR 108).

Munz's onion is currently known from 15 populations in Riverside County. The Multi-Species HCP indicates that two of the largest populations are located at Estelle Mountain near the northern terminus of the proposed transmission alignment; and on Elsinore Peak, about 3 miles south of the proposed upper reservoir site at Morrell Canyon. Occurrences are also known from Temescal Wash, near Lee Lake. MBA's surveys did not detect any new populations. FWS designated 176 acres of critical habitat for Munz's onion at Elsinore Peak (70 FR 108), but the designation does not encompass several other known occurrences in this vicinity (memorandum from S.D. White, Botanist, White & Leatherman Bioservices, Upland, CA, to S. Crawford, Project Manager, MBA, San Bernardino, CA, dated November 16, 2004).

San Diego Ambrosia (Endangered)—This perennial herb occurs in sparsely vegetated non-native grasslands and ruderal habitats on open floodplain terraces, in vernal pools and alkali playas. The species occurs at three locations in Riverside County: two sites near Alberhill and one site near Murrieta Hot Springs. The Alberhill sites are about 4 miles northwest of Lake Elsinore. In 2002, FWS found that designation of critical habitat for this species would be prudent, but was precluded by higher priorities (67 FR 127).

San Jacinto Valley Crownscale (Endangered)—San Jacinto Valley crownscale is a low-growing, grayish annual that requires seasonal inundation. It occurs only in highly alkaline seasonal floodplain wetlands and occasionally in alkali grasslands. The species is endemic to western Riverside

County. Twelve occurrences are known from the county. The nearest location to the LEAPS Project area is at Alberhill Creek, approximately 4 miles northwest of Lake Elsinore. FWS identified about 32 acres in the Alberhill Creek floodplain as essential habitat for San Jacinto Valley crownscale, but because this location would be protected under the provisions of the Multi-Species HCP, have proposed to exclude it from designation as critical habitat (69 FR 193).

Nevin's Barberry (Endangered)—Nevin's barberry is an evergreen shrub that reaches heights up to about 12 feet. It is associated with chaparral and alluvial scrub habitats, growing in coarse soils on the margins of washes and rocky slopes. It is known from six areas in Riverside County. The Multi-Species HCP describes the distribution as very narrow. The occurrence nearest the project area is located in the vicinity of Temecula, about 10 miles southeast of the project area. We conclude that this species is unlikely to occur in the project area.

Thread-leaved Brodiaea (Threatened)—Thread-leaved brodiaea is a member of the lily family. It occurs in vernal pools and alkali grassland habitats on hillsides, valleys, and floodplains from near sea level to about 2,000 feet in San Diego and Riverside counties. Twelve populations are known from Riverside County. These are clustered in two main areas: one along the San Jacinto River near Perris and Lakeview, and the other on the Santa Rosa Plateau. FWS proposed designated critical habitat at Miller Mountain near the proposed transmission alignment route in 2004 (69 FR 235).

Slender-horned Spineflower (Endangered)—Slender-horned spineflower is a small, herbaceous annual that is usually associated with mature alluvial scrub growing in sandy or gravelly soils. It is currently known from four locations in Riverside County. The occurrence nearest the LEAPS Project area is in Temescal Wash, northwest of Lake Elsinore.

San Diego Button-celery (Endangered)—In Riverside County, this species is known only from vernal pools on the Santa Rosa Plateau. Most known populations are located in San Diego County. The occurrence nearest the project lies about 5 miles southeast of the southern terminus of the transmission line, within the Santa Margarita drainage. Several other occurrences are known from this drainage. Because of its very narrow habitat requirements and geographic distribution, this species would not likely occur in any areas that would be affected by construction of the LEAPS Project.

Mexican Flannelbush (Endangered)—The total population of this species is thought to number less than 100 individuals, located at sites in southern San Diego County and in Baja, Mexico. We conclude that this species is not likely to occur in the project area, and we do not discuss it further in this document.

Spreading Navarretia (Threatened)—Spreading navarretia is a low-growing member of the phlox family. It occurs in vernal pools and in depressions in areas that once supported vernal pools, persisting only in the wettest areas. Its range extends from Los Angeles County to northwestern Baja. Twelve of the approximately 38 existing U.S. populations are located in Riverside County. FWS identified essential habitat for this species in the vicinity of the Santa Rosa Plateau in 2004 (69 FR 194). The California Native Plant Society identifies habitats that support this species as being chenopod scrub, marshes, swamps, playas, and vernal pools. Because this species has very narrow habitat requirements, it is unlikely to occur in the project area.

California Orcutt Grass (Endangered)—California Orcutt grass occurs only in vernal pools with clay or alkali soils. It is typically found in the deepest portions of pools that support it, and less frequently along the margins. It is known from three sites in Riverside County. The site nearest the project area is located on the Santa Rosa Plateau, about 6 miles southeast of Lake Elsinore. In 1993, FWS determined that it would not be prudent to designate critical habitat for this species, because of its vulnerability to vandalism, illegal collection and other human activities (58 FR 147). FWS addresses recovery of California Orcutt grass in the Draft Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon (FWS, 2004b).

Animals

Quino Checkerspot Butterfly (Endangered)—Although it may once have been the most common butterfly in coastal southern California, the Quino checkerspot butterfly is now known to occur only in Riverside and San Diego counties and northwestern Baja, California. Key populations in Riverside County are located at approximately 14 sites. The occurrence nearest the project area is located near Harford Springs Regional Park, about 7 miles north of Lake Elsinore.

FWS designated critical habitat in 2002 (67 FR 72) and completed a recovery plan for the species in 2003 (FWS, 2003). Designated critical habitat for this species is located in the vicinity of Estelle Mountain, where the northern segment of the proposed and staff alternative transmission alignment would terminate. Protection for this species in Riverside County is addressed in the Multi-Species HCP.

In its early lifestages (egg, larva, pupa), the Quino checkerspot butterfly is closely tied to just a few host plant species. These include western plantain, purple owl's clover, white snapdragon, and southern Chinese houses. Adults survive on nectar from small annual plants such as yerba santa, chia, ground pink, and gilia. Habitat components that support both early stages and adults are found in association with a variety of cover types. Adults have been observed in vernal pool settings, sage scrub, chaparral, native and non-native grassland, and open oak woodland communities, at elevations from sea level to about 5,000 feet. Diverse topography may be important; Quino checkerspot butterfly adults often use open or sparsely vegetated hilltops, ridgelines, and rocky outcrops.

Arroyo Toad (Endangered)—The range of the arroyo toad extends through the coastal plains and mountain streams of southern California, west of the desert, from Monterey County to northwestern Baja. Most populations occur at elevations from about 1,000 to 4,600 feet. Arroyo toad populations are known from nine locations in Riverside County. This species is also known from several locations on the Cleveland National Forest, where it is an MIS that represents riparian-dependent species (USFS, 2005b).

The FWS recovery plan indicates the arroyo toad is present in the headwaters of San Mateo Creek and some of its tributaries, and identifies San Juan Creek from Decker Canyon to the Orange County line as being within Recovery Unit 10 (FWS, 1999). Essential habitat for this species is located in the San Juan Creek drainage downstream of the Riverside/Orange County line, about 4 miles south of Morrell and Decker canyons (70 FR 70). Protection of this species in Riverside County is addressed within the Multi-Species HCP.

The arroyo toad breeds in the shallow pools of slow-moving streams, where the canopy is open and there is little herbaceous cover. After metamorphosis, juveniles remain in moist habitats, where they forage primarily on ants. Adults may move farther from water, foraging for a variety of insects and arthropods in sandy or gravelly terraces, chaparral, oak woodland. Recent studies indicate dispersal movements of over 1 mile along riparian corridors or overland.

California Red-legged Frog (Threatened)—The historical range of the California red-legged frog extended through the Pacific slope drainages from Shasta County south to Baja, at elevations from sea level to 4,500 feet. One very small population (e.g., less than five individuals) is known to occur in Riverside County; this location is the only extant population known to exist south of Ventura County.

FWS designated critical habitat for the California red-legged frog in 2001 (66 FR 49) that includes the San Mateo Creek Watershed and the Santa Rosa Plateau, from 5 to 10 mile southeast of the southern segment of the transmission alignment, where both the proposed and alternative transmission alignments would cross Tenaja Creek. The Santa Rosa Plateau is located within Recovery Unit 8 (FWS, 2002). FWS recently issued a revised proposed designation of critical habitat (70 FR 212), which excludes both the San Mateo Creek Watershed and the Santa Rosa Plateau. The Multi-Species HCP addresses protection of this species in Riverside County.

The California red-legged frog is typically associated with still or slow-moving water over 16 inches deep, bordered by dense, shrubby or emergent vegetation. Two thirds of the known localities are from small drainage areas. Larvae need cool water for proper development, so although this species may be found in ephemeral streams, it is unlikely that populations persist in such habitats. The California red-legged frog is often found over 300 feet from water, and during dispersal, frogs may move overland as much as 2 miles.

Southwestern Willow Flycatcher (Endangered)—The breeding range of the southwestern willow flycatcher extends from southern California into northwestern Mexico, and eastward into west Texas. The southwestern willow flycatcher overwinters in Mexico and Central America, arriving in southern California in late April-early May, and returning to wintering grounds in late summer. In Riverside County, there are records (both historic and current) of southwestern willow flycatcher at 12 locations. Those nearest the LEAPS Project area are in the vicinity of Canyon Lake, about 3 miles northeast of Lake Elsinore, and at Temescal Wash/Alberhill Creek, about 2 miles north of Lake Elsinore.

FWS completed a recovery plan for this species in 2002 (FWS, 2002) and designated critical habitat in October 2005 (70 FR 201). Critical habitat nearest the LEAPS Project area is located in San Diego County about 5 miles southeast of the proposed substation (70 FR 201). The Multi-Species HCP addresses protection of this species in Riverside County.

The southwestern willow flycatcher nests in riparian woodlands where surface water is present throughout the breeding season, including areas dominated by dense stands of willows, cottonwoods or alders,. Suitable habitat occurs mainly along low-gradient streams with wide floodplains, but some nesting also occurs in steeper, more confined stream corridors.

Least Bell's Vireo (Endangered)—The least Bell's vireo was once a common breeding species in California. It winters in Mexico, returning to California in late March or early April, and departs by the end of September (Zeiner et al., 1990). Its historical breeding range extended from Tehama County southward into Baja and eastward into the Owens Valley, Death Valley, and the Mohave River. Currently, the highest concentrations of this species occur in San Diego County. In the study area, this species is found in the vicinity of Lake Elsinore and Temescal Wash, just north of the lake.

FWS designated critical habitat for the least Bell's vireo in 1994, including a unit along the Riverside/San Bernardino County border, well to the north of the LEAPS Project area (59 FR 22), and completed a draft recovery plan for this species in 1998 (FWS, 1998). The Multi-Species HCP protects habitat for this species in Riverside County.

Breeding pairs are associated primarily with dense riparian vegetation, including southern willow scrub, sycamore alluvial woodland, and coast live oak riparian forest. This species forages primarily in willow-dominated riparian areas, but may also forage in chaparral.

Bald Eagle (Threatened)—In the western United States, the range of the bald eagle extends from Alaska to Baja, California. Bald eagles that breed in California usually are present year-round. The number of eagles increases at several locations during the winter, with an influx of migrants from farther north. The number of occupied territories in California increased from about 25 in 1977 to more than 150 in 1999. This upward trend is consistent with increases in bald eagle populations throughout the United States. In 1999, FWS proposed to remove the bald eagle from the list of threatened and endangered species.

The Multi-Species HCP considers the bald eagle to be primarily a migrant and wintering species in western Riverside County, although two nest territories have been documented in the county. One of these is located at Lake Skinner, about 15 miles southeast of Lake Elsinore. The co-applicants indicate this nest has not been active since 1999. A pair of eagles nesting at Lake Hemet, about 40 miles east of Lake Elsinore on the San Bernardino National Forest, has been resident since 1994, and fledged two young in 2003 (USFS, 2005b). The USFS has conducted annual bald eagle counts at Big Bear Lake on the San Bernardino National Forest from December through March since 1978. In the 27-year period, the average number of observations each winter has ranged from a low of 4 to a high of 18.

For nesting, bald eagles select large trees on the shorelines of lakes, reservoirs and large rivers, where prey is abundant. Perch sites are also located in large trees that provide a clear view of the water. Fish is usually the mainstay of the bald eagle diet, but eagles are opportunistic in their foraging habits, and also take small mammals, waterfowl and gulls, carrion, and refuse.

The Multi-Species HCP mentions records from Lake Elsinore, indicating that bald eagles bred there at one time. The co-applicants state that eagles have been observed to forage in Lake Elsinore during the winter, but suggests that prey is more abundant in other lakes in the vicinity (e.g., Lake Skinner, Lake Mathews), and eagles are more likely to forage at those sites. For this reason, the co-applicants did not conduct bald eagle surveys at Lake Elsinore. In its comments on the draft EIS, the city of Lake Elsinore stated that bald eagles often use Lake Elsinore during the winter, where they prey on migratory ducks, geese and grebes.

Coastal California Gnatcatcher (Threatened)—The historical range of the coastal California gnatcatcher extended from southern Ventura County southward into Baja California. The coastal California gnatcatcher occupies generally the same range under current conditions, but it is no longer considered common. Approximately 10 percent of the known population occurs in Riverside County.

FWS proposed designation of critical habitat in 2003 (68 FR 79). In the LEAPS Project vicinity, proposed critical habitat is located along the north side of Interstate 15 from Murrietta to El Cerrito, and in some areas (including Temescal Wash), encompasses lands along the south side of the interstate, as well. FWS is continuing to analyze the economic effects of this designation. Protection for populations in Riverside County is addressed in the Multi-Species HCP.

The coastal California gnatcatcher is strongly associated with low-elevation (i.e., sea level to 1,000 feet) sage scrub habitat, including Riversidean sage scrub. These habitats are composed of low-growing, dry-season deciduous and succulent plants. This species also uses chaparral, grassland, and riparian habitats if they are adjacent to sage scrub.

Suitable habitat in the study area (Riversidean or Diegan sage scrub) is located in three areas along the northern segment of the staff alternative transmission alignment and along the alternative penstock routes.

Stephens' Kangaroo Rat (Endangered)—The Stephens' kangaroo rat is restricted to Riverside County and north-central San Diego County. The Multi-Species HCP identifies 14 key populations in Riverside County, and indicates the species has a patchy distribution throughout suitable habitat. The Lake Mathews-Estelle Mountain population is the nearest to the LEAPS Project area.

FWS listed the Stephens' kangaroo rat as endangered in 1988 and prepared a draft recovery plan in 1997 (FWS, 1997). FWS announced in 2004 that it would conduct a status review of this species (69 FR 77), in response to a petition to delist it. The Multi-Species HCP addresses protection of Stephens' kangaroo rat in Riverside County.

Stephens' kangaroo rat is found primarily in open grasslands or sparse shrublands in relatively flat or gently sloped settings, with sandy or sandy loam soils. It feeds almost exclusively on the seeds of filaree, an introduced forb, and annual bromes.

3.3.5.2 Environmental Consequences

Listed Aquatic Species

In San Mateo Creek, only the lowermost 6 to 7 stream miles are reported to be accessible to listed southern steelhead trout in the main stem and tributaries. The cliffs of Tenaja Falls on the main stem of the San Mateo present an impassible barrier to the upstream extent of historical and potential steelhead migration. Similarly, lower reaches in the creek are available to anadromous steelhead only when significant precipitation events make these areas accessible to steelhead for spawning. Water quality in tributaries to San Mateo Creek could be affected during construction of project transmission lines that cross these tributaries.

Effects of Construction on Southern California Steelhead

Co-applicants' Proposal—Construction of the proposed Morrell Canyon upper reservoir would occur outside of the San Mateo Watershed, where listed steelhead have been reported.

The co-applicants propose to develop and implement a water quality monitoring plan in consultation with the USFS, the State Water Board, and San Diego Water Board for the purpose of assessing project-related effects on both the San Mateo and San Juan Creek watersheds.

The co-applicants propose to locate transmission line towers outside of sensitive areas, including streams. They propose to establish setbacks from streams and implement BMPs including, but not limited to, those road, building site, and watershed BMPs identified in USFS' *Water Quality Management for Forest System Lands in California—Best Management Practices* (USFS, 2000).

Effects Analysis

Construction of the proposed Morrell Canyon upper reservoir would not occur in the San Mateo Creek Watershed and would not affect steelhead or steelhead habitat in San Mateo Creek.

In San Mateo Creek, only the lowermost 6 to 7 stream miles are reported to be accessible to listed southern California steelhead trout in the main stem and tributaries. As noted above, the cliffs of Tenaja Falls on the main stem of the San Mateo present an impassible barrier to the upstream extent of historical and potential steelhead migration. Similarly, lower reaches in the creek are available to anadromous steelhead only when significant precipitation events make these areas accessible to steelhead for spawning.

The southern segment of the proposed transmission alignment would cross San Mateo Creek and its tributaries at 12 locations, although no construction activities are proposed in or in proximity to any of those stream channels. Steelhead have not been reported in those tributaries that would be crossed by the proposed transmission alignment. Development of measures to control construction erosion and transport of sediments to San Mateo Creek would serve to avoid downstream transport of sediment that could negatively affect steelhead spawning or rearing habitat.

Implementation of BMPs as proposed would limit the potential for construction activities to result in sediment discharge to the San Mateo Creek Watershed and reduce the potential for effects on steelhead or steelhead habitat in San Mateo Creek.

Development of the proposed water quality monitoring plan could help to identify project-related effects on water quality that might affect steelhead in San Mateo Creek. Subsequent actions to address effects would reduce such effects on steelhead as well as resident fish.

Staff Alternative—Construction of the Decker Canyon reservoir would not occur in the San Mateo Creek Watershed and would not affect steelhead or steelhead habitat in San Mateo Creek.

The staff alternative transmission alignment would cross San Mateo Creek and its tributaries at 12 locations, although no construction activities are proposed in or in proximity to any of those stream channels. Steelhead have not been reported in those tributaries that would be crossed by the proposed transmission alignment. Development of measures to control construction erosion and transport of sediments to San Mateo Creek would serve to avoid downstream transport of sediment that could negatively affect steelhead spawning or rearing habitat.

Optional Ortega Oaks and Evergreen Powerhouses—Construction of the Ortega and Evergreen powerhouses would not occur in the San Mateo Creek Watershed and would have no effect on steelhead or steelhead habitat in San Mateo Creek.

Effects of Operation on Southern California Steelhead

Operation of the LEAPS Project would not affect steelhead or steelhead habitat in San Mateo Creek.

Listed Plant Species

The co-applicants' biological resource consultant, MBA, conducted surveys for rare plants annually from 2001 through 2005. Surveys were conducted by qualified scientists using California Native Plant Society guidelines. No listed plants were found during any of the surveys, with the exception of a re-location of a known occurrence of Munz's onion.

The surveys covered suitable habitat at the two potential sites for the upper reservoir, the three potential sites for the powerhouse and their associated penstock routes, at the substation sites, and within 600 feet of the centerline of the proposed transmission alignment and transmission alignment variation 1 that were analyzed in the draft EIS. As explained in section 3.3, *Terrestrial Resources*, some areas that could be affected by the project were not surveyed because MBA considered them inaccessible due to rugged terrain, impenetrable shrub, or private ownership. Portions of the proposed alignment and the staff alternative transmission line route considered in this final EIS that do not coincide with the original route and its alternatives were not surveyed because they have only recently been developed by the USFS and Commission staff. No surveys have been conducted at the southern substation site that is currently included in both the co-applicants' proposal and the staff alternative.

Surveys were not conducted along access roads, because no road alignments have been identified, as yet. As described earlier, helicopters would be used to construct most of the transmission line alignment, to avoid adverse effects on steep slopes (e.g., over 15 percent). About 10.8 miles (about 15.7 acres) of temporary access roads would be needed to construct the proposed transmission alignment. About 9.3 miles of road (13.5 acres) would be associated with the staff alternative transmission alignment. The roads would be obliterated and revegetated following construction.

Surveys may have covered the route that would be taken by the proposed underground segments of the transmission alignment and the permanent maintenance road that would follow alongside it. These routes would be similar under either alternative, but the road associated with the proposed underground segment would be 5.2 miles long (9.5 acres), while the road associated with the underground segment of the staff alternative transmission alignment would be 4.1 miles long (7.5 acres).

Section 3.3, *Terrestrial Resources*, describes several protection, mitigation, and enhancement measures that are proposed by the co-applicants or recommended by the agencies and are intended to prevent or minimize the risk of adverse effects on special status plants. Those measures also apply to the federally listed plants identified below.

Effects of Construction on Munz's Onion

Co-applicants' Proposal—Munz's onion has a very narrow geographic distribution, occurring only in southwestern Riverside County. For the most part, it is restricted to just a few clay and cobbly clay soil types. It is known from several sites in and near the project area, including Estelle Mountain (Subareas 1 and 2), the Temescal Valley (Subareas 2 and 11), Alberhill (Subareas 2, 3, and 11), and Elsinore Peak (Subarea 5), where it grows in grasslands or grassy openings in coastal sage scrub, chaparral, or coast live oak woodland. No Munz's onion was observed during MBA's fieldwork.

Effects Analysis

The northern segment of the proposed transmission line alignment would pass through areas that may support Munz's onion where it would cross the Temescal Valley and terminate at Estelle Mountain. About 13 towers would be needed to span the distance across Temescal Wash and up to the Estelle Mountain substation, and a total of about 3.25 acres would be disturbed.[51] An additional 35 acres would be disturbed for construction of the substation. Site-specific surveys could be used to locate towers so that known populations of Munz's onion could be avoided, new populations, if present, could be identified, and minimal amounts of suitable habitat would be disturbed. The same survey approach could be implemented to identify occurrences along access roads, if any are constructed in potential habitat for this species. Performance of site-specific surveys would be consistent with requirements of the Multi-Species HCP regarding narrow endemic plant species.

The central segment of the proposed transmission alignment where it roughly parallels the South Main Divide Road in the vicinity of Decker Canyon would cross through an area mapped as Las Posas gravelly loam, a soil type that supports Munz's onion (70 FR 108). The road traverses a little over 1 mile of this soil type, and construction of transmission towers, overhead-underground transition stations, underground line, or access roads in this soil type could affect Munz's onion, if present. Some of the soil unit was included in MBA's surveys, but additional surveys would be needed to provide complete coverage.

The southern segment of the proposed transmission line would pass near (i.e., within about 250 feet) the eastern boundary of recently designated critical habitat for this species just east of Elsinore Peak (70 FR 108). FWS concluded that no known populations of Munz's onion occur within the proposed transmission alignment in the vicinity of the designated critical habitat, that the alignment would cross soils mapped as Cieneba-rock outcrop complex, and that Munz's onion does not occur on this soil type (70 FR 108).

In addition to removing habitat, construction activity often functions as a vector for the introduction of non-native species and noxious weeds that could reduce habitat quality for Munz's onion. Construction activity can cause secondary effects on habitat, also, such as soil compaction, trampling of vegetation, increased dust, and litter in areas adjacent to construction sites. BMPs could be implemented to minimize these effects during the construction period. The co-applicants' proposal to employ a construction monitor to coordinate with project engineers regarding mapping, flagging, and fencing of sensitive areas would help to minimize the risk of accidental habitat damage due to construction vehicles and personnel operating outside approved areas.

As described in section 3.3.1.2, *Effects of Construction Related to On- and Off-Site Borrow*, one dam design would require importing clay from the Pacific Clay Company pits at Alberhill. We assume areas supporting Munz's onion would be protected, because the Alberhill population of Munz's onion is located within the Multi-Species HCP Criteria Area (Riverside County, 2003).

Staff Alternative—Construction at the Decker Canyon site would not affect designated critical habitat for Munz's onion. Soils at the Decker Canyon upper reservoir site are not known to support Munz's onion; however, as mentioned above, the existing South Main Divide Road in this vicinity passes through soils mapped as Las Posas gravelly loam, which supports a few occurrences of this species. Construction along the existing road and access to the Decker Canyon upper reservoir site from the

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[51] The co-applicants estimate that the area occupied by each tower would be about 2,500 square feet, and that the area maintained to meet firebreak clearance requirements would extend the footprint to about 4,900 square feet. For planning purposes, however, the co-applicants assume each tower would affect about 0.25 acre.

existing road would pass through this same soil unit. Focused surveys could be used to identify existing populations, when the road is designed.

Construction of the staff alternative transmission alignment would not affect designated critical habitat. Effects of constructing the northern segment of the staff alternative transmission alignment and northern substation would be the same as those described under the proposed alternative.

Construction of the central portion of the staff alternative alignment would not affect designated critical habitat, but would pass through soils mapped as Las Posas gravelly loam along the South Main Divide Road. As mentioned above, additional surveys could be conducted to determine whether Munz's onion occurs at sites where overhead-underground transition stations, towers, or access roads would be located, or where the transmission line would be buried.

The southern segment of the staff alternative transmission alignment would swing east of the proposed transmission alignment in the vicinity of Elsinore Peak. This alignment would be well outside designated critical habitat and any known occurrences of Munz's onion.

Optional Ortega Oaks or Evergreen Powerhouse—No suitable habitat for Munz's onion is known to occur at the Ortega Oaks or Evergreen powerhouse site.

Effects of Operation on Munz's Onion

Co-applicants' Proposal—The co-applicants propose to perform transmission line maintenance using helicopters. Transmission line access roads would be permanently closed and revegetated. A permanent maintenance road along the underground segment would be closed to public access. However, as mentioned in section 3.3.4.1, *Terrestrial Resources*, public access on project roads may be difficult to control, and additional site-specific measures (e.g., boulders or pylons to prevent trampling of listed plant populations) may be needed to protect listed species, if present. A monitoring and management plan in conjunction with USFS revised preliminary 4(e) conditions regarding road management could be used to determine whether road closures are effective in minimizing the risk of adverse effects (e.g., increased risk of wildfire, illegal dumping, OHV use with associated trampling and soil compaction, introduction and spread of weeds and invasive non-native plants) on sensitive soils and any listed plants they may support. Implementation of a plan to monitor and manage noxious weeds and invasive exotic plants, as the co-applicants have proposed, could be used to increase the likelihood that if weeds are introduced, they could be quickly eradicated or contained.

During project operation, we anticipate there would be no adverse effects on Munz's onion populations or suitable habitat along the southern segment of the proposed transmission alignment. Any roads that are constructed would closely follow the transmission alignment route and would be located well away from suitable habitat and known populations.

Staff Alternative—The same precautions as described above would be needed to minimize the risk of disturbance at the Decker Canyon site and along any access roads that might be constructed along the northern or central segments of the staff alternative transmission alignment that pass through potential Munz's onion habitat.

During project operation, we anticipate there would be no adverse effects on Munz's onion populations or suitable habitat along the southern segment of the staff alternative transmission alignment. Like the proposed transmission alignment, any access roads would be located well away from suitable habitat and known populations.

Optional Ortega Oaks or Evergreen Powerhouse—No habitat that would support Munz's onion is present at the Ortega Oaks or Evergreen powerhouse site.

Effects of Construction on Slender-horned Spine Flower

Co-applicants' Proposal—Slender-horned spine flower is associated with mature alluvial scrub on sandy soils, where periodic flooding provides overbank deposits (Multi-Species HCP [Riverside County, 2003]). Documented occurrences nearest the LEAPS Project area are in Temescal Wash at Indian Creek and Alberhill, in Subarea 2. The co-applicants' identified an area adjacent to Lee Lake as providing suitable habitat for this species, but did not observe any slender-horned spine flower.

Effects Analysis

The northern segment of the proposed transmission alignment would cross Indian Canyon Creek and Temescal Wash and would pass through areas of mature alluvial sage scrub. Siting transmission towers in alluvial sage scrub may be unavoidable, although this habitat is interspersed with other cover types, and a total of about 13 towers would affect an estimated 3.25 acres. Surveys would be needed at each tower sited in this habitat type to ensure no effects on this species. Although helicopters would be used to construct most of the transmission line, roads may be constructed in areas like Temescal Wash, where topography allows. Grading plans would need to take suitable habitat into account, as well to ensure that construction of towers does not interfere with flood processes that help to maintain suitable habitat for this listed species. The same measures would be needed for designing and constructing access roads, if any are built in this vicinity.

Staff Alternative—No suitable habitat for slender-horned spine flower is present at the Decker Canyon reservoir site.

The northern segment of the staff alternative transmission alignment follows the same route as the proposed alignment. Potential effects would be the same, and the same precautions would be needed to protect this species.

The central and southern segments of the staff alternative transmission alignment would not be located in or affect suitable habitat for the slender-horned spine flower.

Optional Ortega Oaks or Evergreen Powerhouse—No suitable habitat for slender-horned spine flower is present at the Ortega Oaks or Evergreen powerhouse site.

Effects of Operation on the Slender-Horned Spine Flower

Co-applicants' Proposal—If roads are constructed to provide maintenance access, a road management program would help minimize, but would not eliminate, the risk of adverse effects (e.g., increased risk of wildfire, illegal dumping, OHV use, introduction and spread of noxious weeds and invasive exotic plants) on sensitive soils and any listed plants they may support. Implementation of a plan to monitor and manage noxious weeds and invasive exotic plants, as described above, would also be needed to allow for rapid detection and control of weeds.

Staff Alternative—No habitat is present at the Decker Canyon reservoir site. Potential effects along the staff alternative transmission alignment would be the same as those described for the proposed alignment.

Optional Ortega Oaks or Evergreen Powerhouse—No suitable habitat for slender-horned spine flower is present at the Ortega Oaks or Evergreen powerhouse site.

Effects of Construction on San Diego Ambrosia, California Orcutt Grass, Thread-leaved Brodiaea, and San Jacinto Valley Crownscale

Co-applicants' Proposal—Several of the federally listed plant species that may occur in the project area are found primarily in vernal pool habitats but also are known to grow in clay soils in alkali floodplains. These include San Diego ambrosia, California Orcutt grass, thread-leaved brodiaea, and San Jacinto Valley crownscale.

Both the northern and southern segments of the proposed transmission alignment would pass through the Western Riverside County Vernal Pool Region, which extends into northern San Diego County (Keeler-Wolf et al., 1998). Regional mapping was based on several factors, including underlying geology and soils. It indicates the potential occurrence of vernal pools and shows known locations of vernal pool species and communities, but it was not intended to provide precise planning-level data.

Soils mapping conducted for the Multi-Species HCP shows that clay soils underlie alkali floodplains along Temescal Wash in the vicinity of Alberhill. These areas currently support non-native grasslands and alluvial sage scrub plant communities.

As discussed in section 3.3.5.1, above, the co-applicants' consultant did not observe any listed vernal pool-associated or alkali floodplain-associated plant species during field surveys. The co-applicants did not map any vernal pools as part of their vegetation studies, but they did note the presence of one vernal pool near the study area in Subarea 8. This site is located about 600 feet west of the proposed transmission alignment, about 1 mile south of the Riverside/San Diego County line.

The Multi-Species HCP cites one 1969 record of California Orcutt grass that may be from Tenaja Canyon, and interactive mapping associated with the Multi-Species HCP (Scott Laboratory, 2001) shows a 1990 record that appears to be near Alberhill. San Diego ambrosia has been documented at two sites along the floodplain of Alberhill Creek. San Jacinto Valley crownscale has also been documented to occur at Alberhill Creek. All of these occurrences are located in Subarea 2 or in the adjacent Subareas 3 and 11.

Thread-leaved brodiaea occurs on floodplain substrates in mixed grasslands and alluvial sage scrub plant communities on clay or alkaline soils, as well as in vernal pools. FWS has proposed critical habitat for this species at Miller Mountain, within approximately 0.5 mile of the southern segment of the transmission alignment route and has proposed essential habitat along Tenaja Road, approximately 2 miles east of the proposed transmission alignment route (69 FR 235). These locations are in or near Subarea 7.

Effects Analysis

The northern segment of the proposed transmission alignment would cross Temescal Wash about 3 miles northwest of Alberhill and would cross four other tributary drainages. No clay or saline-alkali soils were mapped in this vicinity for the Multi-Species HCP, but the co-applicants mapped non-native grasslands and coastal sage scrub along approximately 2 miles of the proposed transmission line route in this vicinity. If soils and hydrology are suitable, it is possible that these areas support the same listed species (California Orcutt grass, San Diego ambrosia, and San Jacinto Valley crownscale) that are known from sites near Alberhill. No critical habitat would be affected along this segment of the transmission line alignment. Installation of 13 transmission towers could affect about 3.25 acres of potential habitat.

No suitable habitat for California Orcutt grass, San Diego ambrosia, San Jacinto crownscale or thread-leaved brodiaea are present along the central segment of the proposed transmission alignment.

The southern segment of the proposed transmission line alignment would cross Tenaja Creek. Based on documented occurrences of thread-leaved brodiaea in habitats upstream and downstream of the crossing, it is possible that thread-leaved brodiaea could also occur at the crossing. No critical habitat would be affected along this segment of the transmission line route. Installation of one transmission tower could affect approximately 0.25 acre of potential habitat.

The co-applicants propose to place transmission line towers outside wetlands and riparian habitats, and they do not plan to clear vegetation beneath the line. As plans for the project are developed, the co-applicants propose to delineate any wetlands that may be affected by construction. Once a route is selected, wetland delineations should provide an adequate base of information to allow siting of transmission towers outside any vernal pools that may be present along the route. Grading plans would also need to take vernal pools into account to ensure that construction does not interfere with hydrologic support. The same measures would be needed for designing and constructing access roads.

Siting transmission towers in floodplain habitats at Temescal Wash and Tenaja Canyon may be unavoidable. Focused surveys at sites where transmission towers are proposed would be needed to evaluate potential effects on listed plants.

Staff Alternative—No habitat is present at the Decker Canyon reservoir site that would support California Orcutt grass, San Diego ambrosia, San Jacinto Valley crownscale, or thread-leaved brodiaea.

The northernmost segment of the staff alternative transmission alignment follows the same route as the proposed alignment in the vicinity of Temescal Wash, and potential effects would be the same as those described above. The same planning efforts as described above would also be needed to ensure no adverse effects to these listed species.

No habitat is present along the central portion of the staff alternative transmission alignment that would support California Orcutt grass, San Diego ambrosia, San Jacinto Valley crownscale, or thread-leaved brodiaea.

Like the southern segment of the proposed transmission alignment, the southern segment of the staff alternative transmission alignment would pass through the Western Riverside County Vernal Pool Region and would cross Tenaja Creek. The effects of constructing this segment of the staff alternative transmission alignment would be the same as those described for the proposed transmission alignment.

Optional Ortega Oaks or Evergreen Powerhouse—No habitat is present at the Ortega Oaks or Evergreen powerhouse site that would support California Orcutt grass, San Diego ambrosia, San Jacinto Valley crownscale, or thread-leaved brodiaea.

Effects of Operation on San Diego Ambrosia, California Orcutt Grass, Thread-leaved Brodiaea, and San Jacinto Valley Crownscale

Co-applicants' Proposal—If roads are constructed to provide maintenance access, a road management program would help to minimize the risk of adverse effects on vernal pools and floodplains, and any listed plants they may support. However, public access on project roads would be difficult to monitor and control, and additional site-specific measures (e.g., boulders or pylons to prevent trampling of listed plant populations) might be needed to protect listed species, if present. Also, public access would increase the risk of fire and the introduction and spread of weeds.

Staff Alternative—No habitat is present at the Decker Canyon reservoir site or the Ortega Oaks powerhouse site that would support California Orcutt grass, San Diego ambrosia, San Jacinto Valley crownscale, or thread-leaved brodiaea.

The potential effects would be the same for the staff transmission alignment as for the proposed transmission alignment, i.e., there would be a risk of disturbance along access roads in the vicinity of Temescal Wash and Tenaja Canyon.

Optional Ortega Oaks or Evergreen Powerhouse—No habitat is present at the Ortega Oaks or Evergreen powerhouse site that would support California Orcutt grass, San Diego ambrosia, San Jacinto Valley crownscale, or thread-leaved brodiaea.

Listed Wildlife Species

The co-applicants' biological resource consultant, MBA, conducted a number of surveys for listed wildlife species in the LEAPS Project area (table 16). MBA concluded that no surveys were necessary for the bald eagle because of their infrequent occurrence in the project area. Rather than conducting surveys for Stephens' kangaroo rat, MBA assumed presence within the Stephens' Kangaroo Rat Fee Assessment Area. No listed species were found during any of the surveys (MBA, 2004, 2005).

Table 16. Number of field visits conducted during FWS protocol surveys for listed species, by year, in the LEAPS Project area. (Source: MBA, 2004, 2003).

FWS Protocol Surveys	2001	2002	2003	2004	2005
Quino checkerspot butterfly	0	0	8	6	6
Arroyo toad	6	0	0	6	6
California red-legged frog	4	0	4	4	0
Southwestern flycatcher	5	5	5	5	8
Least Bell's vireo	8	8	8	8	8
California gnatcatcher	8	6	8	6	6

Surveys were conducted by qualified biologists using FWS protocols to cover suitable habitat that could be affected by construction at either of the upper reservoir sites, the potential powerhouse sites and associated penstocks, and within 600 feet of the centerline of the proposed transmission line route and northern substation presented in the draft EIS. Surveys were also conducted in suitable habitat for each species along the alternative transmission line route presented in the draft EIS. Surveys were not conducted in areas where the co-applicants' proposed alignment or staff alternative transmission alignment differ from the original alternatives, or at the southern substation that is currently included in both the co-applicants' proposal and the staff. Surveys were not conducted along access roads, because no road alignments have been identified, as yet. Some areas that could be affected by the project were not surveyed because MBA considered them inaccessible due to rugged terrain, impenetrable shrub, or private ownership.

Section 3.3, *Terrestrial Resources*, describes several protection, mitigation and enhancement measures proposed by the co-applicants or specified or recommended by the agencies, that are intended to prevent or minimize the risk of adverse effects on special status animals (e.g., USFS 4(e) conditions no. 29 and 30, and Interior 10(a) recommendation no. 2). Those measures also apply to the federally listed animals discussed in this section.

One measure—Interior 10(a) recommendation no. 3—applies specifically to federally listed fish and wildlife. Interior 10(a) recommendation no. 3 requests that the Commission retain an ESA reopener provision and other appropriate reservations of authority to reinitiate Section 7 consultation, if needed. This recommendation is outside the scope of environmental analysis because it pertains to a legal matter. This recommendation would be addressed in any license order the Commission may issue for the LEAPS Project.

Effects of Construction on Quino Checkerspot Butterfly

Co-applicants' Proposal—Potential habitat for Quino checkerspot butterfly in the project area occurs along the northern segment of the proposed transmission alignment between Temescal Wash and Estelle Mountain, and the transmission line would extend about 1.5 miles into designated critical habitat at Estelle Mountain. The co-applicants conducted surveys for Quino checkerspot butterfly in suitable habitat, but they did not observe this species (MBA, 2004).

Effects Analysis

Approximately 35 acres of designated critical habitat would be removed for construction of the proposed substation northeast of Lee Lake. About 1.75 acres of designated critical habitat would be removed for construction of 7 transmission towers in this vicinity. About 0.75 acre of potential habitat outside the designated critical habitat would be removed for construction of three additional towers.

Staff Alternative—Effects along the northern segment of the staff alternative transmission alignment would be the same as those described for the proposed alignment.

Optional Ortega Oaks or Evergreen Powerhouse—No suitable habitat for Quino checkerspot butterfly occurs at the Ortega Oaks or Evergreen powerhouse site.

Effects of Operation on Quino Checkerspot Butterfly

Co-applicants' Proposal—With the exception of the indirect effects of roads that may be constructed to provide access to the transmission line for maintenance, no operational effects would be expected because no additional habitat would be removed or altered. As discussed above, public access of roads is often difficult to control. Adverse effects associated with public access include OHV use that could cause trampling and soil compaction; increased dust that could smother plants that butterflies rely on; increased risk of wildfire; illegal dumping; and introduction and spread of noxious weeds and invasive exotic plants. The combination of management plans to address public access and weeds would reduce, but not eliminate, the risk of adverse indirect effects resulting from public access into and across designated critical habitat or nearby suitable habitat.

Staff Alternative—No operational effects would be expected at the Decker Canyon site because no potential habitat for the Quino checkerspot butterfly exists in these areas. Operational effects along the northern segment of the staff alternative transmission alignment would be the same as those described above for the proposed alignment, except that the length of temporary access roads would be 9.3 miles, rather than 10.8 miles.

Optional Ortega Oaks or Evergreen Powerhouse—No operational effects would be expected because no potential habitat for the Quino checkerspot butterfly exists at the Ortega Oaks or Evergreen powerhouse site.

Effects of Construction on Arroyo Toad and California Red-legged Frog

Co-Applicants' Proposal—The co-applicants' consultant, MBA, identified potential habitat for the arroyo toad and the California red-legged frog at one location on the northern segment of the proposed transmission alignment (Temescal Wash) and at two locations along the southern segment (Los Alamos Canyon and Tenaja Creek), where the transmission alignment would cross streams and associated riparian habitat. MBA conducted surveys for the arroyo toad and California red-legged frog at each of these sites but did not observe any evidence of either species (MBA, 2004).

In April 2005, FWS revised the boundaries of designated critical habitat for the arroyo toad (70 FR 70). No critical habitat is now designated within the San Juan Creek or San Mateo Creek drainages in Riverside or Orange County.

In April 2006, FWS revised the boundaries of designated critical habitat for the California red-legged frog (71 FR 71). No critical habitat is now designated within Riverside, San Diego, or Orange counties.

Effects Analysis

The co-applicants propose to place the transmission line towers outside riparian habitat, and do not propose to clear vegetation beneath the line. This approach would minimize adverse effects on potential habitat for the arroyo toad and California red-legged frog at Temescal Wash, Los Alamos Canyon, and Tenaja Creek; however essential habitat for the arroyo toad is considered to include uplands within 1,640 feet of riparian habitat (70 FR 70).

The distance between transmission towers depends on a variety of factors (e.g., topography, soils, waterways, changes in direction, existing roads and buildings), and may vary from 1,000 to greater than 1,700 feet. Our preliminary estimate indicates that two towers could be placed within 1,640 feet of riparian habitat at Temescal Wash—one at Los Alamos Canyon, and one at Tenaja Creek—which would affect a total of 1 acre of potential habitat.

California red-legged frogs are known to use upland habitats, also, but essential upland habitat is considered to occur within a narrower band (i.e., 300 feet) along each side of a suitable stream or wetland (69 FR 71). It is assumed (but not guaranteed) that potential effects on habitat for the California red-legged frog could be avoided through proper siting of the transmission towers.

Temporary road construction could adversely affect the San Mateo Creek watershed due to erosion and sedimentation. A total of 10.8 miles of temporary access roads would be needed for construction, but helicopters would be used to access areas where slopes are steeper than 15 percent. Use of existing roads or helicopters to construct transmission line crossings at tributaries to San Mateo Creek (e.g., Los Alamos Creek) would minimize these effects.

The co-applicants did not conduct surveys for the arroyo toad or California red-legged frog at the proposed site of the upper reservoir, because it does not provide suitable habitat for either species. However, Morrell Canyon is located in the headwaters of San Juan Creek, which provides essential habitat for the arroyo toad and supports essential populations of this species in its lower reaches and tributaries. Maintaining the existing hydrology in San Juan Creek would be an important conservation measure for this species. Implementation of the co-applicants' proposed erosion and sediment control plan would also be protective of aquatic habitats downstream that might support arroyo toads.

Staff Alternative—Riparian habitat at the Decker Canyon site is similar to that at the proposed Morrell Canyon site, but it occurs in narrower bands along the tributary drainages and does not include seeps or springs. No suitable breeding or dispersal habitat for the arroyo toad or California red-legged frog is present at the Decker Canyon site.

Like Morrell Canyon, Decker Canyon is located in the headwaters of San Juan Creek. Collection and conveyance of flows under the reservoir and return of these flows to the stream would be important in maintaining hydrologic support for arroyo toad habitat lower in the watershed.

Effects of the staff alternative transmission alignment would be the same as those for the proposed alignment, except that temporary roads would total about 9.3 miles, rather than 10.8 miles. Again, use of helicopters or existing roads to gain construction access would minimize the risk of erosion and sedimentation.

Optional Ortega Oaks or Evergreen Powerhouse—No suitable habitat for the arroyo toad or California red-legged frog is present at the Ortega Oaks or Evergreen powerhouse site.

Effects of Operation on Arroyo Toad and California Red-legged Frog

Co-applicants' Proposal—Use of helicopters or existing roads to perform maintenance of the transmission line at stream crossings that could provide suitable habitat for arroyo toad or California red-legged frog would minimize the risk of erosion and sedimentation, and would reduce the risks associated with unauthorized public use. Implementation of Interior's recommendation to monitor unplanned releases from the upper reservoir and FS revised preliminary 4(e) condition no. 35 (Surface Water Management) would be useful in identifying whether project operations cause any changes in hydrology that would in turn cause changes in arroyo toad habitat downstream.

Staff Alternative—No habitat would be removed or altered, and there would be no effects at the Decker Canyon reservoir site.

Potential effects associated with the staff alternative transmission alignment would be the same as those described above for the proposed alignment.

Optional Ortega Oaks or Evergreen Powerhouse—No habitat would be removed or altered, and there would be no effects at the Ortega Oaks or Evergreen powerhouse site.

Effects of Construction on Southwestern Willow Flycatcher and Least Bell's Vireo

Co-applicants' Proposal—Potential habitat for the southwestern willow flycatcher and least Bell's vireo in the project area is present at one location along the northern transmission line route (in Temescal Wash) and at one location along the southern transmission line route (Tenaja Canyon). MBA conducted surveys for southwestern willow flycatcher and least Bell's vireo at both locations but did not observe either species (MBA, 2004).

As mentioned above, the co-applicants propose to place the transmission line towers outside riparian habitat, and do not plan to clear vegetation beneath the line. Constructing transmission line access roads within riparian habitat could result in removal of some (e.g., 0.5 acre associated with two towers at these crossings) suitable habitat, but no designated critical habitat for either the southwestern willow flycatcher or least Bell's vireo would be affected. Use of helicopters or existing roads to construct the segments of transmission line where it would cross Temescal Wash and Tenaja Canyon would minimize the need to remove any potential habitat.

Staff Alternative—No habitat for these species is present at the Decker Canyon reservoir site.

Effects of the staff alternative transmission alignment would be the same as those described for the co-applicants' proposed alignment.

Optional Ortega Oaks or Evergreen Powerhouse—No habitat is present at the Ortega Oaks or Evergreen powerhouse site.

Effects of Operation on Southwestern Willow Flycatcher and Least Bell's Vireo

Co-applicants' Proposal—No habitat for these species would be affected during project operation, unless temporary access roads are constructed in riparian habitat, and unauthorized public use occurs along these roads. As described above, unauthorized use of access roads would increase the risk of disturbance to habitat and to these bird species, if present.

Staff Alternative—No habitat for these species is present at the Decker Canyon reservoir site. Operational effects along the staff alternative transmission alignment would be the same as those described above for the co-applicants' proposed alignment.

Optional Ortega Oaks or Evergreen Powerhouse—No habitat is present at the Ortega Oaks or Evergreen powerhouse site.

Effects of Construction on Bald Eagle

Co-applicants' Proposal—Because of their strong association with large bodies of water, no potential habitat for bald eagles is present at Morrell Canyon, the Santa Rosa powerhouse site, or the proposed substations. Potential nesting or perching habitat is present only in the vicinity of Lake Elsinore.

In Elsinore Valley MWD and Nevada Hydro (2005), the co-applicants evaluated bald eagle use of Lake Elsinore and the potential effect of noise disturbance along the shoreline during construction of pumping facilities. The co-applicants consulted with CDFG and FWS and reviewed compilations of data based on observations of a local ornithologist between 1973 and 1977 (McCaskie, 1977–1973, as cited in Elsinore Valley MWD and Nevada Hydro, 2004c) and breeding bird surveys conducted between 1966 and 2003 (USGS, 2004, as cited in Elsinore Valley MWD and Nevada Hydro, 2004c).

CDFG and FWS biologists indicated no reports of nesting activity at Lake Elsinore. McCaskie did not record the presence of bald eagles at any time of year. The co-applicants state that the USGS breeding bird survey database includes records of eagles using the lake for winter migration stop-overs and winter foraging.

The co-applicants concluded that bald eagle use of Lake Elsinore is infrequent because of low food availability, and conducted no field surveys for this species. While bald eagles may forage in Lake Elsinore upon occasion, the co-applicants assume they would likely overwinter at Lake Skinner or Lake Mathews, which the co-applicants describe as being more productive. However, the city of Lake Elsinore staff report that they frequently observe bald eagles during the winter, when large numbers of migrant waterfowl are present.

As described in section 3.3, *Terrestrial Resources*, consistent with USFS revised preliminary 4(e) condition no. 35, the co-applicants propose to construct a 32-mile-long transmission line according to APLIC et al. (1996) guidelines to minimize the risk of avian electrocution. Interior 10(a) recommendation no. 1 requests that the co-applicants coordinate with FWS regarding the completion of plans and designs for measures to protect, mitigate damages to, and enhance fish and wildlife resources.

Effects Analysis

There is no suitable habitat for eagles at the Morrell Canyon site. No potential perch or nest trees would be removed for construction of the LEAPS Project at Morrell Canyon or at any other construction site. Construction of the pumping facilities on the west shoreline would not be likely to cause disturbance to bald eagles because they are present so infrequently. The project is not expected to alter fish abundance in Lake Elsinore, or to alter water clarity that could improve sightability of fish prey for bald eagles. The co-applicants do not propose any recreation enhancements that would increase human activity at the lake that could cause disturbance to breeding or wintering eagles, if present.

The proposed transmission alignment would parallel anticipated flight paths along the northwest-to-southeast Elsinore Valley, except where it would cross Temescal Wash. It would not bisect any apparent flight patterns between Lake Elsinore and Lake Skinner and Lake Mathews to the east. Lake Hemet and Bear Lake, where bald eagles winter and breed, are also located to the east. For these reasons, the location of the proposed transmission alignment should pose a minimal risk of collision, and because the co-applicants propose to construct it according to state-of-the-art guidelines, the line should pose a minimal risk of electrocution.

Staff Alternative—No suitable eagle habitat is present at the Decker Canyon reservoir site.

Construction design would be the same for the staff alternative transmission alignment as for the proposed transmission alignment, and we would anticipate a minimal risk of bald eagle electrocution associated with the transmission line. Like the proposed route, this alternative would parallel anticipated eagle flight patterns northwest and southeast along the Elsinore Valley, except where it would cross Temescal Wash.

Optional Ortega Oaks or Evergreen Powerhouse—No habitat is present at the Ortega Oaks or Evergreen powerhouse site.

Effects of Operation on Bald Eagle

Co-applicants' Proposal—No habitat for bald eagles is present at Morrell Canyon, the Santa Rosa powerhouse site, or the proposed substation sites. No large-diameter live trees or snags near Lake Elsinore that could serve as perch or nest trees would be removed and there would be no project-related change in the prey base or recreation use of Lake Elsinore that would be likely to cause disturbance to nesting or wintering birds, if any should begin to use the lake as foraging habitat. As mentioned earlier in this section, bald eagle populations in Riverside County are increasing, reflecting the success of recovery efforts in California and throughout the west. As populations fill high quality habitat, eagles are likely to take advantage of marginal habitats (Jackman and Jenkins, 2004) and it is possible that bald eagle use of Lake Elsinore will increase in the future. If populations do increase, the risk of adverse interactions with project transmission lines would also increase. Implementation of an Avian Protection Plan, using guidelines developed by APLIC and FWS (2005), as discussed in section 3.3, *Terrestrial Resources*, could be an important measure in protecting bald eagles, if their use of Lake Elsinore does increase.

Staff Alternative—No suitable bald eagle habitat exists at the Decker Canyon reservoir site.

No habitat would be removed or altered along the staff alternative transmission alignment route during operation. There would be a small risk of electrocution or collision because of the presence of the transmission line. Regular maintenance of the transmission line would cause short-term, localized effects, if eagles were present.

Optional Ortega Oaks or Evergreen Powerhouse—There is no suitable habitat for the bald eagle at the Ortega Oaks or Evergreen powerhouse site.

Effects of Construction on Coastal California Gnatcatcher

Co-applicants' Proposal—Suitable habitat for the coastal California gnatcatcher in the project area is present in coastal sage scrub along the northern segment of the proposed transmission alignment, just south of the point where the alignment would cross Temescal Wash. Lands on both sides of Interstate 15 in this vicinity are within proposed critical habitat (68 FR 79). Additional suitable habitat (outside the proposed critical habitat) is located at the proposed Santa Rosa powerhouse site and along the penstock route leading down the slope to it.

The co-applicants conducted surveys for coastal California gnatcatcher in suitable habitat in 2004 and 2005, expanding the survey area that was covered in previous years (2001–2003). No coastal California gnatcatchers were observed during any of the surveys (MBA, 2005). The USFS reports it has located gnatcatchers in the vicinity of Temescal Wash several times, and this area is considered occupied habitat (personal communication, K. Winter, Cleveland National Forest Wildlife Biologist, on August 24, 2005). The most recent observations were during each of three survey visits in 2002.

Effects Analysis

No suitable habitat exists at the Morrell Canyon site.

Cover type maps provided by the co-applicants indicate that about 30 acres of coastal sage scrub is present at the proposed Santa Rosa powerhouse site. This habitat, (thought to be unoccupied, based on MBA's surveys) would be removed for construction of the powerhouse, although the powerhouse itself is proposed to be located underground. Small amounts might also be removed for construction of the power tunnels and penstocks, depending on the locations of adits for these project features, which would also be located underground. Trenching to place the underground segment of the transmission line in the vicinity of the powerhouse could also remove small amounts of coastal sage scrub.

Construction of the northern substation would remove about 35 acres of non-native grassland within proposed designated critical habitat. We estimate that 10 transmission line towers are needed to cross areas of coastal sage scrub and non-native grassland in the northern section of the proposed transmission alignment. Construction of these towers could adversely affect about 2.5 acres of habitat that is within proposed designated critical habitat and is documented as occupied by the coastal California gnatcatcher. Four additional towers outside proposed designated critical habitat would affect 1.0 acre of potential habitat. Road construction could remove an additional, unquantified amount of occupied habitat.

Staff Alternative—No suitable habitat is present at the Decker Canyon site.

Effects of constructing the staff alternative transmission alignment would be the same as those that would occur as a result of the proposed alignment.

Optional Ortega Oaks or Evergreen Powerhouse—The Ortega Oaks site contains about 5 acres of coastal sage scrub, which would be removed during construction. Based on MBA's surveys, this habitat is unoccupied. The Evergreen powerhouse site includes about 20 acres of this cover type, which would be removed during construction, if this site is selected. Based on MBA's surveys, this habitat is unoccupied.

Effects of Operation on Coastal California Gnatcatcher

Co-applicants' Proposal—No habitat would be removed or altered after the construction period is complete. Maintenance access, whether by helicopter or road, would cause short-term, localized noise disturbance along the proposed transmission alignment. Adverse effects on coastal California gnatcatcher could be avoided by scheduling maintenance outside the breeding season.

As discussed earlier in this section, helicopters would be employed to build the transmission line wherever steep slopes (e.g., over 15 percent) prevent conventional construction methods. Suitable habitat near Temescal Wash is located in flatter areas, where roads may be used to provide construction access. Although roads would be obliterated and revegetated following the construction period, public access is difficult to control. Public access along roads would increase the risk of OHV use that would cause trampling of vegetation and compaction of soils, introduction of noxious weeds and invasive exotic plants, and noise disturbance resulting from traffic and human activity. Implementation of a road management plan and a noxious weed management plan would reduce, but not eliminate, the risk of adverse effects in occupied habitat.

Staff Alternative—No habitat would be removed or altered, and no disturbance would occur at the Decker Canyon site. Effects along the staff alternative transmission alignment would be the same as those described above for the proposed alignment.

Optional Ortega Oaks or Evergreen Powerhouse—No habitat would be removed or altered during operation at either the Ortega Oaks or Evergreen powerhouse site. Project maintenance could cause noise disturbance; however, MBA's surveys indicate that California coastal gnatcatchers do not occupy the area of either optional powerhouse site.

Effects of Construction on Stephens' Kangaroo Rat

Co-applicants' Proposal—No suitable habitat for the Stephens' kangaroo rat is located at the Morrell Canyon or Santa Rosa sites. Suitable habitat is present in grasslands and areas of sparse shrub cover along the northern segment of the proposed transmission alignment, and at the proposed site of the northern substation. These areas are located within Riverside County's Stephens' Kangaroo Rat Fee

Assessment Area, and the northernmost segments are located inside the Lake Mathews-Estelle Mountain Core Reserve (see figure 15).[52] The co-applicants propose to assume the species is present, rather than to conduct surveys, and to mitigate for potential effects on this species and its habitat by paying $500 per acre (or the current cost as determined by Riverside County) where project features overlap with the fee assessment area.

Effects Analysis

The length of the transmission alignment within the fee assessment boundary measures about 13,000 feet. We estimate that 13 transmission towers would be constructed along this segment of the line, and that 3.25 acres of potential habitat for the Stephens' kangaroo rat would be disturbed. The substation would occupy another 35 acres, so the total area of effect would be approximately 38.25 acres. No additional habitat would be removed if helicopters are used to build the transmission line. Temporary access roads could affect suitable habitat, but their alignment is not known at this time.

The co-applicants' approach to mitigation for effects of removing habitat within the fee assessment area would be consistent with the existing Stephens' Kangaroo Rat HCP and Multi-Species HCP, which uses mitigation fees to acquire and manage large habitat reserves.

Staff Alternative—No suitable habitat for the Stephens' kangaroo rat is present at the Decker Canyon site. Effects of the staff alternative transmission alignment would be the same as those described above for the proposed alignment.

Optional Ortega Oaks or Evergreen Powerhouse—The Ortega Oaks or Evergreen powerhouse site are both outside the fee assessment area and do not contain suitable habitat.

Effects of Operation on Stephens' Kangaroo Rat

Co-applicants' Proposal—No additional habitat would be removed or altered during project operation. Maintenance activities would cause short-term, localized disturbance. If construction access roads are built and are located in suitable habitat for the Stephens' kangaroo rat, public access may be difficult to control, even after roads are obliterated and revegetated. Adverse effects of public access would include OHV traffic that may result in trampling of vegetation and compaction of soils; introduction and spread of noxious weeds and invasive exotic plants; illegal dumping; increased wildfire hazard, and disturbance due to traffic and human activity. Implementation of a road management plan and a noxious weed management plan would help to minimize, but would not eliminate, these risks.

Staff Alternative—No habitat would be removed or altered, and no disturbance would occur at the Decker Canyon reservoir site. No additional habitat would be removed or altered along the staff alternative transmission alignment during project operation. Effects of operation and maintenance would be the same as those described under the co-applicants' proposal.

Optional Ortega Oaks or Evergreen Powerhouse—No habitat would be removed or altered at the Ortega Oaks or Evergreen powerhouse site during project operation, and no disturbance would occur.

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[52] Riverside County developed a single-species habitat conservation plan targeting the Stephens' kangaroo rat in 1996. This plan, the Stephens' Kangaroo Rat HCP, is still in effect, separate from the Multi-Species HCP. As part of the HCP, Riverside County Ordinance 663 requires payment of a mitigation fee for development within the Stephens' Kangaroo Rat HCP area. The amount of the fee may be adjusted up or down by the county Board of Supervisors, depending on the costs of administering the HCP. For this analysis, we have assumed a per-acre fee of $500.

3.3.5.3 Cumulative Effects

Construction of the LEAPS Project would adversely affect designated critical habitat for the Quino checkerspot butterfly, proposed designated critical habitat for the coastal California gnatcatcher, and suitable habitat for the Stephens' kangaroo rat within the boundaries of the Stephens' Kangaroo Rat HCP and Multi-Species HCP Lake Mathews-Estelle Mountain Core Reserve. Below, we discuss the cumulative effects of the project on each species.

Quino Checkerspot Butterfly

FWS listed the Quino checkerspot butterfly as an endangered species in 1997. At one time, the Quino checkerspot butterfly's range included much of coastal southern California and inland valleys south of the Tehachapi Mountains, but populations appear to have been reduced in number and size by more than 95 percent, due to the direct and indirect effects of habitat loss and fragmentation. Other threats include OHV use, grazing, invasion of exotic plants, and changes in fire regime. Other factors, such as predation, increased nitrogen deposition, increased atmospheric carbon dioxide concentrations, and climate change, may also affect this species and its habitat. Currently, the Quino checkerspot butterfly is known to occur only in Riverside and San Diego counties and in Baja California.

The Quino checkerspot butterfly is known from only a few locations within the Multi-Species HCP Plan Area, including Harford Springs County Park. This site is part of a distribution that once included lands south and east of Lake Mathews. The Lake Mathews-Estelle Peak Core Reserve is located partially within the Northwest Riverside Recovery Unit (FWS, 2003) and designated critical habitat Unit 1 (67 FR 72). Construction of the proposed transmission line or staff alternative transmission alignment and northern substation would affect about 36.75 acres of land within designated critical habitat at the Lake Mathews-Estelle Peak Core Reserve, and about 0.75 acre nearby. No other project features would be located in areas where historical populations have been documented, unless temporary access roads are constructed. Roads would also contribute to cumulative effects, by increasing the risk of habitat damage due to OHV use, fire, weed spread, and dust. As described earlier in this section, public access is difficult to prevent, even after roads have been closed and revegetated. The effects of human activity along roads extend beyond the road itself, and add to cumulative impacts of disturbance that would be caused by urban development.

We consider that project effects on the Quino checkerspot butterfly would be significant because so few populations exist, and habitat loss and degradation is ongoing. Loss of small acreages under either alternative would contribute to the cumulative effects of past, present and future actions. However, the co-applicants could contribute to recovery efforts. While the recovery plan emphasizes the importance of preserving existing suitable habitat, it also emphasizes the need to restore habitats that are not currently suitable, by measures such as removing and managing weeds, planting native species, and increasing ground cover using brush and rocks. The recovery plan indicates that one of the criteria for down-listing the Quino checkerspot butterfly to threatened status would be to document or introduce a population within the formerly occupied Lake Mathews site in the Northwest Riverside Recovery Unit.

Coastal California Gnatcatcher

The coastal California gnatcatcher is considered uncommon throughout its range, which extends from southern Ventura County into Baja California. Riverside County supports about 10 percent of the total population. In 1993, FWS estimated the number of breeding pairs in Riverside County at 261, and in 1996, about 300 pairs. It is widely distributed within the Multi-Species HCP Plan Area, including the Lake Mathews-Estelle Mountain Core Reserve and Alberhill area. The highest densities occur in two important patches located along the I-15 corridor. One of these is situated east of I-15 between Lake Mathews and the City of Lake Elsinore.

FWS listed the coastal California gnatcatcher as a threatened species in 1993 because of habitat loss and fragmentation as a result of development (including conversion to agricultural land use) in coastal sage scrub. The Multi-Species HCP describes coastal sage scrub as one of the most depleted habitat types in the U.S. In addition, OHV use, grazing, weed invasion, changes in fire frequency, and air pollution can also adversely affect coastal sage scrub, reducing its quality for the coastal California gnatcatcher.

We consider the project's effects on the coastal California gnatcatcher to be significant because construction of the LEAPS Project would convert about 37.5 acres within proposed designated critical habitat or the Lake Mathews-Estelle Peak Core Reserve to project use, and an additional 1.0 acre nearby.

About 30 acres of potential habitat would be removed at the Santa Rosa powerhouse site. Loss of this 30-acre patch would occur outside proposed designated critical habitat or core reserves, but would contribute to cumulative effects of other past and present actions that have reduced the cover of coastal sage scrub in Riverside County, and future actions that allow development between western shoreline of Lake Elsinore and the Santa Ana Mountains. Construction of roads would also contribute to cumulative effects, by increasing the risk of habitat damage due to OHV use, fire, weed spread, and harassment.

Stephens' Kangaroo Rat

As mentioned in section 3.3.5.1, the Stephens' kangaroo rat is restricted to parts of Riverside County and north-central San Diego County. FWS listed the Stephens' kangaroo rat as an endangered species in 1988 due to its small range and the rapid loss of habitat within that range, as natural landscapes were converted to agricultural uses and urban development. The changes also caused habitat fragmentation, which can lead to genetic isolation in species, such as the Stephens' kangaroo rat, that are relatively sedentary.

In March 2004, FWS announced it would be initiating a status review to determine if delisting is warranted, based on new information submitted in a petition for delisting the species (69 FR 77). The new information included the results of several focused surveys that showed more locations for the species than were previously known, and studies indicating that some types of disturbance may enhance habitat, by maintaining sparse vegetative cover. FWS also found the status review was warranted because the existing Stephens' kangaroo rat HCP and Multi-Species HCP and the North County MSCP (in progress) may adequately protect this species.

The proposed transmission alignment would remove approximately 38.25 acres of potential habitat within the Lake Mathews-Estelle Peak Core Reserve and adjacent fee area, which supports one of the key Stephens' kangaroo rat populations in the Plan Area. Stephens' kangaroo rat may occupy 4,264 acres of the 11,243-acre reserve, and may be present at higher densities than are typical of other locations.

We consider project effects on Stephens' kangaroo rat to be significant because the project would affect a key population of a species that occurs within a very narrow geographic range. Loss of habitat would contribute to cumulative adverse effects caused by other past, present, and future development-related activities in Riverside County. Construction of roads would also contribute to cumulative effects, by increasing the risk of habitat damage due to OHV use, fire, weed spread, and harassment. However, the co-applicants could mitigate for adverse effects by paying into existing mitigation funds, and more directly, by enhancing habitat that is not directly lost to project features through vegetation management, such as planting and management of vegetation preferred by this species.

3.3.5.4 Unavoidable Adverse Effects

No unavoidable adverse effects on listed steelhead would occur from project construction or operation.

The alignment of access roads has not yet been determined. Although access roads would be obliterated and revegetated following construction, public access is difficult to control once a road has been built. Implementation of a road management plan and a noxious weed management plan would avoid, but not completely eliminate the risks of illegal entry because there still might be some OHV activity that could cause trampling of vegetation and compaction of soils; increased dust that could smother vegetation; increased risk of wildfire, and introduction and spread of noxious weeds and invasive exotic plants that have the potential to outcompete native species and reduce wildlife habitat quality. Each of these factors would contribute to adverse cumulative effects on threatened and endangered terrestrial species.

3.3.6 Recreational Resources

3.3.6.1 Affected Environment

Recreational resources associated with this project provide for a spectrum of uses that are important because of their proximity to a large population center and because the project is located at the interface of lands with urban and wildland characteristics. Located in the densely populated area of southern California, Lake Elsinore has extensive residential development around the reservoir; the reported population of this community in 2000 was approximately 35,000 people. This region also supports recreational uses for the nearby population centers of the city of Riverside with a population in 2000 of 255,166 and other communities within the Riverside County with a countywide population in 2003 of almost 1.8 million residents. Recreational use in this region also likely comes from residents of Orange County, which is located to the west of the project and had a population of 2.9 million people in 2003 (U.S. Census Bureau, 2005).

The most important public land for recreational resources in the vicinity of the project is the San Mateo Canyon Wilderness Area. This 39,450-acre wilderness area is located to the south of the proposed Morrell Canyon upper reservoir site and south and east of the southern portion of the proposed transmission alignment. This wilderness is managed by the Cleveland National Forest and there are trails that provide for non-motorized forms of access. No existing or proposed project facilities are located inside of the existing wilderness area. The USFS has received comments during its current forest planning process requesting wilderness designation for an “unnamed canyon” and that portion of Morrell Canyon that is proposed as the upper reservoir site. The special designation does not currently exist for this area. Although the proposed Morrell Canyon site could be selected as the location for the upper reservoir, it appears unlikely that it would qualify for wilderness designation because it may lack qualities such as primeval character and natural conditions.

Management of recreation activities in the Cleveland National Forest is achieved by the incorporation of Recreation Opportunity Spectrum (ROS) into the final Land Management Plan. The ROS is a framework for defining classes of outdoor recreation environments, activities, and experience opportunities within the forest. The opportunities are arranged along a continuum or spectrum divided into classes which define recreation opportunities within various areas of the forest. Table 17 describes the four ROS classes that occur within the northern portion of the Cleveland National Forest near the proposed project.

Table 17. Description of Recreation Opportunity Spectrum classes. (Source: USFS, 2005a, 1990)

ROS Class	Description of Recreation Opportunity Setting
Primitive (P)	Very high probability of solitude and closeness to nature, challenge and risk; essentially unmodified natural environment; minimal evidence of others; few restrictions evident; non-motorized access and travel on trails or cross county; no vegetation alterations; at least 5,000 acres in size; at least 3 miles from the nearest road or trail with motorized use.
Semi-primitive, Non-motorized (SPNM)	High probability of solitude, closeness to nature, challenge, and risk; natural appearing environment; some evidence of other users; subtle restrictions and controls are evident; non-motorized access and travel on trails; vegetative alterations occur but are widely dispersed and not too evident; at least 2,500 acres in size; at least 0.5 mile from all roads, railroads, or trails with motorized use.
Semi-Primitive, Motorized (SPM)	Moderate probability of solitude, and closeness to nature; high degree of challenge and risk using motorized equipment; predominately natural appearing environment; few users but evidence on trails; minimum or subtle on-site controls; vegetative alterations occur but are few; at least 2,500 acres in size; at lease 0.5 mile from all roads, railroads, or trail with motorized use, but may contain roads that are usually closed.
Roaded Natural (RN)	Some probability of solitude; little challenge and risk; mostly natural appearing environment; moderate concentration of users at developed and dispersed campsites; some obvious site restriction sand user controls are present; access is motorized; vegetative alterations completed to maintain desired visual characteristics; no size restrictions.

In addition to San Mateo Canyon Wilderness Area, several other areas of regional recreational importance are within the vicinity of the project. The Ronald W. Caspers Wilderness Park and the Starr Ranch sanctuary are located adjacent to the western border of the Trabuco Ranger District of the Cleveland National Forest. The Ronald W. Caspers Wilderness Park is an 8,000-acre park in the western coastal Santa Ana Mountains located on both sides of Ortega Highway between the confluences of San Juan Creek with Bell Canyon and Hot Springs Creek. Orange County owns and operates the wilderness park. Amenities at this park include day and overnight facilities to accommodate family, group, equestrian, biking, and recreational vehicle uses; there are trails and interpretive facilities and programs. Starr Ranch is a 4,000-acre wilderness preserve that the National Audubon Society owns and operates. Starr Ranch is closed to general public access; however, the National Audubon Society provides programs that the public may participate in, such as volunteer docent-led nature walks, programs for adults and children, and university classes.

The lands associated with this project support recreational activities that include hiking, equestrian use, OHV use, scenic driving, camping, wildlife observation, mountain biking, and hang gliding. Urban areas have fields for team sports, gymnasiums, playgrounds, and parks. The wildland areas consist mainly of the public lands managed by the Cleveland National Forest where recreational facilities have a much lower level of development. Because snowfall is rare, winter recreation sports such as skiing, snowmobiling, and snow play do not occur here. Similarly, the relatively low level of precipitation that occurs in this area of California does not produce sufficiently high flowing river systems that could support whitewater boating activities.

Access is also a component of the recreational resources associated with the project. Ortega Highway is a paved, two-lane, east-west route between San Juan Capistrano and Lake Elsinore. This heavily traveled route is popular for scenic driving as well as commuting, and is eligible for designation as a State Scenic Highway. Another main route of access is Interstate 15, which is located on to the east of the project. Connecting to these main routes of access are paved and unpaved routes that provide access to public lands. South Main Divide Road, a county road, is another important route of access from Ortega Highway that leads to the Morgan Trailhead, which is one of four points of entry for visitors to the San Mateo Canyon Wilderness.

No nearby rivers or watercourses in the vicinity of the project are designated as Wild and Scenic Rivers under the National Wild and Scenic Rivers system. The USFS has received comments during its current forest planning process requesting Wild and Scenic River consideration for San Juan and San Mateo creeks. Although the project potentially could affect both of these watercourses, the special designation does not currently exist, and it is not known whether the USFS planning process will determine these watercourses to be eligible for inclusion in the Wild and Scenic Rivers system.

No nearby trails in the vicinity of the project are designated as National Recreation Trails, and no trails are proposed for inclusion in the current USFS planning process. There is however a trail managed by the California Department of Parks and Recreation as part of the California Trail System—the Whittier to Ortega Trail runs through the Puenta-Chino Hills and the Santa Ana Mountains from Whittier Narrows Regional Park to Ortega Highway, near Lake Elsinore.

Lake Elsinore is an important regional resource for water-based recreation activities. The urban setting has highly developed recreation facilities for boating, day and overnight use, fishing access at parks, RV and tent campgrounds, and resorts. While recreational boating use is significant, Lake Elsinore is not one of the most popular recreational lakes in Southern California. The most important condition affecting recreation use at Lake Elsinore is the reservoir level. The co-applicants report that between 1992 and 1999, the surface elevation of Lake Elsinore fluctuated between 1,229 and 1,259 feet msl, as discussed in greater detail in section 3.3.2, *Water Resources*. According to the California Department of Parks and Recreation's Lake Elsinore State Recreation Area Preliminary General Plan, "Lake Elsinore is not blessed with good water quality." According to the Santa Ana Water Board, at lake levels below 1,240 feet msl the water quality of Lake Elsinore declines significantly and effects recreational use. This poor water quality exists because warm water resulting from lowering lake levels creates excessive algal growth leading to sporadic fish kills. Both the fish kills and abundant algae create unpleasant conditions and potentially unsafe conditions for water contact recreation.

Reservoir levels affect various recreational opportunities. First, warm water resulting from lowering water levels tends to favor fish populations of carp and shad, which anglers do not value highly. Second, the lake level affects the condition of the shoreline, which is an important location for recreational uses. The co-applicants described three areas of the shoreline with public access relative to the effects of existing reservoir levels: (1) Lakeshore Drive and Riverside Drive, (2) Park at end of Chaney Street and (3) Riverside County Park in Lakeland Village. Table 18 shows that the shallow reservoir configuration causes small reservoir fluctuations to noticeably affect the suitability of the shoreline for recreational uses. Another water body of recreational importance in the region is Canyon Lake, located about 10 miles east of Lake Elsinore. This lake is leased to the local property owners for recreational purposes.

Topography near the project and the phenomenon referred to as the Elsinore Convergence provide suitable conditions for hang gliding. Lake Elsinore is known locally, regionally, and internationally for providing high-quality hang gliding and paragliding opportunities. The Elsinore Convergence is the name given to the mixing of the cool, moist ocean air stream from the northwest meeting the warm, dry desert air stream from the southeast. These colliding air streams, or convergence zones, drive air masses up into the atmosphere generally along a defined shear line. Hang glider and paragliding pilots launch into this air space in search of the rising air masses (also known as thermals) that allow pilots to generate ascents of 10,000 to 15,000 feet within minutes of launching.

Table 18. Shoreline locations of recreational value potentially affected by lake-level fluctuations. (Source: Elsinore Valley MWD and Nevada Hydro, 2004a).

Shoreline Location	Change in Surface Elevation (feet amsl)	Resulting Horizontal Shoreline Movement (receding shoreline in feet)
Lakeshore Drive and Riverside Drive	1,240 to 1,242	112 feet
	1,240 to 1,247	415 feet
Park at end of Chaney Street	1,240 to 1,242	21 feet
	1,240 to 1,247	81 feet
Riverside County Park in Lakeland Village	1,240 to 1,242	21 feet
	1,240 to 1,247	95 feet

Note: amsl – average mean sea level

The technique at Elsinore is to launch toward the east off the ridge, travel about 1,000 feet toward Grand Avenue, working the ridge for uplift and if successful, cross back across the ridge line in search of “house” thermals (or predictable thermal locations where typically there is no water, there are dark surfaces, and ridge lines or spines that cause the thermal to break away from the ground) for a continued flight. Pilots are then afforded the choice of flying in the local area and landing at the Ortega Oaks landing zone or flying ”cross country” and landing elsewhere some distance from the launch point. If conditions are not suitable for making it back across the ridge line after launching, a pilot must make preparations for a landing at a suitable site at the bottom of the mountain, typically the Ortega Oaks site; however, depending on where the pilot launched and wind directions, conditions may force the pilot to alternative landing areas such as the school site (Butterfield Elementary School) or other reasonably safe open spaces (personal communication, P. Weslowski, Senior Project Manager, and J. Splenda, Environmental Planner, Louis Berger, Needham, MA, with C. Mackin, Member, Elsinore Hang Gliders Association, Lake Elsinore, CA, on September 6, 2005). Successful launches occur in about 75 percent of attempted launches across all skill levels (personal communication, P. Weslowski, Senior Project Manager, and J. Splenda, Environmental Planner, Louis Berger, Needham, MA, with C. Mackin, Member, Elsinore Hang Gliders Association, Lake Elsinore, CA, on September 6, 2005).

The Elsinore convergence is fairly consistent, reportedly creating suitable conditions for hang gliding about 300 days a year (O’Malley, 2005). In a letter filed March 24, 2005, Elsinore Testing of Experimental Aircraft Mechanisms Inc. estimates the total annual use at 500 users per year, 100 of which are regular and consistent users. Neither the *California Outdoor Recreation Plan* (2002) nor the *Public Opinions and Attitudes on Outdoor Recreation in California* (2002) has published information about statewide demand, opportunities, participation rates, or attitudes toward hang gliding resources in California. Other known hang glider and paraglider launch sites available to pilots residing in the Inland Empire area (although they may not be of comparable experience) and within an hour drive include Cucamonga, Crestline/Marshall, Soboba, and Blossom. Known launch sites farther away in the Los Angles area (60 to 90 miles) include Kagel, Dockweiler Beach, Mt. Wilson, Ave S, Ave L, and Parker and in the San Diego area (60 to 90 miles) include Torrey Pines, Horse Canyon, Mt. Laguna, Big Black, Little Black, and Otay Mesa.

The privately owned land near the Ortega Oaks powerhouse site has been historically used as a landing site for hang gliders and paragliders. Launching potential exists at nine locations along South Main Divide Road in the vicinity of the proposed and alternative upper reservoir sites; however, at two of the sites located near the proposed Morrell Canyon upper reservoir site, the Cleveland National Forest authorizes a local user group to maintain two hang glide and paraglide launch sites under a special use permit. The two sites are known as: (1) Edwards Launch Site and (2) E Launch Site. The E Launch Site is across the South Main Divide Road from the Morgan Trailhead, and the Edwards Launch Site is about 1 mile east of the Morgan Trailhead, also along the South Main Divide Road. Figure 17 shows the approximate location of these sites. Under the terms of the authorization, the permit holder provides a portable restroom, trash removal, traffic control structures, and a bulletin board on which visitor information is posted. The Cleveland National Forest also issues authorizations to use these sites for special events such as hang gliding or paragliding competitions. In addition to providing suitable launch sites, these locations also afford expansive views to the northeast, and users visit these areas to sightsee (personal communication, C. Efird, Recreation Specialist, Louis Berger, Oakhurst, CA, with V. Mink, Recreation Special Uses Manager, Cleveland National Forest, Corona, CA, on July 12, 2005).

Existing Facilities

The existing recreational facilities near the project include facilities that federal, state, county, and local agencies and private commercial recreation providers own, operate, and maintain.

The recreational facilities available in the Cleveland National Forest provide for day and overnight use, hiking, backpacking, mountain biking, wildlife observation, OHV use, and hang gliding. The USFS-operated campgrounds in the vicinity of the project include Blue Jay (55 sites) and Falcon (3 group sites), located west of Ortega Highway on Long Canyon Road; El Cariso North (24 sites), located west of Ortega Highway near South Main Divide Road; Upper San Juan (18 sites), located along Ortega Highway and southwest of Decker Canyon; and Wildomar (12 sites), located east of the area of Rancho Capistrano and south of Elsinore Peak. The Cleveland National Forest also provides 327 miles of trails for non-motorized use and 54 miles of designated routes for OHV use. The Wildomar OHV area, located at the end of South Main Divide Road south of Elsinore Peak, is a 360-acre area designated for OHV use with 8 miles of trails and a nearby campground (Wildomar). Four trailheads provide parking and restrooms for visitors to the San Mateo Canyon Wilderness: San Juan Loop Parking Area, Morgan Trailhead, Tenaja Falls Trailhead, and Tenaja Trailhead. The San Juan Loop and Morgan trailheads are the first- and second-most heavily used trailheads, respectively, for accessing the San Mateo Canyon Wilderness.

The Morgan Trailhead parking area is a paved loop with approximately 10 spaces where visitors can park to begin their trip into the wilderness. The parking area includes a bulletin board on which visitor information is posted, a picnic table, and a trash receptacle. The trailhead is accessible year-round, and the Cleveland National Forest staff reports that approximately 2 to 3 vehicles are usually observed at the trailhead on peak use weekends (personal communication, C. Efird, Recreation Specialist, Louis Berger, Oakhurst, CA, with V. Mink, Recreation Special Uses Manager, Cleveland National Forest, Corona, CA, on July 12, 2005).

State-operated recreational facilities are not located in the project vicinity. The closest facilities to the project are Lake Perris State Recreational Area, located 12 miles northeast of Lake Elsinore and Chino Hills State Park, located 20 miles northwest of Lake Elsinore. Two other state parks, Doheny State Beach and San Onofre State Park, are located along the coast in the proximity to San Juan and San Mateo creeks, respectively.

County agencies operate recreational facilities in the project vicinity; these facilities generally provide for recreational needs of residential communities. Riverside County operates the Santa Rosa Plateau Ecological Reserve, located west of the city of Murrieta, and the 640-acre Kabian Park, near the city of Perris. Orange County operates the Ronald W. Caspers Wilderness Area.

The city of Lake Elsinore provides several recreational facilities at Lake Elsinore (table 19).

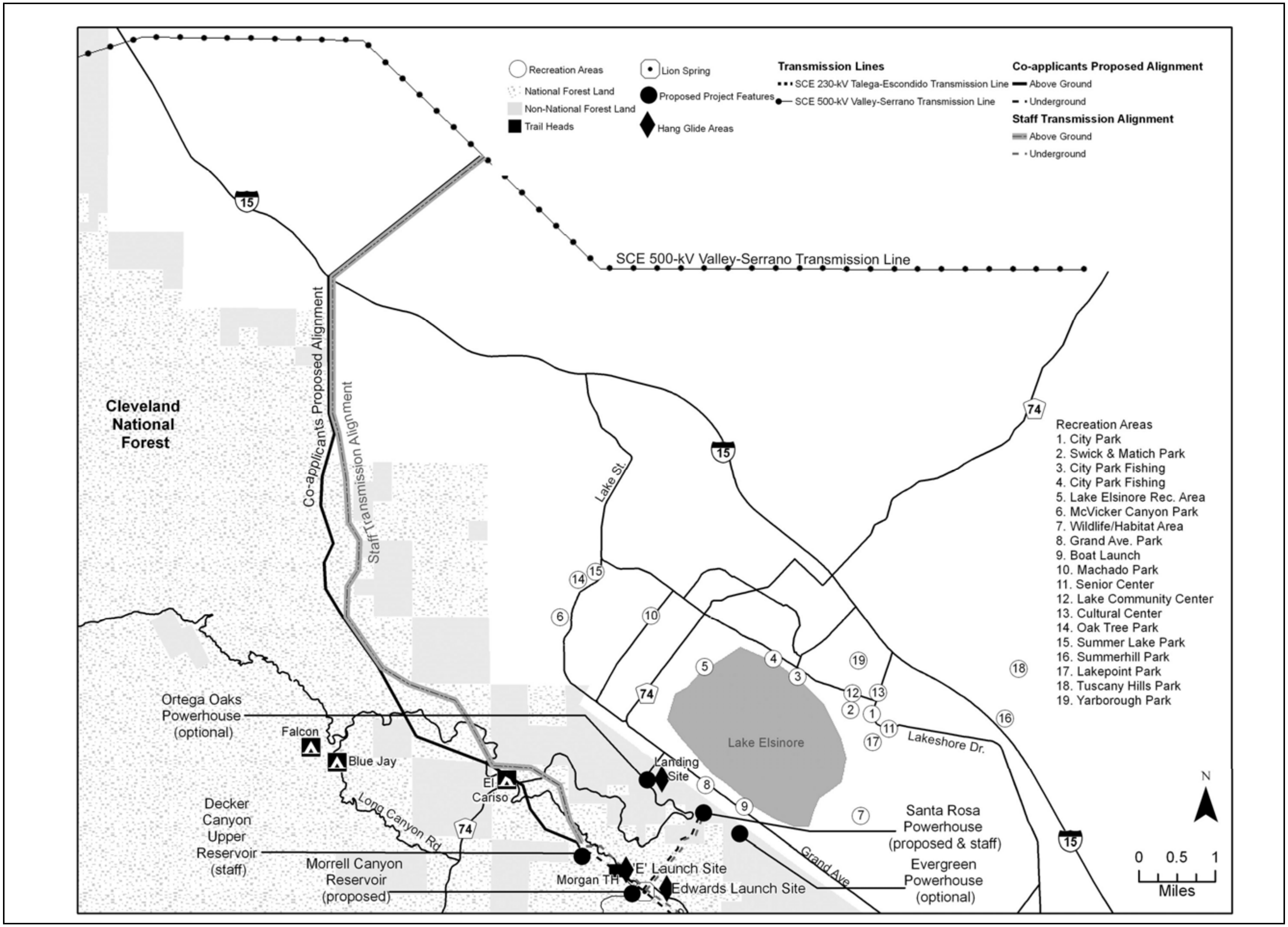

Figure 17. LEAPS Project—Existing recreational facilities (page 1 of 2). (Source: Staff)

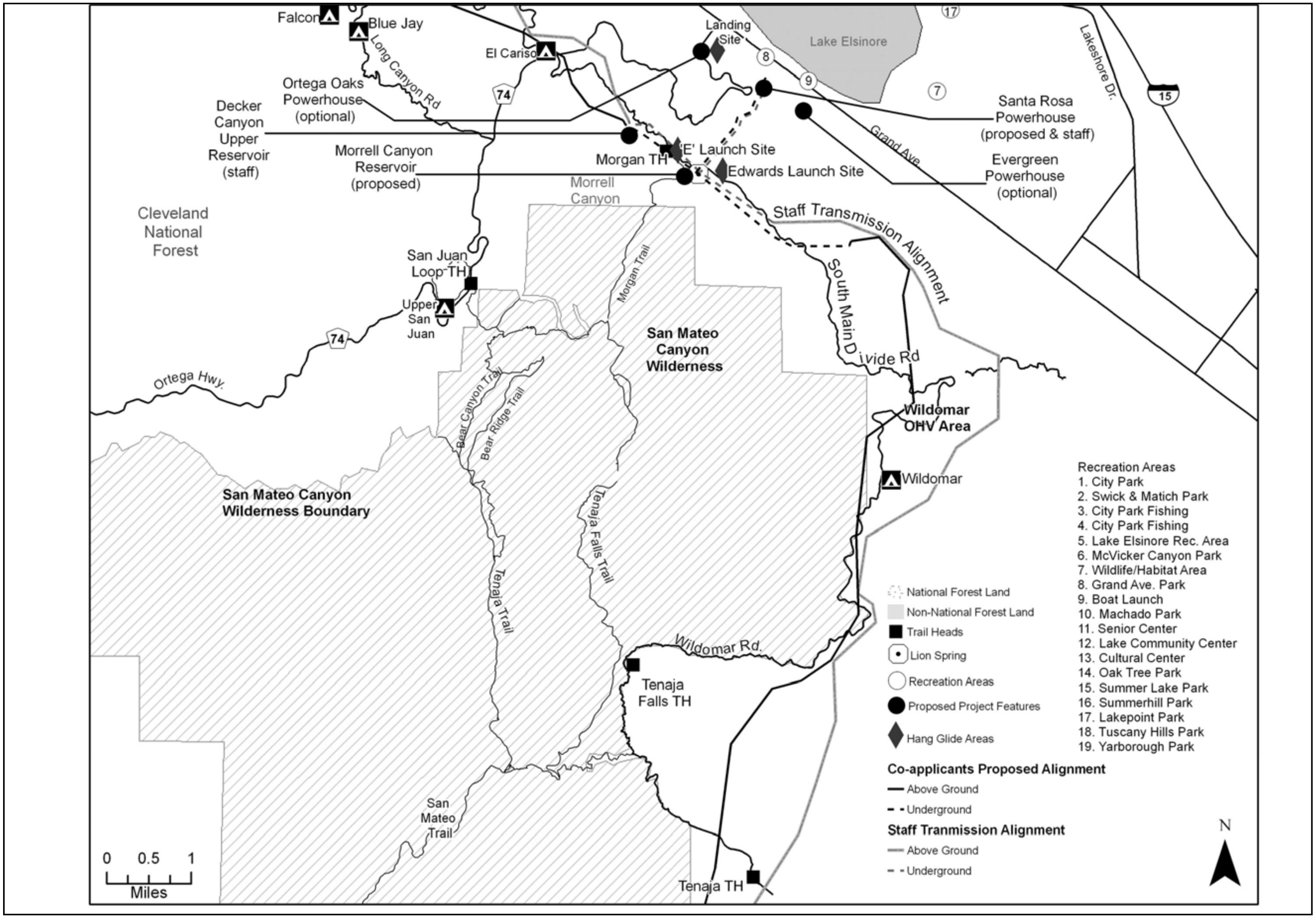

Figure 17. LEAPS Project—Existing recreational facilities (page 2 of 2).

Table 19. City of Lake Elsinore recreational facilities. (Source: Elsinore Valley MWD and Nevada Hydro, 2004a)

City of Lake Elsinore Recreational Facility and Amenities	Approximate Acreage	Community Center	Gymnasium	Restroom	Concession	Parking	Baseball/Softball	Football	Soccer	Volleyball	Tennis	Horseshoes	Sports Lighting	Shade Structure	Play Equipment	Drinking Fountain	Benches	Public Area/Shelter	Barbeques
City Park	4			●	●	●						●		●	●	●	●	●	●
Lake Community Center	--	●	●	●		●				●							●●		
Swick & Matich Park	7			●	●	●	●	●	●				●	●		●	●		
Cultural Center	--		●	●												●			
Yarborough Park	3			●		●	●							●	●	●	●	●	●
Tuscany Hills Park	5			●		●	●						●		●	●	●		
Summerhill Park	5			●		●		●	●							●		●	
Lakepoint Park	12.5			●	●	●	●	●	●	●			●	●	●	●	●	●	●
Senior Center	--			●		●						●		●		●	●		
Public Fishing Beach	--			●		●								●					
Public Beach	5			●		●				●				●	●			●	●
Machado Park	5			●		●		●	●	●	●			●	●	●	●	●	●
Summerlake Park	16			●		●		●	●				●	●	●	●	●	●	
Oak Tree Park	2																		
McVicker Canyon Park and Skate	26			●	●	●							●	●	●	●	●	●	●

Boat launches are provided at the City Public Launch (operated by the city of Lake Elsinore) and at as many as nine commercial launches associated with the privately owned resorts and campgrounds. Boating on Lake Elsinore has a limited capacity of 500 active boats-at-one-time. In 2000, 41,484 annual boating passes were sold for Lake Elsinore.

Commercial recreation providers round out the complement of recreational facilities near the proposed project. As many as 12 commercial businesses provide campgrounds and resorts for recreational vehicles, tent, and group use; some of these facilities have boat launching facilities.

Estimated visitor use at Lake Elsinore in 2000 included approximately 41,250 recreation visitor days from local residents, and 177,300 visitor days from out-of-area visitors. Trips from both groups of users were mainly boating-related, and only 5 to 20 percent of the estimated use was associated with angling. Nearby, on public lands managed by the Cleveland National Forest, recreational use during 2001 was estimated at 790,000 National Forest visits +/– 31 percent. There were 830,000 site visits, an average of 1 site visit per National Forest visit. Included in the site visit estimate are 31,616 wilderness visits (USFS, 2002a). It should be noted that this level of use is attributed to the entire 567,000-acre Cleveland National Forest, which includes areas not in the vicinity of the project.

As discussed above, there are recreational resources of regional and local importance located in the area of the proposed project features. Figure 17 shows the locations of the features proposed by the co-applicants, both preferred and alternative, in relation to areas of recreational importance.

3.3.6.2 Environmental Consequences

Construction Effects on Lake Elsinore Recreation

Co-applicants' Proposal—At Lake Elsinore, construction activity would occur within the reservoir—the tailrace, intake/outlet structure, and other infrastructure necessary to operate the project would be installed and a cofferdam would be constructed in the reservoir to allow for this activity. According to the proposed construction schedule, this activity would take place over a period of about 3 years.

Effects Analysis

Construction activities would have temporary effects on reservoir-based recreation activities at Lake Elsinore. The portion of the lake surface where the cofferdam and access road would be located would need to have public boating access restricted for public safety reasons. Although the co-applicants' proposal does not specify the amount of lake surface that would require navigational restrictions, it is possible to estimate area from information provided in the general project description, which states that a temporary access road would be constructed between the powerhouse and intake/outlet structure. The lengths of the proposed tailrace tunnels are estimated to be 1,950 feet from the proposed Santa Rosa, powerhouse site. From the conceptual drawings, it appears that two-thirds of the tunnel could extend into Lake Elsinore. Assuming there would be a 200-foot navigational restriction along the entire length of the tailrace that extends into the lake during construction, this would cause a loss of up to 6 acres of boatable surface.[53] At 1,240 feet, the construction related closure would represent a loss of less than 0.5 percent of

[53] Acreage calculated by multiplying 2/3 of the tailrace lengths by 200 feet and converting square footage to acreage.

the surface area for boating originating at boat ramps usable at this elevation.[54] This minimal effect would occur throughout the 3-year construction period.

Aesthetic effects on recreation, such as noise associated with construction and the visual effects of seeing construction equipment and vehicles, are discussed in section 3.3.7, *Environmental Consequences,* in *Land Use and Aesthetic Resources,* and section 3.3.10, *Environmental Consequences* in *Air Quality and Noise*, respectively. According to the monthly usage data for the boat launches in 2000, it appears the boating use is at its highest levels from May through August. The co-applicants reported monthly usage estimates between 6,916 and 8,270 boating days occur during this time, representing about 75 percent of the annual use. The cofferdam and associated construction activities would require restricted public boating access for up to 3 years. The aesthetic effects (noise and visibility of construction activities) would not continue beyond the 3-year construction phase of the project.

Staff Alternative—The potential effects of construction on Lake Elsinore recreational use are the are the same as discussed under the co-applicants' proposal.

Optional Ortega Oaks or Evergreen Powerhouse—Construction activities at the Ortega Oaks and Evergreen powerhouse sites would not affect reservoir-based recreation because these sites are not located within the water surface of Lake Elsinore. The tailrace tunnel would extend into Lake Elsinore for about the same distance as at the Santa Rosa powerhouse, resulting in the same 6-acre reduction of boatable surface.

Effects of Project Operation on Lake Elsinore Recreation

Co-applicants' Proposal—The co-applicants propose to use Lake Elsinore as the lower reservoir in a pump-storage design, which would result in daily changes in surface elevation as water is cycled for electricity production purposes. For public safety reasons, boating access would be restricted on Lake Elsinore in the vicinity of the tailrace and intake/outlet structure during proposed project operations.

Because of safety considerations related to fluctuation of water depths resulting from generation and pumped storage operations, no water-related recreational activities would be provided at the proposed or alternative upper reservoir; the reservoir would be fenced to prohibit public access. Consequently, project operations would not affect reservoir-based recreation at the proposed Morrell or Decker Canyon upper reservoir sites. The co-applicants' proposal also would include working with CDFG and FWS to support a fish stocking program in Lake Elsinore consistent with the Fisheries Management Plan as discussed in section 3.3.3, *Aquatic Resources*.

Effects Analysis

As discussed in section 3.3.2, *Water Resources*, the co-applicants would operate the project between 1,240 and 1,247 feet msl consistent with the Lake Elsinore Stabilization and Enhancement Project. The co-applicants would pay a management fee to the Elsinore Valley MWD for make-up water to maintain Lake Elsinore at a minimum water surface elevation of 1,240 feet msl or above. Maintenance of reservoir levels by the Elsinore Valley MWD would provide a predictable surface area for boating, which, as analyzed earlier, would be higher than historical summer lake elevations. Stabilized lake levels also would improve the availability of beaches for swimmers and anglers. Lake Elsinore would no longer retreat to levels where there are wide expanses of exposed and muddy shoreline. Under the co-applicants'

[54] The city-owned boat ramp at the the Lake Elsinore campgrounds and recreation boat ramps on the north side of Lake Elsinore allows access to the water at elevation 1,235 feet msl (North County Times, 2005).

proposal, water levels would fluctuate 1 foot daily and 1.7 feet weekly. During the summer, this would act much like a rising tide in that as the day progresses and the proposed project generates energy, the lake would fill, and boaters would be afforded more water surface later in the day. There would be a small decrease in boatable area on Lake Elsinore from the public boating access restrictions that would need to be imposed at the tailrace and intake/outlet structure. The boatable area lost to the navigational restriction at the inlet/outlet structure would be less than 1 acre,[55] assuming boating would be restricted to within 100 feet of the intake/outlet structure, and be offset by the proposed higher lake elevations.

Improvements to water quality (as discussed in section 3.3.2, *Water Resources*) would provide positive benefits to the recreational experience for water contact recreation users and anglers (also discussed in section 3.3.3, *Aquatic Resources*). The stocking of desirable sport fish in Lake Elsinore would benefit the local recreation fishery. Lake Elsinore visitors would welcome improved angling opportunities resulting from the stocking program and improved conditions that would be more desirable for fish species.

The reduction of algae blooms as discussed in section 3.3.2, *Water Resources* would improve conditions for boating and water contact recreation. With a decrease in algae blooms, we would expect an increase in boating activity on the lake and there would be fewer instances of entangling boat propellers in the algae.

Construction Effects on Developed Recreational Facilities

Co-applicants' Proposal—The co-applicants propose to site construction staging areas so as not to unreasonably restrict access to near-site recreational facilities. A 20- to 40-acre laydown area would be needed in the vicinity of the proposed upper reservoir. Prior to commencement of construction operations, the co-applicants would provide the USFS with a detailed site plan depicting both the extent of ground-disturbing activities in the vicinity of the proposed and alternative upper reservoir sites and delineate the boundaries of the associated construction laydown areas. The site plan would delineate existing recreational facilities within and adjacent to those areas that could be affected by construction activities and construction staging operations. The plan would include a contingency for closing or restricting public access and having the co-applicants provide alternative, comparable facilities outside of the boundaries of the construction activity for recreational use.

Resource Agency Measures

USFS revised preliminary 4(e) condition no. 13 specifies that the co-applicants provide a safety during project construction plan to identify potential hazards near public roads, trails, and recreational facilities, and measures necessary to protect public safety. Under the plan, the co-applicants would conduct daily inspections, documented in writing, of affected National Forest System lands and the co-applicants' adjoining fee title property during construction for fire plan compliance, public safety, and environmental protection.

USFS revised preliminary 4(e) condition no. 27 specifies that within 1 year of license issuance, the licensee file with the Commission a recreation facility development plan for a recreation facility at the project equipment and material laydown area on National Forest System lands or for an alternative use and/or location as may be approved by the USFS.

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[55] Assumes the restricted area for navigation would have a circular configuration with a diameter of 230 feet.

The proposed transmission alignment would be a linear feature extending approximately 32 miles, mostly over National Forest System lands. Laydown areas would be necessary and construction activities would take place over the first and second year of construction.

Effects Analysis

The Morgan Trailhead and Morgan Trail are located in the vicinity of the proposed Morrell Canyon upper reservoir site. The co-applicants' proposal indicates that the footprint of the reservoir would not include the trailhead, so there would be no direct effects on the trailhead during construction. Regardless, increased traffic on South Main Divide Road and noise associated with construction of the upper reservoir at the proposed Morrell Canyon site would be apparent to visitors using the Morgan Trailhead. The increased construction traffic may cause visitors to the San Mateo Canyon Wilderness to select one of the other three trailheads to begin their trip. According to the co-applicants' construction schedule, construction traffic and high levels of noise would likely affect visitors during the third year of construction. Considering the low visitation to the trailhead, the public safety requirements that would be implemented as part of the safety during construction plan, and the provision to provide alternative sites for recreational access, there would be minimal effects on trailhead visitors' ability to access the trail network during construction.

Because the footprint of the reservoir would include portions of the Morgan Trail, the trail would need to be re-routed. The combination of construction activities and changing the trail location could cause visitors to avoid using this point of entry to the wilderness; however, access to areas of the Cleveland National Forest in the vicinity of the construction would still be provided. This use would likely be shifted to one of the other three trailheads during the third year of construction. The effects on the Morgan Trail would be minimal because, as previously mentioned, this trail receives low levels of use, public safety requirements would be implemented as part of the safety during construction plan, and there would be a provision to provide alternative sites for recreational access during construction. Views from short segments of Morgan Trail would include transmission lines and towers about 1 mile northwest of the relocated trail and also within 2 miles to its southeast. The same structures would also be visible to people who drive South Main Divide Road for pleasure. Use of the Morgan Trailhead parking lot and the re-routed trail could resume within 4 years after breaking ground (post-construction).

No developed recreational facilities are located in the vicinity of the proposed Santa Rosa powerhouse site, so construction activities would not affect these facilities.

Under the co-applicants' proposal, no developed recreational facilities would be located near construction activities that would take place at Lake Elsinore. Most of the developed recreational facilities are located on the east side of the reservoir and construction activities would occur in the vicinity of the southeast portion of the reservoir shoreline. Although there would be a general increase in vehicular traffic on local roads, construction activities would not directly affect developed recreational facilities at Lake Elsinore.

Aspects of constructing the overhead portions of the proposed transmission alignment that could affect developed recreational facilities would likely relate to vegetation clearing, traffic, and noise. The only developed recreational facilities immediately adjacent to the proposed transmission alignments are the Wildomar OHV area and campground. If the alignment were constructed along this route, these facilities would most likely be closed during the first and second year of construction. Construction of the underground portion of the line could potentially affect the Morgan Trailhead and parking area; however, implementation of the safety during construction plan would minimize the effects. It is expected the site could remain open during the majority of construction of the underground portion of the line, but the site may require closing to protect the public's safety when construction work in the immediate vicinity of the parking area is underway. Closure of the parking lot or trail are not expected to last more than a year at the most and given the low level of use, this is likely to be a modest effect.

Staff Alternative—No developed recreation facilities are located in the vicinity of the Decker Canyon upper reservoir site. The Decker Canyon upper reservoir site is located northwest of the Morgan Trail and would not require any temporary or permanent re-routing of Morgan Trail. Regardless, increased traffic on South Main Divide Road and noise associated with construction of the upper reservoir at the Decker Canyon site would be apparent to visitors using the Morgan Trailhead. According to the co-applicants' construction schedule, construction traffic and high levels of noise would likely affect visitors during the third year of construction. Considering the low visitation to the trailhead, the public safety requirements that would be implemented as part of the safety during construction plan, and the provision to provide alternative sites for recreational access, there would be minimal effects on trailhead visitors during construction.

Aspects of constructing the staff alternative transmission alignment that could affect developed recreational facilities would likely relate to vegetation clearing, traffic, noise, and placement of underground transmission lines. Areas where construction of the southern segment of the staff alternative transmission alignment could disturb developed recreation sites include the Morgan Trailhead and Trail and the El Cariso campground. Underground placement activities would most likely require the temporary closure of the trailhead parking area for public safety reasons. These effects would likely last less than 1 year. The staff alternative transmission alignment would avoid any direct effects on the El Cariso campground; however, construction activities around the OHV and Wildomar campground could result in limited, reduced, or restricted use of these areas. Increased traffic and noise associated with right-of-way clearing, tower construction, and line installation could cause secondary effects, in the form of periodic disturbances, on nearby visitors at these sites during the first 2 years of construction. These effects would be minimal considering the temporary nature of these events, the distance of the line construction activities from the developed recreational facilities, and the measures implemented as part of the safety during construction plan (USFS revised preliminary 4(e) condition no. 13).

Optional Ortega Oaks or Evergreen Powerhouse—No developed recreational facilities are located near the Ortega Oaks or Evergreen powerhouse locations, so construction activities would not affect these types of facilities.

Effects of Project Operation at Developed Recreational Facilities

Co-applicants' Proposal—Public access to the proposed Morrell Canyon or Decker Canyon upper reservoir would be prohibited for public safety concerns by installing a fence around the reservoir at either location. If it becomes necessary for public safety and after consultation with the USFS, the access road could also be fenced to prohibit public access.

Developed recreational facilities would not be provided at the reservoir although information signs could be provided to inform the public about the project, cultural, or natural resources. The co-applicants also propose to provide an ancillary structure that would complement the USFS firefighters' memorial along Ortega Highway. The USFS has suggested that a visitor information center would be appropriate.

Following construction, the co-applicants propose several treatments of the 20- to 40-acre reservoir construction laydown area such as grading, seeding, and surface treatment to reduce dust to allow development of a recreational facility or administrative site. In their December 15, 2005, filing of alternative preliminary 4(e) conditions, the co-applicants request that the USFS allow the option of providing a recreational facility at another site in the vicinity of the upper reservoir. At the proposed Santa Rosa powerhouse site, or at the Evergreen powerhouse site if selected, the co-applicants propose to convey a 20- to 30-acre portion of the laydown area adjacent to the powerhouse to the county, local parks district, a county service area, or city of Lake Elsinore for development of a recreational facility. The co-applicants suggest that this area would be suitable for recreational development such as baseball or multi-purpose fields, basketball courts, tennis or handball facilities, or a picnic area with on-site parking.

Within 3 years of commencement of operations, park improvements would be finalized and funded by the co-applicants. The co-applicants' also propose to develop a botanical garden at either the Santa Rosa or Evergreen powerhouse sites to promote public awareness of water conservation and use of drought tolerant and native plant species and locally collected seeds. The recreational facility would be developed as a joint-use facility with the adjacent Butterfield Elementary Visual and Performing Arts Magnet School.

If the Evergreen powerhouse site were selected, the co-applicants propose to engage in planning efforts with the appropriate local agency to develop the construction laydown area into a neighborhood or community park. The co-applicants suggest that this area may be suitable for recreational development such as baseball or multi-purpose fields, basketball courts, tennis or handball facilities, or a picnic area with on-site parking. The co-applicants also proposed a botanical garden at the Evergreen powerhouse site to promote public awareness of water conservation and use of drought-tolerant and native plant species as well as locally collected seeds. Within 3 years of commencement of operations, recreational improvements would be finalized and funded by the co-applicants.

If the powerhouse would be built at the alternative Ortega Oaks site, the co-applicants propose that a 5-acre hang glider landing site and a community park could be included in the final design plans in lieu of a botanical garden. If, after consultation with the appropriate local agencies, it is determined that the Ortega Oaks powerhouse site would not be suitable for a neighborhood or community park, the co-applicants would be willing to pursue a similar development on areas associated with either the proposed Santa Rosa or Evergreen powerhouse sites. If either of these sites were selected for development of a neighborhood or community park, the co-applicants would still provide a formal a hang glider landing site at the Ortega Oaks site.

In his letter dated December 7, 2003, Mr. Hilberath of the Elsinore Hang Glider Association states that the proposed 5-acre park dedicated to hang glider landing and staging needs would not be a sufficient space for safe landings. Mr. Hilberath recommends a landing area of 12 acres as being sufficient to accommodate landings. A 12-acre site would preserve additional open space, potentially safeguarding pilot safety from navigational hazards during landings when the project is operational. The features of a park of either size have not been finalized. The co-applicants do not propose to provide funding for operating and maintaining any developed recreational facilities and expect that O&M would be funded by taxes and fees, unless the facilities remain in public ownership and are located on National Forest System lands. The co-applicants are open to retaining ownership and being responsible for O&M activities subject to a determination whether such ownership and operation would be authorized under the Elsinore Valley MWD’s existing special district authority for developments not in public ownership and not located on National Forest System lands.

Under the co-applicants’ proposal, educational tours of the powerhouse would be provided to the public, regardless of the site selected.

The co-applicants do not propose to develop any additional recreational facilities at Lake Elsinore in their application and suggest that additional development would be initiated by the private sector or by other public entities independent of the proposed project.

Resource Agency Measures

USFS revised preliminary 4(e) condition no. 27 specifies that the co-applicants file a recreation facility development plan for a day-use recreation facility at the upper reservoir laydown area on National Forest System lands or for an alternative use and/or location. The revised preliminary 4(e) conditions do not include recommendations for recreational development at Lake Elsinore as part of the project.

The proposed transmission alignment appears to include areas within or immediately adjacent to the Wildomar OHV Area and campground.

Effects Analysis

Co-applicants' Proposal—The area inundated at the proposed Morrell Canyon upper reservoir site would not include the Morgan Trailhead, but it would include portions of the Morgan Trail. Segments of the trail would require rerouting to enable continued use of the resource. Trail users would be affected by the sight of the chain link fence, impoundment, dam, and other appurtenant project features. These effects could be alleviated by re-routing the trail away from the fence and reservoir and providing interpretive signage to explain the project to visitors at points where the project would be viewed from the trail.

The proposal to provide the USFS with an ancillary structure such as a visitor information center along the Ortega Highway could be directly related to the project operation by providing an interpretive venue, which would enhance interpretive resources for the public in the general vicinity of the project.

A day-use site with visitor information center near Ortega Highway would accommodate visitors who are coming to the area, potentially visiting the upper reservoir and/or viewing Lake Elsinore. Currently, no day-use facilities are located near the proposed upper reservoir, so visitors park in many informal turnouts along South Main Divide Road. Providing a formal recreation day-use area near the reservoir would reduce pollution by providing visitors with facilities to dispose of trash and human waste, protect vegetation and soil by controlling the locations where vehicles may travel and park, and reduce the potential for fires by providing cleared areas for parking. Since day-use facilities do not currently exist in this area, this facility would meet the needs of visitors who are coming to the project by providing a few basic conveniences while protecting natural resources from the effects of wide-spread dispersed recreational use.

Because developed recreational facilities do not exist at the proposed Santa Rosa powerhouse site, project operations associated with the powerhouse would not affect existing developed recreational facilities.

The co-applicants' proposed development and conveyance of a 20- to 30-acre park with sports fields to a local government as well as interpretive tours and a botanical garden at the powerhouse site would provide excellent opportunities that do not currently exist in the vicinity of the project. Considering the powerhouse would be located in proximity to an urban setting, interpretive tours of the project would be readily available to large numbers of people. Additionally, the concept of creating a joint-use facility with the adjacent school would be a public benefit.

A botanical garden would increase public awareness regarding water conservation. This could cause residents and visitors to the project to be conscious of actions they could take to minimize water consumption and how to use native plants to landscape their property. The co-applicants' proposal would cause a secondary beneficial effect of reducing water consumption.

If a powerhouse were constructed at the proposed Santa Rosa powerhouse site, the area currently used for landing hang gliders at the Ortega powerhouse site would continue to be available for recreation enhancements pending any plans filed with the Riverside County.

The co-applicants' proposal discusses options for securing O&M funding for recreational facilities developed as part of the project. However, relying on funding that may or not be available to local agencies would not provide certainty that the facilities would be properly maintained through the period of the license.

At Lake Elsinore, the only developed recreational facilities that would potentially be directly affected by project operations would be boat docks. Project operations would require that water levels at Lake Elsinore be maintained within a relatively narrow range (1,240 to 1,247 feet msl) as compared to conditions prior to implementation of the Lake Elsinore Stabilization and Enhancement Project (1,229 to 1,259 feet msl). Because lake levels are more stable than historical variability, a beneficial effect of the

Joint Watershed Authority's Lake Level Stabilization and Enhancement Project, boat docks can remain in the water longer and would be available to users year-round. The co-applicants' investigation determined that even at the lowest possible reservoir elevation under project operation (1,240 feet msl), project-induced fluctuations in water elevation in Lake Elsinore would not adversely affect existing recreational facilities now operating at Lake Elsinore.

Boaters and shoreline park users at Lake Elsinore would be subject to the 1-foot change (1.7-foot change on weekends) in lake elevations. Typical operation would remove water at night and return it during the day, resulting in rising elevations that would coincide with the most common times boaters and shoreline park users would be out recreating. The effect would be much like a rising tide at the beach and as the day progressed the boatable surface area of the Lake would increase. Because there are no beaches, the decreasing width of shoreline would have a negligible effect on park users. Effects of this would be most common during the summer coinciding with the peak electrical demand. The 1- to 1.7-foot rise would be negligible compared to the increase in number of boatable days expected under the Lake Level Stabilization and Enhancement Project as there would be sufficient water year-round as opposed to the historical trend of receding lake levels throughout the summer and, depending on the water year, beyond. As such, the effect of the Lake Level Stabilization and Enhancement Project on boating on Lake Elsinore would be much more significant than a slow rise in lake level elevation of 1 foot during the course of a day.

Considering the high-density residential development at Lake Elsinore and the extensive and diverse types of existing private, state, and local recreational developments at the reservoir, there are adequate numbers and types of existing developed recreational facilities to support existing and future reservoir-based recreation at Lake Elsinore.

Aspects of operating the proposed transmission alignment that could directly affect developed recreational facilities would likely relate to clearing vegetation under the right-of-way and the visible presence of the towers, conductors, and cleared land. The only developed recreational facilities immediately adjacent to proposed transmission alignments are the Wildomar OHV area and campground. These facilities would be directly affected if the footprint of the proposed transmission alignment would cross the boundaries of the OHV area or campground. The effects could include a reduction of land available for OHV use and camping. The cleared area under the proposed transmission alignment could be attractive to OHV users, potentially encouraging unauthorized OHV use outside of the designated area; this would be an indirect secondary effect of operating the transmission alignment in the proposed corridor.

If the proposed route were implemented, the quality of recreational experience at the OHV area and campground facilities also could be diminished. As proposed, the alignment would, at a minimum, be visible from these facilities, and it could potentially even cross portions of the OHV area.

Staff Alternative—As with Morrell Canyon upper reservoir site, public access to the Decker Canyon reservoir site would be prohibited by installing a fence around the reservoir because of public safety concerns. If it is determined necessary for public safety and after consultation with the USFS, the access road also could be fenced to prohibit public access.

The area inundated at the Decker Canyon site would not include the Morgan Trailhead or Morgan Trail; therefore, there are no existing developed recreational facilities that would be affected by developing a reservoir at this site. The co-applicants would provide the same recreational enhancements as those that are proposed at the Morrell Canyon upper reservoir site.

The staff alternative transmission alignment also appears to include an area within or immediately adjacent to the Wildomar OHV Area and campground. Aspects of operating this transmission alignment that could directly affect developed recreational facilities would be similar to those discussed under the co-applicants' proposal.

Aspects of operating the southern segment of the staff alternative transmission alignment that could directly affect developed recreational facilities would likely relate to clearing vegetation under the right-of-way and the visible presence of the towers, conductors, and cleared land. The southern segment of the staff alternative transmission alignment may require the towers to be placed or span across lands designated and managed in the USFS Land Management Plan as having ROS classifications of Semi-primitive, Non-motorized (SPNM) and Roaded Natural (RN).

Visitors using the Morgan Trailhead and Trail would not be able to see the underground transmission lines, which would conserve their level of experience while using the site. Because the trail descends into the canyon and away from the ridgeline, trail users would not see the above ground portions of the proposed transmission lines.

Optional Ortega Oaks or Evergreen Powerhouse—The co-applicants' proposed community park and powerhouse tours at the Ortega Oaks powerhouse site would provide excellent opportunities that do not currently exist in the vicinity of the project. Considering the powerhouse would be located in proximity to an urban setting, interpretive tours of the project would be readily available to a large number of people.

If the Ortega Oaks powerhouse were selected, the area available for landing hang gliders would be diminished and this would be a direct effect of the project. Providing a formal 5-acre landing area would preserve a portion of the existing informal landing area, but may be too small to ensure safe use of the site. Designating a permanent 12-acre park for landing hang gliders as proposed by Mr. Hilberath would preserve the space necessary to safely land and ensure that the sport could continue safely at this site into the future. In combination with an underground transmission alignment that would avoid direct conflicts with hang gliding launches and flight paths, a formal landing area of sufficient size would enable hang gliders to continue to use the area's unique atmospheric resources that are necessary for the sport to exist. The co-applicants' proposal discusses options for securing O&M funding for recreational facilities developed as part of the project. However, relying on funding that may or not be available to local agencies would not provide certainty that the facilities would be properly maintained through the period of the license. This potential effect could be avoided if the co-applicants were required to submit a recreation plan for the facility development that included financial commitments to provide O&M funding in the event that intended sources of O&M funding are either insufficient or unavailable.

Effects associated with the Evergreen powerhouse site would be the same as with the Ortega Oaks powerhouse sites with a couple of exceptions.

A botanical garden (at the Evergreen powerhouse site) would increase public awareness regarding water conservation. This could cause residents and visitors to the project to be conscious of actions they could take to minimize water consumption and how to use native plants to landscape their property. The construction of the powerhouse at the Evergreen powerhouse site would cause a secondary beneficial effect of reducing water consumption.

If the powerhouse were located at the Evergreen site, the undeveloped area currently used for landing hang gliders at the Ortega Oaks powerhouse site would continue to be available.

Construction Effects on Dispersed Recreation

Co-applicants' Proposal—The co-applicants do not propose any specific measures for dispersed recreation. The project as proposed by the co-applicants could affect dispersed recreational use at the wilderness area, hang gliding launch sites, Morgan Trail, powerhouse site, and hang gliding flight paths and landing areas. Project effects as they relate to dispersed recreation at Lake Elsinore are discussed under the previous section titled *Construction Effects on Lake Elsinore Recreation*.

The proposed transmission alignment would cross National Forest System land designated under the Cleveland National Forest Management Plan as SPNM, Semi-primitive, Motorized, RN, and Rural

(R). Laydown areas would be necessary and construction activities would take place over the first and second year of construction.

The USFS specifies in revised preliminary 4(e) condition no. 13 that the co-applicants provide a safety during construction plan, which would identify potential hazard areas and measures necessary to protect public safety including public roads, trails and recreation areas and require daily inspections, documented in writing, of affected National Forest System lands and the co-applicants' adjoining fee title property during construction.

Effects Analysis

The proposed Morrell Canyon upper reservoir site is within approximately 1,000 feet of the wilderness boundary. A portion of the Morgan Trail appears to pass within 200 feet of the proposed Morrell Canyon reservoir site.

Disturbance to visitors hiking into and within the San Mateo Wilderness would likely occur.

The proximity of this project feature to the wilderness would likely compromise the quality of the wilderness experience for visitors. Although the facility would be located outside[56] of the wilderness, its presence would be noticeable from within the wilderness, and this would likely degrade the values of solitude and the lack of human influence. These effects of construction would begin in the first year and continue throughout the remaining period of construction.

Hang gliders could potentially launch from nine various points along South Main Divide Road in the vicinity of the proposed Morrell Canyon upper reservoir site and the proposed construction laydown area. Increased traffic on South Main Divide Road associated with construction activity at the upper reservoir may disturb some users. Construction activities would directly affect both of the two sites that are operated for hang glider launches under a special use permit from the USFS. Because the E Launch Site is located directly across South Main Divide Road from the reservoir site, it is likely that this area would need to be closed to the public during construction for safety reasons. The Edwards Launch Site would likely be affected by the proposed construction trailer site, which would be located adjacent to this launch site. The other seven potential launch sites along South Main Divide Road would remain available to the public and would not be directly affected by upper reservoir construction activities. Displaced users could potentially use alternative launch sites during construction activities; however, the two sites operated under special use permits are the most suitable locations for this activity, so construction of the upper reservoir at this site would cause considerable effects on hang gliders. The construction of a reservoir at Morrell Canyon would eliminate a series of (over 3) known house thermals (or thermal origination points, where solar heated air masses break away from the earths surface) along the ridge to the south west of Morrell Canyon.

The conceptual plan for the proposed Morrell Canyon upper reservoir site[57] indicates that Lion Spring and a portion of the Morgan Trail leading to the spring would be inundated by the reservoir. This direct effect would eliminate an important recreational component of the area. The immediate area around Lion Spring offers visitors an enjoyable riparian-like setting with cool shade from mature oak and sycamore trees, and Lion Spring has easy access from a major road. This small area stands in stark contrast to the surrounding expansive arid hillsides of chaparral vegetation. The inundation of this small area would be a notable loss of dispersed recreational opportunities because this type of setting is not abundant in the general area.

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[56] The ROS designation for lands within the potential reservoir sites is RN.

[57] Conceptual Plan-Instream and Seepage Collection and Delivery System, Morrell Canyon Upper Reservoir, dated October 2004.

It would be necessary to close an area greater than the footprint of the powerhouse and laydown area for public safety reasons, causing a direct loss of public access to National Forest System land at the proposed Santa Rosa powerhouse site.

For hang gliding pilots not affected at the launch sites, project construction could potentially alter the flight quality. Construction of the proposed underground transmission lines would require construction equipment along the ridgeline in the vicinity of the launch sites. These construction related features would encroach into areas where known house thermals exist and may reduce their quality. Construction activities would disrupt the earth's surface and the characteristics that are responsible for generating the consistent thermal uplift. Aside from disrupting the actual origination points, pilots may avoid known thermals near construction when flying at low elevations because of the uncertainty associated with the quality of the thermal and the ability to make a safe landing should a historically known thermal be compromised. Under the proposed project, 9 or 10 mapped house thermals across the upper mountain ridge could be directly affected by construction activities.

Aspects of constructing the proposed transmission alignment that could affect dispersed recreational opportunities would include creating routes of access, vegetation clearing, traffic, and noise. These effects would most likely be acceptable for National Forest System lands designated as R and RN; however, these activities would not be consistent with ROS SPNM and SPM settings.

In areas designated SPNM, access is via non-motorized trails or non-motorized primitive roads or cross-country. There is a low contact frequency with other visitors, and high probability of solitude and natural-appearing environment are present. The effects of constructing roads, clearing rights-of-way, and installing tall towers with lines of conductors may be inconsistent with the ROS classifications and scenic integrity objectives (SIOs) designated for these areas (see section 3.3.7, *Land Use and Aesthetics*, for more on the effects on aesthetics). Portions of the proposed route affecting lands with this designation are located in the northernmost part of the route, beginning generally north of Lake Elsinore and continuing north to its terminus, and at the portion of the proposed route located in the vicinity of Wildhorse Canyon.

In SPM areas, access is via motorized trails or primitive roads or cross-country where terrain and regulations permit. Low to moderate contact frequency with other visitors can be expected. The environment may have moderately dominant alterations but these do not dominate views from trails or primitive roads in the area. Transmission towers, conductors, and cleared rights-of-way across the landscape would dominate views. Portions of the proposed transmission alignment route affecting lands with this designation are located east of Trabuco Peak.

Staff Alternative—The direct effect on dispersed recreation of constructing a reservoir at Decker Canyon would include the loss of public access due to construction activities. The area inaccessible to the public would include the 120-acre reservoir footprint and the 20- to 40-acre construction laydown area.

The Decker Canyon reservoir site is within approximately 0.5 mile of the San Mateo Canyon Wilderness boundary. There would not likely be effects on wilderness values because the site would be located at sufficient distance from the wilderness.

The effects of construction activities (staging areas, increased traffic) at the Decker Canyon powerhouse site on the launching of hang glides would be similar to those at Morrell Canyon.

The staff alternative transmission alignment would include lands designated under the Cleveland National Forest Land Management Plan ROS as RN, R, SPNM, and SPM. Laydown areas would be necessary, and construction activities would take place over the first and second year of construction. Aspects of constructing the staff alternative transmission alignment that could affect dispersed recreational opportunities would include creating routes of access, vegetation clearing, traffic, helicopters, and noise. These effects would most likely be acceptable for National Forest System lands designated as R and RN; however, these activities are not consistent with SPNM and SPM ROS settings.

Pilots able to launch their hang gliders would experience similar effects on flight quality resulting from encroaching construction activities near house thermals as under the co-applicants' proposed alignment. Even if the lines are not planned directly above or below a house thermal, the clearing of vegetation and road construction may affect the conditions that produce the consistent thermal up lift. Under the staff alternative transmission alignment, two to three known house thermal sites near the toe of the mountain could be affected by construction activities.

Lands potentially affected by the southern segment of the staff alternative transmission alignment (shown in figures 17 and 18) are classified in the current Cleveland National Forest Land Management Plan as having an ROS setting of RN. Effects of the southern segment of the staff alternative transmission alignment on recreational resources would be similar to the co-applicants' proposed transmission alignment. The duration of these effects is estimated at 2 years, the entire construction phase process of setting the towers, under-grounding cable and running the lines.

Optional Ortega Oaks or Evergreen Powerhouse—Construction activities at the Ortega Oaks site would probably diminish or eliminate hang glider landing opportunities at this location during powerhouse construction in the second or third year of construction. Because this is one of the most suitable and highly used sites for landings, construction activities at this site would substantially affect hang gliders. Construction of any permanent hang glider park in the current landing zone would completely eliminate landing during park construction. Recreation enhancements would be completed during the final year of construction.

It would be necessary to close an area greater than the footprint of the powerhouse for public safety reasons, causing a direct loss of public access to National Forest System land at the Evergreen powerhouse site.

Effects of Operation on Dispersed Recreation

Co-applicants' Proposal—The effects of operating the project as they relate to dispersed recreation at Lake Elsinore are discussed under *Effects of Operations on Lake Elsinore Recreation*.

The proposed transmission alignment would include lands designated under the Cleveland National Forest Land Management Plan ROS classification as SPNM, SPM, RN, and R. Laydown areas would be necessary and construction activities would take place over the first and second year of construction.

Effects Analysis

The proposed Morrell Canyon upper reservoir site is within approximately 1,000 feet of the wilderness boundary. A portion of the Morgan Trail passes within the proposed Morrell Canyon reservoir site; therefore, rerouting of the trail is necessary and disturbance to visitors hiking into and within the San Mateo Wilderness would occur.

The proximity of this project facility to the wilderness would likely compromise the quality of the wilderness experience for visitors. Although the facility would be located outside[58] of the wilderness, its presence would be noticeable from within the wilderness and this would likely degrade the values of solitude and the lack of human influence.

Project operation at the upper reservoir would not affect any of the nine potential hang glider launch sites or the two sites under the special use permit.

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[58] The ROS designation for lands within the potential reservoir sites is designated SPNM and RN.

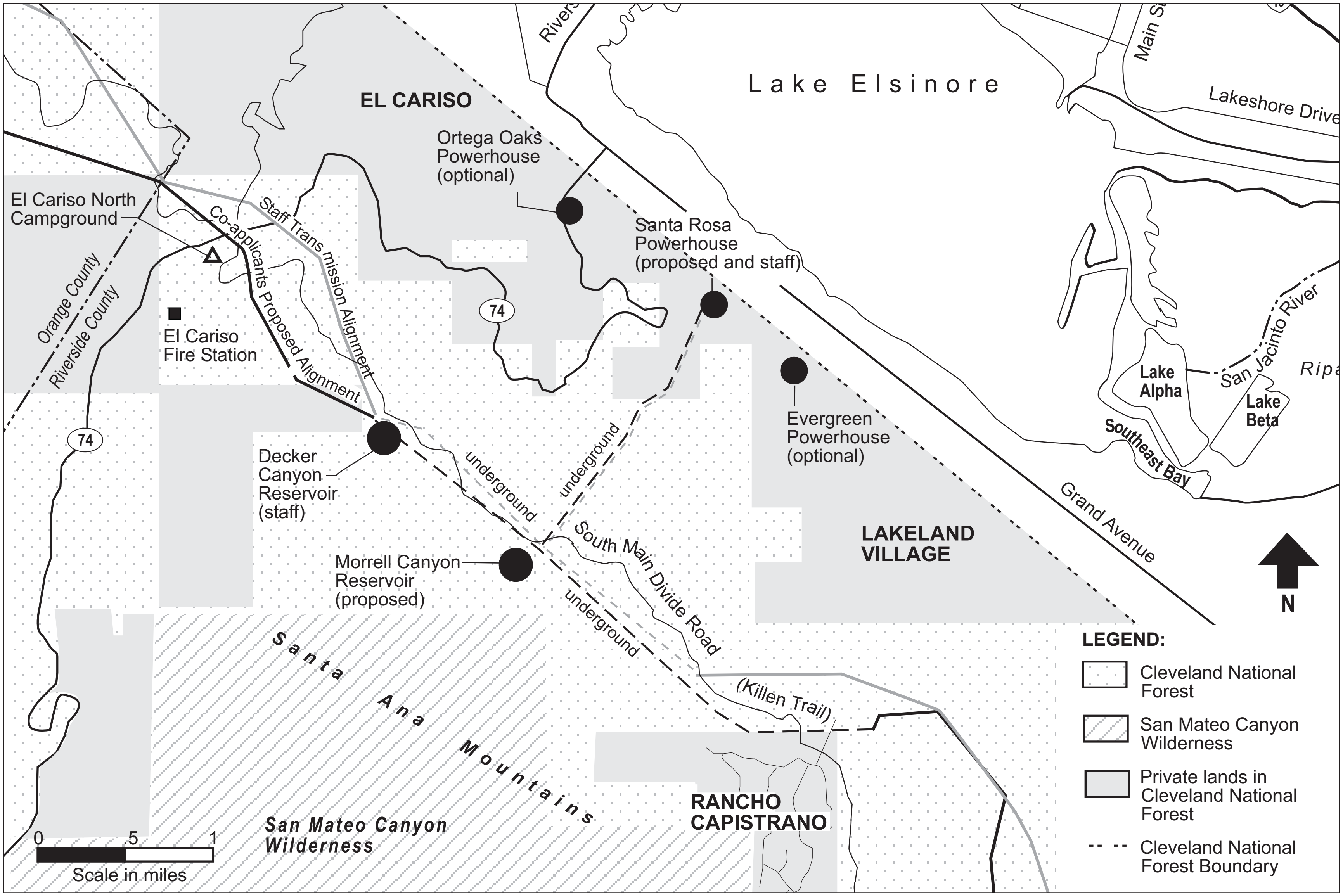

Figure 18. LEAPS Project—Land uses and communities near proposed and alternative reservoir sites. (Source: Elsinore Valley MWD and Nevada Hydro, 2004a, as modified by staff)

A small area necessary for operating the proposed Santa Rosa powerhouse would need to be closed to public access for safety reasons, causing a direct loss of public access to National Forest System land; however, because the powerhouse itself would be underground, use of the site would shift from dispersed use to developed use at a multi-use recreation site once a facility is finished.

Aspects of operating the proposed transmission alignment that could affect dispersed recreational opportunities would include maintaining routes of access, and vegetation clearing. If the transmission lines were constructed the lines would cross about 8 miles of ROS SPNM designated lands, over 12 miles of SPM lands, 7 miles of RN lands, and about a half mile of Primitive lands.

Placing about 3 miles of the proposed transmission lines underground would allow hang gliders to continue to use the popular launch sites off of South Main Divide Road (see figure 17). Under the co-applicants' proposal, the transmission lines would descend below ground about 1,700 feet north of the "E" launch site and would daylight about 12,500 feet south of the "Edwards" launch site. Because the above-ground portions of the proposed transmission lines are closer to the "E" launch site, the number of launches may decrease; however, given the wide buffer given to the "Edwards" launch site, any reductions in hang glider launches is expected to be minimal. Operation of the project as proposed may also cause a reduction in hang gliding opportunities due to the loss of house thermals from changes to the earth's surface; however considering the popularity of this location for hang gliding at Lake Elsinore resulting from the combination of unique atmospheric and geographic conditions, the effect is expected to be modest compared to scenarios that utilize above ground transmission lines in these areas. The closest comparable hang gliding alternative could be considered Crestline/Marshall in San Bernardino about 50 miles away.

Staff Alternative—The direct effect on dispersed recreation of constructing a reservoir at the Decker Canyon reservoir site would include the loss of public access to approximately 100 acres necessary for project operations.

The Decker Canyon reservoir site is within approximately 0.5 mile of the San Mateo Canyon Wilderness boundary, so there would not likely be effects on wilderness values because the site would be located at sufficient distance from the wilderness as compared to other features within proximity to the wilderness.

Project operation at the upper reservoir would not directly affect the two sites that are operated for hang glider launch sites under the USFS special use permit. The seven other potential sites used for hang glider launches along South Main Divide Road would remain available to the public and would not be directly affected by project operations at the upper reservoir.

The staff alternative transmission alignment would include lands classified under the Cleveland National Forest Management Plan ROS as RN, R, SPNM, and SPM. Aspects of operating the transmission line that could affect dispersed recreation opportunities would include maintaining routes of access, vegetation clearing, and their overall presence. If the staff alternative transmission alignment were to be implemented, the amount of lines traversing USFS ROS SPNM lands would be less than the co-applicants' proposal by about 1.5 miles would cross into the wilderness area, ROS designation Primitive. Increased noise associated with managing vegetation within the right-of-way may cause secondary effects in the form of periodic disturbances to nearby visitors during project operation. These effects would be short term.

Similar to the proposed action, the staff alternative transmission alignment would include placing a portion of the transmission line near the hang glider launch sites underground; however, to balance aesthetics and fire fighting abilities, the staff alternative, its closest, would daylight about 1,700 feet from the "E" launch site and at about 7,800 feet from the "Edwards" launch site. Given the locations of the launch sites and typical flight paths, the shorter underground distance as compared to the proposed alternative should preserve hang gliding launches from the "Edwards," or southern of the two USFS permitted sites. Given the relatively closer proximity to the "E" launch site, operations of the transmission line would likely reduce the number of launchings from this site. Proposed project operations could negatively affect house thermals in areas near transmission alignments. Under the southern segment of the staff alternative transmission alignment, two to three thermal origination points (areas where air masses break away from the surface) are expected to be affected by the operations aspect of the proposed project in the vicinity of South Main Divide Road.

*Optional Ortega Oaks or Evergreen Powerhouse—*Development of the Ortega Oaks site would eliminate a small portion of the site from public use; however, the co-applicants' proposed development of a formal landing site would probably enhance hang glider landing experience at this location since currently no developed facilities exist at this site. This would be a beneficial effect of the project because this is one of the most suitable and highly used sites for landings. The co-applicants propose a 5-acre hang glider park if the Ortega Oaks site were selected; however, development of a permanent hang glider park at Ortega Oaks should preserve the space necessary to ensure the sport could continue at Lake Elsinore while potentially mitigating the negative effects on the sport imposed by the presence and operation of the transmission lines. Development of a 12-acre park as suggested by Mr. Hilbreth would increase the safety of pilots during landing by affording more open space, which would be necessary when landing in less than ideal conditions.

A powerhouse and substation at the Evergreen site in combination with either the co-applicants' proposed transmission alignment or the staff alternative transmission alignment would place high voltage lines between the launch and landing site underground, preserving hand gliding use in the project area.

The cost estimates pertaining to the recreational measures and transmission alignments are presented in section 4.0, *Developmental Analysis,* and final measures included in the staff alternative are discussed in section 5.2, *Discussion of Key Issues.*

3.3.6.3 Unavoidable Adverse Effects

Construction of the upper reservoir in Morrell Canyon and transmission lines would have a long-term unavoidable adverse effect on hang gliding, Morgan Trail users, and pleasure driving on South Main Divide Road. Construction of the upper reservoir in Decker Canyon overall would have fewer long-term unavoidable adverse effects limited to the elimination of up to three existing thermals used by hang gliders. Construction of the intake/outlet structure and operation of the pumped storage project would slightly reduce the boatable surface of Lake Elsinore.

3.3.7 Land Use and Aesthetic Resources

3.3.7.1 Affected Environment

Land Use

Land Use in the Project Area

The proposed and alternative locations of project facilities, including upper reservoir sites, powerhouse sites, and transmission alignments, are located within or near the Cleveland National Forest (figure 2). The Cleveland National Forest encompasses the proposed Morrell Canyon and Decker Canyon upper reservoir sites, the construction laydown areas for the proposed and alternative upper reservoirs, the proposed Santa Rosa and Evergreen powerhouse locations, all or portions of the penstocks from the upper reservoir to the powerhouse (depending on the selected sites), and portions of the co-applicants' proposed and staff alternative transmission alignments.

As described by USFS (2003), this area of the Cleveland National Forest is almost entirely surrounded by urban development, serving as a scenic backdrop valued by its urban communities for neighborhood communities and providing a mountainous background to motorists traveling between Los Angeles and San Diego along Interstate 15, and from Riverside to Orange County along Ortega Highway (see figures 1 and 2). The area includes both east-facing and west-facing slopes of the Santa Ana Mountains. Communities on the east-facing slope in the area include El Cariso, located southwest of Lake Elsinore and west of Ortega Highway, and Lakeland Village, located south of Lake Elsinore and east of Ortega Highway (figure 18). On the west-facing slopes, small residential communities include Rancho Capistrano, located on a private in-holding in the Cleveland National Forest. The co-applicants' proposed and staff alternative transmission alignments cross primarily undeveloped lands characterized by forests, chaparral, and coastal sage habitats (see section 3.3.4.1, *Terrestrial Resources*), sometimes in the vicinity of single-family homes or other land uses, such as a private airstrip and the Wildomar OHV area.

Land Use Within and Adjacent to the Proposed Project Boundary

Upper Reservoir Sites and Construction Laydown Areas—Both the proposed Morrell Canyon and Decker Canyon upper reservoir sites are located on forested areas of the Cleveland National Forest (figure 18). The area around the proposed upper reservoir is used primarily for recreation associated with hiking on the Morgan Trail. Both upper reservoir sites are located near hang gliding launch sites along South Main Divide Road, which also serves as the sole access road to the homes at Rancho Capistrano (approximately 4 miles southeast of Ortega Highway) and the Wildomar OHV area (approximately 9 miles southeast of Ortega Highway). Slightly farther east is Elsinore Peak, where the USFS has issued a special use permit for operation of telecommunications facilities, currently comprising six towers and five buildings. West of the proposed and alternative upper reservoir sites, nearby land uses include the USFS El Cariso fire station, an adjacent visitor information facility, and a campground (figure 18).

Powerhouse Sites—The proposed Santa Rosa powerhouse site and the Ortega Oaks and Evergreen sites are located at the base of the mountains in the developed area along the south shore of Lake Elsinore, south of Grand Avenue (figure 18). The area along Grand Avenue is characterized by a mix of single-family residences, small commercial establishments, multi-family residential development, and vacant property. New single-family residential developments are filling in some of the vacant properties.

The proposed 30-acre Santa Rosa powerhouse site is located within the Cleveland National Forest boundary, adjacent to the unincorporated community of Lakeland Village. The construction laydown area proposed for this site is nearby, abutting Grand Avenue, but outside the Cleveland National Forest boundary. The proposed powerhouse site is located southwest of the southwesterly extension of Santa Rosa Drive and northwest of the southwestern extension of Magnolia Street. With the exception of numerous dirt roads that crisscross the property, the site is vacant. Figure 19 indicates the types and locations of nearby land uses. These include multi-family residential properties such as the Santa Rosa Mountain Villa apartments fronting along Santa Rosa Drive, the Butterfield Elementary Visual and Performing Arts Magnet School on Grand Avenue, and single-family homes along Union Avenue, Magnolia Street, and other nearby streets. Single-family homes along Grand Avenue in this vicinity have direct access to Lake Elsinore.

The 75-acre Evergreen powerhouse site is also within the Cleveland National Forest boundary, adjacent to Lakeland Village, while the associated 30-acre construction laydown site is outside the Cleveland National Forest, abutting Grand Avenue. The Evergreen powerhouse site is located southeast of the southwesterly extension of Evergreen Street, southwest of Akley Street (figure 19). The site is vacant except for numerous crisscrossing dirt roads and evidence of a former orchard. There are an

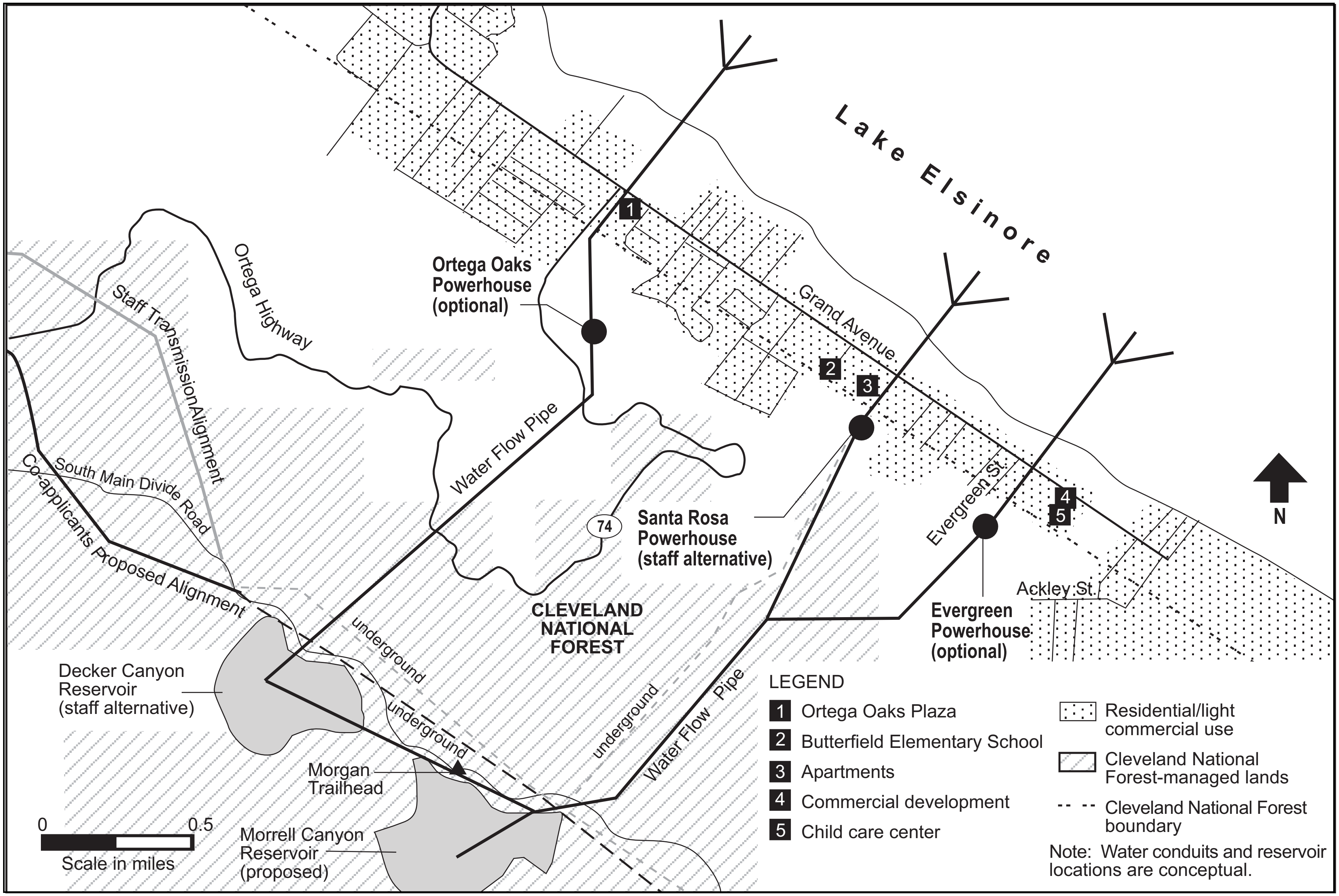

Figure 19. LEAPS Project—Land uses near proposed and alternative powerhouse sites. (Source: Elsinore Valley MWD and Nevada Hydro, 2004a, as modified by staff)

existing single-family residence and other outbuildings just northeast of the site, within the abutting construction laydown area. Also located nearby, but outside the Cleveland National Forest boundary, is a small, multi-tenant commercial development, the Lakeland Village Plaza, that includes a childcare center. Other land uses in the immediate vicinity include single-family homes and vacant land. Like the Santa Rosa site vicinity, nearby homes along Grand Avenue have direct access to Lake Elsinore.

The 58-acre Ortega Oaks powerhouse site lies east of Ortega Highway and south of Grand Avenue, fronting on both roads. The associated construction laydown area is within the powerhouse site. Although the site is located in unincorporated Riverside County, lands within the city of Lake Elsinore are adjacent to the site to the east, north, and west (figure 19). Although currently vacant, this site has been subdivided and approved for the development of approximately 100 single-family homes. This site and adjacent vacant property are used as a hang glider landing zone. North of the property, fronting on both Ortega Highway and Grand Avenue are a currently vacant former gasoline station and the Ortega Market. The Riverside County Transportation Commission has identified the market's parking lot as a park and ride lot. Ortega Oaks Plaza, a neighborhood-serving development with commercial uses (e.g., beauty salon, donut shop) at the first level and residential units on the second floor, lies east of the Ortega Market. Multi-family residential units are located further east along Morro Way and Grand Avenue. Single-family residences lie north and east of the site along several residential streets. The land south of the site is primarily undeveloped hillside, with limited scattered residential development and an enclosed Elsinore Valley MWD-operated reservoir located to the south-southeast. West of the site, across Ortega Highway, is a new single-family housing development. To the northwest are an existing commercial use and several new single-family homes.

Tailrace Tunnel—The tailrace tunnel sites are between the powerhouse sites and Lake Elsinore. The tailrace tunnels from the proposed Santa Rosa site or Evergreen site would cross vacant land, go under Grand Avenue, and cross residential property(ies) to the lake. The tunnel from the Ortega Oaks powerhouse site would go through or near the Ortega Oaks Plaza parking area, under Grand Avenue, and through vacant property to the lake.

Transmission Alignments—Most of the co-applicants' proposed and staff alternative transmission alignments are located within the Cleveland National Forest boundary. From an area west of the hang glider take-off points along South Main Divide Road to about one-fourth mile east of Rancho Capistrano, the central section of the proposed transmission line would be placed underground where it would cross a popular hang-gliding area above Lakeland Village, Lake Elsinore, and the city of Lake Elsinore (refer to figure 17 and section 3.3.6, *Recreational Resources*). The underground portion would also include a segment connecting to the proposed powerhouse. From this central area, the proposed alignment would cross primarily undeveloped areas. Development within 0.5 mile of the proposed transmission alignment (starting from the central point and moving north or south) includes the following:

- Proposed northern transmission alignment—El Cariso fire station, single-family homes in the growing residential area of El Cariso Village, the Glen Eden Policy Area, Glen Eden Sun Club community, Sycamore Creek community, Interstate 15, and nearby commercial properties; and
- Proposed southern transmission alignment—single-family homes in Rancho Capistrano and Lakeland Village, Wildomar OHV area, scattered single-family homes, single-family homes in the La Cresta area, USFS Tenaja guard station, scattered ranch houses, and a private landing strip.

The central section of the staff alternative transmission alignment would be similar to the proposed alignment except that the underground portion would be slightly shorter, terminating just east of the entrance road to Rancho Capistrano. Development within 0.5 mile of the staff alternative transmission alignment (starting from the central point and moving north or south) includes the following:

- Northern segment of the staff alternative transmission alignment—very similar to the proposed alignment, passing near scattered single-family homes, the Glen Eden Policy Area, Glen Eden Sun Club community, Sycamore Creek community, Interstate 15, and nearby commercial properties; and
- Southern of the staff alternative transmission alignment—single-family homes in Lakeland Village, single-family homes in the growing residential area of El Cariso Village, single-family homes in the La Cresta area, USFS Tenaja guard station, scattered ranch houses, and a private landing strip.

Future Land Uses

Prospective future land uses in the vicinity of the proposed project vary. In the absence of project development, the USFS would manage the proposed Morrell Canyon and Decker Canyon reservoir sites and the co-applicants' proposed and staff alternative transmission alignments across National Forest System lands according to current management direction. The proposed Santa Rosa and optional Ortega Oaks, and Evergreen powerhouse sites, all vacant lots, would likely be developed as single-family or multi-family residences or as small commercial developments, similar to those in the surrounding area along Grand Avenue.

Land Ownership

Within and adjacent to the project site are lands owned and/or administered by a number of governmental agencies. The lands and administering agencies include the following:

1. U.S. Department of Agriculture, Forest Service—Several of the proposed project sites would be on USFS lands within the Cleveland National Forest boundary, including the proposed and alternative upper reservoir sites and portions of both the proposed and alternative northern and southern transmission alignments.[59] The USFS has the authority to impose permit conditions on the project components on USFS lands.
2. U.S. Department of the Interior, Bureau of Land Management—A portion of the proposed and alternative southern transmission alignments would cross lands administered by the BLM. BLM has the authority to impose permit conditions on the project components on BLM lands.
3. U.S. Department of the Navy, Marine Corps—Portions of the proposed southern transmission alignment would be located within Camp Pendleton.
4. California Department of Transportation—Portions of the proposed penstock and electrical transmission systems would cross above and/or beneath Ortega Highway and the Interstate 15 corridor. Easements from the California Department of Transportation would be required to cross those rights-of-way.
5. Riverside County Habitat Conservation Agency—Between a proposed substation site and SCE's existing 500-kV Valley-Serrano transmission line are lands within the Lake Mathews/Estelle Mountain Reserve and the boundaries of the Stephens' Kangaroo Rat HCP area. Riverside County Habitat Conservation Agency, MWD, BLM, and CDFG jointly own the Lake Mathews-Estelle Mountain Reserve.

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[59] Although the proposed Santa Ana powerhouse site and the optional Ortega Oaks and Evergreen powerhouse sites are within the Cleveland National Forest boundary, they are privately owned.

6. Riverside County—Portions of the co-applicants' proposed and the northern segment of the staff alternative transmission alignment; each of the proposed northern electrical substations; segments of the proposed and alternative penstocks, tailrace, and intake structures; the proposed Ortega powerhouse site; those portions of the Evergreen and Santa Rosa powerhouse sites that are located on private lands within the Cleveland National Forest boundary; and the construction laydown areas for the all three of the proposed and alternative powerhouse sites are located in unincorporated areas of Riverside County, within the sphere of influence of the city of Lake Elsinore.

7. Orange County—Portions of the co-applicants' proposed and staff alternative transmission alignments northwest of Ortega Highway are located in Orange County.

8. San Diego County—The portions of the co-applicants' proposed and the southern segment of the staff alternative transmission alignments generally south of Tenaja Canyon and each of the co-applicants' proposed and alternative southern electrical substations are located in San Diego County.

9. City of Lake Elsinore—The city of Lake Elsinore owns the geographic area comprising the proposed lower reservoir (that is, Lake Elsinore). Elsinore Valley MWD, however, owns the waters that comprise the lake.

Plans

Cleveland National Forest Land Management Plan—The sites of several proposed and alternative project facilities occur on lands managed by the USFS according to the vision, strategy, and design criteria laid out in the Cleveland National Forest Land Management Plan (USFS, 2005b). Part 1 of the Land Management Plan describes the desired conditions the USFS is striving to realize on the national forest. Part 2 defines and describes each of the land use zones, which are the on-the-ground manifestation of the desired conditions and are the primary tools used by the USFS to describe the management intent and suitable uses for various areas of the national forest. The activities that are allowed in each zone are expected to result in progress along the pathway toward the realization of the desired condition for that zone. Part 3 of the Land Management Plan includes the design criteria that the USFS follows in implementing projects and activities over time. The following four land use zones are relevant to the LEAPS Project:

Developed Areas Interface (DAI). This zone includes areas adjacent to communities or concentrated developed areas with more scattered or isolated community infrastructure. The level of human use and infrastructure is typically higher than in other zones. The characteristic Recreation Opportunity Spectrum (ROS) objectives are Rural (R) and Roaded Natural (RN) and the zone is managed for motorized public access. While this zone may have a broad range of higher intensity uses, the management intent is to limit development to a slow increase of carefully designed facilities to help direct use into the most suitable areas. USFS managers expect that there will be some road construction, but anticipate no more than a 5 percent net increase in road mileage.

Back Country (BC). This zone includes areas that are undeveloped, with few roads. The level of human use and infrastructure is generally low to moderate. The characteristic ROS objective is Semi-primitive, Motorized (SPM), with limited areas of RN, and the zone is managed for motorized public access on designated roads and trails. A network of low standard Back Country roads provide access for a wide variety of dispersed recreation opportunities in remote areas, and some new trails may be constructed to improve opportunities between trails on the existing system. Although this zone generally allows a broad range of uses, the management intent is to retain the natural character inherent in the zone and limit the level and type of development. USFS managers expect to manage the zone for no increase or a very low level of increase in the national forest road system in this zone.

Back Country (Motorized Use Restricted) (BCMUR). Like the Back Country zone, this zone includes areas that are undeveloped, with few roads. Few facilities are found in this zone, and the level of human use and infrastructure is low to moderate. The characteristic ROS objectives are SPM and Semi-primitive, Non-Motorized (SPNM), and the zone is managed for non-motorized (mechanized, equestrian, and pedestrian) access. The zone allows for a range of low intensity land uses, and the management intent is to retain the natural character of the zone and limit the level and type of development. Some roads may be constructed and maintained, but the intent is to manage the zone for no increase or a very low level of increase in road system development.

Back Country (Non-Motorized) (BCNM). This zone also includes areas that are undeveloped with few, if any, roads. The characteristic ROS objective is SPNM. Developed facilities supporting dispersed recreation activities are minimal and generally limited to trails and signage. The level of human use and infrastructure is low. This zone is managed for a range of non-motorized uses that include mechanized, equestrian, and pedestrian public access. Administrative access, usually for community protection, is allowed by exception for emergency situations and for short duration management purposes, such as fuel treatment. The intent is to use temporary routes while management is occurring and then close or remove the route. Access to authorized facilities and to private land is not anticipated, but may occur by exception when there are existing rights to such access. Except for trails, facility construction is generally not allowed, but may occur in remote locations where road access is not needed for maintenance. Temporary facilities are expected to be removed when they are no longer needed.

Other Plans—Except where otherwise precluded, those portions of the project sites not located on public lands may be subject to the jurisdiction of the local land use entity (that is, the city of Lake Elsinore, Riverside County, Orange County, or San Diego County). Because the proposed project would be undertaken by a public entity and would be licensed by a federal agency (if approved), the proposed project would not necessarily be subject to the land use authority (city, county, or other jurisdiction) that would otherwise govern. Nonetheless, we set forth below the land use policies that generally govern land use decisions within these jurisdictions.

County of Riverside Comprehensive General Plan. Riverside County's Comprehensive General Plan, adopted October 7, 2003, provides a countywide framework for planning. It includes a General Plan that covers the unincorporated portions of the county and 19 more detailed Area Plans. The thrust of the General Plan is to manage the overall pattern of development in the county more effectively. The Area Plans are designed to provide "a clear and more focused opportunity to enhance community identity within the County and stimulate quality of life at the community level" (County of Riverside, 2003a). The Elsinore Area Plan, which encompasses most of the proposed and alternative project sites, is the detailed Area Plan that is most relevant to the proposed LEAPS Project. The Southwest Area Plan is relevant to a segment of the proposed southern transmission alignment that appears to coincide with the boundary separating the Elsinore Area Plan from the Southwest Area Plan.

The General Plan Land Use Element functions as a guide to planners, the general public, and decision makers concerning the general pattern of development. Since the Land Use Element governs how land is to be used, many of the issues and policies contained in other plan elements are linked in some degree to the Land Use Element. According to the General Plan, the population of Riverside County is expected to double between 2000 and 2020, growing by approximately 1.4 million people (County of Riverside, 2003a). Thus, the General Plan and the Land Use Element focus primarily on growth-related issues such as community design, project design, and ways to achieve an integrated and coordinated land use, open space, and transportation system. The preferred pattern is to focus growth into strategically located centers or into existing developed areas to minimize development pressures on rural, agricultural, and open space areas. The Land Use Element acknowledges the importance of infrastructure and public facilities in supporting an increase in population, but it does not directly address regional facilities such as the LEAPS Project. It accommodates support services such as governmental facilities, utility facilities (including public and private electric generating stations and corridors), landfills, airports, educational facilities, and maintenance yards with the Public Facility Area Plan Land Use Designation, which is designed to provide for adequate public facilities with the county while ensuring compatibility with surrounding land uses. The policies for public facilities state, in part, that the Public Facilities Land Use Designation is to:

1. accommodate the development of public facilities in areas appropriately designated by the General Plan and area plan land use maps;
2. require new public facilities to protect sensitive uses such as schools and residences from the effects of noise, light, fumes, odors, vehicular traffic, parking, and operational hazards;
3. require that public facilities be designed to consider their surroundings and visually enhance, not degrade, the character of the surrounding areas; and
4. require that development and conservation land uses do not infringe upon existing public utility corridors, corridors, fee owned rights-of-way, or permanent easements whose true land use is that of public facilities. This policy is to "ensure that the 'public facilities' designation governs over what otherwise may be inferred by the large-scale general plan maps" (County of Riverside, 2003a).

The General Plan addresses parks, recreational and scenic resources, seismic and geologic hazards, and other specific environmental topics in Chapter 5, the "Multipurpose Open Space Element" (County of Riverside, 2003a). These topics, as they would pertain to the LEAPS Project, are addressed for the Elsinore Area Plan in the Lake Elsinore Environs Policy Area section.

Elsinore Area Plan. Like the Riverside County General Plan of which it is a part, the Elsinore Area Plan was adopted in October 2003b. The Elsinore Area Plan describes the area setting and various communities, policy areas, hazard areas, and other attributes. Those most relevant to the LEAPS Project include the following:

1. Unique Features—Unique features include the Cleveland National Forest and the Temescal Wash. As noted previously, many of the proposed and alternative project facility sites are located within the Cleveland National Forest boundary. The co-applicants' proposed and the northern segment of the staff alternative transmission alignments cross the Temescal Wash, which is an outlet for Lake Elsinore and serves as a linkage for animals between the Santa Ana Mountain and Gavilan Hill habitats on either side of the wash.
2. Unique Communities—The Elsinore Area Plan lists five unique communities, a designation that includes unincorporated areas that may be annexed to one or more cities or special districts, incorporated as a new city, or designated as an Unincorporated Community. The proposed and optional powerhouse sites are located in the Cleveland Ridge (Lakeland Village) community, while the northernmost end of the co-applicants' proposed and the northern segment of the staff alternative transmission alignment terminates near the Warm Springs community.
3. Incorporated Cities—The proposed lower reservoir (Lake Elsinore) is within the boundaries of the city of Lake Elsinore.
4. Policy Areas—The Elsinore Area Plan lists eight special policy areas designed to address important locales that have special significance to the residents in that part of the county. Four of these are relevant to proposed or alternative project sites as follows:
   - As noted above, the northernmost end of the co-applicants' proposed and the northern segment of the staff alternative transmission alignments terminate near the Warm Springs area, which has policies to "protect the life and property of residents and maintain the character of the Gavilan Hills" through adherence to various elements of the General Plan.

- The area of the Temescal Wash that is within the 100-year flood plain is a designated policy area, with policies to encourage the maintenance of the wash in its natural state. The wash is crossed by the co-applicants' proposed and the northern segment of the staff alternative transmission alignments.
- The co-applicants' proposed transmission alignment and the staff alternative transmission alignment pass within one-quarter mile of the Glen Eden Policy Area, which calls for residential development at an average density of 2.5 units per acre, but also encourages the clustering of dwellings within an individual project to provide for the conservation of open space.
- The Lake Elsinore Environs Policy Area, which is along the west shoreline of the lake, encompasses the 100-year floodplain and an existing W-1 zoning prohibiting the development of structures. The proposed and alternative site for the water flow pipes from the powerhouse to the lake cross this policy area.

5. Rural Overlay Areas—Part of the co-applicants' proposed transmission alignment and staff alternative transmission alignment cross private property located in El Cariso Village, which is identified in the Elsinore Area Plan as a Rural Village Overlay study area. As necessary, the General Plan will be amended to establish the final Rural Village Overlay boundaries. The Rural Village Overlay allows a concentration of development within rural areas, but with the intent to control the extent and density of development in order to maintain the areas' rural character through placement of uses so that impacts from noise, light, odors, and traffic to surrounding properties are minimized (County of Riverside, 2003). Rural Village Overlay zoning classifications include Medium Density Residential (2 to 5 dwelling units per acre), Medium High Density Residential (5 to 8 dwelling units per acre), and Commercial Retail areas (County of Riverside, 2003b). The county is currently in the process of updating the zoning of all parcels to conform to the county's General Plan and the relevant Area Plans.
6. Multi-purpose Open Space—The Elsinore Area Plan indicates that the area contains significant oak woodland areas that should be protected to preserve habitat and the character of the area. This plan component is relevant to the proposed and alternative upper reservoir sites and the proposed and the southern segment of the staff alternative transmission alignments.
7. Hazards—The plan sets forth local hazard policies with respect to flooding, wildland fire hazard, seismic faults, and slope instability, indicating which hazards should be avoided entirely and which can be mitigated by special building techniques. All of these factors may be relevant to the LEAPS Project.

County of Orange General Plan. The Orange County General Plan (County of Orange, 2005a) is a blueprint for growth and development, largely implemented through zoning and subdivision decisions. All subdivision, capital improvements, development agreements, projects subject to the zoning code, specific plans, and other land use actions must be consistent with the adopted General Plan. All 34 cities in Orange County have general plans that address their individual jurisdictions. While the Orange County General Plan primarily focuses on the unincorporated area (territory that is not located within a city), the plan also addresses regional services and facilities provided by the County such as regional parks, roads, and flood control facilities. With the probability of more incorporations and city annexations in the future, the County's General Plan is expected to be consistently reevaluated to ensure its policies and programs reflect the unincorporated area's changing territory and population.

The Land Use Element of the General Plan describes objectives, policies, and land use patterns for all unincorporated territory and establishes development criteria and standards, including population density and building intensity. Land use categories are used to depict the general distribution, location, and extent of public and private uses of land. The Land Use Element has two additional purposes. First, the County intends to achieve many of the goals of the General Plan through application of land use policies. These land use policies provide a basis for the evaluation of physical development and growth trends in order to achieve the General Plan goals. Second, these policies are intended to determine land use capacities and the appropriate level of public services and infrastructure necessary to support these land uses.

The northern portion of the co-applicants' proposed and staff alternative transmission alignments cross a short distance of Orange County. This area is designated in the Land Use Element either as Cleveland National Forest or, on in-holdings within the national forest, as Open Space (County of Orange, 2005b). The Open Space category indicates the current and near-term use of the land. It is not necessarily an indication of a long-term commitment.

County of San Diego General Plan. The San Diego County General Plan divides San Diego County into a number of community planning areas. The Pendleton-De Luz Community Planning Area encompasses the area directly south of Riverside County where a portion of the co-applicants' proposed and the southern segment of the staff alternative transmission alignments are located. Under the current plan, the area is designated national forest and state parks, with some forest conservation initiative areas. There is currently no adopted plan text for that region. A new plan, referred to as General Plan 2020, is currently being developed by the county.

Aesthetics

The Lake Elsinore Project area lies on the eastern edge of the Elsinore Mountains, the southern extension of the Santa Ana Mountain range in southern California. These mountains rise above the coastal foothills east of the cities of Mission Viejo and San Juan Capistrano, reaching a peak of 3,500 feet (Elsinore Peak) near the proposed project and then abruptly descending to Lake Elsinore (long-term lake elevation between 1,240–1,249 feet msl), a depression in the geologic landscape between the Santa Ana-Elsinore coastal range and the inland hills (figure 1). The landscape character of this area can be characterized by two general descriptions: the mountainous zone and the Lake Elsinore zone.

The mountainous zone, the majority of which consists of National Forest System land as discussed above, provides a natural area with limited development surrounded by densely populated, urbanized areas all less than an hour drive away. The mountainous landscape of ridges cut by intermittent streams is covered mostly with chaparral vegetation, and the low-lying streambed areas are populated with riparian and oak woodland type communities. The short wet season followed by a lengthy warm and dry season dictate the colors and textures of the plants and hillsides within the mountainous zone. Views from the proposed project in the north-south direction include the mountains and rock outcroppings while views to the east from the ridgeline provide striking views over Lake Elsinore in the foreground and the hills beyond. Residential houses along South Main Divide Road are generally hidden from public view. Throughout the mountainous zone, intermittent streams, occasional springs, exposed rock outcrops, spring wildflowers, pockets of oak-pine woodland, and dense chaparral are common. Colors in this area vary from tans, browns, golds, grays and dull greens in the summer to bright greens and patches of flowers in the late winter/early spring mixed with the sandstone hardscape. The proposed Morrell Canyon upper reservoir site and the northern and southern portions of the proposed and staff alternative transmission alignments would be within this zone.

The Lake zone comprises the urban area of Lake Elsinore and the unincorporated area of Lakeland Village surrounding Lake Elsinore, which is situated between Interstate 15 to the east and the mountain zone to the west. This zone also includes the areas north and south of Lake Elsinore along the Interstate 15 transportation corridor. The local landscape is characterized by residential, commercial, some light industrial and mining development surrounding Lake Elsinore interspersed with patches of non-native grasslands and bare ground. Light colored stucco buildings, darker asphalt roadways, and planted landscapes are major elements in the urban and residential color scheme and texture typical of southern California, although the overall color scheme highlights the neutral colors (i.e., beige, tan, sandstones, some greens, and interspersed red tile). The larger viewscape from this zone includes the east slope of the Elsinore Mountains up to the ridgeline of the mountainous zone. The mountains are the dominant feature of the distant visual landscape while Lake Elsinore, where visible through the residential development, is the dominant feature of this visual landscape. At times from the Lake zone, both the lake and mountains are visible, making for a striking aesthetic setting of the steep mountains descending into Lake Elsinore. The proposed generation facilities, the low voltage distribution lines (115-kV) and Lake Elsinore (lower reservoir), would be within this landscape zone.

USFS Scenery Management System

The USFS Scenery Management System provides a framework for the inventory and analysis of the aesthetic values on USFS lands and is a tool for integrating the benefits, values, desires, and preferences regarding aesthetics and scenery for all levels of land management planning. Scenic Integrity Objectives (SIOs) have been designated for all areas of the national forest (see figure 20). At the project level, all national forest activities are subject to review of the SIOs. SIOs are the objectives that define the minimum level to which landscapes are to be managed from an aesthetics standpoint. The Land Management Plan assigns five SIOs to lands within the Cleveland National Forest close to proposed project areas or lands potentially influenced by project operations. The SIOs include Very High, High, Moderate, Low, and Very Low. The four SIOs that apply to the proposed project area are further described in table 20. The locations of the various SIO designations for lands within the proposed project area or lands influenced by proposed project operations are shown in figure 20 and discussed in table 21.

Table 20. Description of SIO designations and guidelines for National Forest System lands. (Source: USFS, 2005a, as modified by staff)

SIO Designation	Definition
Very High	This classification generally provides for ecological changes only. This refers to landscapes where the valued (desired) landscape character is intact with only minute, if any, deviations. The existing landscape character and sense of place is expressed at the highest possible level. The landscape is unaltered. This is synonymous with the Preservation Visual Quality Objective under the original Visual Management Plan.
High	This classification provides for conditions where human conditions are not visually evident. This refers to the valued (desired) landscape character "appears" intact. Deviations may be present but must repeat form, line, color, texture, pattern, and scale common to the characteristic landscape. The landscape appears unaltered. This is synonymous with the Retention Visual Quality Objective under the original Visual Management System.
Moderate	This classification refers to landscapes where the valued (desired) landscape characters "appears slightly altered." Noticeable deviations must remain subordinate to the landscape character being viewed. The landscape appears slightly altered. This is synonymous with the Partial Retention Visual Quality Objective under the original Visual Management System.

SIO Designation	Definition
Low	This classification refers to landscapes where the valued (desired) landscape characters "appears moderately altered." Deviations begin to dominate the valued landscape character being viewed, but they borrow valued attributes such as size, shape, edge, effect, and pattern of natural openings, vegetative-type changes or architectural styles outside the landscape being viewed. Deviations must be shaped and blended with the natural terrain (landforms) so that elements such as unnatural edges, roads, landings, and structures do not dominate the composition. The landscape appears moderately altered. This is synonymous with the Modification Visual Quality Objective under the original Visual Management System.

In addition to the Scenery Management System SIOs, the Cleveland National Forest Land Management Plan emphasizes place-based programs and goals and considers visual character and quality of an area as key attributes when identifying a place. The proposed project would be located within the Elsinore Place, which described in the plan as:

> …one of the most visible landscapes on the national forest and is maintained as an undeveloped island in the rapidly developing southern Riverside County and a natural appearing urban backdrop to the Interstate 15 corridor. The valued landscape attributes to be preserved over time are the undeveloped quality and character of the urban backdrop, including the natural appearing skyline silhouette of the Santa Ana Mountains, and the scenic integrity of areas visible from the Interstate 15 and Ortega Highway corridors.

BLM Visual Resource Management System

Because a short portion (less than 3 percent of the total line length) of the southern segment of the proposed transmission alignment would cross public land managed by BLM, a separate set of visual resource objectives is used to evaluate the aesthetic resources on BLM lands. BLM's visual resource objectives are set forth in the Visual Resource Management Program, which evaluates the quality of existing scenery by accounting for the distance from which scenery is viewed and peoples' sensitivity to changes in the landscape. The seven "key factors" used in the BLM rating procedure are landform, vegetation, water, color, adjacent scenery, scarcity, and cultural modifications. Table 22 shows BLM's system ratings and the corresponding factors. Table 23 shows the scores for the various areas of potential effect under the proposed project derived from the use of the inventory/ evaluation criteria.

Existing Site-specific Aesthetics

Upper Reservoir Sites and Construction Laydown Areas—Both the proposed Morrell Canyon and Decker Canyon upper reservoir sites are canyons in the headwaters of the San Juan Creek Watershed (see figure 18). Lion Spring, an intermittent flow of perched groundwater, is located in Morrell Canyon and supplies water to a diverse plant community (see section 3.3.4, *Terrestrial Resources*). The Morgan Trail follows Morrell Canyon, and lush growth in the canyon bottom contrasts with the typically dry, hot conditions that prevail on the trail outside the canyon.

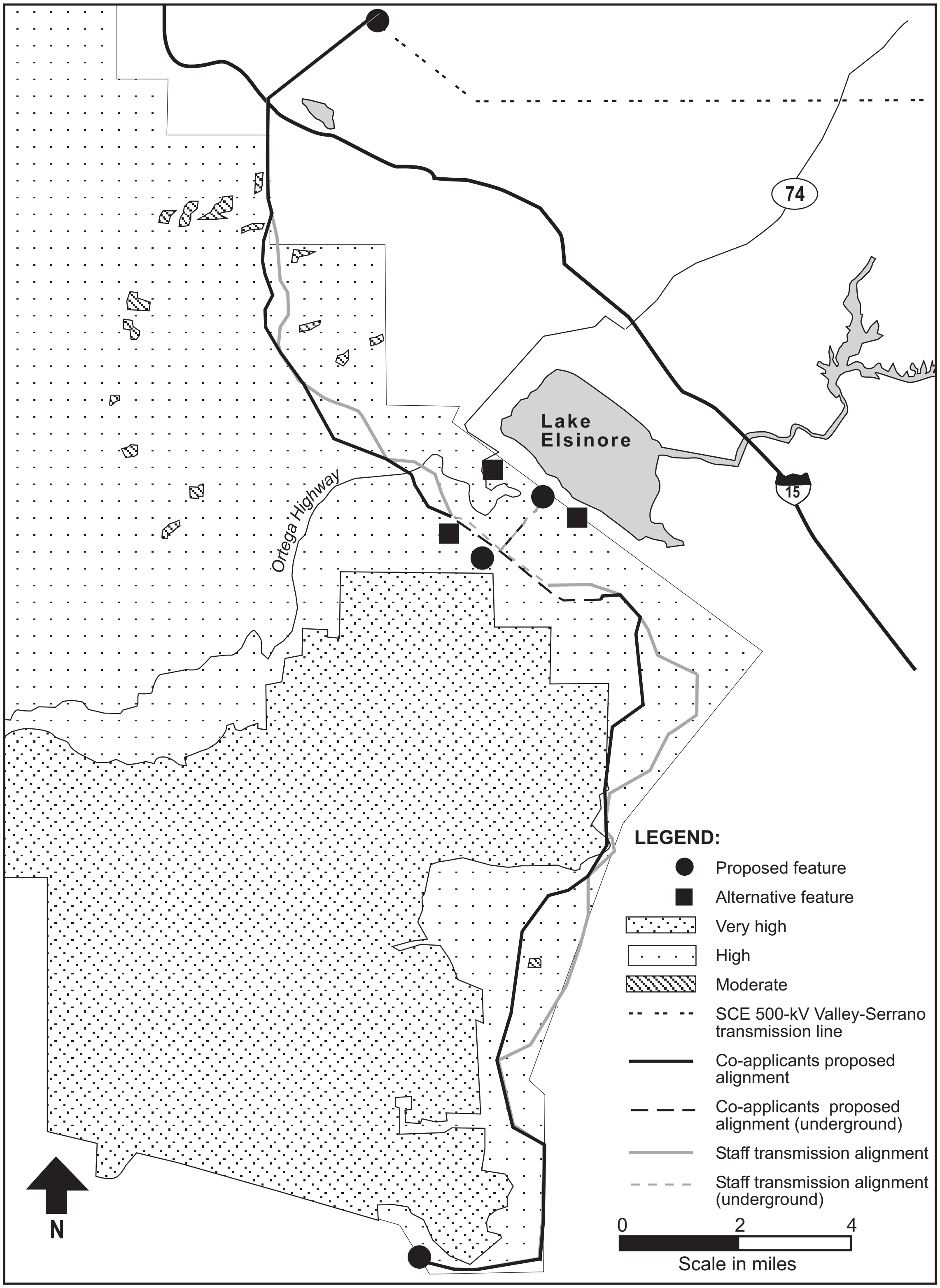

Figure 20. LEAPS Project—Scenic integrity objectives in the Cleveland National Forest and San Mateo Wilderness area. (Source: USFS, 2005a, as modified by staff)

Table 21. SIO designations for lands within the proposed project area or lands influenced by project operations. (Source: Elsinore Valley MWD and Nevada Hydro, 2004a, as modified by staff)

Project Feature	SIO Designation
Upper reservoir	The SIO for the lands where the proposed Morrell Canyon upper reservoir site and staging areas would be located is High. The SIO for the San Mateo Wilderness, located approximately 0.5 mile from the west side of the proposed Morrell Canyon upper reservoir site, is Very High.
Transmission Lines	The SIOs for those lands on which the northern portion of the proposed transmission alignment would cross the National Forest System lands are designated High, while lands on which the southern portion of the proposed transmission line would cross lands designated both High and Moderate; however, the Moderate lands represent about 2 to 3 percent of the entire line.
Proposed powerhouse sites	The proposed Santa Rosa powerhouse site and the Ortega Oaks and Evergreen powerhouse sites are outside the USFS jurisdiction and are not designated.

Table 22. BLM scenic quality scoring and evaluation criteria. (Source: Elsinore Valley MWD and Nevada Hydro, 2004a, as modified by staff)

Feature	BLM Scoring and Evaluation Rating Criteria		
Landform	5: High vertical relief (e.g., prominent cliffs, spires or massive rock outcrops) or severe surface variation or highly eroded formation including major badlands or dune systems, or detailed features, dominant and exceptionally striking and intriguing (e.g. glaciers).	3: Steep canyons, mesas, buttes, cinder cones and drumlins; or interesting erosional patterns or variety in size and shape of land forms, or detail features present and interesting though not dominant or exceptions.	1: Low rolling hills, foothills or flat valley bottoms. Interesting, detailed landscape features few or lacking.
Vegetation	5: A variety of vegetative types in interesting forms, textures, and patterns.	3: Some variety of vegetation, but only one or two types.	1: Little or no variety or contrast in vegetation.
Water	5: Clear and clean appearing, still, or cascading white water, any of which are a dominant factor in the landscape.	3: Flowing or still, but not dominant in the landscape.	0: Absent or not noticeable.
Color	5: Rich color combinations, variety or vivid color; or pleasing contrast in the soil, rock, vegetation, water, or snow fields.	3: Some intensity or variety in colors and contrasts of the soil, rock and vegetation, but not a dominant scenic element.	1: Subtle color variations, contrast, or interest, generally muted tones.

Feature	BLM Scoring and Evaluation Rating Criteria		
Adjacent Scenery	5: Adjacent scenery greatly enhances visual quality.	3: Adjacent scenery moderately enhances overall visual quality.	0: Adjacent scenery has little or no influence on overall visual quality.
Scarcity	6: One of a kind; or unusually memorable. Chance for exceptional wildlife or wildflower viewing.	2: Distinctive, though somewhat similar to others within the regions.	1: Interesting within its setting, but fairly common within the region.
Cultural Modifications	2: Free from aesthetically undesirable or discordant sights and influences or modifications add favorably to visual variety.	0: Scenic quality is somewhat depreciated by inharmonious intrusions, but not so extensively that they are entirely negated; or modifications add little or no visual variety to the area.	–4: Modifications are so extensive that scenic qualities are mostly nullified or substantially reduced.

Table 23. Existing scenic quality based on BLM Visual Resource Management inventory/evaluation criteria. (Source: Elsinore Valley MWD and Nevada Hydro, 2004a, as modified by staff).

BLM Indicator	Transmission Alignment
Landform	1
Vegetation	3
Water	3
Color	1
Adjacent Scenery	3
Scarcity	1
Cultural Modifications	0
Total	12
Scenic Quality Class Rating	B

Notes: Category A scores – 19 to 33 points

Category B scores – 12 to 18 points

Category C scores – 1 to 11 points

The view of Morrell Canyon from South Main Divide Road consists of dense stands of oak trees and other riparian vegetation in the canyon bottom surrounded by mountain tops with chamise-dominated chaparral vegetation and rock outcroppings. The view of Decker Canyon from South Main Divide road is similar to Morrell Canyon; however, the landscape lacks the mature trees and entirely comprises chaparral-chamise vegetation communities. The construction laydown area would be on the east side of South Main Divide Road in an area that is currently partially barren and used for the launching of hang gliders. Maximum viewable distances across Morrell and Decker canyons from South Main Divide Road terminate at interior mountains higher than the view point in the San Mateo Wilderness about 0.5 mile away. A portion of the view from the top of Decker Canyon extends northwest toward the confluence of Decker and San Juan Creek Canyons about 5 miles away; however, vegetation, canyon topography, and at times, atmospheric haze largely obstructs the view. Views from the construction laydown area to the west are similar to those adjacent to Morrell Canyon because of proximity while views to the east overlook Lake Elsinore, the Interstate 15 corridor, and (depending on the amount of haze in the air) beyond to more mountain ridges on the horizon.

The USFS Land Management Plan designates both the proposed Morrell Canyon and Decker Canyon upper reservoir sites and the construction laydown areas with a High SIO, based on the naturally appearing landscape. Human-made alterations exist (e.g., South Main Divide Road, Morgan Trailhead, some residential houses on private in-holdings within the forest); however, the scale of these features is not out of context for the landscape, and the overall sense of the landscape when viewed from South Main Divide Road is that it is mostly unaltered.

Powerhouse Sites—The proposed Santa Rosa, the Ortega Oaks, and the Evergreen and Ortega Oaks powerhouse sites would be located at the base of the mountains within the Cleveland National Forest boundary just west of Grand Avenue in the unincorporated area of Lakeland Village. The parcels identified for the powerhouses are on private in-holdings within the forest and, as such, do not have a SIO designation under the most recent Land Management Plan.

The land uses along Grand Avenue dictate the aesthetic feel of the area, which includes single-family residences, small commercial establishments, multi-family residential development, and vacant property. The parcel associated with the proposed Santa Rosa powerhouse site consists primarily of non-native grasses with occasional shrubs, bare land, and numerous trails or dirt roads traversing the area. Unique features visible from this parcel (other than the neighboring housing development) include the mountains to the west and partial views of Lake Elsinore, where visible, to the west through the development and landscaping. The general character of this parcel is considered open space within an urban environment. This characterization is derived from the parcel’s fairly large size and lack of development; however, it is surrounded by the urbanized areas of Lakeland Village and is subject to informal recreation uses (numerous dirt trails and roads traversing the parcel and visual evidence of illegal dumping). The landscape and visual aesthetics of this site are not unusual, but they are accentuated by the parcel’s proximity to the mountains and the striking backdrop they provide to all parcels along Grand Avenue. The Evergreen and Ortega Oaks powerhouse sites exhibit similar aesthetic qualities in that they are both currently vacant parcels within the Cleveland National Forest boundary and west of Grand Ave in Lakeland Village; they possess the same vegetation, offer the same views of the mountains to the west and obstructed views of Lake Elsinore, and are crossed by multiple dirt trails and roads. The proposed Ortega Oaks powerhouse site is somewhat different from the other two powerhouse sites in that it has less visual appeal because dispersed recreational use has exposed bare soil and the site appears considerably disturbed. Ortega Oaks parcel shares road frontage with Ortega Highway and as such is also more visible to drivers on the Highway.

Views of the foreground and middle ground (0 to 0.5 mile [foreground] and 0.5 to 5 miles [middle ground]) to the west from the proposed and alternative powerhouse sites look directly at the base of the mountains and up to the ridge line. Viewable distances to the east are obscured by residential influences and are not more than 0 to 0.5 mile in total distance.

Transmission Alignments—The majority of the northern and southern portions of the proposed and staff alternative transmission alignments would be located within the Cleveland National Forest. The central portion of the proposed transmission alignment as well as the southern portion of the northern transmission alignment and the northern portion of the southern transmission alignments would parallel the eastern side of the mountains, an area of steep, chaparral vegetated slopes between the developed areas of the Interstate 15 corridor including Lakeland Village (Lake Elsinore) and the mountain peaks.

From this central portion, the lines would extend north and south over undeveloped National Forest System lands. The aesthetic character of these lands is described above in the context of the Mountainous zone. Overall, the National Forest System lands offer views of undeveloped natural landscapes, which are a welcome contrast to the surrounding residential developments located at the base of the mountains at Lake Elsinore.

The Land Management Plan designates almost all of the forest lands the proposed and staff alternative transmission alignments would cross with a High SIO. The ridgeline and front slope (side facing Lake Elsinore and Interstate 15) is almost entirely void of human developments that contrast with the landscape character, and the mountains appear as a natural backdrop to the city of Lake Elsinore and the Interstate 15 corridor.

A short segment of the northern portion of the proposed transmission alignment would cross BLM lands northeast of Interstate 15 near the small impoundment of Temescal Wash called Lee Lake. The lands here are adjacent to the interstate and are generally steep hills with chaparral vegetation. Overall, the BLM scenic quality class of these lands within the proposed transmission alignment is B and subordinate in quality to the lands above Lake Elsinore.

Key Viewpoints Associated with the Project

Many of the features associated with constructing the proposed project would be visible from public travelways that adjoin the proposed project site. Changes to the landscape would be most visible to the public who use South Main Divide Road, Ortega Highway, and Grand Avenue and neighboring community. Other important areas with views of the proposed project features would include the surface of Lake Elsinore, Wildomar Road, Morgan Trail, and Interstate 15. Figures D-1 through D-6-b (appendix D) include photographs of the project sites before proposed construction. This appendix also contains photographs simulating views of the proposed project facilities.

Morrell Canyon (Morgan Trail)—The Morgan trailhead parking lot is on South Main Divide Road and once the trail leaves the parking lot it descends quickly into Morrell Canyon. Views along the trail vary with elevation and distance from the trailhead. Once in the canyon the trail follows the stream bed under a canopy of mature vegetation precluding views out of the canyon. At about 1 to 2 miles from the trailhead parking lot, the trail crosses the streambed and follows the terrain into the San Mateo Wilderness and continues on to a junction with Tenaja Falls Trail and then continues south toward Ortega Highway. Views from the trail between the trailhead and the Tenaja Falls Trail are limited to the sides of the canyon and the streambed which includes the dense vegetation canopy surrounding Lion Spring. The longest views are to the south toward Ortega Highway. South Main Divide Road is not visible in any view from the trail once the trail leaves the trailhead parking lot (a few hundred yards).

South Main Divide and Wildomar Roads—South Main Divide Road is a two-lane, paved, county-maintained road popular with scenic drivers. South Main Divide Road winds across the ridge of the mountains, allowing views of Lake Elsinore and beyond from various points along the road. Figures D-1a and D-1b in appendix D show the roads in proximity to the top of the ridgeline and views to the north and south. When the views are limited by vegetation and local topography the natural environment dominates the viewscape with residential driveways, gates, and fences interspersed.

Wildomar Road is a USFS road that extends across National Forest System lands to the south of South Main Divide Road and provides access to the Wildomar Campground and OHV Area. Views from this road are dominated of the mostly naturally appearing landscape save for the communication towers on Elsinore Peak and the OHV use areas that exhibit disturbances to the vegetation.

Ortega Highway—The Ortega Highway is a two-lane, paved, state highway connecting Riverside and Orange counties. This heavily traveled route is popular for scenic driving as well as commuting, and is eligible for designation as a State Scenic Highway. Travel speeds on Ortega Highway play a strong role the ability to view details in the surroundings as traffic flow is typically in the 45 to 55 mph range. Further limiting the views on Ortega Highway west of South Main Divide are the numerous turns, vegetation, and steep canyon walls on both sides of the road as the highway nears the crest. East of South Main Divide Road the landscape views open up as the highway descends the mountains with numerous vistas of Lake Elsinore and beyond.

Lake Elsinore and Nearby Communities—Boaters on Lake Elsinore are afforded 360 degree views of the lake in the near ground and the mountains in almost all directions in the distance (figures D-4 and D-5). Grand Avenue is in an area of dense residential and commercial development and carries a significant amount of local traffic near the proposed powerhouse. Views from here are predominantly residential with the mountains rising in the background to the west and Lake Elsinore, when visible through open spaces between houses and vegetation to the east.

Interstate 15—Interstate 15 is a federal interstate highway located less than 1 mile at its closest point to the east of Lake Elsinore and receives heavy commercial as well as non-commercial travel use. Similar to views from the water and eastern shore of Lake Elsinore, the most visible non-natural feature on the mountains (looking west) is the Ortega Highway road cut rising from the western shoreline of Lake Elsinore across the mountain face. It is about 4.5 miles as the crow flies from Interstate 15 to the pass where Ortega Highway crosses the mountains. The distance from Interstate 15 to the Ortega Highway reduces the effect as the mountains are striking and dominant compared to Ortega Highway. The ability to identify non-natural details on the mountains from Interstate 15 is further reduced by local topography and atmospheric haze depending on where the observer is on the interstate and the season as seen in figure D-3.

La Cresta—The community of La Cresta is located southwest of the Wildomar OHV and Campground areas outside the forest boundary on a plateau situated below the more mountainous Cleveland National Forest and above the Lake Elsinore basin. Views relevant to the proposed project are to the north into the national forest. Views into the forest are mostly naturally appearing save for the communication towers on Elsinore Peak (figures D-6 and D-7).

3.3.7.2 Environmental Consequences

Change of Land Use

National Forest System lands in southern California have been under increasing pressure to provide recreational amenities, mineral resources, and forest product resources to growing populations. Demand for these amenities can, at times, lead to conflicting uses. Change in land use from forest to utility uses can displace hunters, bikers, hang gliders, hikers, and other users from the property. Construction of hydroelectric project elements in forested areas can affect visual resources by adding new visual elements, including new roads and road cuts, clearings for transmission lines and penstocks, and other new structures, which contrast with traditional land uses.

At the same time, private land in southern California's rural areas and small towns are under increasing development pressure as people search for more affordable housing than can be found in larger cites, and as people seek rural settings for their primary residence or for weekend/retirement property. Development of utility features such as powerhouses, switchyards, and transmission lines contrasts with the visual setting and precludes other types of development that might have been planned for the same land.

Effects of Construction on Change of Land Use

Co-applicants' Proposal—The co-applicants assessed land use within and adjacent to the proposed project boundary and concluded that construction of the proposed development would have some minor to locally significant effects on land use in the area. The co-applicants propose the following site-specific measures to address these effects:

- At the proposed Morrell Canyon upper reservoir site, reroute Morgan Trail, if necessary, to go around the upper reservoir.
- At the proposed Santa Rosa powerhouse site and laydown area, acquire the Santa Rosa Mountain Villa apartments (and possibly other nearby properties); provide appropriate relocation assistance to displaced individuals, families and businesses as may be required under the provisions of Section 7260-7266 of the California Government Code and Section 33410-33418 of the California Health and Safety Code; use the acquired properties for construction purposes or retain the improvements in vacant condition; and, upon completion of construction, return the properties to the regional housing inventory or other productive reuse.
- At the optional Ortega powerhouse site, if it were selected, develop a formal hang glider landing site, provide for a community park, and use a northern transmission alignment.
- At the optional Evergreen powerhouse site and laydown area, if they were selected, purchase the laydown area property and Lakeland Village Plaza, and possibly other properties, to minimize potential construction-related impacts, returning the properties to productive reuse following construction.
- Prepare a plan to avoid or minimize disturbances to the quality of the existing visual resource of the project area.

Effects Analysis

The proposed Morrell Canyon upper reservoir site is designated Conservation—Habitat on the Riverside County General Plan (General Plan) map (County of Riverside, 2005). Upper reservoir construction at the proposed Morrell Canyon site would eliminate the site's current forest habitat and replace it with a water body dedicated to power generation. As described in section 3.3.6.2, *Environmental Consequences, Construction Effects on Dispersed Recreation*, construction of the upper reservoir at the proposed Morrell Canyon site would permanently change the land use from forest habitat and dispersed recreation to a utility use. The co-applicants' proposal to reroute the affected portion of Morgan Trail would provide for continuation of the recreational use nearby.

The proposed Santa Rosa powerhouse site is designated Medium Density Residential on the General Plan map (County of Riverside, 2005). Although currently vacant, the site is crisscrossed by several dirt roads that suggest it may be used for dispersed recreation. Construction at the Santa Rosa site would replace any current use of the site with a utility (power generation) land use, including an underground powerhouse and aboveground substation, permanently changing the land use to a utility use. It would also prevent the currently vacant property from being developed for other uses, such as the residential use designated in the General Plan. Noise and dust during construction would likely affect those residing nearby, although the effects would be temporary and within applicable standards, as described in section 3.3.10.3, *Environmental Consequences*, in *Air Quality and Noise.*

The proposed Santa Rosa powerhouse construction laydown area is designated Medium Density Residential on the General Plan map (County of Riverside, 2005). The site is a vacant parcel near the Butterfield Elementary Visual and Performing Arts Magnet School and multi-family residences. The co-applicants' planning area for the site encompasses both the proposed 20-acre laydown area and the privately-owned parcels that separate the laydown area from the school. The co-applicants state that inclusion of the privately-owned parcels in their planning area "is intended to ensure appropriate site planning and to allow for the subsequent acquisition of those properties, if such acquisition is deemed warranted for environmental and/or access reasons" (Elsinore Valley MWD and Nevada Hydro, 2004a). During construction, the laydown area would contrast with the neighboring land uses in the scope and scale of the waste materials, soil piles, and equipment storage. These impacts on neighboring properties would be ongoing until the co-applicants reclaim the site. The co-applicants' proposal to acquire the 12-unit Santa Rosa Mountain Villa apartments near the site, and possibly other nearby properties as well, would increase the distance of the construction site to the nearest residence, reducing residents' exposure to construction impacts. Long term use of the proposed Santa Rosa construction laydown area is uncertain, but the co-applicants propose to return the property to productive reuse.

The proposed tailrace tunnel from the Santa Rosa powerhouse site to Lake Elsinore would be constructed underground, across currently vacant land. Construction of the tunnel would require clearing and the use of heavy equipment in the otherwise undisturbed mix of vacant, residential, and commercial properties. It is likely that dust and noise would be generally dispersed above the developed areas along Lake Elsinore. Construction of the tunnel would displace recreational users of Lake Elsinore to the remainder of the lake, as described in section 3.3.6.2, *Environmental Consequences, Construction Effects on Lake Elsinore Recreation.*

The northern and southern segments of the co-applicants' proposed transmission alignment would be located primarily on undeveloped lands, but the alignment would cross a limited number of forest in-holdings upon which easements or other rights-of-way would be required. A few existing residences could be displaced by transmission line construction along the alignment, and a private airstrip near the alignment could be made unusable. The co-applicants and affected property owners could find it advantageous for the co-applicants to acquire fee simple interests in some properties.

As with the construction of other project features, noise and dust during construction would likely affect those residing nearby, although the effects would be temporary and within applicable standards, as described in section 3.3.10.3, *Environmental Consequences*, in *Air Quality and Noise*. The potentially affected residents include those residing in homes within one-quarter mile of the proposed alignment, as well as in nearby neighborhoods such as El Cariso Village, Sycamore Creek (planned), Glen Eden Sun Club, and La Cresta. Potential effects on recreational use of the area are addressed in section 3.3.6.2, *Environmental Consequences, Construction Effects on Dispersed Recreation*. Along the southern segment of the proposed transmission alignment, use of the existing range allotments would likely be curtailed during construction, and animals would need to be provided with alternative grazing sites. This topic could be addressed as part of a road and land management plan for the project.

Staff Alternative—Upper reservoir construction at the Decker Canyon site, which is designated Conservation-Habitat in the Riverside County General Plan (County of Riverside, 2005) would have effects similar to the co-applicants' proposal.

The effects of constructing the powerhouse at the Santa Rosa site would be the same under the staff alternative as under the co-applicants' proposal. That is, the impacts on neighboring properties would be ongoing until the co-applicants reclaim the site, but the co-applicants' proposal to acquire nearby properties would increase the distance of the construction site to the nearest residence, reducing residents' exposure to construction effects.

Construction effects on the staff alternative transmission alignment would be similar to the co-applicants' proposal, with the exception that there are more residential uses near the staff alternative transmission alignment. The northern and southern segments of the staff alternative transmission alignment are located primarily on undeveloped lands, although a limited number of homes or buildings would need to be razed or moved to accommodate transmission line construction along the alignment, and a private airstrip along the alignment could become unusable.

The southern segment of the staff alternative transmission alignment would cross more private lands, such as the La Cresta area; 13.4 miles of the staff alternative transmission alignment lie across or within 0.25 mile of private land parcels, compared to 6.1 miles of the co-applicants' proposed transmission alignment (see table 24). Noise and dust during construction would likely affect those residing nearby, although the effect would be temporary and would not exceed applicable standards, as described in section 3.3.10.3, *Environmental Consequences*, in *Air Quality and Noise.* Potential effects on recreational use of the area are addressed in section 3.3.6.2, *Recreation, Environmental Consequences, Construction Effects on Dispersed Recreation.*

Table 24. Comparison of proposed and alternative alignments proximity to privately owned parcels and land zoned for residential uses. (Source: Staff)

Environmental factor	Unit	Co-applicants' Proposed Alignment	Staff Alternative Alignment
Privately owned lands	Number of parcels within 0.25 mile of midpoint of alignment	406	452
Privately owned lands	Length of alignment crossing or within 0.25 mile of private lands	6.1 miles	13.4 miles
Lands zoned for residential use (5 to 20 acres or more)	Length of alignment crossing or parallel to these zones	8.6 miles	15.9 miles

Optional Ortega Oaks or Evergreen Powerhouse—The 58-acre Ortega Oaks powerhouse and construction laydown site is designated Medium Density Residential on the General Plan map (County of Riverside, 2003a). The site is currently vacant, but has been subdivided and approved for the development of approximately 100 single-family homes. Part of the site is also used as a hang glider landing site. Construction at the Ortega Oaks site would replace any current use of the site with a utility (power generation) land use, including an underground powerhouse and aboveground substation and would provide a formal hang gliding site.

Construction of the powerhouse and substation at the Ortega Oaks site would permanently change the land use to a utility use. It would also prevent the selected property from being developed for other uses, such as the residential use designated in the General Plan and already approved by the Riverside County Board of Supervisors. The co-applicants' proposal to provide a community park and to provide powerhouse tours would provide for a recreational use of the property in the long term.

The 75-acre Evergreen powerhouse site is designated Medium Density Residential on the General Plan map (County of Riverside, 2005). Although currently vacant, the site is crisscrossed by several dirt roads that suggest it may be used for dispersed recreation. Construction at the Evergreen site would replace any current use of the site with a utility (power generation) land use, including an underground powerhouse and aboveground substation.

Construction of the powerhouse and substation at the Evergreen site would permanently change the land use to a utility use. It would also prevent the selected property from being developed for other uses, such as the residential use designated in the General Plan. The co-applicants' proposal to establish a botanical garden on the property and to provide powerhouse tours would provide for a recreational use of the property in the long term.

The 30-acre Evergreen powerhouse construction laydown area is designated Medium Density Residential on the General Plan map (County of Riverside, 2005). Use of this land during construction would contrast and possibly conflict with neighboring land uses, by adding heavy industrial activity near residential and commercial areas. These impacts would be ongoing for the full construction period and would be mitigated once the co-applicants reclaim the area. The co-applicants' proposal to purchase the laydown area property and Lakeland Village Plaza would increase the distance of the construction site to the nearest potentially affected users, reducing others' exposure to construction impacts.

Effects of Operation on Change of Land Use

Co-applicants' Proposal—The co-applicants assessed land use within and adjacent to the proposed project boundary and concluded that operation of the proposed development would have some minor effects on land use in the area. The co-applicants propose the following site-specific measures:

- At the proposed Santa Rosa or optional Evergreen powerhouse sites, if it were the selected site, establish a botanical garden at the site once the powerhouse and substation are in place, and provide tours of the powerhouse.
- At the optional Ortega Oaks powerhouse site, if it were selected, provide for a community park and develop a formal hang gliding landing site.

Effects Analysis

For the proposed Morrell Canyon upper reservoir site and any substation sites, the land use would remain altered as long as the facilities were in place. At other proposed project sites, construction would not preclude other land uses during subsequent project operation.

The co-applicants propose to prepare a plan to avoid or minimize disturbances to the quality of the existing visual resource of the project area and to mitigate for project effects on visual resources and to reduce the contrast between the project and the surround landscapes. Creating a botanical garden and providing powerhouse tours at the Santa Rosa powerhouse site, as proposed by the co-applicants, would allow for ongoing recreational use of the utility site. The construction laydown area associated with the Santa Rosa powerhouse site could be developed as residential property, as it is designated in the General Plan.

Once landscaped, the powerhouse would receive regular use by the co-applicants' personnel, but on a scale consistent with neighboring commercial uses. If the co-applicants make a concerted effort to landscape the buried powerhouse site and the surrounding property, the site would blend with neighboring uses. The co-applicants' proposal to establish a botanical garden on the property and to provide powerhouse tours would provide for ongoing recreational use of the property of a different character than currently exists.

The northern and southern segments of the co-applicants' proposed transmission alignment, left undisturbed, could return to their use as wildlife habitat and/or grazing lands. Operation of the transmission line along the northern and southern segments of the co-applicants' proposed alignment could affect future development of nearby lands, although the extent of this potential effect cannot be determined. For the most part, the proposed transmission alignment avoids lands that are designated for residential development crossing or paralleling about 8.6 miles of such lands. These lands are generally designated in the current plan with 5- to 20-acre lot size restrictions, but includes some lands in El Cariso Village that may be rezoned at much greater densities under General Plan amendments,

Some sites near the transmission alignment could be less desirable for development, although development pressures in the area suggest that all developable lands may ultimately be developed (see section 3.3.8, *Socioeconomic Resources*).

Staff Alternative—Similar to the co-applicants' proposal, the Decker Canyon upper reservoir would permanently alter the land use from forest habitat to utility use. The construction laydown area associated with the Decker Canyon site could be rehabilitated for future recreation or habitat use.

As described for the co-applicants' proposal, creating a botanical garden and providing powerhouse tours at the Santa Rosa powerhouse site would allow for ongoing recreational use of the utility site. The construction laydown area associated with the Santa Rosa powerhouse site could be developed as residential property, as it is designated in the General Plan.

The northern and southern segments of the staff alternative transmission alignment, reclaimed, could return to their use as wildlife habitat and/or grazing lands. As with the co-applicants' proposal, operation of the transmission line along the northern and southern segments of the staff alternative transmission alignment could affect future development of nearby lands, although the extent of this potential effect cannot be determined. The staff alternative transmission alignment would cross or parallel about 15.9 miles of land designated for residential development under the General Plan, including about 13.4 miles in or near the edge of the La Cresta area, about 0.5 mile near the El Cariso Rural Village Overlay area, and 2.0 miles between the planned Sycamore Creek community and the Glen Eden Sun Club community. Home sites near the transmission alignment could be less desirable for development, although development pressures in the area (see section 3.3.8, *Socioeconomic Resources*) suggest that all developable lands may ultimately be developed.

Optional Ortega Oaks or Evergreen Powerhouse—Use of the Ortega Oaks powerhouse site would provide a formal site for a hang gliding, but would preclude residential use of the site. As with the co-applicants' proposal, a botanical garden and powerhouse tours at the Evergreen powerhouse site would allow for recreation use of the site. The construction laydown area associated with the Evergreen powerhouse site could be developed as residential property, as it is designated in the General Plan.

Infrastructure

Construction for utility purposes in developed areas, especially underground construction such as that associated with the proposed powerhouse and tailrace canal, can disrupt existing storm-water drainage systems or put them at risk. Further, the project, including transmission lines, would be located within 2 miles of the Skylark Airport, which could interfere with approach and take-off patterns in the area. Project transmission lines would also fall within 3,000 feet of a private air strip, and could also potentially affect military training and other operations in and around Camp Pendleton.

Effects of Construction and Operation on Infrastructure

A county-maintained storm drain facility is located at the proposed Santa Rosa powerhouse construction laydown area, and the co-applicants have indicated that project construction could adversely affect one or more Riverside County Flood Control District facilities, such as the Ortega debris basin. In its comments on the draft EIS, Riverside County indicated that a major portion of the proposed project is located within Flood Control District's preliminary Lakeland Village Master Drainage Plan boundary and the proposed alignment for the powerhouse and the inlet/outlet structure may be in potential conflict with one of its proposed facilities. The co-applicants propose additional consultation with Flood Control District and indicate that the co-applicants will formulate detailed plans to ensure that the proposed project does not adversely affect existing county facilities and that project-related drainage is fully mitigated both during construction and during the project's operational life. Consultation with Flood Control District would address both existing and proposed Flood Control District facilities.

In its April 28, 2005, letter to the Commission, Riverside County states that any work that involves Riverside County Flood Control District rights-of-way, easements, or facilities would require an encroachment permit from the Riverside County Flood Control District. Additionally, the Riverside County indicates that any facility construction within a road right-of-way that could affect Riverside County Flood Control District storm drains should be coordinated with the Riverside County Flood Control District.

The co-applicants do not propose any specific measures to address potential project-related effects on the Skylark Airport. No stakeholders expressed specific concern about the effects of construction or operation activities on the Skylark Airport. However, in its April 28, 2005, letter to the

Commission, Riverside County indicated that the project would require Airport Land Use Commission review if any part of the project is taller than 200 feet. In response to the letter, the co-applicants indicate that the transmission towers would be 120 to 170 feet tall and would lie below the ridgeline in the area between Elsinore Peak and the airport.

The co-applicants do not propose any specific measures to address potential project-related effects on the private landing strip located within 3,000 feet of the co-applicants' proposed southern transmission alignment. Several stakeholders commented that the proximity of the transmission alignment to the airstrip would make it unusable.

With respect to potential transmission alignment effects on Camp Pendleton operations, the co-applicants propose to demarcate the transmission lines (for example, by installing ball markers) and follow Federal Aviation Administration requirements.

Effects Analysis

The proposed Santa Rosa powerhouse and associated inlet/outlet structure could affect the existing storm drain system and could conflict with proposed District drainage facilities, both from runoff associated with new impervious surfaces and from the laydown area. The co-applicants' proposal to consult with the District and prepare a drainage plan would help prevent adverse construction-related effects on flood control and drainage facilities associated with the Santa Rosa powerhouse site.

The proposed transmission line would include towers approximately 170 feet tall within 2 miles of the Skylark Airport. Towers of that height and the conductors strung between the towers would not be high enough to pose a safety hazard to aircraft operating according to standard flight rules. Thus, although it would be built within 2 miles of the Skylark Airport at its nearest point, the southern segment of the proposed transmission alignment would not interfere with or cause a safety hazard with respect to airport operations. Nonetheless, consultation with the airport before and during construction would help ensure that project features would not interfere with flight patterns in the area.

The co-applicants' proposed transmission alignment is within 3,000 feet of a private airstrip, which could render the airstrip unusable. Although the owner of the property would have to be compensated for loss of the property's use, people who currently use the strip for pleasure flying or commuting could lose that resource.

The proximity of the co-applicants' proposed transmission alignment to Camp Pendleton could potentially affect military training and other operations, including helicopter flights in and around the area. The co-applicants' proposal to demarcate the transmission lines and follow Federal Aviation Administration requirements would minimize the potential for conflicts. The co-applicants note that consultation with the Department of the Navy would help ensure that any project facilities near Camp Pendleton adequately address the Navy's safety needs and operation requirements.

Staff Alternative—As with the co-applicants' proposal, construction and operation of the Decker Canyon upper reservoir is unlikely to affect the county's storm drainage system.

As with the proposed transmission alignment, the staff alternative transmission alignment would be unlikely to affect the county storm drain system. Nonetheless, consultation with the county and preparation of a storm water drainage plan would alleviate any potential effects on the county storm drain infrastructure.

The southern segment of the staff alternative transmission alignment would be constructed about 1.5 miles from the Skylark Airport at its nearest point. The staff alternative transmission alignment would not be expected to pose a safety hazard to aircraft operating according to standard flight rules. As with the co-applicants' proposal, consultation with the airport prior to constructing any transmission facilities within 2 miles of the airport would help alleviate construction related effects on the airport.

The staff transmission line would have the same potential effects on the private airstrip and Camp Pendleton operations as the proposed alignment. That is, the private airstrip could be rendered unusable, but any effect on Camp Pendleton operations could be mitigated through adherence to Federal Aviation Administration requirements and consultation with the Department of the Navy with respect to its safety needs and operational requirements.

Optional Ortega Oaks or Evergreen Powerhouse—Powerhouse construction at the Ortega Oaks or Evergreen powerhouse sites could affect the county's storm drain system, although the potential conflict does not appear to be of the same magnitude as at the proposed Santa Rosa site. Consultation with the county and preparation of a storm water drainage plan should alleviate effects on the county storm drain infrastructure.

Consistency with Land Management Plan

The Cleveland National Forest Land Management Plan identifies uses, including road construction, that are considered suitable for each land use zone. Utility structures alter the setting and may conflict with the intended condition of some zones. New roads affect land use by providing public access in areas that are otherwise difficult to reach. Further, new roads can add new visual elements to the landscape, such as road cuts and tree clearing, that contrast with traditional land uses.

Effects of Construction and Operation of Project Facilities, Including Temporary Roads

Co-applicants' Proposal—The co-applicants indicate that new, temporary roads may be needed for construction and installation of transmission facilities within the Cleveland National Forest. The co-applicants propose that temporary construction roads would be installed only subject to USFS approval and in accordance with USFS policies, where environmental impacts could be effectively mitigated. The co-applicants also indicate that, except where the USFS authorizes continued use of the roads for transmission line maintenance, the co-applicants would remove the roads following completion of construction, would recontour the roads to prevent future unauthorized use, and would landscape the area with native plants.

In its revised preliminary 4(e) conditions, USFS recommends three standard 4(e) conditions and one specific 4(e) condition that are relevant to the co-applicants' management of any temporary construction roads on National Forest System lands. The standard conditions reserve the right of the United States to have unrestricted use of any roads on the National Forest (standard condition no. 10); indicate that the co-applicants must confine all project vehicles to roads or specifically designed access routes and that the USFS may close any routes where damage is occurring to the soil or vegetation (standard condition no. 11); and indicate that the co-applicants must maintain all of the project improvements on National Forest System lands to standards of repair, orderliness, neatness, sanitation, and safety acceptable to USFS (standard condition no. 12). Specific condition no. 26 recommends that the co-applicants prepare and file with the Commission a USFS-approved Project Road and Traffic Management Plan that would, among other elements, have the co-applicants consult with the USFS in advance of performing any road construction, realignment, maintenance, or closure involving USFS roads; cooperate with the USFS on the preparation of a condition survey and proposed maintenance plans subject to USFS approval; maintain affected non-USFS roads to the appropriate state and/or county standard; and identify the co-applicants' responsibility for road maintenance and repair costs commensurate with their use and any other project-induced use.

Effects Analysis

The co-applicants do not address the consistency of their proposed project features with the Land Management Plan. Table 25 summarizes the Cleveland National Forest Land Management Plan description of suitable land uses that are relevant to the LEAPS Project.

Table 25. Suitable uses by land use zone. (Source: USFS, 2005b)

Activity or Use	Developed Areas Interface	Back Country	Back Country Motorized Use Restricted	Back Country Non-Motorized
Authorized motorized use	Suitable	Suitable	Suitable	By exception
Major utility corridors	Designated areas	Designated areas	Designated areas	Not suitable
Road construction or re-construction	Suitable	Suitable	Suitable for authorized use	Not suitable
Developed facilities	Suitable	Suitable	By exception	Not suitable

Note: By exception means that conditions that are not generally compatible with the land use zone but may be appropriate under certain circumstances.

The Morrell Canyon upper reservoir site is located in the Back Country Motorized Use Restricted zone, which allows for developed facilities on a exception basis. The proposed road around the reservoir would also be suitable for this zone. The USFS could consider utility facilities as a suitable use by exception in this land use zone.

The issue of compatibility with the Land Management Plan and construction of new, temporary roads is most relevant to the proposed and alternative transmission line routes. Given the issues associated with road construction on steep slopes (for example, accelerated erosion and the visual effects of large cut-and-fill slopes), it is assumed that the co-applicants' proposal with respect to temporary roads would be applicable only for sections of the transmission alignment where slopes are less than 15 percent. On slopes greater than 15 percent, helicopter construction would be required and no roads would be constructed. Table 25 provides an estimate of the miles of transmission line that would occur on slopes greater than and less than 15 percent, by land use zone. Table 26 indicates that only 22 percent of the co-applicants' proposed alignment is on slopes less than 15 percent and is eligible for possible road construction. For purposes of analysis, it is assumed that the miles of road constructed in areas with slopes less than 15 percent would equal 1.5 times the miles of transmission line.

Table 26. Transmission line mileage by slope and land use zone. (Source: Staff)

Cleveland National Forest Land Use Zone	Total (miles)	Slope Less Than 15% (miles)[a]	Slope Less than 15% (percent)	Road Miles
Co-applicants' Proposed Transmission Alignment				
Developed areas interface	7.3	2.4	7.5	3.6
Back country	12.5	2.5	7.5	3.6
Back country motorized use restricted	4.7	0.5	1.6	0.9
Back country non-motorized	4.0	0.4	1.2	0.6
Outside Cleveland National Forest	3.4	1.4	4.2	2.1
Wilderness	0.2	0	0	0
Total	32.1	7.2	22	10.8

Cleveland National Forest Land Use Zone	Total (miles)	Slope Less Than 15% (miles)[a]	Slope Less than 15% (percent)	Road Miles
Staff Alternative Transmission Alignment				
Developed areas interface	7.4	1.8	5.9	2.6
Back country	13.2	1.1	13.5	1.7
Back country motorized use restricted	4.5	1.6	5.2	2.4
Back country non-motorized	2.7	0.7	2.1	1.1
Outside Cleveland National Forest	3.9	1.0	3.3	1.5
Total	31.7	6.2	20	9.3

[a] Each entry in this column represents miles of transmission line. Miles of new, temporary road would equal 1.5 times this number.

In terms of consistency with the Land Management Plan, the co-applicants' proposed transmission alignment would include the following attributes:

- Suitable uses—7.2 miles of road in the Developed Areas Interface and Back Country zones (although road construction is not encouraged in these zones);
- Uses suitable in designated areas—24.5 miles of major utility corridor in the Developed Areas Interface, Back Country, and Back Country Motorized Use Restricted zones;
- Uses suitable for authorized use—0.9 mile of road in the Back Country Motorized Use Restricted zone (although road construction is not encouraged in this zone); and
- Not-suitable uses—4 miles of transmission line and 0.6 mile of road in the Back Country Non-Motorized zone.

For the co-applicants' proposed transmission alignment, the co-applicants' proposal would introduce a permanent utility corridor and developed facilities into areas where they do not currently occur. The co-applicants' proposal to remove temporary access roads, recontour road beds to follow the original contour, and replant with native landscaping after construction would help prevent new public access to remote areas. Further, the proposal would help mitigate for the visual effects of road scars.

The USFS' revised preliminary 4(e) conditions would improve upon the co-applicants' proposal and would further assure that the co-applicants adequately rehabilitate temporary roads by closing roads where resource damage is occurring, maintaining roads to USFS standards, and developing and implementing a road management plan for USFS roads within the project boundary. These measures, in combination with the co-applicants' proposal, would help reduce the potential for long-term visual and land use issues that may occur from construction. Over time, the temporary construction roads associated with transmission line construction could return to use as wildlife habitat and/or grazing lands after the co-applicants implement their proposed recontouring and revegetation program. Nonetheless, the co-applicants' proposed transmission line would not be consistent with the Land Management Plan land use zones insofar as 4 miles of transmission line and 0.6 mile of road would be routed through the Back Country Non-Motorized zone. A Land Management Plan amendment would be required before construction could occur on the proposed alignment. Avoiding the Back County Non-Motorized zone would not be feasible because the alignment is along the Cleveland National Forest boundary in those areas, and any re-routing would require either a major increase in the length of the line or shifting the alignment onto private land that has been and is continuing to be developed for residential uses.

Staff Alternative—The Decker Canyon upper reservoir site is partially located in the Developed Areas Interface zone and partially located in the Back Country Motorized Use Restricted zone. The USFS could consider utility facilities as a suitable use by exception in this land use zone.

The staff alternative transmission alignment would cross slightly less area of slopes less than 15 percent and would therefore allow for slightly less temporary road construction (9.3 miles) compared to the proposed route (10.8 miles). In terms of consistency with the Land Management Plan, the staff alternative transmission alignment would include the following attributes:

- Suitable uses—4.3 miles of road in the Developed Areas Interface and Back Country zones (although road construction is not encouraged in these zones);
- Uses suitable in designated areas—25.1 miles of major utility corridor in the Developed Areas Interface, Back Country, and Back Country Motorized Use Restricted zones;
- Uses suitable for authorized use—1.1 miles of road in the Back Country Motorized Use Restricted zone; and
- Not-suitable uses—2.7 miles of transmission line and 1.1 miles of road in the Back Country Non-Motorized zone.

Like the co-applicants' proposed transmission alignment, the staff alternative transmission alignment would introduce a permanent utility corridor and developed facilities into areas where they do not currently occur. The effect of the co-applicants' road management plan and the USFS road management recommendations would be similar to those described for the co-applicants' proposal. While the staff alternative transmission alignment would reduce the number of miles of transmission line within the Back Country Non-Motorized zone (2.7 miles compared to 4 miles under the co-applicants' proposal), this alternative would still not be consistent with the Land Management Plan land use zones. As with the co-applicants' proposed alignment, a Land Management Plan amendment would be required before construction could occur on the staff alternative transmission alignment. Avoiding the Back Country Non-Motorized zone would not be feasible for the same reason cited for the co-applicants' proposal.

The cost estimate for road and traffic management plans is presented in section 4.0, *Developmental Analysis,* and measures included in the staff alternative are discussed in section 5.2, *Discussion of Key Issues.*

Aesthetic Resources

Effects of Construction on Viewsheds

Construction and operation of the proposed project and alternatives would introduce new visual elements into the viewsheds of the Cleveland National Forest, San Mateo Wilderness Area, BLM lands, and the small villages along the western shore of Lake Elsinore. These would include views of pooled water at the upper reservoir, dams, power lines, and fences, graded landscapes and buildings.

Co-applicants' Proposal—Prior to any ground disturbing activities the co-applicants propose to file with the Commission plans to mitigate and minimize the effects of construction activities on the aesthetic environment. Additionally, the co-applicants propose to clear and re-vegetate the construction lay down area consistent with their intention to provide the USFS with a cleared and graded site that could then be developed for a future recreational use. The co-applicants also plan to landscape the face of the dam once construction is completed.

The USFS revised preliminary 4(e) condition no. 37 stipulates the co-applicants file with the Commission a scenery conservation plan within 1 year of license issuance or prior to any ground disturbing activities. The purpose of the plan is to identify actions that would minimize the project's visible disturbance to the naturally established landscape. In order for the plan to achieve the greatest consistency with the "High" Scenic Integrity Objective, the project shall integrate certain design recommendations into the scenery conservation plan for the following features: (1) powerlines; (2) reservoir; (3) roads; (4) penstock pipes; and (5) structures.

Effects Analysis

Overall, construction of the proposed upper reservoir, laydown area, and associated structures would directly affect approximately 150 acres of lands and would require about 3 million cubic feet of earthwork. Excavation of the water conduit tunnels would likely result in of the temporary storage of earthen materials at the 20- to 40-acre laydown area near the powerhouse. The upper reservoir construction activities would be limited to a single canyon near the point of entry into the Cleveland National Forest, which is at the urban-forest interface. Views of the proposed Morrell Canyon upper reservoir site from South Main Divide Road would first appear to the public in the middleground (0.5 to 4 mile) and transition to the foreground (0 to 0.5 mile). Hikers on the realigned Morgan Trail would have foreground views of the proposed upper reservoir.

Constructing the proposed upper reservoir at Morrell Canyon would negatively affect aesthetic resources by eliminating a natural appearing canyon with oak woodland vegetation and replacing it with a reservoir, perimeter dike, and chain link fence, as shown in graphic simulations contained in the co-applicants' license application. Construction would entail using vehicles, trailers, equipment, materials, laborers, earthen debris, and fencing along South Main Divide Road near Morrell Canyon. The area would be de-vegetated, re-graded, leveled, barricaded, lined, and filled. Effects from construction on the visual resources would last for up to 3 years. This construction activity, while isolated to the single canyon, would be a condition where human alterations would be extremely visually evident from Morgan Trail, the San Mateo Wilderness, and segments of South Main Divide Road, which would be inconsistent with the High SIO set by the Cleveland National Forest for this area.

Construction would significantly alter the landscape character along South Main Divide Road and would dominate the foreground views along the road between Ortega Highway and Rancho Capistrano where the transmission lines would be buried. Traffic estimates provided by the co-applicants registered 515 vehicles on a single day in July 2002 at the intersection of South Main Divide Road and Ortega Highway. It is likely that the majority of these vehicles originate from the Rancho Capistrano residential community, located beyond the proposed upper reservoir site and these people would see the construction work on a daily basis for period of up to 3 years.

Because of its location on the ridge top and unobstructed setting, a portion of construction activities at the staging area and the perimeter dike would be visible from significant portions of the Lake Elsinore community and Lake surface and potentially from as far away as Interstate 15. The potential effect of these construction activities on noise levels in the project area are discussed in section 3.3.10.

Construction activities around the proposed powerhouse site would involve the excavation of approximately 776,000 cubic yards of soil from the water conduits, penstock, powerhouse cavern and shaft, transformer gallery, surge shaft, draft tubes, tailrace tunnels, and intake/outlet structure (see section 2.3.2, *Construction Sequence*, in *Co-applicants' Proposal*). Construction activities would also affect about 30 acres of the powerhouse site and another 20 acres for staging construction activities. The landform in this area would be leveled, excavated, and built into and transformed from open space to a functioning underground powerhouse with above ground switchyard and associated features. Effects from construction would be the presence of large excavation work, earthen debris, an open construction site and dust, noise and construction related traffic (discussed further in section 3.3.8, *Land Use*). These effects would last for the duration of the construction of these facilities (about 3 years). Excavation of the sediments to tunnel the inflow/outlet pipes to the powerhouse would occur within a cofferdam separating the working area from the lake water, minimizing any effects on water resources as described in section 3.3.2, *Water Resources*.

Construction of 32 miles of transmission lines and an estimated 167 towers would require access roads that have yet to be planned or surveyed. Constructing the access roads would cause visible scars, especially where there is side-casting of waste materials along the roads and where trees are felled. The presence of road cuts and transmission line would introduce linear elements into the predominately natural appearing mountain sides within the Cleveland National Forest. Furthermore, the vegetation type consists of generally low, brush type shrubs whose effectiveness at screening these tall and linear features would be marginal. Laying the underground portion of the proposed transmission alignment would require exposing a linear trench in close proximity to South Main Divide requiring the clearing of existing vegetation and recontouring the immediate area.

From the base of Lake Elsinore, except for those observers located in proximity to the proposed transmission alignment, views of the proposed transmission alignment would generally be in the middleground and in the background. Along Interstate 15, Ortega Highway, South Main Divide Road, and Wildomar Road, segments of the proposed transmission alignment are close to or cross these travelways. Consequently, there are numerous points where the transmission towers and corridors would be visible in the foreground, middleground, and background. Construction activities within the Cleveland National Forest would result in features that would conflict with the High SIO.

Construction of the proposed transmission alignment across BLM lands would introduce some cultural modification into the landscape, but not enough modification to justify a lower class rating.

Adherence to a scenery conservation plan as specified by the USFS would help mitigate the disruptions the proposed project would cause to the existing visual resources; however most of the design recommendations relate to the materials used in project development rather than ways to reduce the effects of construction (e.g., powerline materials, screening project structures after construction). We discuss the effects of these measures below under *Effects of Operation*.

Staff Alternative—The construction activities at the Decker Canyon site would be essentially the same as those proposed at the proposed Morrell Canyon site. The existing aesthetic resources within Decker Canyon are similar to Morrell Canyon; however, the canyon lacks the landscape character of the mature trees present at Morrell Canyon. Construction of the upper reservoir at Decker Canyon would require a perimeter dike surrounding the site with a top elevation of 2,850 feet (see figures D-1a, b, appendix D). At this elevation, portions of the dike would be about 50 feet above the surface grade of South Main Divide Road; however, the local topography consists of a peak adjacent to the site east of South Main Divide Road near the Edwards Launch Site that would block a considerable amount of the feature from viewers to the east (not including viewpoints along South Main Divide Road). Photosimulations of the reservoir and dike structure suggests it would be difficult to see from vantage points east of Lake Elsinore and within the Interstate 15 corridor (see figure D-5a, b, and D-3 appendix D). Given the considerable distance and the relatively small size of the viewable amount of the feature compared to the whole mountain range, it is uncertain exactly what a viewer would perceive. If a viewer knew where and what to look for, the flat top of the dike would make it potentially recognizable from a section of Ortega Highway to the northwest, however the viewable window compared to the entire length of the highway is quite small. Morgan Trail users would not have direct views of Decker reservoir construction due to the local topography and trail location once they are down into Morrell Canyon (few hundred yards from trail head parking lot). Development of the Decker Canyon upper reservoir site would avoid the mature oak-woodland riparian area at Lion Spring.

Construction of the staff alternative transmission alignment, as shown on figure 5, would result in similar construction related effects on the aesthetic resources as the proposed transmission alignment; however about 1 mile less of the line would be buried along the ridge near South Main Divide. The staff alternative transmission alignment would be situated almost entirely within the High SIO. The use of helicopters to install transmission line towers where slopes are greater than 15 percent would further limit the amount of access roads necessary to construct the transmission line and the effects of new road cuts on scenic resources. Above ground transmission lines would be clearly visible from north facing vistas along South Main Divide Road specifically along the road between the proposed Decker Canyon site and the intersection with Ortega Highway. About a quarter mile of the lines would also be visible from vistas off South Main Divide Road near the community of Rancho Capistrano; however because the lines would be positioned on the face of the mountains the effect would be less than if they were placed along the ridgeline diminishing the length of road the lines that would be viewable from the residential community.

Construction of the southern segment of the staff alternative transmission alignment would involve the same construction techniques as building the rest of the 27 or so miles of line; however, once the transmission lines transition from below ground to above ground they would run on the face of the mountains, parallel the top of the mountains just west of the ridgeline (below Rancho Capistrano), and wrap around the mountains heading south ward inside the Cleveland National Forest boundary. Because portions of this route would cross both the face and near the top of the ridgeline, construction activities would be visible from almost all key observation points (along South Main Divide Road, Lake Elsinore and surrounding community, Ortega Highway, and along the Interstate 15 corridor). This alternative's position on the ridgeline affords the viewer sightlines to a significant portion of the structure from areas surrounding Lake Elsinore. Photosimulations of what the lines would look like from the community of La Cresta indicate that the local topography dictates which residences would have views of the lines or not. As figure D-6-b, appendix D, shows, the staff alternative transmission alignment in the near ground, more visible to a greater number of residences than the proposed alternative farther in the distance. Construction activities would last for about 2 years.

Optional Ortega Oaks or Evergreen Powerhouse—Construction of the powerhouse at the Ortega Oaks site would result in similar effects on the aesthetic resources as described above with respect to the proposed Santa Rosa powerhouse site. Construction activity at the Ortega Oaks site would be visible from Ortega Highway and portions of Grand Avenue in Lakeland Village, two prominent viewpoints to commuters in the area as well as vistas off South Main Divide Rd overlooking Lake Elsinore. California Department of Transportation traffic volume and flow data estimates the average annual daily traffic at Ortega Highway and Grand Avenue at 9,500 vehicles. Construction work would be visible in the near and potentially middle grounds from viewers along Grand Avenue and would be clearly visible from vistas along South Main Divide Road within the Cleveland National Forest.

Construction of the powerhouse at the Evergreen site would result in similar effects on the aesthetic resources as described above with respect to the proposed Santa Rosa powerhouse site.

Effects of Operation on Viewsheds

Co-applicants' Proposal—The co-applicants propose a design for the upper reservoir at Morrell Canyon that calls for a water surface elevation slightly higher than the nearby South Main Divide Road. The perimeter dike would have a 20-foot-wide access road and 8-foot-long chain link fence around the entire perimeter.

The co-applicants propose to fill the upper reservoir at night and use the stored water during daylight hours to meet regional electricity needs. The upper reservoir would be at its fullest on a Sunday and lowest on a Friday. The upper reservoir would fluctuate approximately 40 feet per day, exposing the geo-membrane liner system.

The co-applicants propose to prepare a plan to avoid or minimize disturbances to the quality of the existing visual resources of the project area.

The USFS revised preliminary 4(e) condition no. 37 specifies that the co-applicants file with the Commission a scenery conservation plan within 1 year of license issuance or prior to any ground disturbing activities. The purpose of the plan is to identify actions that would minimize the project's visible disturbance to the naturally established landscape. In order for the plan to achieve the greatest consistency with the "High" Scenic Integrity Objective, the project shall integrate certain design recommendations into the scenery conservation plan for the following features: (1) powerlines; (2) reservoir; (3) roads; (4) penstock pipes; and (5) structures.

Effects Analysis

Under the co-applicants' proposal, the upper reservoir, dam, dike, spillway, fencing, and additionally related structures would introduce industrial elements into the natural appearance of Morrell Canyon and be visible from South Main Divide Road for approximately 0.25 to 0.5 mile in either direction of the project.[60] Views of the reservoir perimeter dike and dam would be visible from portions of the realigned Morrell Canyon Trail just inside the San Mateo Wilderness Area boundary and from points off South Main Divide Road with appropriate vantage points. The proposed upper reservoir, access road, and security fence would introduce line, colors, and textures into the landscape that do not currently exist, and this would not be consistent with the High SIO. The reservoir surface would fluctuate throughout the day and the geomembrane liner would be visible at the top 40 feet of the reservoir at maximum drawdown. As discussed above, the presence and operation of the upper reservoir would alter the landscape character along the forest-urban interface with the alteration of the naturally appearing environment.

The Morgan Trail would be re-aligned around the proposed dam, giving hikers clear line of sight of the earthen dam and surrounding dike. Recreation estimates mentioned in section 3.3.6, *Recreation Resources*, indicate that the trail receives very low use levels (typically 2 vehicles in the trailhead parking lot on peak weekends), however the shady canopy under which the trail is located would be lost and the trail would wind its way down the exposed canyon sides providing a much different hiking experience.

The upper reservoir would be most visible in the foreground and middle ground distances with diminished visibility proportional to observers distance. Photosimulations of views of the proposed project from the east shoreline of Lake Elsinore suggest that the reservoir perimeter dike could be visible in that the flat top of the dike would contrast with the natural land forms; however given the considerable distance between the viewpoint and the reservoir it is unlikely that observers not familiar with the project would notice the feature (figure D-5). Given the distance between the Interstate 15 still further east, and the obstructed view of the upper reservoir, it is unlikely that the majority of the public would be able to discern the feature with the naked eye. The visual contrast the dam would pose to the canyon and surroundings would be minimally reduced by the co-applicants' proposed planting of the front of the dam with native vegetation. Designing a perimeter dike that would incorporate native vegetation similar to the surroundings or landscaping the form to follow more naturally appearing elevations could work in concealing its purpose to unsuspecting viewers beyond the mountain ridge (e.g., Ortega Highway, Grand Ave, Lake Elsinore, Interstate 15 key observation points). Regardless, the proposed upper reservoir would still introduce line, colors, and textures into the landscape that do not currently exist and would not be consistent with the High SIO designation.

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[60] It should be noted that the water within the reservoir may not be readily visible from directly adjacent to the reservoir from South Main Divide Road because of the constructed berm that rises above the road grade blocking views of the reservoir surface.

The majority of the constructed powerhouse would be located underground, minimizing the visibility of the structure from neighboring areas. Re-vegetating the parcel as proposed by the co-applicants would restore the landscape associated with the powerhouse to pre-construction conditions. It is expected that implementation of a re-vegetation plan developed in consultation with the USFS would result in post-construction landscape that would have the potential to improve the aesthetic resources over the existing conditions, depending on the level of effort put into landscape design. The switchyard would be fenced and most visible within the neighborhood (foreground and middle ground); however, due to the residential developments, it would not likely be visible from great distances that share similar elevations (e.g., Lake Elsinore, Ortega Highway, Interstate 15). The switchyard would be visible from vistas along the ridgeline in the same way that buildings are visible below.

Project operations would cause the surface of Lake Elsinore to fluctuate by 1 foot per day and 1.7 feet per week, which would result in the exposure of varying amounts of shoreline (estimated to be about 40 feet in most places however over 100 feet of shoreline could be exposed in some of the shallower embayments). Historically, Lake Elsinore shoreline has been exposed by more than 100 feet; however this would typically occur over seasons or even years while under the proposed project the shoreline exposure would occur on a weekly basis. Project operations could change the composition of shoreline vegetation and the water quality as discussed in section 3.3.2, *Water Resources,* and 3.3.4, *Terrestrial Resources*, respectively, which would also affect the aesthetics of the shoreline. The presence of buoys placed in Lake Elsinore to warn boaters of the intake/output structures would be a new feature to the water surface. The lake currently has six axial turbines floating on the surface as part of a water quality enhancement project, which are much larger than warning buoys. The buoys would be visible from the water and portions of the shoreline closest to them.

The presence of the proposed transmission alignment and associated access roads across the landscape would be visually evident from numerous key viewpoints. This alteration would strongly affect the landscape character, most notably within the USFS-designated Elsinore Place. The transmission alignment would be most visible from the vistas off of South Main Divide Road and Ortega Highway to the north and south and from routes within the city of Lake Elsinore, Lakeland Village, and Interstate 15. Photosimulations of the proposed transmission lines as predicted from Interstate 15 near Lee Lake suggest the lines would be visible in the immediate area but what is not clear is how much of the line would be visible beyond what is in close proximity to the highway and how the ability to see the towers and lines would diminish with distance considering the irregular background, mountainous topography, and atmospheric haze, which develops throughout much of the year (figure D-3). Over the term of the license, maintenance crews would maintain a fire break below the lines, and these fire breaks also would be apparent as a scar across the native vegetation. The linear features of the lines would contrast with the mountain and, within the Cleveland National Forest, would be in conflict with the SIOs. The towers, conductors, and resulting footprint of the corridor would be visible from highly traveled roadways (Ortega Highway, South Main Divide Road, and Interstate 15) as well as from points around the densely populated community of Lake Elsinore. Running the lines underground for 2 miles in the vicinity of South Main Divide Road between Ortega Highway and the far side of Rancho Capistrano would reduce their visibility in the area of the South Main Divide Road key viewpoint and preserve unobstructed views (not including the upper reservoir) from South Main Divide Road as well as views of the ridgeline from Lake Elsinore, Grand Avenue, and surrounding areas. Because the transmission lines would be buried, and the trail is within a canyon, Morgan Trail users would not see any lines or towers.

Photosimulations of the proposed alignment relative to La Cresta suggest that the lines would be far away enough that the mountainous topography would afford many opportunities to obstruct their views (figure D-6). Use of dark, non-reflective lines, dark painted towers, and in some cases “tree type” towers in areas of high visibility (e.g., crossing Interstate 15) as recommended in USFS revised preliminary 4(e) condition no. 37, would reduce the visual conflict the towers pose with the natural environment.

Staff Alternative—Views of the dike, perimeter fence, and dam would be clearly visible from South Main Divide Road. The top of the dike would be about 50 feet above the road surface adjacent to the reservoir making views into it from such close proximity nearly impossible. Views into the reservoir would only be possible from portions of South Main Divide Road and points within the San Mateo Wilderness off Morgan Trail above the dike line of sight (foreground and middle ground views). Given the local topography and trail alignment, Morgan Trail users would have very limited opportunity to view the reservoir, if at all. Operation of the upper reservoir at Decker Canyon would introduce line, colors, and textures into the landscape that do not currently exist and this would not be consistent with the High SIO. As mentioned above under construction effects, photosimulations suggest that a portion of the perimeter dike would be visible over the ridgeline to viewers on Lake Elsinore and down the canyon (westward direction) to a small window of opportunity to travelers on Ortega highway. If the perimeter dike were vegetated with native flora similar to the surroundings and incorporated designs that followed existing forms and contours, it would be difficult to distinguish it at these distances. Because key viewpoints along Grand Avenue are so close to the toe of the mountain, the viewing angle would preclude seeing the reservoir from this location. Given the greater distance, frequent atmospheric haze and driving speeds, the Decker Canyon reservoir would be nearly unrecognizable to travelers on Interstate 15.

The staff alternative transmission alignment would produce similar effects to those discussed above under construction and operation of the proposed transmission alignment; however with two main areas of difference: (1) the underground segment along South Main Divide Road would daylight on the north side of Rancho Capistrano and the above ground line would operate on the east slope of the mountains below Rancho Capistrano; and (2) along the southern portion where the line avoids crossing the Wildomar OHV area. In some areas, the staff alternative transmission alignment would be outside the forests SIOs altogether avoiding potential conflict between the lines presence and SIO management. Because the staff alternative would daylight north of Rancho Capistrano and operate on the face of the mountains below the residential community, this above ground section of line would be visible from key viewpoints along Grand Avenue, Lake Elsinore, and potentially from the Interstate 15 corridor (see figure D-5a,b). Photosimulations from this key viewpoint suggest that about 1 mile of lines below Rancho Capistrano would likely be visible to the above mentioned viewpoints before the alignment turns south following the Forest boundary. Within this run of line the staff alternative transmission alignment skirts the San Mateo Wilderness boundary by leaving the Cleveland National Forest for about 300 yards before returning to the Cleveland National Forest. Photosimulations from the La Cresta key viewpoint indicate that local topography plays an important role in how much of the line and towers are visible. The staff alternative transmission alignment avoids the Wildomar OHV and Campground area but runs closer to the Cleveland National Forest boundary providing more unobstructed views of the lines from La Cresta than the proposed alignment further away from the boundary (see figures D-6 and D-7. Use of dark, non-reflective lines and dark towers as recommended by USFS revised preliminary 4(e) condition no. 37 would help reduce the lines and towers visibility against the mountainous backdrop.

Similar to the proposed action, the staff alternative transmission alignment would not be in direct view from South Main Divide Road vistas looking east. The lines near the top of the mountains north and south of the underground portion would likely be visible from the Interstate 15 corridor in clear weather conditions.

Optional Ortega Oaks and Evergreen Powerhouse—The Ortega Oaks and Evergreen powerhouse sites would be located underground and out of obvious view to vehicles passing on adjacent roads. The switchyards, however, would be fenced above ground and visible. Operations at the Ortega Oaks site would be more visible in general because of the proximity of and sight lines from Ortega Highway west of its intersection with Grand Avenue. Any additional noise or effects of noise on the audible environment are discussed in section 3.3.10, *Environmental Consequences*, in *Air Quality and Noise.*

Effects of Construction on Odors

Co-applicants' Proposal—The co-applicants' proposal would require work to be performed in Lake Elsinore and the removal of 200,000 cubic yards of bottom sediments in order to place the intake/outflow structure. These activities could potentially release unpleasant odors. The decomposition of organic material in the lower water column and sediments in oxygen-free conditions would be the likely source of foul-smelling gasses originating from the lake. Disturbance of the water column or sediment could release enough gasses to cause a noticeable smell in the air.

Effects Analysis

The disturbance of bottom sediments could potentially release unpleasant smelling gasses into the water column that could escape into the atmosphere. Lake Elsinore is a highly eutrophic lake that experiences large algae blooms. When the algae die, they sink to the bottom where they decompose. The decomposition occurs more quickly in the presence of oxygen but the lake often becomes stratified and the bottom waters become anoxic (oxygen starved). Under these conditions, decomposition occurs at a much slower rate so the sediments become filled with organic material faster than it can be broken down. The organic matter and gasses associated with its breakdown become trapped at the bottom. Exposing the sediments and bottom material to the atmosphere would allow the material to breakdown. The removal of the sediments from the water to the shore would expedite the off-gassing process, possibly producing a concentrated or objectionably smelling gas plume. These effects are expected to be short term because they could only last as long as construction activities were needed or at sometime before that as the sediments released all the poor smelling gasses. The communities adjacent to the construction would be at the most risk to receive unpleasant odors from this portion of the project; however, distant communities even across the Lake could potentially be affected, depending on the wind patterns and concentrations at the time of gas release. Although the air may become poor smelling, these gasses are not expected to be toxic in anyway.

Construction of the proposed upper reservoir site and proposed transmission alignment is not expected to cause any nuisance odors.

Staff Alternative—Construction of the upper reservoir at Decker Canyon is not expected to cause any nuisance odors.

Construction of the staff alternative transmission alignment is not expected to cause any nuisance odors.

Optional Ortega Oaks and Evergreen Powerhouses—Nuisance odors would originate from the disturbance and storage of Lake Elsinore bottom sediments. Storage of these materials at the Ortega Oaks construction laydown area could potentially affect a much larger population of individuals who commute along Ortega Highway each day as the pile of debris off-gasses. The level of effect would depend on the amount of organic material stored in the sediments and the wind patterns.

The potential effects of odor at the Evergreen powerhouse site would be similar to the other powerhouse locations.

Effects of Operations on Odors

Co-applicants' Proposal—As mentioned in section 3.3.4.1, participants during scoping identified the potential for the proposed upper reservoir to cause unpleasant odors, especially when empty, as a resource issue that should be addressed in the EIS. Operation would require the transfer of Lake Elsinore water, which historically has had nuisance odors, to the upper reservoir areas, which are currently void of any large-scale sources of unpleasant odors.

Effects Analysis

Foul smelling odors have been associated with Lake Elsinore water many times throughout the past. The odor most likely originates when the water column turns over meaning that the bottom waters are mixed and brought to the surface releasing gasses with unpleasant odors. The breakdown of organic matter under oxygen-free conditions often found at the bottom of the Lake during the summer is the most likely source of the gases.

The potential for water within the upper reservoir to release unpleasant odors in the future is minimal due to lake stabilization and enhancement efforts, water quality improvement programs, and operations of the proposed project. The Lake Elsinore Stabilization and Enhancement Project is designed to eliminate conditions that promote the growth of algae in Lake Elsinore, and allow low DO conditions to persist at the lake bottom. The water quality improvement efforts are designed to introduce more oxygen into lake waters and control the amount of nutrients entering the lake. Operation of the project would additionally mix the lake waters preventing conditions that would allow the odors to set up. Together these efforts would benefit the water quality (as discussed in greater detail in section 3.3.2, *Water Resources*), which would have a positive effect on the aesthetics by reducing the risk of unpleasant odors. For these reasons unpleasant odors would not be released from Lake Elsinore or the upper reservoir due to operations.

Electromagnetic Field Effects

The term electromagnetic field (EMF) is used to describe the combination of electric and magnetic fields that are created by electric voltage and electric currents. As electric currents move through electrical devices such as those used in households and work places, magnetic fields are created. Electric fields are then created by the potential voltage or electrical pressure that is applied on an object. Electric fields can exert force on other electrical charges at a given distance, becoming stronger when near a charged object and diminishing when moved away, with the electric field measured by the change in voltage over distance (volts per meter, V/m). Because of the relationship between electric current and magnetic fields, exposure to magnetic fields is common wherever electricity is used. In the United States, most equipment used for generating, transmitting, or distributing electrical power produces extremely low frequency magnetic and electric fields (60 Hertz [Hz]). The electric and magnetic energy given off by power lines and substations is comparable, if not equivalent, to that given off by standard household appliances. At reasonably close distances, electric fields in the vicinity of power lines can cause the same phenomena as the static electricity experienced on a dry winter day, or with clothing just removed from a clothes dryer (CPUC/USFS, 2006). An acknowledged potential effect on public health from electric transmission lines is the hazard of electric shock, which is generally the result of accidental contact by the public with energized wires.

Magnetic fields from power lines are created whenever current flows through power lines at any voltage. The strength of the field is directly dependent on the current in the line. Magnetic field strength is typically measured in milliGauss (mG). Similar to electric fields, magnetic field strength attenuates rapidly with distance from the source. In developed areas, EMFs are prevalent from the use of electric appliances and existing electric powerline. In general, electric distribution lines exist throughout developed portions of a community and represent the predominant source of public exposure to power line EMF except in the immediate vicinity of transmission corridors (CPUC/USFS, 2006).

Some studies, while inconclusive, have purported to find a positive relationship between electromagnetic fields and certain diseases or conditions in animals, including humans (World Health Organization, 2002). However, studies conducted by the National Research Council, Commission on Life Sciences (1997), National Institute of Environmental Health Sciences (NIEHS, 1998) and Department of Health Services (DHS) (2002), among others, had equally inconclusive findings, which led the U.S. Department of the Interior (2003) to state, "[t]here is a consensus among the medical and scientific communities that there is insufficient evidence to conclude EMF causes adverse health effects."

Regardless of these findings, which indicate a lack of evident harm not only to people but to animals and plants as well, the World Health Organization (WHO) has stated that there is "sufficient evidence" to apply a "precautionary principle" to both power and high-frequency electromagnetic fields to help protect from uncertain risks. WHO supported its position by stating:

> …If the risk is eventually found not to exist, it may be that any measures undertaken will not have protected health and some resources will have been spent unnecessarily. However, this outcome is often more acceptable than one where public health measures were delayed or neglected because a risk was thought not to exist, but was eventually shown to be both real and substantial.

To provide additional context for our evaluation of potential EMF effects from the co-applicants' proposed and staff transmission lines, we reviewed many documents concerning EMF effects. The following points, summarized from the draft EIR/EIS prepared for Southern California Edison's proposed Antelope-Pardee 500-kV Transmission Project (CPUC/USFS, 2006) provide some useful perspective for our analysis:

- The International Radiation Protection Association, in cooperation with the World Health Organization, has published recommended guidelines for magnetic field exposure that would limit the general public to exposures less that 833 mG.
- A 1999 report to Congress by the National Institute of Environmental Health Sciences suggested the evidence supporting EMF exposure as a health hazard was insufficient to warrant aggressive regulatory action. The report suggested the power industry continue its practice of siting lines to reduce public exposure to EMF and to explore ways to reduce the creation of magnetic fields around lines.
- Florida and New York, the only states that currently limit the intensity of magnetic fields from transmission lines, limit magnetic fields to 200 to 250 mG at the edge of the right-of-way. The magnetic field limits were based on an objective of preventing field levels from increasing beyond levels currently experienced by the public and were not based upon any link between scientific data and health risks (Morgan, 1991,as cited in CPUC/USFS, 2006)
- Several agencies and municipalities have adopted a concept of "prudent avoidance", which has been defined as "…limiting exposures which can be avoided with small investments of money and effort." (Morgan, 1991,as cited in CPUC/USFS, 2006)
- In January 1991, the California Public Utility Commission began an investigation of the potential health effects that their electric utility power lines might cause by generating EMFs. The study considered potential health effects that included childhood cancer and chronic lymphocytic leukemia. The study also explored potential mitigation measures for reducing potential public health impacts. Following input from interested parties, the California Public Utility Commission implemented a decision that requires that utilities use "low-cost" or "no-cost" mitigation measures for facilities requiring certification under General Order 131-D. The California Public Utility Commission did not adopt any specific numerical limits or regulation on EMF levels related to electric power facilities.
- In January 2006, the California Public Utility Commission issued Decision D.06 01 042, which affirmed the low-cost/no-cost policy. The decision stated that "at this time we are unable to determine whether there is a significant scientifically verifiable relationship between EMF exposure and negative health consequences."

- Research on ambient magnetic fields in homes and buildings found average magnetic field levels within most rooms of about 1mG, while in rooms with appliances present, the measured values ranged from 9 to 20 mG (Severson et al. 1988 and Silva, 1988, as cited in CPUC/USFS, 2006). Typical magnetic fields measured within 12 inches of household appliances range from less than 1mG to 250 mG, with maximum strengths of up to 20,000 mG from common appliances such as can openers and hair dryers (Gauger, 1985, in CPUC/USFS, 2006).
- Measurements of ambient magnetic field strengths associated with the proposed Antelope-Pardee 500-kV line found pre-project field strengths at the edge of the right-of-way to be 0 to 12.5 mG, while model estimates of post-project field strengths ranged from about 2 to 23 mG. In undeveloped areas with no existing transmission or electrical distribution lines, the increase associated with the project was generally in the range of 14 to 18 mG. In more developed areas where the proposed line would share right-of-way with existing lines, the change ranged from 0.2 mG to -11.7 mG[61]

Based on the foregoing information and analysis, the California Public Utility Commission and USFS determined that EMFs from the proposed Antelope-Pardee 500-kV transmission line would have no effect.

Effects of Operation on EMF

Co-applicants' Proposal—The co-applicants propose to place some sections of the transmission line underground, which has the effect of reducing EMF exposure in those areas because of magnetic field cancellation.

As part of scoping, Lake Elsinore Unified School District commented that the Commission should evaluate potential effects of the project on EMFs created from the generation and transmission of electricity from the project.

Effects Analysis

Operation of the proposed project would contain several elements that would generate EMFs, including the proposed powerhouse and substation at the Santa Rosa site, the transmission line along the northern and southern segments of the co-applicants' proposed transmission alignment, and the proposed substations along the proposed transmission alignment. The EMF strengths that would be generated would be typical for similar generation and transmission facilities.

The area near the Upper Reservoir would not produce any substantial EMF because there would only be low voltage electricity supply to power lights and simple machinery at the reservoir.

EMF intensity would be more substantial at the Santa Rosa powerhouse, where generators would produce project electricity, the substation would adjust voltage to the transmission system, and the transmission system would carry electricity to the grid. However, much of the transmission facility, as well as the powerhouse, would be underground, which would help to reduce magnetic fields. As described in section 3.3.7.1, *Affected Environment, Land Use*, the area surrounding the proposed Santa Rosa powerhouse and substation site is characterized by a mix of single-family and multi-family residences and an elementary school. Single-family residences and various commercial, industrial, and

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[61] In this instance, negative changes are associated with combining the proposed Antelope-Pardee 500-kV line on a double-circuit tower with the existing Pardee-Vincent 500-kV line, where the close spacing of the circuits would increase magnetic field cancellation (CPUC/USFS, 2006).

transportation uses occur within 0.5 mile of the northern and southern segments of the proposed transmission alignment. Because current literature about comparable projects of similar size and length, such as the Antelope-Pardee 500-kV line, provides little evidence supporting the contention that EMFs from high-voltage transmission lines or electrical generating facilities have adverse effects on wildlife, plants, or humans, we expect that there would be no adverse effects associated with the EMF intensities at the proposed powerhouse, substations, or transmission line.

The co-applicants' proposed transmission alignment would cross private residences near the project development and then enter more rural and undeveloped lands associated with the Cleveland National Forest. The high-voltage transmission line could produce EMF through the right-of-way. However, because the literature to date provides little evidence supporting the contention that EMFs from high-voltage transmission lines have adverse effects on wildlife, plants, or humans, we expect that there would be no adverse effects associated with the EMF intensities at the proposed transmission alignment.

Staff Alternative—Operation of the upper reservoir at the Decker Canyon site would have no effect on EMF.

For the same reasons noted above for the co-applicants' proposal, we expect there to be no adverse effects associated with the EMF intensities at the Santa Rosa powerhouse site and substations.

Land uses along the staff alternative transmission alignment are similar to those along the proposed alignment; that is, single-family residences and various commercial, industrial, and transportation uses. For the same reasons note above, we conclude that there would be no adverse effects associated with the EMF intensities of the high-voltage transmission lines if they were located along the staff alternative transmission alignment.

Optional Ortega Oaks or Evergreen Powerhouse—Land uses near the Ortega Oaks powerhouse site include single- and multi-family residences, commercial properties, and vacant land. For the same reasons noted above, we expect that there would be no adverse effects associated with the EMF intensities at the Ortega Oaks site if the powerhouse and substation were located there.

We expect that there would be no adverse effects associated with the EMF intensities at the Evergreen site if the powerhouse and substation were located there.

Traffic Circulation and Management

The Lake Elsinore area is accessible by Interstate 15 from the north and south and by Ortega Highway from the west. Orange County has designated Ortega Highway as a primary arterial highway and the state of California has designated Ortega Highway as a CA Legal Advisory Route—Kingpin to Rear Axle (KPRA) not to exceed 30 feet. This state determination allows for CA Legal trucks only; however, travel is not advised if KPRA length is over the posted value. The proposed upper reservoir site would be accessed via South Main Divide Road, a county-maintained, paved, two-lane road with access off of Ortega Highway. The intersection of South Main Divide Road and Ortega Highway is stop-sign controlled. South Main Divide Road provides access to the upper mountainous areas within the Cleveland National Forest as well as to the residents who live in the Rancho Capistrano (Morrell Potero) residential community and other unincorporated areas. The paved road continues south along the mountain ridge to the upper reservoir site. Beyond Elsinore Peak the road becomes a single-lane, dirt road and continues to the community of Tenaja. This portion of South Main Divide Road would be used for vehicular access to the southern transmission alignment.

The proposed Santa Rosa powerhouse site and Evergreen powerhouse site would be primarily accessed via smaller side streets, all leading upslope from Grand Avenue, which generally runs north-south along the western edge of Lake Elsinore through Lakeland Village. Grand Avenue is divided by a two-way left turning lane. Ortega Highway intersects Grand Avenue less than 1 mile north from the proposed powerhouse at an all way stop control. The posted speed limit just north of this intersection is

40 mph. Grand Avenue connects with roadways that provide access to and from the Interstate 15 and Lake Elsinore. The Ortega Oaks powerhouse site would be located just off the Ortega Highway, upslope of Grand Avenue.

Access to the proposed transmission lines south of Ortega Highway could use portions of the South Main Divide Road but complete installation would require the construction of new road spurs. Access to the proposed transmission lines north of Ortega Highway could be via Interstate 15, Forest Route 3S04, local and county roads, and roads constructed for the project. All project-related traffic would access the project area via the two aforementioned highway routes and would then continue to either the upper reservoir along South Main Divide Road or to the powerhouse via Grand Avenue.

The co-applicants conducted a traffic analysis and reported recent traffic volumes for the five road segments and one intersection potentially affected by the proposed project (segments near Ortega Highway-South Main Divide Road and Ortega Highway-Grand Avenue). Two key findings of this traffic analysis were:

1. Under existing conditions, the street (and highway) segments that would be affected by the proposed project are currently all operating at acceptable level of service (LOS) during both morning and evening peak hours. The Grand/Ortega intersection currently warrants installation of a traffic signal, which if installed would result in acceptable LOS.

2. Under the existing conditions plus ambient growth scenario (assessed by applying a growth rate of 2 percent per year [compounded] to existing traffic volumes over the 7-year period from 2003 to 2010), the five street segments are expected to maintain their acceptable LOS. The Ortega Highway-Grand Avenue intersection worsens to a LOS rating of “E,” however, indicating that the intersection would require improvement beyond the addition of the traffic signal.

The co-applicants’ construction traffic analysis was based on assumed trip generation and distribution patterns up to year 2010 conditions. The co-applicants have stated that their analyses are not for one specific project scenario but rather there is a split in trip assignments between various sites to account for “varying construction scenarios.” Trip generation analyses within the study assumed that 76 trucks (38 in and 38 out) or 152 passenger vehicles could be accommodated during any particular hour, by the projected year 2010 conditions on the surrounding road system, without a drop in LOS below “C.” The above analysis does not assign trip distributions nor does it account for concurrent truck traffic. In other words, only theoretical maximum truck traffic was calculated against the LOS rating system.

Existing roadway design capacities, volumes, and proposed construction trip generation numbers for each of the five road segments for both morning and evening peak hours are shown in table 27. The study used these maximum trip numbers without a drop in LOS as the baseline for trip assignments. Although a 25 percent buffer was added to create a conservative, worst-case scenario, this analysis does not entirely assess the likely traffic created by specific construction activities such as the clay import needs or hauling of excavated soils off site.

Effects of Construction on Existing Traffic Circulation, Patterns, and Congestion

Co-applicants’ Proposal—The co-applicants propose that there would be a balance between the excavated and fill material throughout the project site. To achieve this balance, material excavated at the lower project sites would be transported by trucks to the upper reservoir to construct the impoundment dam. To mitigate potential effects on the traffic resources at the Grand Avenue/Ortega Highway intersection, the co-applicants propose either of the following: (1) add a second left turn lane to the Ortega Highway intersection approach to address the high number of left turns on to Ortega Highway from Grand Avenue, or (2) add a through lane on Grand Avenue (for a total of two) in both directions, at the Grand/Ortega intersection.

Table 27. Trip assignments for each of the five road segments analyzed by the co-applicants. (Source: Elsinore Valley MWD and Nevada Hydro, 2004a, as modified by staff)

Road Segment	Hour	Capacity	Existing + Ambient Growth Volume	Estimated Project Related Increase in Volume	Projected LOS
Ortega Highway east of South Main Divide Road	a.m. peak	2,000	1,417	140	"C"
	p.m. peak	2,100	1,187	140	"B"
Ortega Highway west of South Main Divide Road	a.m. peak	2,000	1,417	10	"C"
	p.m. peak	2,100	1,187	0	"A"
Ortega Highway west of Grand Avenue	a.m. peak	2,300	1,438	140	"B"
	p.m. peak	2,300	1,115	140	"A"
Grand Avenue south of Ortega Highway	a.m. peak	2,300	1,239	110	"A"
	p.m. peak	2,500	1,587	110	"B"
South Main Divide Road south of Ortega Highway.	a.m. peak	2,100	36	150	"A"
	p.m. peak	2,500	59	150	"A"

Note: LOS – level of service

The co-applicants also propose to prepare traffic management and control plans addressing both construction traffic and access to and from the construction sites. Affected public agencies would approve the plans prior to filing them with the Commission. Plans would identify signs, striping, barricades, flagmen, roadway modifications, and other safety measures. At all times, traffic access along South Main Divide Road would be maintained. If limited distance single-lane traffic is required, appropriate one-way traffic control would be implemented.

Resource Agency Measures

USFS revised preliminary 4(e) condition no. 26, Road and Traffic Management Plan, specifies that the co-applicants develop and implement a plan for the management of all USFS and unclassified roads required by the co-applicants to access the project area. The plan would include provisions for the following: (1) the identification of such roads; (2) a map of such roads with digital spatial data accurate to within 40 feet; (3) a description of each such road segments; (4) cooperation with the USFS in the preparation of a condition survey and proposed maintenance; (5) maintenance of roads to appropriate state or county standard; (6) appropriate authorizations for access; and (7) determination of the co-applicants' responsibility for road maintenance and repair costs commensurate with the co-applicants' and project-induced use.

Effects Analysis

During construction, a wide range of vehicles, including heavy trucks used to transport materials and equipment between the powerhouse and the upper reservoir sites, would use South Main Divide Road, Ortega Highway and Grand Avenue as well as other auxiliary roads depending on final design plans. The co-applicants state there would be temporary construction-related traffic effects from the estimated 2,460 person-years of employment during construction; however, the co-applicants' also note that they are unclear on which alternative project configuration would be constructed and do not state their assumptions in deriving this estimate of person-years.

The largest portion of construction traffic would involve the transport of soil and rock material excavated from proposed project features for use in the upper dam and dike construction. This material would be generated by excavation activities associated with the powerhouse, conduit, penstocks, tailrace tunnel and intake structure. Because the co-applicants propose to achieve a balance between excavation and fill at the project site, fill material would need to be hauled to the upper reservoir site. Depending on the final dam design, clay may also need to be hauled in from off-site locations.

The co-applicants estimate that the roadways could accommodate up to 38 trucks in each direction during peak driving hours and not experience a drop in LOS. Under the co-applicants' proposal, the 590,000 cubic yards of extra fill material not used for back fill around the powerhouse would need to be trucked to the upper reservoir (see section 2.3, *Co-applicants' Proposal*). Because Ortega Highway is designated CA-Legal KPRA-30, truck traffic is regulated by California Vehicle Code that specifies allowable gross weight limits for trucks by the distance between the first and last axles. This analysis assumes the distance between axles is 27 feet. At 27 feet, the maximum gross weight allowed is 56,950 pounds (Caltrans, 2005a). Assuming an empty hauling truck weighs 40,000 pounds, the haul load could weigh 16,950 pounds. Assuming the excavated earth weighs 2,100 pounds per cubic yard[62], each truck would haul about 8 cubic yards of material. This equates to approximately 73,750 truck loads, which using the co-applicants' volume estimates for peak hour times for the entire day, the maximum number of one-way trucks available to haul material away would be at 288 truck loads[63] per day. As such, it would take about 256 days to haul the material from the bottom sites to the upper reservoir area. Total truck traffic would be twice this amount because trucks would likely be running both directions.

While the co-applicants' study was based on traffic counts from a single day in July, the data is reasonably consistent with recent data collected by Caltrans in the project area. For example the Caltrans traffic volume estimates the peak hourly traffic on Ortega Highway west of Grand Avenue (between Grand Avenue and the Riverside County line) at 1300 where as the co-applicants peak estimate for Ortega Highway west of Grand Avenue was 1252. In addition, Caltrans peak hourly estimate for Ortega Highway east of Grand Ave (between the intersection with Grand Avenue and Lake Shore Drive) at 1800 vehicles whereas the co-applicants estimated peak hourly traffic volume on Grand Avenue south of Ortega Highway at 1382. Although these two road segments are not the same segment, they do present a reasonable picture of the estimated traffic volumes on Grand Avenue in the vicinity of its intersection with Ortega Highway and in the vicinity of the proposed Santa Rosa powerhouse.

If the co-applicants were to excavate an additional 10 feet from the upper reservoir for necessary fill requirements rather than transport material from the lower excavations, the co-applicants would not need to haul the 590,000 cubic yards of material up Ortega Highway. Instead, the excavated material could be staged at the powerhouse area for removal to disposal sites accessible from Interstate 15. By stockpiling the material at the staging area, the timing to remove the material would not be as critical. Additionally, Decker Canyon has negligible overburden, so soils could easily be excavated to greater depths to satisfy fill requirements

[62] Dry excavated earth weighs about 2,100 pounds per cubic yard (Reade Advanced Materials, 2005, as modified by staff).

[63] This assumes a one-way peak-hour maximum of 36 trucks for every hour in an 8-hour work day.

Ortega Highway between Grand Avenue and Interstate 15 is level and has multiple lanes and does not have any special restrictions on truck lengths. Using a truck with an axle to axle length of 40 feet (middle of the truck spectrum), the gross weight limit would be 60,000 pounds[64]. Assuming an empty hauling truck weighs 40,000 pounds, the haul load could weigh 20,000 pounds, so each truck could haul about 9.5 cubic yards of earthen material. At this removal efficiency, it would take about 62,000 truck trips. Again, assuming traffic flow would not decrease below LOS "C" at 288 trucks per day, it would take about 215 days of steady truck traffic (8 hours a day, 7 days a week) to remove the excavated material from the powerhouse-staging area site. This route uses streets that are level and have more than one lane to allow other vehicles to pass. Total truck traffic would be twice this amount because trucks would likely run in both directions.[65]

The co-applicants state that an impervious clay core may be required for upper reservoir construction. The source of the material is specified by the co-applicants as the Pacific Clay site in Alberhill, northeast of the project area; however, the quantity of clay fill is not stated. Therefore, for the purposes of assessing truck trips and traffic, it is assumed that clay would make up 5 percent of the total fill volume. Thus, the upper reservoir sites would require at most 150,000 cubic yards of clay product delivered to the site. An additional option proposed by the co-applicants would be to import bentonite clay and mix it with materials present at the site (at an unspecified ratio) to produce an impervious core. For this assessment, a worst-case assessment of clay importation from Alberhill is assumed, and the effects of importing bentonite to the site would be less. Once fill sources, volumes, and dam designs are finalized, better trip generation estimates could be made.

Assuming clay is required to line the bottom of the upper reservoir and using the same 288 number of one way trips, it would take about 21,500 hauling trips to get 150,000 cubic yards from Alberhill to the upper reservoir[66] (accounting for the return trip would double this number). This equals about 75 days and could be completed within the co-applicants' proposed construction schedule. If 36 trucks were allowed to pass through each segment an hour that would equate to 1 truck almost every 2minutes. If it took each truck 20 to 30 minuets to get from the Grand Avenue/Ortega Highway intersection to the South Main Divide Road/Ortega Highway intersection there would be about 10 to 15 trucks on the highway (in both directions) at the same time during construction hours. Existing truck traffic information is not contained within the co-applicants' study for comparison with this potential effect.

Adherence to the co-applicants' traffic control plan that specified priority hauling times and controlled traffic volume necessary to haul the clay material to the site would help alleviate congestion along Grand Avenue, South Main Divide Road, and Ortega Highway (including beyond the intersection with Grand Avenue to the Interstate 15). According to the Caltrans Highway Design Manual as cited in

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[64] The California Vehicle Code Axle Group Weight Chart uses 40 feet for a 3-axel configuration as the distance (in feet) between the extremes of any group of two or more consecutive axles.

[65] This estimate is consistent with the co-applicants' proposal construction schedule for excavating the tunnel/powerhouse and preparing the upper reservoir as provided in Elsinore Valley MWD and Nevada Hydro (2004a, exhibit c).

[66] The California Vehicle Code specifies allowable gross weight limits for trucks by the distance between the first and last axles. Because Ortega Highway is designated CA-Legal KPRA-30, the analysis here assumes the distance between axles is 27 feet to account for the difference between the kingpin and axel. At 27 feet, the maximum gross weight allowed is 56,950 pounds (Caltrans, 2005a). Assuming an empty hauling truck weighs 40,000 pounds, the haul load could weigh 16,950 pounds. A mix of wet and dry excavated clay weighs about 2,500 pounds per cubic yard (Reade Advanced Materials, 2005, as modified by staff), so each truck would haul about 7 cubic yards of clay material.

the *SR-74 Ortega Highway Safety Improvements IS/EA*, the definition of LOS "C" for two-lane highways is "stable traffic flow, but less freedom to select speed, change lanes, or pass" and an operating speed of 45 mph (Caltrans, 2005b). Ortega Highway is a steep, winding, two-lane highway and having 10 to 15 fully loaded trucks on the highway at the same time would undoubtedly reduce drivers' freedom to select speed. Implementation of a traffic plan that sets clear travel limits as to the quantity and timing of allowable truck travel would help minimize construction interruptions along the various routes allowing nearby residents to proceed with limited delay.

Residents of Rancho Capistrano would be subject to truck traffic and could experience delays or regulated travel depending on final construction and traffic plans. Effects from construction would last throughout the construction phases for an estimated 4 years. There would be some very minor traffic effects from the arrival and departure of employees.

Traffic along Grand Avenue could be affected if special handling of lakebed materials is needed. Excavations from the bottom of Lake Elsinore could produce sediment material with toxic properties. If special handling of the material is required, this could generate additional effects on traffic resources depending on the final disposal site and preferred route.

Construction of transmission lines and associated substations would also have some traffic-related effects. However, given the relatively remote location for these activities and the use of helicopters to install transmission towers, traffic capacity of affected roadways is not anticipated to be a critical issue. However, the size/logistics of the materials and trucks to transport the construction materials for the construction of the transmission lines and substations would be the primary traffic resource factor to address.

Effects of Construction on Road Pavement

Co-applicants' Proposal—The co-applicants acknowledge and a number of individuals commented that the construction traffic associated with building the proposed project could affect pavement. The co-applicants state that if affected agencies determine that the project's construction is required to address effects on the pavement due to construction truck traffic, it should be addressed through some form of program that assesses all pertinent vehicles contribution to the overall pavement impacts.

Resource Agency Measures

USFS revised preliminary 4(e) condition no. 26, *Road and Traffic Management Plan*, would require the co-applicants to develop and implement a plan for the management of all USFS and unclassified roads required by the co-applicants to access the project area. As mentioned above, the plan would include provisions for such items as inventorying preconstruction road conditions; maintenance of roads to appropriate state or county standard; and a determination of the co-applicants' responsibility for road maintenance and repair costs commensurate with the co-applicants' and project-induced use.

Effects Analysis

Although grading quantities in the areas of the proposed upper reservoir have been designed to be balanced, there could potentially be a significant number of trucks hauling dirt between the proposed Santa Rosa powerhouse to the upper reservoir site and to other off-site locations. Based on the potentially large number of heavy truck trips generated by the proposed actions, the effects on pavement could be substantial—particularly on Grand Avenue, smaller roads such as South Main Divide Road, and roads used for transmission line installations that are not engineered for substantial, repetitive, heavy truck traffic. Potential effects could begin as breaks in the pavement, which when combined with continued heavy use and precipitation, could exacerbate the roads conditions.

A road management plan, as specified by the USFS, would help document current (pre-construction) road conditions within the context of ensuring that the roads would be maintained for users after construction. The details of how each bulleted item would be satisfied are expected to be part of the overall plan.

Staff Alternative—The effects related to roads and traffic for the Decker Canyon upper reservoir site are essentially the same as the co-applicants' proposal. The one exception is that the Decker Canyon site is located slightly closer to Ortega Highway, and therefore the total number of miles traveled on South Main Divide Road by construction traffic would be less. In addition, a slightly shorter distance of South Main Divide Road pavement would be affected by construction traffic.

The effects of construction for the Santa Rosa powerhouse site and the staff alternative transmission alignment would be essentially the same as that of the co-applicants' proposal. The only exception may be a somewhat greater reliance on county and private roads for the construction of the transmission lines, and a concurrent decrease in the need for use of USFS roads. Therefore, traffic effects may be increased for residents living off these county and private roadways, and decreased through the forest road network. This conclusion is a generalization made absent a specific proposal for transmission line access road locations by the co-applicants, and could be different based on final designs if a license were issued.

The majority of effects from construction of the southern segment of the staff alternative transmission alignment would be the same as those under the above-mentioned transmission alignments; however, tower and line placement along South Main Divide Road would use the existing road and not require new road construction. New road construction (where accessible) would be required to the north and south of this segment of this alternative to construct the transmission lines.

Optional Ortega Oaks or Evergreen Powerhouse—The Ortega Oaks powerhouse location would produce less traffic through the Grand Avenue-Ortega Highway intersection because the site is located up the Ortega Highway to the west. Therefore, a signal and improvements at the Grand Avenue-Ortega Highway intersection may not be needed. However, loaded trucks leaving the site will be entering the Ortega Highway (westbound) from a complete stop. Because the Ortega Highway maintains a relatively steep and consistent gradient, it would seem that loaded trucks will be moving much slower than through-traffic at this location, making it potentially difficult for the trucks to enter the roadway. Further, because of the sustained grade, the trucks would require some distance to get up to speed. Adoption of a traffic control plan or signal with provisions to manage truck traffic leaving the Ortega Oaks site would help traffic flow. In addition, truck traffic to and from the tailrace construction area would still utilize the Grand Avenue-Ortega Highway intersection and assessment of this incremental portion of total truck traffic would still need to be evaluated.

Construction of the Evergreen powerhouse would produce many of the same effects as the co-applicants' proposal. Effects on the pavement would be the same for South Main Divide Road and through the Grand Avenue-Ortega Highway intersection. Therefore, a signal and improvement analysis at the Grand Avenue-Ortega Highway intersection would be necessary. Because the Evergreen powerhouse site is the most southerly site along Grand Avenue, trucks would have to drive a longer stretch of Grand Avenue than under the proposed action as effects on the pavement caused by truck traffic would occur over a greater length of road.

Effects of Operation

Traffic generated during project operations would be minor. There would be few employees and/or other traffic generators associated with actual project operations. If licensed, once the project begins operating, the approximately 20 project employees would generate only minimal traffic mostly related to periodic trips by supply and maintenance vehicles. Traffic generated during operation of the proposed hydropower project and any associated effects would be minor. Increases in traffic from recreation use at the lower powerhouse park site (or any lake access areas) are anticipated to be minimal.

The cost estimates pertaining to the road management and traffic plan are presented in section 4.0, *Developmental Analysis,* and measures included in the staff alternative are discussed in section 5.2, *Discussion of Key Issues.*

3.3.7.3 Unavoidable Adverse Effects

The presence of the transmission line along either the co-applicants' proposed alignment or the staff alternative alignment would permanently alter the condition of Cleveland National Forest land use zones, and would be inconsistent with the Land Management Plan insofar as they cross the Back Country Non-Motorized zone. Some residents and businesses would be displaced by construction of the power plant at the Santa Rosa site under either alternative, and a few residents could be displaced by either transmission alignment. A private airstrip could be rendered unusable by either transmission alignment. Either transmission alignment would add a permanent linear feature that would detract from the visual quality of the area.

3.3.8 Socioeconomic Resources

3.3.8.1 Affected Environment

All proposed and alternative project facility locations except for portions of the transmission alignments would be in Riverside County, the fourth largest county in California. Portions of the proposed and alternative transmission alignments would extend into northern San Diego County (U.S. Census Bureau, 2000a).

Population and Population Trends

Riverside County measures almost 200 miles from east to west, encompassing more than 7,300 square miles (4,612,740 acres) of land. The 2000 census reported the county population at 1.5 million residents, or approximately 4.6 percent of all state residents (U.S. Census Bureau, 2000d). The county is one of the fastest growing counties in California, with most of the growth and associated development occurring in the western portion of the county that includes the city of Lake Elsinore, the Lakeland Village Census Designated Place[67] (CDP), and the LEAPS Project area. Table 28 compares the pace of growth for California, Riverside County, San Diego County, and the city of Lake Elsinore, indicating that Riverside County is growing faster than the state, and the city is growing faster than the county. Other data indicate that rapid population growth and rapid job growth have mirrored one another in California's Inland Empire, which includes the western portions of Riverside and San Bernardino counties (Public Policy Institute of California, 2002).

San Diego County encompasses more than 4,500 square miles (2,081,739 acres) and had a 2000 population of 2.8 million, or approximately 8.3 percent of all state residents (U.S. Census Bureau, 2000e). In contrast to Riverside County and Lake Elsinore, San Diego County's growth rate has been slightly

[67] A census designated place, or CDP, is a statistical entity defined for each decennial census according to Census Bureau guidelines, comprising a densely settled concentration of population that is not within an incorporated place, but is locally identified by a name. CDPs are delineated cooperatively by state and local officials and the Census Bureau, following Census Bureau guidelines. The proposed and alternative powerhouse locations are in the unincorporated CDP of Lakeland Village. Not all census data are reported by CDP; this draft EIS includes data for Lakeland Village where it is available.

below that of the state. Because little of the proposed project development would take place in San Diego County, its socioeconomic characteristics are not discussed further.

Table 28. Population, 1990, 2000, and 2003 (estimate). (Source: U.S. Census Bureau, 2000a)

Year	State of California	Riverside County	City of Lake Elsinore	Lakeland Village CDP	San Diego County
Population 1990	29,760,021	1,170,413	18,285	NA	2,498,016
Population 2000	33,871,648	1,545,387	28,928	5,626	2,813,833
Population 2003 (est.)	35,484,453	1,782,650	34,914	NA	2,930,886
Percent Change, 1990–2000	13.6	32.0	58.2	NA	12.6
Percent Change, 2000–2003	4.8	15.4	20.7	NA	4.2

Note: CDP – census designated place

NA – not available

The Southern California Association of Governments has forecast population growth for the seven counties that comprise southern California, which includes San Diego County and the six Southern California Association of Governments -region counties (including Riverside County) (SCAG, 1998). The forecast is for the Riverside County population to grow by 1,128,200 people between 2000 and 2020, representing a 66.6 percent increase in the county population over that period. Of the seven southern California counties, Riverside County would be the second fastest growing in terms of both percent growth and growth in absolute numbers.

Race and Ethnicity

Approximately 59.5 percent of California's population identified themselves as White in the 2000 census, compared to 65.6 percent in Riverside County and the city of Lake Elsinore, and 79.0 percent in Lakeland Village CDP (table 29). Those identifying themselves as Black or African American constituted the largest racial minority group in all four areas, although those percentages are less than 7 percent in the state and county and less than 2 percent in Lake Elsinore and Lakeland Village. People of Hispanic or Latino origin, who may be of any race, range from 31.0 percent of the population in Lakeland Village to 38.0 percent of the population in the city of Lake Elsinore.

Table 29. Race and ethnicity, 2000. (Source: U.S. Census Bureau, 2000f)

	Percent of Total Population			
Racial/Ethnic Group	State of California	Riverside County	City of Lake Elsinore	Lakeland Village CDP
Total Population	33,871,648	1,545,387	28,928	5,626
White	59.5	65.6	65.6	79.0
Black or African American	6.7	6.2	1.3	1.8
Some Other Race	29.0	23.9	22.6	15.4
Two or More Races	4.7	4.4	5.2	3.8
Hispanic or Latino (of any race)	32.4	36.2	38.0	31.0
White alone, not Hispanic or Latino	46.7	51.0	51.4	63.3

Employment

Employment information for 2000 indicates that the city of Lake Elsinore was comparable at that time to the state of California in terms of the percent of persons 16 and older who are in the labor force (62.3 and 62.4 percent, respectively) and whether they were employed (62.0 and 61.8 percent, respectively) (table 25). In Riverside County as a whole, a smaller percentage of the population was in the labor force (58.2 percent), and a smaller percentage was employed (53.6 percent).

Later data indicate a changing job market at the state, county, and local level, with unemployment rates down slightly in 2001 compared to 2000, then peaking in 2002 or 2003 and falling thereafter. California Employment Development Department data indicate that March 2005 unemployment rates in the state (5.7 percent), Riverside County (5.0 percent), Lake Elsinore (4.7 percent), and Lakeland Village (8.0) were all slightly lower than they were in March 2000 (CEDD, 2005).

In terms of occupation, the state average for management, professional, and related occupations (36 percent) is much higher than in the county (27.8 percent) or the city of Lake Elsinore (21.9 percent) (table 30). Lake Elsinore has a substantially higher percentage of jobs in the construction, extraction and maintenance occupations (5.0 percent) and the transportation and moving occupations (17.6 percent) than either the state or the county.

Table 30. Total employment by sector, 1990 and 2000. (Source: U.S. Census Bureau, 2000b)

	State of California		Riverside County		City of Lake Elsinore	
	Number	**Percent**	**Number**	**Percent**	**Number**	**Percent**
Employment Status						
Population 16 years and older	25,598,144	100.0	1,124,807	100.0	19,701	100.0
In labor force	15,977,879	62.4	654,387	58.2	12,268	62.3
Civilian labor force	15,829,202	61.8	651,952	58.0	12,218	62.0
Employed	14,718,928	57.5	602,856	53.6	11,352	57.6
Unemployed	1,110,274	4.3	49,096	4.4	866	4.4
Armed forces	148,677	0.6	2,435	0.2	50	0.3
Occupation						
Management, professional, and related occupations	5,295,069	36.0	167,739	27.8	2,488	21.9
Service	2,173,874	14.8	105,466	17.5	1,806	15.9
Sales and office	3,939,383	26.8	163,095	27.1	3,300	29.1
Farming, fishing, and forestry	196,695	1.3	9,499	1.6	67	0.6
Construction, extraction, and maintenance	1,239,160	8.4	70,974	11.8	1,698	15.0
Production, transportation, and moving	1,874,747	12.7	86,103	14.3	1,993	17.6

	State of California		Riverside County		City of Lake Elsinore	
	Number	**Percent**	**Number**	**Percent**	**Number**	**Percent**
Industry						
Agriculture, forestry, fishing and hunting, and mining	282,717	1.9	13,063	2.2	101	0.9
Construction	915,023	6.2	55,751	9.2	1,415	12.5
Manufacturing	1,930,141	13.1	72,837	12.1	1,899	16.7
Wholesale trade	596,309	4.1	21,400	3.5	493	4.3
Retail trade	1,641,243	11.2	76,466	12.7	1,657	14.6
Transportation, warehousing, and utilities	689,387	4.7	31,683	5.3	636	5.6
Information	577,463	3.9	13,956	2.3	244	2.1
Finance, insurance, real estate, and rental and leasing	1,016,916	6.9	34,348	5.7	469	4.1
Professional, scientific, management, administration, and waste management services	1,711,625	11.6	51,577	8.6	836	7.4
Educational, health and social services	2,723,928	18.5	113,407	18.8	1,574	13.9
Arts, entertainment, recreation, accommodations, and food services	1,204,211	8.2	59,131	9.8	981	8.6
Other services, except public administration	761,154	5.2	30,166	5.0	721	6.4
Public administration	668,811	4.5	29,071	4.8	326	2.9

Differences in local vs. county- and state-level jobs are evident as well in the distribution of jobs among industries (table 30), where the average percentage of workers employed statewide is higher in industries such as finance, insurance, and real estate; professional, scientific, management, and administration; educational, health, and social services; and public administration than they are in the city of Lake Elsinore. By contrast, workers in Lake Elsinore are more likely than the statewide average to be found in the construction, manufacturing, and retail trade sectors. Due to the rapid growth that is occurring in Lake Elsinore and much of Riverside County, the county-wide average of 9.2 percent of workers employed in the construction industry is almost 50 percent higher than the statewide average of 6.2 percent, and the Lake Elsinore value of 12.4 percent is double the statewide average.

Income and Poverty

Census data for 1999 indicate that at that time, household and per capita income in Lake Elsinore and Lakeland Village were lower than the state and county averages, while the percentage of the population below the poverty level was higher (table 31). The Public Policy Institute of California (2002) reports that during the past 3 decades, the economic well-being of California's regions, as measured by income, has diverged. In 1969, the wealthiest region of the state (the Bay Area) had a per capita income about 10 percent higher than the state as a whole, while the poorest region (San Joaquin Valley) had a per capita income about 20 percent lower than the state average. By 1999, the gap had grown tremendously, with an average Bay Area income almost 40 percent higher than the state average and the San Joaquin Valley having a per capita income more than 30 percent below the state average. Between 1989 and 1999, inflation-adjusted per capita incomes grew in California and in all regions of the state except the San Joaquin Valley and the Inland Empire, which includes Riverside County. The greatest decline in per capita incomes occurred in the Inland Empire during that period (California Department of Finance, 2002).

Table 31. Per capita incomes and percent of individuals below poverty level, 1999. (Source: U.S. Census Bureau, 2000c)

	State of California	Riverside County	City of Lake Elsinore	Lakeland Village CDP
Median Income in 1999 (dollars)				
Households	47,493	42,887	41,806	34,136
Per capita	22,711	18,689	15,408	14,922
Individuals below poverty level (%)	14.2	14.2	17.0	16.5

3.3.8.2 Environmental Consequences

Socioeconomic issues associated with the proposed project and alternatives include potential effects on socioeconomic conditions of the affected communities; potential effects on property owners and future development in the vicinity of proposed and alternative project features; whether or not, and to what extent, the proposed project and alternatives would have growth-inducing effects; and whether the proposed project and alternatives would have disproportionately negative effects on poor or minority populations.

Socioeconomic Conditions—Employment and Earnings

Project construction and operations would contribute directly to the economy by providing employment and earnings, which also contribute indirectly to the economy through employee purchase of goods and services. The creation of jobs associated with the project would contribute positively to the region's socioeconomic conditions. At the same time, project construction and operations could reduce or eliminate employment and earnings associated with activities that would be precluded by the presence of the project.

Effects of Construction on Employment and Earnings

Co-applicants' Proposal—The co-applicants do not propose any specific measures to address employment and earnings. However, employment associated with the co-applicants' proposal is expected to equal about 2,460 work years, or about 550 full-time equivalent jobs per year over the 4.5-year construction period, not including employment associated with the transmission line.

The co-applicants' estimate of construction requirements by year, not including employment associated with constructing the proposed transmission line, would equal 385 full-time equivalent jobs in year 1 (15.7 percent of the total construction-period employment), 535 in year 2 (21.7 percent), 515 in year 3 (20.9 percent), 585 in year 4 (23.8 percent), and 440 in year 5 (17.9 percent). This would equal 2,460 work-years of employment over the construction period, or an average of 546 full-time equivalent jobs per year for 4.5 years. Roughly 55 percent of the jobs would be for skilled trades, 30 percent for general labor, and 15 percent for supervisory and support staff (Elsinore Valley MWD and Nevada Hydro, 2004a).

The co-applicants did not provide an estimate of employment associated with constructing the proposed transmission alignment. Our review of other transmission line projects indicates that about 28 full-time equivalent work-years would be required to construct 32 miles of 500-kV transmission line in the type of terrain located along the proposed transmission alignment. Adding this estimate to the co-applicants' employment estimate yields a total estimate of 2,488 work-years of employment for the complete project, or approximately 553 full-time equivalent jobs per year for 4.5 years.

The co-applicants estimate payroll for the non-transmission line construction workers to be $126.1 million over the 4.5-year construction period, ranging from a low of $18.6 million in year 1 to a high of $31.2 million in year 4[68]. We estimate a payroll of $1.4 million for construction of the proposed transmission alignment, bringing the total payroll associated with the co-applicants' proposal to about $127.5 million.

Effects Analysis

As indicated in section 3.3.8.1, *Affected Environment*, Riverside County has been and is projected to remain one of the fastest growing counties in California. In 2000, the 602,856 people employed in Riverside County included 55,751 (9.2 percent) in the construction sector, while the city of Lake Elsinore's employed population of 11,352 people included 1,415 (12.4 percent) in construction (see table 25). Given the large construction labor pool currently existing in the county, we conclude that the existing area-wide work force would be sufficient to accommodate project-related construction needs. Only a limited number of specialty construction contractors, such as earth boring machine operators and support personnel, might need to relocate to the project area from elsewhere during the construction period. With very few construction personnel needing to relocate to the project area, there would be no substantial in-migration of people, no excessive demand for rental housing, little or no increased demand for permanent housing, and little or no increased demand for government facilities or services associated with the construction workforce.

The project-related construction employment and payroll would have a positive short-term effect on the local economy, although the effect would be small in relative terms because of the overall size of the economy. The 553 full-time equivalent jobs on an average annual basis associated with project construction would equal about one-tenth of one percent of Riverside County's 602,856 employment level in 2002. The effect of the project-related payroll of $127.5 million would be comparable to employment; that is, positive but relatively small compared to the size of the current economy.

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[68] The co-applicants' payroll estimate is based on 2003 data from the California Economic Development Department and the 2002 data from the Riverside County Economic Development Department. The co-applicants used the "high" wage rates by trade from those sources and assumed a 40-hour work week and 50-week work year, with no overtime rates included (California Department of Health Services, 2003, as cited in Elsinore Valley MWD and Nevada Hydro, 2004a).

Staff Alternative—The scope of the construction effort and the effects on employment and earnings for the alternative sites would be similar to the co-applicants' proposed development.

Effects of Operation on Employment and Earnings

About 20 employees would be needed to manage, operate, and maintain the proposed project. The total staff would include 2 management personnel, 7 operating staff, and 11 maintenance personnel. Additional contractors and independent labor would be hired to fulfill specific functions, such as qualified monitors to conduct water quality monitoring and groundskeepers, arborists, and horticulturalists to maintain the project landscaping. The co-applicants indicate that locally available independent firms, consultants, and contractors would be employed to perform these and other functions. Because of the small size of the operations work force compared to the size of the local economy, there would be no substantial in-migration of people and little or no increased demand for rental housing, permanent housing, or government facilities or services associated with the operations workforce.

The estimated payroll for the 20 regular project employees would be about $1.0 million annually, which, compared to the construction phase, would have a relatively small but positive long-term effect on the local economy.

The increase in employment and earnings associated with the continuing presence of project features would have some negative effects on the economy as well. The proposed powerhouse site, once devoted to the powerhouse and substation, would not be available to support other businesses or residential construction that might have occurred in the absence of project development.

Staff Alternative—The number of employees needed for any of the alternative project configurations would likely be the same as for the co-applicants' proposal.

Property Values and Development

Research has shown that the effect of utility projects on nearby property values varies considerably from site to site. Many studies show that projects have either no effect or a negative effect on property values; the estimates of negative effects generally range from 1 to 10 percent but are sometimes considerably greater. For the LEAPS Project, the greatest potential for negative effects on property values lies with the aboveground substation at the powerhouse site and with the transmission line.

Effects of Construction and Operation on Property Values and Development

Co-applicants' Proposal—The co-applicants assessed project effects on values and development patterns associated with the project. Although they reach the conclusion that the project would not significantly affect property values either near the powerhouse site or near the transmission alignment, the co-applicants acknowledge that there is a potential for some residential and/or business displacement and propose to purchase certain properties to help offset this effect. At the construction laydown area associated with the proposed Santa Rosa powerhouse site, the co-applicants propose to purchase the 12-unit Santa Rosa Mountain Villa property and possibly other properties as well, returning them to productive reuse after the construction period is complete. With respect to the proposed transmission alignment, the co-applicants identified potentially affected properties and property owners, but have not yet identified which specific properties might need to be acquired.

The co-applicants propose to acquire properties in several ways. The majority of the project's proposed sites are on National Forest System lands, for which the co-applicants propose to acquire special use permit for a 50-year leasehold interest. Established USFS procedures would be followed to acquire that real property interest. Similarly, the co-applicants propose to follow procedures established by other public entities—including BLM, Caltrans, the city of Lake Elsinore, and Elsinore Valley MWD—that have jurisdiction over any properties that would be needed for project construction, operation, or maintenance.

For the limited number of privately owned properties that could be affected by the proposed project, the co-applicants propose to acquire fee simple or leasehold interests on those lands through voluntary sale or conveyance. If a negotiated sale or conveyance could not be realized, the Elsinore Valley MWD has eminent domain authority, meaning that they could acquire property interests through condemnation following payment of just compensation to the owner.[69]

Effects Analysis

In response to comments on the preliminary permit and initial state consultation document recommending that the Commission require the co-applicants to study the effect the project would have on property values of residences near the project, the co-applicants state that the project would have little effect, noting the following quote from the California Department of Health Services: "developers of planned residential areas often express concern that their property would have little appeal and market value if an energy facility were built nearby. While considerable anecdotal evidence has been put forward for such an impact, there is little solid evidence indicating actual impact" (California Department of Health Services, 2003, as cited in Elsinore Valley MWD and Nevada Hydro, 2004a). The co-applicants reviewed a number of studies of energy project effects on nearby property values, and specifically concur with two of the findings relevant to the proposed powerhouse site and proposed transmission alignment, as discussed further below.

The proposed Morrell Canyon upper reservoir site is on National Forest System lands, with no adjacent private properties. Construction of the upper reservoir at the proposed Morrell Canyon site should not affect private property values or require the purchase or lease of any private property interests.

With respect to the powerhouse site, the co-applicants cite the California Department of Health Services regarding a study of the effects of wind power developments on properties within view of the wind turbines. The study cited by the Department found that wind projects do not harm viewshed property values (California Department of Health Services, 2003, as cited in Elsinore Valley MWD and Nevada Hydro, 2004a), and the co-applicants indicate that the same findings would apply to a facility like the proposed powerhouse. At the proposed Santa Rosa powerhouse site, the co-applicants' proposal to purchase the Santa Rosa Mountain Villa apartments, and possibly other properties as well, would reduce the potential adverse effect on that property owner, as long as just compensation is paid for the property. The co-applicant's proposal to return the acquired property to productive reuse following the termination of construction would create a buffer between the powerhouse substation and other nearby properties, reducing the potential adverse effect on the nearby properties because negative effects on property values generally decline as the distance from the power facility increase (see discussion below).

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[69] As outlined in the California Code of Civil Procedure, an agency empowered with the right of eminent domain may acquire private property for public purposes, if the following criteria are established: (1) the public interest and necessity require the proposed project (Section 1240.030[a]); (2) the proposed project is planned or located in the manner that will be most compatible with the greatest public good and the least private injury (Section 1240.030[b]); (3) the property that the agency intends to acquire is necessary for the proposed project (Section 1240.030[c]); and (4) an offer for the full amount of the agency's appraisal has been made to the owners of record (Section 7267.2). In an effort to establish uniform treatment of all people affected by any public project, the State of California passed the Uniform Acquisition and Relocation Act and Eminent Domain Law, which guides land acquisitions of state and local public agencies.

With respect to the proposed transmission alignment, the co-applicants cite a USFS conclusion regarding a proposed 765-kV transmission line that would cross both National Forest System lands and non-federal lands in Virginia. The USFS concluded:

> Although the specific studies of 765 kV lines in Virginia do not suggest the possibility of property value impacts, the available research and court rulings suggest that some unknown (and therefore, unquantifiable) effect on property values is possible from implementation of the proposed project. The exact magnitude of this potential impact cannot be predicted for several reasons. First, effects on specific properties can vary widely because of many other factors such as physical desirability, lot size and configuration, exact location of the line or tower relative to the remaining parcel, distance from the line, and overall market conditions in the area. Second, effects also vary with type of land use (e.g., residential, agricultural, commercial). Because the precise alignment for the proposed project has not been established, conclusions about potential property value effects would be speculative and premature. In general, significant property value effects are considered unlikely because most of the Proposed Corridor and alternatives traverse rural acreage (which tends to be less affected in property value) (USFS, 2002b, cited in Elsinore Valley MWD and Nevada Hydro, 2004a).

The co-applicants state that those same conclusions are applicable to the proposed project transmission alignment.

A wealth of research is available concerning the potential adverse effects of transmission lines on nearby property values, although the results are highly variable and site specific.[70] From the 1950s to the late 1980s, almost all reported research concluded that transmission lines have little or no effect on property values. More recent studies tend to support the idea that proximity to transmission lines may affect the value of residential property (Colwell, 1990; Delaney and Timmons, 1992; Hamilton and Schwann, 1995; Cowger et al., 1996). Some observers have linked this general change in perspective to increased concerns for EMF-related health effects (see section 3. 3.7.2, *Environmental Consequences, Electromagnetic Field Effects*), but a nationwide survey of real estate appraisers suggests that for the most part, potential negative effects on property values tend to be related to the visual effect of transmission line facilities (Delaney and Timmons, 1992).

Studies based on both survey and market data have reached similar conclusions. Delaney and Timmons (1992), reporting on a nationwide survey of real estate appraisers, found that 84 percent of the surveyed appraisers believed that transmission facilities negatively affected the value of nearby properties, with an average decrease in value of 10 percent. Hamilton and Schwann (1995) studied 12,907 residential real estate transactions in Vancouver, British Columbia, and concluded that properties adjacent to a transmission line lost 6.3 percent of their value. They also found that the effect decreased with distance, with more distant properties losing about 1 percent of their value. Colwell (1990) found that properties within 50 feet of a transmission line had property values that were 6 to 9 percent lower than comparable properties included in the study. He also found that this reduction in value decreased over time.

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[70] The research summary presented in this section is taken primarily from the *Methow Transmission Project Draft Environmental Impact Statement* (Tetra Tech FW, Inc., 2005). Some of the same research results were included, uncited, in the co-applicants' license application, exhibit E.5, *Report on Socio-Economic Impacts* (Elsinore Valley MWD and Nevada Hydro, 2004a).

Other studies have reported smaller negative effects, no effects, or even positive correlations between residential property values and proximity to transmission lines. A Bonneville Power Administration study found that properties near transmission lines in King County, Washington, were valued about 1 percent lower than comparable properties that were not near transmission lines, but that the opposite was true in the Portland, Oregon/Vancouver, Washington area, where properties near transmission lines were worth about 1.5 percent more than comparable properties not near transmission lines (Cowger et al., 1996). An updated study of the same areas in 2000 found similar results (Bottemiller et al., 2000).

The studies discussed above suggest that proximity to electric transmission lines can have negative effects on residential property values, with the estimates generally ranging up to 10 percent. The findings also suggest that the negative effect diminishes with distance and tends to decline over time. The co-applicants note other studies that have found, for example, negative effects of 0 to 10 percent for single-family residential property but greater negative effects on rural vacation home developments, and negative effects of 18 to 53.8 percent on vacant lot values. According to Cowger et al. (1996), most studies have concluded that other factors, such as location and size of property, type and condition of improvements, and the level of real estate activity, are more important in determining the value of property than is proximity to a transmission line.

Based on our review of these and other studies, we conclude that the northern segment of the proposed transmission alignment could adversely affect residential property values for a distance of about 2.5 miles where the alignment would cross private property designated for residential development. Much of this land is designated for development at densities ranging from 5- to 20-acre minimum lot size, but other areas, such as El Cariso Village, may be rezoned for development at much greater densities. The southern segment of the proposed transmission alignment could adversely affect residential property values for a distance of about 6.1 miles in Riverside and San Diego counties where it would cross private property designated for residential development at the same densities The magnitude of the potential effect cannot be determined at this time but would have to be determined on a case-by-case basis.

Staff Alternative—Like the proposed Morrell Canyon site, the Decker Canyon site is on National Forest System lands and would not affect any private property values.

As noted above for the co-applicants' proposal, construction and operation of an underground powerhouse and aboveground substation at the Santa Rosa powerhouse site is not expected to adversely affect nearby residential property values because of the co-applicants' proposal to acquire some properties closest to the site to mitigate effects during construction.

The northern segment of the staff alternative transmission alignment could adversely affect residential property values for a distance of about 2.5 miles where the alignment would cross private property designated for residential development at densities ranging from 5- to 20-acre minimum lot size. The southern segment of the staff alternative transmission alignment could adversely affect residential property values for a distance of about 10.9 miles in Riverside County where it would cross private property designated for residential development at the same densities (including the La Cresta area), as well as an undetermined number of properties in San Diego County. The magnitude of the potential effect cannot be determined at this time but would have to be determined on a case-by-case basis.

Optional Ortega Oaks or Evergreen Powerhouse—Construction and operation of an underground powerhouse and aboveground substation at the Ortega Oaks powerhouse site is not expected to adversely affect nearby residential property values because of the distance between the nearest residential properties and the site.

If the Evergreen powerhouse site and construction laydown area were selected for project construction, the co-applicants propose to acquire the property at the laydown area. Because construction could be disruptive to the continued operation of the Lakeland Children's Center and the Child Care

Center at nearby Lakeland Village Plaza, the co-applicants propose to acquire that property and reuse or adaptively use those properties both during construction and following the start of project operations. Regardless of the ultimate use of the building, the child-related businesses would be displaced.

Growth-Inducing Impacts

Construction and operation of the project under any alternative is not expected to induce growth in Riverside or San Diego counties. As discussed above under the topic of *Socioeconomic Conditions—Employment and Earnings*, neither project construction nor project operation would induce any appreciable in-migration of construction or operations personnel. The project's power would be used to meet regional power needs and, therefore, would not improve the availability or cost of power in the project area relative to any other places in the region in a way that would favor growth in the project area

Effects on Poor and Minority Populations

Poverty statistics provide insight into how reductions in economic output and job losses can be absorbed by the county. Communities with high levels of poverty are typically less able to absorb reductions in economic output, reductions in wages, or job losses.

Effects of Construction and Operation on Poor and Minority Populations

Co-applicants' Proposal—The co-applicants do not propose any specific measures to address project effects on poor and minority populations.

Effects Analysis

Project construction and operation are likely to contribute short-term and long-term jobs to the community, which would have a minor but positive benefit for the county's socioeconomic conditions. As such, it is unlikely that construction or operation of the project under any alternative would have a disproportionate adverse effect on poor populations. Although the percentage of individuals living below the poverty level in 1999 was slightly higher (16.5 percent) in Lakeland Village CDP, where the proposed and alternative powerhouse sites are located, than it was in Riverside County (14.2 percent) or California as a whole (14.2 percent), it was comparable to the city of Lake Elsinore (17 percent). The proposed and alternative transmission alignments do not cross or parallel residential areas that have higher than average numbers of people living below the poverty level.

Construction and operation of the project are not expected to have a disproportionate adverse effect on minority populations. Lakeland Village CDP has a lower percentage of African Americans and Hispanics (of any race) than the rest of Riverside County and California as a whole. The proposed and alternative transmission alignments do not cross or parallel residential areas that have higher than average minority populations.

3.3.8.3 Unavoidable Adverse Effects

Project construction is likely to adversely affect property values of an unknown number of properties nearing the vicinity of the selected powerhouse site and transmission alignment.

3.3.9 Cultural Resources

3.3.9.1 Affected Environment

Definition of Cultural Resources, Historic Properties, and Area of Potential Effects

Section 106 of the National Historic Preservation Act

The Advisory Council on Historic Preservation's regulations define historic properties as cultural resources that are listed or eligible for listing in the National Register of Historic Places (National Register). Historic properties represent things, structures, places, or archaeological sites that can be either Native American or European-American in origin. In most cases, cultural resources less than 50 years old are not considered eligible for the National Register unless they possess exceptional importance. Cultural resources also must have enough internal contextual integrity to be considered historic properties. For example, dilapidated structures or heavily disturbed archaeological sites may not have enough contextual integrity to be considered eligible.

Archaeological resources refer to both prehistoric and historic artifact scatters and historic architectural ruins. Archaeological resources are also referred to as prehistoric and historic sites. Historical resources refer to architectural and structural features that are not in ruins.

Area of Potential Effects

Pursuant to Section 106, the Commission must take into account whether any historic property within the project's APE could be affected by the licensed project. The APE is defined as the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. In this case, the APE for LEAPS Project encompasses the following:

- The locations of the proposed and alternative upper reservoir sites, the designs for each site, and associated construction laydown areas required for the staging of equipment, materials and personnel during construction;
- Fifty-foot-wide corridors within which the low-head (tailrace) pipelines from the lake to the powerhouse would be constructed;
- The possible locations of the proposed and alternative powerhouse sites, including switchyards and construction laydown areas;
- A 600-foot-wide corridor (the location of which has not yet been determined) within which the overhead high-voltage transmission lines, associated transmission towers, staging areas and/or access roads would be located;
- The community of Alberhill, situated immediately south of Interstate 15;
- The rights-of-way of local streets within which several low-voltage overhead distribution lines carried on existing, modified or newly-erected power poles, which would extend from the powerhouse to two existing local substations; and
- Approximately 100 acres within which the project's electrical substations would be placed, once their locations have been determined.
- The shoreline around Lake Elsinore (the lower reservoir) to the upper limit of the zone of daily fluctuation expected from the project.

Cultural History Overview

Prehistory

The prehistory of Southern California is divided into three temporal periods: Paleo-Indian, Archaic, and Late Prehistoric. The Paleo-Indian period, dating from 12,000 years to 8,000 years B.P. is typified by artifact assemblages of the San Dieguito complex. This complex is represented almost exclusively by flaked stone technology. Artifacts include large projectile points, choppers, and scrapers. This complex is also marked by the absence of milling technology. The Paleo-Indian complex was superseded by the Archaic approximately 8,000 years ago.

The Archaic period (8,000–2,000 B.P.) in southern California is typified by the La Jollan and Early Milling Stone Horizon cultural traditions. While the Archaic is generally aceramic, the reduction of projectile point sizes and the appearance of milling technology imply a shift from a hunting-based subsistence strategy to a broad-based subsistence pattern that utilized a wide variety of plant products.

The Late Prehistoric period is marked by the appearance of arrow points, ceramics, bone tools and various ornaments are also common. Habitation sites vary from small camps to large sites that exhibit extensive occupation. Sites are found primarily on plateaus and creek terraces in or near bedrock outcroppings.

Human occupation in southern California extends as far back as 10,000 years before present (BP). However, evidence for such early Paleoindian occupation is very sparse consisting of mostly of isolated finds of distinctive projectile points. Such occupations probably represented small groups of mobile hunter gatherers (Wallace, 1978). The earliest well-documented predecessors of the Luiseno and Juaneno occurs in the Archaic period, identified as “Millingstone” peoples, who were scattered over much of southern California from as early as 6000 BC. The La Jolla and Pauma archaeological complexes of San Diego County represent early food gathering economies associated with this Millingstone horizon (Wallace, 1978; Moriarty, 1967; True, 1958). These peoples were principally seed and root gatherers who seldom developed large settlements or occupied a single area on a year-round basis. Around 1500 BC, at the beginning of a period archaeologists call the “Intermediate” era, the Native peoples in the area began to use stone mortars and pestles to process acorns. Some archaeologists believe that sometime between AD 500 and AD 1000, during the Late Prehistoric period, Shoshonean-speaking peoples moved into southern California from the Great Basin, absorbing or decimating the indigenous populations, in a movement known as the Takic Spread.

Ethnography

The project is situated midway between the historic territories of the Juaneno (Acjachemen) and Luiseno[71] aboriginal groups, who spoke closely related Shoshonean dialects. When the Spanish arrived in the late eighteenth century, the homeland of the Juanenos was centered around modern San Juan Capistrano and extended west to Aliso Creek. The Luiseno territory included much of western Riverside and northern San Diego Counties, but anthropologists believe that most of the Luisenos who visited the Elsinore Mountains resided in the region of Lake Elsinore. Prehistorically, these aboriginal groups resided in both permanent villages and seasonal camps. According to O’Neil and Brown (2003), “the villages consisted of 35 to 300 persons of a single lineage in the smaller villages and of a dominant clan with other families in the larger settlements.” White (1963, as cited in O’Neil and Brown, 2003), noted that the Acjachemen and Luiseno (their neighbors to the east) village communities were autonomous of each other.

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[71] The name “Luiseno” was given by the Spanish to the Native American groups who lived in the area under the influence of the Spanish Mission San Luis Rey.

The village political structures were probably similar to other Southern California Tribes in that they consisted of localized patrilineal groups who were generally exogamous and patrilocal (Gifford, 1973, as cited in O'Neil and Brown, 2003). As noted above, a village usually had one clan or lineage that dominated, with lineages or single families of other clans residing there as well. These ranged in size from 35–50 individuals to as high as of 250–300 depending on the resource base (O'Neil and Brown, 2003). Marriage was used as a mechanism of politics, ecology and economics and the important lineages were allied by marriage.

According to O'Neil and Brown (2003), only men were initiated in to the mysteries of the religion, which included the use of Jimson Weed, but both boys and girls were involved in rites of initiation around the age of puberty. The center of the Acjachemen religion was Chinigchinich, the last of a series of heroic mythological figures. The Acjachemen generally cremated their dead. The work was done by Ritual Specialists who were paid for their services. Among groups living in the interior, plant foods were the largest part of the traditional diet with acorns being one of the highest ranked. The principle game animals were deer, rabbit, jackrabbit, wood rat, mice, ground squirrels, deer, antelope, and water fowl. Fish and other marine animals were also exploited by groups living at or traveling to the coast. Food resource localities were the property of local clans who kept a watchful eye on them. According to O'Neil and Brown (2003), the Juncus Meadow is within an area that was, among other things, a large acorn gathering location that would have belonged to a specific lineage or clan. Non family members could camp and collect in the area if permission was obtained by the owners.

Both the Luiseno and Juaneno resided in permanent villages and seasonal camps. They built "pit houses," constructed by excavating a shallow hole, erecting a frame over the hole, and then covering the frame with branches and earth. They built sweathouses in a similar manner.

The Luiseno and Juaneno used bedrock milling stations (mortars, metates, or slicks), usually located on boulder outcrops near creek beds and oak stands, to grind and otherwise process acorns and other foods. They made chipped stone tools for cutting, and for shaping and removing plant fiber and also made arrow and dart points from this material. These peoples also made pottery (known as "Tizon Brown Ware") of coiled, reddish clay fired in an open hearth.

Stems and leaves of native plants, such as sedges, sumac, and yucca, were used in combination and woven to make baskets, women's caps, and large bins for storing acorns. The Juaneno and Luiseno also manufactured a wide variety of ornaments, including beads from the shells of olivella and other marine shell species as well as from stone.

The Spanish Period (1769–1821)

The Spanish period represents exploration; establishment of the San Diego presidio and the San Diego, San Luis Rey, and San Juan Capistrano missions; the introduction of horses, cattle, sheep, pigs, corn, wheat, olives and other agricultural goods and implements; and a method of building construction and architectural style. Spanish influence continued beyond the year 1821, when California came under Mexican rule, because the missions continued to operate as they had in the past although with reduced funding and support. Laws governing the distribution of land were also retained for a period of time. Forest lands were only occasionally penetrated during this period because of the relatively small numbers of Spaniards, a colonial settlement pattern that focused on coastal missions and presidios, and the resistance of inland/mountain native peoples to Spanish intrusion. In 1776, the Spanish established San Juan Capistrano Mission for the purpose of converting the Juaneno to Christianity and, in the process, turning them from foraging to European-style agriculture. The Juaneno provided most of the mission's labor force, erecting buildings under Spanish supervision, learning to raise livestock and to grow crops. The San Luis Rey Mission, established in 1798, exerted similar "authority" over the Luiseno. Poor living conditions and disease led to rapid declines in Native populations. By the end of the Mission Period

(1769–1834), Luiseno were scattered throughout southern California. Nonetheless, they were able to maintain traditional beliefs and lifeways well into the nineteenth century.

The first non-mission European settlement in the region occurred in 1818, when Leandro Serrano settled in Temescal Canyon. The Trabuco area was also used for grazing and hunting, as well as for accessing the hot pools in the canyon.

The Mexican Period (1821–1846)

The Mexican period includes the retention of Spanish laws and practices until shortly before secularization of Mission San Gabriel, Mission San Luis Rey, Mission San Juan Capistrano, and Mission San Diego de Alcala in the 1830s, over a decade after Spanish rule had ended. Although several Spanish grants of land were made prior to 1834, after secularization, vast tracts of land were granted and the Rancho era began.

Cattle ranching prevailed over other agricultural activities and development of the hide and tallow trade increased during the early part of this period. The Pueblo of San Diego was established, Los Angeles and San Gabriel became major settlements, and transportation routes expanded. The Mexican Period ended as a result of the Mexican-American War in 1846-48.

While the Mexican landowners pushed further into the interior hills and mountains than had the Spaniards, settlement and extensive land use still focused on the coastal plain and nearby inland valleys.

In 1844, Julian Manriquez received a grant to Lake Elsinore, but the lakeshore was not "settled" until arrival of Don Augustin Machado and his family in 1858. Machado established a ranch that also served as a regular stopping place for Butterfield Overland Mail stagecoaches. Later homesteading families, such as the Stewarts and Morrells, established ranches in the area and ran stock in the mountains above the lake.

The American Period (1848–Present)

The American period began when Mexico ceded California to the United States under the Treaty of Guadalupe Hidalgo in 1848. In direct violation of that treaty, the California Lands Commission was created by the State of California in response to the Act of 1851 that provided a means of validating land ownership throughout the state through settlement of land claims. Few Mexican ranches remained intact because of legal costs and a lack of what Americans considered to be sufficient evidence to provide title claims. Much of the land that once constituted rancho holdings became public land, available for settlement by emigrants to California.

The influx of people to California and the Orange County/San Diego region was the result of various historical and economic forces. These forces include the discovery of gold in the state, conclusion of the Civil War and subsequent availability of free land through passage of the Homestead Act, and importance of the area as an agricultural area supported by the construction of connecting railways. The growth and decline of towns occurred in response to an increased population and the economic "boom and bust" period of the late 1880s.

In the 1880s, both settlers and tourists came to the area, greatly facilitated by the California Southern Railroad's construction of a spur line within 2 miles of the new town of Elsinore, which grew up on the northeast shore of the lake around hot mineral springs. By 1888 the town had a population of around 2000, and boasted two banks, two hotels, two bathhouses, a schoolhouse, three churches and a water supply system. The lake became a major regional recreation center in the 1910s and 1920s, primarily for vacationers from Los Angeles. Ortega Highway, constructed between 1929 and 1934 from the lake to San Juan Capistrano, further connected the previously remote area to larger population and market centers. It also provided access to the mountains from both north and south, and offered public campgrounds, built along the highway by the Civilian Conservation Corps.

The lands now contained within the Cleveland National Forest possessed imagined, and real, potential for lumber, gold, silver, and perhaps most importantly, water. As result of increasing population pressures placed on the land, the Cleveland National Forest was one of the first areas of reserved land created under the Forest Reserve Act passed in 1891. This act repealed the unenforceable Timber Culture Act of 1873 that granted settlers land in exchange for tree cultivation to promote timber growth on the western prairies.

Administered by Interior's General Land Office, Forest Reserves around the region first appeared in 1893 with the 50,000-acre Trabuco Canon Forest Reserve in the Santa Ana Mountains, set aside by President Harrison and named for the prominent peak and canyon within its borders. The 70,000-acre San Jacinto Forest Reserve, named for the mountain range and peak at the entrance to the Colorado Desert, was created by President Cleveland in 1897 and more than doubled two years later (Descanso Ranger District, n.d.; Cleveland National Forest 1972).

Because of the economic depression, beginning in the early 1930s, President Roosevelt proposed the creation, under the Emergency Conservation Act, of the Civilian Conservation Corps to employ young mean from the ages of 17 to 24 to work on both state and federal land. The Civilian Conservation Corps built truck trails, fires breaks, fire stations, and recreation campgrounds within the boundaries of the forest. The program began in 1933 and last until 1941.

During the past 50 years, Cleveland National Forest has been increasingly used by hikers, campers, and other recreationists. Construction of major highways across, and near, the Forest lands has increased ease of access and a national ethic based on experiencing the wilderness and on sharing the outdoor experience has placed pressures on the Forest to develop and maintain facilities. The development and sales of off-road vehicles have posed special challenges for land use and resource managers.

Archaeological Resources

Archaeological investigations in association with the Lake Elsinore Project, originally proposed in 1994, were conducted in 1996 and 1997. Nearly 6 years then passed before project planning, and therefore cultural resources work, was resumed. As a result of design changes, additional investigations were necessary. A records search for identified cultural resources in the APE identified by the co-applicants, conducted in January and February 2005, yielded 13 prehistoric sites, 4 historic-period sites, and one Traditional Cultural Property located within or directly adjacent to the Lake Elsinore project APE, among them two sites that had been identified during the 1996 to 1997 field survey. Intensive field surveys conducted in early 2005 identified two more sites (Dobson-Brown et al., 2005). To date, the APEs of the proposed Morrell Canyon and Decker Canyon upper reservoir sites, the proposed Santa Rosa and Ortega Oaks powerhouse sites, and the water conduit route have been surveyed. The APEs for the Evergreen powerhouse site, both the proposed and alternative transmission alignments, and access roads remain to be surveyed.

The records searches, coupled with the field survey completed to date, have identified 14 prehistoric and 5 historic archaeological sites in the overall project APE. Archaeologists have recommended three of the sites as potentially eligible for the National Register. These sites are a village site with bedrock features and midden (RIV 271), historic-period rock alignment (RIV 3560H/FS 52-82), an occupational site (RIV 4045). Four additional sites on USFS land are considered by that agency as potentially eligible pending any future investigation that would indicate otherwise. These sites are a flake scatter with bedrock mortars (RIV 1082/FS 52-14), bedrock milling features with artifact scatter (RIV 2205/FS 52-55), a site containing pictographs and milling features (RIV 3836/FS 52-78), and a site with bedrock mortars and artifact scatter (SDI 9579/FS 52-32). Archaeologists also have recommended that two historic period sites representing remains of dwellings are not eligible (RIV 5870H, RIV 5871H). The remaining sites have not been evaluated by archaeologists, and the SHPO has not reviewed any of the sites recorded in the APE. The remaining unevaluated sites include RIV 1091 (prehistoric petroglyphs), RIV 1311 (small prehistoric campsite), RIV 5877H (remains of an historic building), RIV 5878 (prehistoric bedrock milling station), RIV 6174 (prehistoric lithic scatter), RIV 7658H (remains of an historic building), SD1 5143 (prehistoric bedrock milling and artifact scatter), and SD1 15649 (prehistoric lithic scatter). Two isolated prehistoric artifact finds (33-12661 and SD1 15164) were also located in the APE and are considered not be eligible for the National Register.

Historical Resources

Nine historic period buildings have been identified in the APE near Lake Elsinore. Eight of these (a former military academy, originally built as a country club, and seven dwellings) range in date from 1903 to 1929, and are associated with the early twentieth century growth of the area as a locus of recreation and tourism. Architectural styles include Mediterranean/Spanish Revival (33-7217, 33-7222), adobe (33-7223), and bungalow/Craftsman (33-7177, 7218, 7219, 7220, and 7221). The ninth dwelling is a cottage of unspecified style dated to 1948 (33-13990). Surveyors evaluated the former Elsinore Naval and Military Academy (33-7217) and one of the bungalows (33-7218) as potentially eligible for the National Register. The remainder are currently evaluated as “significant locally.”

Traditional Cultural Properties

Traditional cultural properties (TCP) are properties eligible for inclusion in the National Register because of their association with cultural practices or beliefs of a living community that: (1) are important to that community’s history, and (2) are important in maintaining the continuing cultural identity of the community. TCPs can be archaeological sites or other special activity areas that often lack artifacts or other obvious signs of human occupation. TCPs in general reflect places used traditionally for generations within one or more tribal communities.

Lake Elsinore (33-11009) was recorded in the state inventory in 1982, and USFS considers it eligible for the National Register. It is the only potential TCP to have been identified thus far in the APE. It is important to the Pechanga Band of Luisano Mission Indians and the Juaneno Band of Mission Indians (Acjachemen Nation) as a part of their traditional homeland and its presence in Luisano creation songs. The co-applicants have contacted and consulted with a number of Tribes in the region, providing copies of its ISCD and draft and final license application for comment to the Juaneno, Pauma, and Pala bands of Mission Indians, the Pechanga Band of Luiseno Mission Indians of the Pechanga Indian Reservation, the Indian Council of San Juan Capistrano, and the Council of Elders–Payomik.

3.3.9.2 Environmental Consequences

Section 106 of the National Historic Preservation Act requires federal agencies to take into account the effect of any proposed undertaking on properties listed in, or eligible for listing in the National Register. If the agency official determines that the undertaking may have adverse effects on properties listed in or eligible for listing in the National Register, the agency official must afford an opportunity for the Advisory Council on Historic Preservation to comment on the undertaking. The licensing of the LEAPS Project is considered an undertaking and the Commission acts as the agency official.

Effects of Construction on Historic Properties

Co-applicants’ Proposal—The co-applicants’ proposed measures to address the potential effects on historic properties during the construction and operation of the proposed project are discussed under the *Historic Properties Management Plan* section below.

Under the co-applicants’ proposal, four prehistoric archaeological sites (RIV-1082, -2205, -3836 and -7659) would be damaged or destroyed during the construction of a reservoir at the proposed Morrill

Canyon upper reservoir site. Construction of a powerhouse at the proposed Santa Rosa site would directly affect two historic sites and one prehistoric site (RIV-5877H, -7658H, and -5878, respectively). Ground-born vibration from construction could potentially affect historic period buildings (33-7177 and -7221) adjacent to the proposed Santa Rosa powerhouse site.

The co-applicants also propose to extend a pipeline from the powerhouse through a developed area into Lake Elsinore. No information has been provided to indicate that this aspect of the proposed project would alter any characteristics contributing to the importance or cultural values of this resource.

Effects Analysis

Extension of a pipeline from the powerhouse through a developed area into Lake Elsinore would not likely adversely affect this potential TCP; it would not alter any characteristics that may contribute to the importance or cultural values of this potential TCP.

The construction of the northern portion of the proposed transmission alignment could potentially affect two prehistoric sites (RIV-1091 and RIV-1311) and two historic period sites (RIV-5870H, -5871H). The southern portion of the proposed transmission alignment would not affect any known archaeological resources; however, one prehistoric site (SDI-9579) could be affected by construction of the proposed southern substation.

The sites noted above were identified during review of state inventory files. Other unsurveyed areas (e.g., transmission alignment and access roads) within the APE may contain historic properties not yet identified that could be lost or damaged during construction.

Staff Alternative—Archaeological surveys identified no historic or prehistoric archaeological resources in the APE of the Decker Canyon upper reservoir site, and no such resources have been previously recorded in that area. Construction of a reservoir in Decker Canyon would therefore not affect any known archaeological sites. Unsurveyed areas within the APE of this alternative site may contain historic properties not yet identified that could be lost or damaged during construction.

Effects of construction of a powerhouse at the Santa Rosa site would be the same as under the co-applicants' proposals. Construction of the tailrace tunnels from the Santa Rosa powerhouse site through developed areas into Lake Elsinore would be unlikely to alter any characteristics that may contribute to the importance or cultural values of Lake Elsinore, a potential TCP.

Surveys have not been completed for the staff alternative transmission alignment. The APE of the staff alternative transmission alignment may contain historic properties not yet identified that could be lost or damaged during construction.

Optional Ortega Oaks or Evergreen Powerhouse—Construction of a powerhouse at the Ortega Oaks site would directly affect one prehistoric site (RIV-4045) located in the vicinity of the proposed tailrace. Extension of pipelines from the powerhouse through a developed area into Lake Elsinore would not likely adversely affect this potential TCP; it would not alter any characteristics that may contribute to the importance or cultural values of this potential TCP.

Construction of a powerhouse at the Evergreen site could affect as yet unidentified historic properties Extension of the tailrace tunnels from the powerhouse through a developed area into Lake Elsinore would not likely adversely affect this potential TCP; it would not alter any characteristics that may contribute to the importance or cultural values of this potential TCP.

Effects of Operation

Co-applicants' Proposal—Installation of a double liner in the upper reservoir would protect any portion of historic properties that remain after construction, and no additional effect is anticipated. Vegetation and facility maintenance, particularly along conduits and transmission lines, have the greatest potential to affect archaeological resources during operation of the project. Access roads to project facilities and the reservoir also may make archaeological sites vulnerable to inadvertent or purposeful destruction. However, historic buildings within the APE would be unlikely to experience any effects once the project is constructed.

Staff Alternative—Operation of a reservoir in the Decker Canyon reservoir site would not affect any known archaeological resources or TCPs. If any historic properties (archaeological sites or TCPs) were located in the fluctuation zone of a reservoir in the Decker Canyon site, they could be protected from damage from fluctuation-induced erosion by the double liner. Access roads to the reservoir could also make archaeological sites vulnerable to inadvertent or purposeful destruction.

Vegetation maintenance as well as facility maintenance along any of the staff alternative transmission line alignment could affect archaeological resources during operation of the project. Access roads also may make archaeological sites vulnerable to inadvertent or purposeful destruction.

Optional Ortega Oaks or Evergreen Powerhouse—Vegetation and facility maintenance along conduit routes could result in damage to any archaeological resources that may be present at the Ortega Oaks or Evergreen powerhouse site. Access roads to such facilities also may make archaeological sites vulnerable to inadvertent or purposeful destruction. However, historic buildings within the APEs of either location would be unlikely to experience any effects once the project is constructed.

Historic Properties Management Plan

By letter of February 18, 2005, the co-applicants filed a revised draft HPMP (February 2005) that specifies a variety of measures for protection and management of historic properties both during construction and during subsequent operations and maintenance over the term of the license. The co-applicants sent copies of this revised draft HPMP to the Tribes, the USFS, BLM, and Camp Pendleton for review and comment. In the HPMP, the co-applicants propose to:

- Consult with the USFS in advance of any construction or cultural resources monitoring or survey on USFS land.
- Monitor construction and/or conduct pre-construction archaeological surveys to locate and identify resources in portions of the APE that have not been investigated due to lack of access and/or because locations of project facilities (e.g., transmission lines, flow lines) and access routes have not yet been determined. This would include locations with potential to contain deeply buried archaeological deposits.
- Consult with the USFS, SHPO, and Tribes, as appropriate, concerning the need for intensive survey to evaluate the National Register eligibility of archaeological sites or TCPs that would be adversely affected by construction or operation and determine appropriate treatment for any adversely affected eligible resources.
- Retain a qualified archaeologist to advise construction and maintenance Field Superintendents and the co-applicants' appointed staff cultural resources coordinator regarding the need for monitoring during construction and for protecting known sites from inadvertent construction damage.
- Appoint a staff Tribal liaison to serve as the co-applicants' point of contact with the Tribes and consult with the Tribes regarding construction monitoring, archaeological survey, and resource protection measures.

- Arrange for a civil structural or geotechnical engineer to determine whether peak ground acceleration from construction exceeds a peak vertical particle velocity of 72.0 millimeter per second in the vicinity of any historic building and recommend treatment of any building for which this threshold is exceeded.
- Arrange for an architectural historian to monitor construction sites after trenching and blasting to ensure that vegetation and any other significant landscape features associated with historic buildings have been returned to their pre-construction state.
- Develop and implement an archaeological monitoring program, including notification to the USFS of monitoring on USFS land, to identify site degradation or damage to archaeological resources. For the first 5 years, monitoring would be conducted annually during the mid-late autumn prior to the rainy winter season. Site conditions would be recorded with photographs and/or video documentation for comparison with previous years' conditions. The co-applicants would send a report on the monitoring to the SHPO and the USFS within 2 months of each annual monitoring effort. At the end of 5 years, sites that have experienced no significant effects would be dropped from the monitoring program.
- Develop a cultural resources public interpretive program in consultation with the Tribes and the USFS within 3 years after project construction.

The draft HPMP also specifies procedures the co-applicants would follow in the event that currently unknown cultural resources are discovered during project construction or project operation. In the event of a discovery, work would immediately cease in the vicinity of the resource. The co-applicants would develop a site-specific historic properties treatment plan, in consultation with the SHPO and the USFS, containing procedures and methodologies "to be used in the eligibility evaluation process for the specific site types that may occur in the Project Area". No work would resume in the vicinity of the resource until the resource had been evaluated in accordance with the Historic Properties Treatment Plan and any adverse effects had been mitigated. Work would then resume in the presence of an archaeological monitor. The co-applicants would submit a report describing the fieldwork and analysis to the SHPO and the USFS.

Regarding paleontological resources, the co-applicants propose to:

- Conduct paleontological monitoring of earth-moving activities on a part-time basis in locations that are sensitive for paleontological resources.
- Prepare any recovered fossil remains to the point of identification, and prepare them for curation by the Los Angeles County Museum or San Bernardino County Museum.

Resource Agency Measures

USFS revised preliminary 4(e) condition no. 28 specifies that the co-applicants to file, within 1 year after license issuance, a heritage resources management plan[72] prepared in consultation with the SHPO, Tribes, the USFS, and other applicable agencies and approved by the USFS. The Heritage Resource Management Plan would define the APE and provide measures to mitigate effects on heritage resources, including any effects arising from the co-applicants' implementation of other Section 4(e) conditions. The Heritage Resource Management Plan would also contain procedures in the event of discovery of previously unknown cultural, historical, archaeological or paleontological "items of value" during ground-disturbing activities associated with project operation.

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[72] The USFS' Heritage Resources Management Plan is equivalent to a HPMP. The USFS uses the nomenclature "heritage resources" in place of "historic properties."

On April 7, 2005, BIA filed comments on the co-applicants' draft HPMP. BIA recommended that the APE should encompass all of Lake Elsinore, including the fluctuation zone. BIA also provided its opinion that additional ethnographic research and consultation with the Tribes may be necessary to determine the Lake's eligibility for the National Register as a TCP.

Effects Analysis

The co-applicants' proposal to complete archaeological surveys once transmission alignments and access roads are determined and the co-applicants obtain any necessary right of entry would ensure that significant archaeological resources would be identified, evaluated, and appropriately mitigated in the event they would be affected by project construction or operation. Archaeological monitoring during construction would ensure that inadvertent discoveries were promptly evaluated and appropriately treated as well. The co-applicants' proposed archaeological monitoring program during at least the first 5 years of operation would ensure that adverse effects on significant archaeological resources were identified and resolved. The revised draft HPMP also provides for the possibility of inadvertent discovery during the course of project construction and operation, with measures to ensure that adverse effects on discoveries are appropriately mitigated. Provisions for notification of and consultation with the USFS and the Tribes regarding all archaeological survey, monitoring, ground disturbance, or other activities during construction and then during operation recognize the obligation of the USFS to ensure that cultural resources on USFS land are adequately protected.

Nevertheless, the HPMP would benefit from certain revisions staff has developed in consultation with the USFS as follows:

Chapter 1, *Project Setting*—The text discussing proposed and existing project components needs to contain references to maps in appendix D for all components, including alternatives. These maps need to include the locations of all construction staging areas as well as project components, and also need to correspond with the APE descriptions in Chapter 2.

Chapter 2, section on *Area of Potential Effect*—The shoreline of Lake Elsinore included in the APE needs to be revised from "the lake's projected minimum operating level (1,240 feet msl)" as currently stated in the draft HPMP to encompass the anticipated zone of daily fluctuation. Further, in the section titled *Inventory Study Areas*, the person or firm performing each of the record searches described in this section needs to be identified to avoid confusion.

Chapter 3, *General Management Measures*—This chapter needs to be reorganized to discuss the following: (1) measures specific to protection of cultural resources during the construction process (including archaeological survey in areas of the APE that have not yet been surveyed); (2) measures to be implemented for treatment and protection over the license term; and (3) other measures (e.g., public interpretation). This chapter also needs to include provisions for coordinating monitoring, accidental discovery, and any other actions on USFS land in advance of implementation and the use of fencing where appropriate to protect sites during construction. Additionally, the section on Native American participation needs to be revised to indicate that the USFS initiated the December 2004 consultation with the Tribes and that disposition of human remains and items of cultural patrimony would follow established federal processes and procedures developed for compliance with NAGPRA. Finally this chapter needs to indicate explicit protocols through which appropriate tribal liaison will coordinate with USFS regarding communication and consultation with the Tribes.

Chapter 4, *Site-Specific Management Measures*—This chapter needs to have an introduction explaining the chapter's purpose and organization. The discussion of site-specific measures needs to be limited to those sites for which effects are known and for which management proscriptions are warranted. Sites for which effects of the project have not been determined need to be grouped by site type, with a statement that management proscriptions for these sites would be developed as effects of construction and/or operation become known. All individual site discussions need to be presented as follows: site number, site description, National Register status, effects, and management proscriptions. Management of standing buildings and structures need to include Historic American Buildings Survey/Historic American Engineering Records recordation as a potential mitigation measure. Finally, the discussion of site 33-11009 (Lake Elsinore) needs to be revised to indicate that USFS considers this property eligible for the National Register and that management measures for this property would be developed in consultation with the USFS, Tribes, BIA, and the SHPO.

Chapter 5, *Schedule for Implementation*—This chapter needs to contain a timeline that includes a listing of all proposed measures and actions, and time frame(s) for initiation and completion of these measures and actions.

Appendices—The project overview map in appendix A needs to have a legend and should indicate land ownership. Appendix F needs to contain a map locating the existing project facilities. Effects of the project on site RIV 271 need to be clarified: the table in appendix I states that site RIV 271 would not be affected by the project, but the site-specific discussion of RIV 271 in Chapter 4 implies that it could in fact be affected, requiring data recovery.

Although paleontological resources generally are not considered Historic Properties subject to the National Historic Preservation Act, the co-applicants' proposal for monitoring and subsequent treatment of such resources would address USFS and state of California concerns regarding these resources.

Finalization and implementation of the co-applicants' HPMP in consultation with the SHPO, Tribes, the USFS, BIA, Lake Elsinore Historical Society and Camp Pendleton would ensure that adverse effects on historic properties arising from project construction, project operations or project-related activities over the term of the license would be avoided or satisfactorily resolved. The HPMP would include specific measures to resolve any potential adverse effects arising from license requirements.

In the event of licensing and pursuant to the National Historic Preservation Act, the Commission would execute a programmatic agreement with the SHPO and the Advisory Council on Historic Preservation (if they choose to participate) to implement a final revised HPMP with one year of license issuance as a condition of any license for this project. The co-applicants, Tribes, the USFS, and the Lake Elsinore Historical Society would be invited to participate in the programmatic agreement as concurring parties.

3.3.9.3 Unavoidable Adverse Effects

Execution of the programmatic agreement and implementation of an HPMP would ensure proper protection and management of significant cultural resources within the APE of the project and also provide satisfactory resolution of any project-related adverse effects.

3.3.10 Air Quality and Noise

3.3.10.1 Air Quality

According to the California Air Resources Board (CARB), air pollution is one of the state's most serious problems (CARB, 2005a). CARB, as part of the California Environmental Protection Agency is the state board responsible for achieving and maintaining healthful air in California. Local air districts along with EPA also share this responsibility. The reasons for the state's air quality problems include the following: (1) a large population (approximately 37 million and growing), which translates into a high number of vehicle miles traveled and associated vehicle emissions; (2) a geography with the most heavily populated areas of the state being valleys or basins hemmed in by mountains; and (3) a climate of hot, stagnant summer air that traps air pollutants in heavily populated basins and valleys. High temperatures catalyze photochemical production of ozone from precursor air pollutants, and ozone is an unhealthful constituent of smog. Sources of air emissions in California include stationary sources (e.g., commercial facility operations), area-wide sources (e.g., fugitive dust, residential fireplaces), mobile sources (e.g., on-road vehicles and trucks, aircraft, boats, trains), and natural sources (e.g., biogenic and geogenic hydrocarbons, natural windblown dust, wildfires).

To maintain acceptable ambient air quality and protect public health, both California and the federal governments have adopted ambient air quality standards for criteria or indicator air pollutants. An ambient air quality standard establishes the concentration above which the pollutant is known to cause adverse health effects to sensitive groups within the population such as children and the elderly. The goal is for localized project effects not to cause or contribute to an exceedance of the standards. Ambient air quality standards are classified as either “primary” or “secondary” standards. Primary standards define levels of air quality, including an adequate margin of safety, necessary to protect the public health. National secondary ambient air quality standards define levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant. The criteria pollutants for which standards have been established are carbon monoxide, lead, ozone, nitrogen dioxide, particulate matter (PM_{10} and $PM_{2.5}$) and sulfur dioxide. Brief descriptions for the three criteria pollutants of most relevance to the proposed project are provided below.

Carbon Monoxide

Carbon monoxide is a colorless, odorless gas that is directly emitted as a byproduct of combustion. The principal sources of carbon monoxide emissions are motor vehicles, and the highest concentrations of this gas occur under cold, stagnant weather conditions. Carbon monoxide is harmful because it is absorbed through the lungs into the blood stream and reduces the ability of the blood to transport oxygen. As a result, the blood supply to the heart, lungs and other tissues is reduced, with potentially critical consequences for the sick and elderly.

Particulate Matter (PM_{10} and $PM_{2.5}$)

Particulate matter is a mixture of different substances including metals, carbon, nitrates, sulfates, organic compounds, and complex mixtures such as diesel exhaust and soil. Particulate matter has been classified as either PM_{10} or $PM_{2.5}$ material. PM_{10} particulates, which have an aerodynamic diameter of 10 microns or smaller, are referred to as “respirable” material because they are small enough to penetrate into inner regions of the lungs where they can be harmful to human health. $PM_{2.5}$ particulate matter, which is even finer (aerodynamic diameter of 2.5 microns or smaller), can deposit deeper in the lungs when inhaled. Exposure to particulate matter aggravates respiratory illnesses and is especially harmful to people with pre-existing heart and lung diseases. Particulate matter (including PM_{10} and $PM_{2.5}$) can either be directly emitted (e.g., dust or soot) or formed in the atmosphere from precursor gaseous emissions, including nitrogen oxides, sulfur oxides and ammonia. Based on EPA estimates, the largest contributor to PM_{10} levels nationwide is fugitive dust, which accounts for 89 percent of the total particulate matter. EPA also estimates that approximately 14 percent of fugitive dust is attributable to construction activities and 9 percent to re-suspension on paved roads.

Ozone

Ozone is a colorless, odorless gas that constitutes the main component of urban smog. Ozone is not directly emitted as a pollutant, but is formed when precursor hydrocarbon and nitrogen oxides emissions react photochemically in the presence of sunlight. Stagnant air or low wind speeds and warm temperatures provide optimum conditions for ozone formation. Ozone irritates the lungs and damages the respiratory system.

For most of the criteria air pollutants, California State standards are more stringent than the federal standard because of inferences from different health effects studies and incorporation of a higher margin of safety to protect sensitive individuals. California and federal (i.e., EPA) ambient air quality standards for criteria pollutants are presented in table 32.

Table 32. California and federal ambient air quality standards. (Source: CARB, 2005b)

			Federal Standards	
Pollutant	**Averaging Time**	**California Standards**	**Primary**	**Secondary**
Ozone (O_3)	1 hour 8 hour	0.09 ppm (180 $\mu g/m^3$) --	0.12 ppm (235 $\mu g/m^3$) 0.08 ppm (157 $\mu g/m^3$)	Same as primary standard
Respirable Particulates (PM_{10})	24 hour Annual mean	50 $\mu g/m^3$ 20 $\mu g/m^3$	150 $\mu g/m^3$ 50 $\mu g/m^3$	Same as primary standard
Fine Particulates ($PM_{2.5}$)	24 hour Annual mean	No standard 12 $\mu g/m^3$	65 $\mu g/m^3$ 15 $\mu g/m^3$	Same as primary standard
Carbon Monoxide (CO)	8 hour 1 hour	9 ppm (10 mg/m^3) 20 $\mu g/m^3$ (23 mg/m^3)	9 ppm (10 mg/m^3) 35 $\mu g/m^3$ (40 mg/m^3)	None
Nitrogen Dioxide (NO_2)	Annual mean 1 hour	-- 0.25 ppm (470 $\mu g/m^3$)	0.053 ppm (100 $\mu g/m^3$) --	Same as primary standard
Sulfur Dioxide (SO_2)	Annual mean 24 hour 3 hour 1 hour	-- 0.04 ppm (105 $\mu g/m^3$) -- 0.25 ppm (655 $\mu g/m^3$)	0.03 ppm (80 $\mu g/m^3$) 0.14 ppm (365 $\mu g/m^3$) -- --	-- -- 0.5ppm (1,300 $\mu g/m^3$) --

In addition to the criteria pollutants, CARB monitors the emissions of 10 toxic air contaminants that have been identified to pose the greatest outdoor ambient public health risks. These air contaminants are acetaldehyde, benzene, 1.3-butadiene, carbon tetrachloride, hexavalent chromium, para-dichlorobenzene, formaldehyde, methylene chloride, perchloroethylene, and diesel particulate matter. The California Health and Safety Code defines a toxic air contaminant as an air pollutant that may cause or contribute to an increase in mortality or in serious illness or that may pose a present or potential hazard to human health. The 10 toxic air contaminants are all carcinogenic. Unlike the criteria pollutants for which adverse health effects are not expected to occur below the ambient air quality standards (i.e., concentrations), there is no threshold concentration that does not pose health risks for any of the ten toxic air contaminants. Of the 10 toxic air contaminants, CARB considers diesel PMs to pose the greatest health risks. Diesel particulate matter is not a single substance, but a complex mix of hundreds of substances emitted by diesel-fueled internal combustion engines and influenced by engine/fuel type and operating characteristics. Because there are no standards for toxic air contaminants, CARB is charged with the responsibility for identifying substances as toxic air contaminants, setting priorities for control, and promoting alternative processes/materials. Table 33 presents a summary of the unit cancer risk factors[73] associated with the 10 toxic air contaminants.

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[73] A unit risk factor is expressed as the probability (cases per million people) of contracting cancer as a result of constant exposure to ambient concentration of 1 ug/m^3 over a 70-year lifetime.

Table 33. California toxic air contaminants unit risk factors. (Source: CARB, 2005a)

Toxic Air Contaminant	Unit Risk per Million People
Acetaldehyde	2.7
Benzene	29
1,3-Butadiene	170
Carbon Tetrachloride	42
Chromium, Hexavalent	150,000
Para-Dichlorobenzene	11
Formaldehyde	6
Methylene Chloride	1
Perchloroethylene	5.9
Diesel Particulate Matter	300

Note: The unit risk represents the number of excess cancer cases per million people continuously exposed to 1 μg/m3 of the toxic air contaminants over a 70-year lifetime

Existing Air Quality

To better manage common air quality problems, California is divided into 15 air basins, each of which is associated with an Air Quality Management District (AQMD). According to CARB, an air basin generally follows political boundary lines and is defined to include both source areas and receptor areas. However, because air masses can move freely from basin to basin, interbasin transport of pollutants is unavoidable. The LEAPS Project area is located within Riverside County, but the proposed transmission alignments extend to Orange and San Diego Counties. Riverside County is partitioned into three air basins: South Coast Air Basin, Salton Sea Air Basin, and Mojave Desert Air Basin. The LEAPS Project is located principally within the South Coast Air Basin. Orange County is entirely located within the South Coast Air Basin, while San Diego County is located within the San Diego Air Basin

State and National Area Designations

Both the California and federal governments use ambient air monitoring data to classify areas according to their attainment status with respect to the criteria pollutants. The designations are used to identify areas with air quality problems and help determine whether project emissions would be considered significant under the NEPA and California Environmental Quality Act assessments. The three basic designation categories are:

- Attainment—indicates that ambient air quality is not in violation of the established standard for the specific criteria pollutant
- Non-attainment—indicates that the ambient air quality violates the ambient air quality standard for the specific air pollutant.
- Unclassified—indicates that there is currently insufficient data for determining attainment or non-attainment.

In addition to the above three designations, the state of California includes a subcategory of the non-attainment designation, called:

- Non-attainment-transitional—this designation is given to non-attainment areas that are making progress and nearing attainment

Overall, based on CARB 2004 monitoring data, the air basins within the LEAPS Project area are in attainment for nitrogen dioxide and sulfur dioxide, non-attainment for ozone and PM_{10}, and mixed classification for carbon monoxide and $PM_{2.5}$. The state attainment classifications for the criteria pollutants and "visibility reducing particulates" for the component air basins are summarized in table 34.

Table 34. California State area designations for criteria air pollutants. (Source: CARB, 2004)

Component Air Basin	**CO**	**PM_{10}**	**$PM_{2.5}$**	**O_3**	**NO_2**	**SO_2**	**VRP**
South Coast Air Basin (Riverside County)	A	N	N	N	A	A	U
South Coast Air Basin (Orange County)	A	N	N	N	A	A	U
Salton Sea Air Basin (Riverside County)	A	N	N	N	A	A	U
Mojave Desert Air Basin (Riverside County)	U	N	N	N	A	A	U
San Diego Air Basin (San Diego County)	T[a]	N	A	N	A	A	U

Notes: A – attainment

CO – carbon monoxide

N – non-attainment

NO2 – nitrogen dioxide

O3 –ozone

PM2.5 – fine particulate matter

PM10 – respirable particulate matter

SO2 – Sulfur dioxide

T – non-attainment-transitional

U – unclassified

VRP – visibility reducing particulates

[a] CO monitoring for San Diego Air Basin stopped in 1992.

The 1990 amendments to the Clean Air Act require federal agencies to conform to applicable State Implementation Plans in non-attainment areas. State Implementation Plans are state air quality regulations that provide for the implementation, maintenance, and enforcement of the National Ambient Air Quality Standards and include emission limitations and control measures to attain and maintain the standards. Federal agencies are required to determine if proposed actions conform to the applicable State Implementation Plan.

EPA has developed two conformity regulations for transportation and non-transportation projects. Transportation projects are governed by the "transportation conformity" regulations (40 CFR Parts 51 and 93). Non-transportation projects are governed by the "general conformity" regulations (40 CFR Parts 6, 51, and 93) described in the final rule for *Determining Conformity of General Federal Actions to State or Federal Implementation Plans.* Since the proposed project is a non-transportation project, only the general conformity rule applies. If required by local or state laws, co-applicants would need to conduct a preliminary air conformity analysis prior to commencing any construction.

Local Emissions and Air Quality Regulations

The LEAPS Project is located principally within Riverside County and in the South Coast Air Basin, although the proposed transmission lines may extend into Orange and San Diego Counties. Besides South Coast Air Basin, Riverside County also includes portions of Mojave Desert Air Basin and

Salton Sea Air Basin. South Coast Air Basin is the state's largest metropolitan region. Because of the geography (surrounding mountainous terrain), warm climate, and stagnant air conditions, the South Coast Air Basin area is particularly prone to air quality problems. To ensure continued progress toward clean air and compliance with state and federal requirements, the South Coast AQMD in conjunction with CARB and the Southern California Association of Governments develops and updates Air Quality Management Plans that contain tactics and strategies for reducing air pollutant emissions. The 2003 Air Quality Management Plan proposes policies and measures to achieve federal and state standards for healthful air in the Southern California Association of Governments and those portions of the Salton Sea Air Basin that are under South Coast AQMD's jurisdiction (i.e., Coachella Valley). Relevant rules and regulations incorporated in the Air Quality Management Plan include:

- Rule 402—requires implementation of dust suppression techniques to prevent fugitive dust from creating a nuisance off site.
- Rule 403—requires use of best available technologies to reduce the amount of particulate matter (dust) entrained in ambient air as a result of anthropogenic (human-made, e.g., construction) activities
- Rule 1402—limits asbestos emissions from building demolition or renovation activities.

The Mojave Desert AQMD pertinent air quality rules are similar to the South Coast AQMD rules. Both Mojave Desert AQMD Rules 402 and 403 address nuisance dust suppression. Mojave Desert AQMD Rule 403.2 (Fugitive Dust Control for Mojave Desert Planning Area) is intended to ensure that the National Ambient Air Quality Standards for PM10 will not be exceeded due to anthropogenic sources of fugitive dust within the Mojave Desert Planning Area and to implement the control measures contained in the Mojave Desert Planning Area Federal PM_{10} Attainment Area. Similarly, the San Diego Air Pollution Control District Rule 51 (Nuisance) regulates the discharge of nuisance air contaminants including dust. It should be noted that the Riverside County portion of Salton Sea Air Basin is under the jurisdiction of South Coast AQMD. Also, Orange County is entirely under SCAB and therefore is subject to South Coast AQMD rules and regulations.

3.3.10.2 Noise

Noise is defined as unwanted sound. It is emitted from many sources including airplanes, factories, railroads, power generation plants, and highway vehicles. The magnitude of noise is described by its sound pressure. Because the range of sound pressure varies greatly, a logarithmic scale is used to relate sound pressures to some common reference level, the decibel. Sound pressures described in decibels are called sound pressure levels.

Sound levels measured using an A-weighted decibel scale are expressed as dBA. Throughout this analysis, all noise levels are expressed in dBA. Several examples of noise pressure levels in dBA are listed in table 35.

Table 35. A-weighted (dBA) sound levels of typical noise environments. (Source: FICON, 1992, as modified by staff)

A-Weighted	Overall Level	Noise Environment
120	Uncomfortably Loud (32 times as loud as 70 dBA)	Military jet takeoff at 50 feet
100	Very loud (8 times as loud as 70 dBA)	Jet flyover at 1,000 feet
80	Loud (2 times as loud as 70 dBA)	Propeller plane flyover at 1,000 feet; diesel truck 40 mph at 50 feet

A-Weighted	Overall Level	Noise Environment
70	Moderately loud	Freeway at 50 feet from pavement edge; vacuum cleaner (indoor)
60	Relatively quiet (1/2 as loud as 70 dBA)	Air condition unit at 10 feet; dishwasher at 10 feet (indoor)
50	Quiet (1/4 as loud as 70 dBA)	Large transformers; small private office (indoor)
40	Very quiet (1/8 as loud as 70 dBA)	Bird calls; lowest limit of urban ambient sound
10	Extremely quiet (1/64 as loud as 70 dBA)	Just audible
0	Threshold of hearing	

Note: dBA – A-weighted decibel scale

The degree of disturbance or annoyance of unwanted sound depends essentially on three things:

- the amount and nature of the intruding noise;
- the relationship between the background noise and the intruding noise; and
- the type of activity occurring where the noise is heard.

In considering the first of these factors, it is important to note that individuals have different sensitivity to noise. Loud noises bother some people more than others, and some patterns of noise also enter into people's judgment of whether or not a noise is offensive.

With regard to the second factor, individuals tend to judge the annoyance of an unwanted noise in terms of its relationship to noise from other sources (background noise). The blowing of a car horn at night when background noise levels are approximately 45 dBA generally would be more objectionable than the blowing of a car horn in the afternoon when background noises might be 55 dBA.

The third factor is related to the interference of noise with activities of individuals. In a 60-dBA environment, normal work activities requiring high levels of concentration may be interrupted by loud noises, while activities requiring manual effort may not be interrupted to the same degree.

The sound level at a particular instant does not provide a good representation of a level of sound, which varies with time over a wide range. To provide a better assessment of time-varying sound levels, time-averaged descriptors are employed. The three most common noise descriptors used in community noise surveys are the equivalent sound level (L_{eq}), percentile distributions of sound levels ($L_{\%}$), and the day-night average sound level (L_{dn}).

The L_{eq} is an energy-averaged sound level that includes both steady background sounds and transient short-term sounds. The L_{eq} is equivalent in energy to the fluctuating sound level over the measurement period. The L_{eq} is commonly used to describe traffic noise levels, which tend to be characterized by fluctuating sound levels.

The $L_{\%}$ indicate the sound level exceeded for a percentage of the measurement period. For example, the L_{90} is the sound level exceeded for 90 percent of the measurement period and is commonly used to represent background sound levels. The L_{10} is the sound level exceeded for 10 percent of the measurement period and represents the peak sound levels present in the environment.

The L_{dn} is another descriptor used to evaluate community noise levels. The L_{dn} is a 24-hour average sound level, which includes a 10 dBA penalty added to nighttime sound levels (10:00 p.m. to

7:00 a.m.) because people tend to be more sensitive to noise during the nighttime. The day-night average sound level is commonly used to describe aircraft and train noise levels.

For the state of California, noise intensity is also discussed in terms of Community Noise Equivalent Level, which presents a weighted average noise level that increases the relative significance of evening and nighttime noise. The Community Noise Equivalent Level descriptor is used to evaluate community noise levels, which includes a 5 and 10 dBA penalty added to evening (7:00 p.m. to 10:00 p.m.) and nighttime (10:00 p.m. to 7:00 a.m.) sound levels, respectively, in consideration of people's increased sensitivity to noise during the evening and nighttime periods.

Existing Noise Environment

The predominant noise sources in the Lake Elsinore area, as documented in a similar environmental documentation conducted recently (Lake Elsinore Stabilization and Enhancement Project Draft Program EIS), are mobile sources, particularly motor vehicles. Interstate 15, Ortega Highway, and several arterial roadways expose portions of the Lake Elsinore area to high noise levels, especially in areas immediately adjacent to the noise sources. General aviation aircraft operations from Skylark Airport, ultra light operations over the lake, and frequent power boat operations also contribute to the noise environment. Power boat and jet ski activities on the lake create intermittent spikes of noise at many residences along the lake. Other sources include industrial and commercial facilities. The noise environment in Lake Elsinore is generally typical of a rural setting, except at locations affected by transportation, recreational, and industrial sources.

Noise Standards

Riverside County

Construction noise standards for Riverside County are documented in Title 15.04.020 of the Riverside County Code. Although the code does not set noise level limits, it restricts construction activities within a 0.25 mile of an occupied residence (property line) to the hours of 6:00 a.m. to 6:00 p.m. during the months of June through September. During the months of October through May, such construction activities are restricted to the hours of 7:00 a.m. through 6:00 p.m.

In terms of operational noise, the County Department of Industrial Hygiene set worst case noise levels for stationary sources projected to the property line of an occupied residential property at 45 dBA between 10:00 p.m. and 7:00 a.m. (nighttime standard; and 65 dBA between 7:00 a.m. and 10:00 p.m. (daytime standard).

In the General Plan (County of Riverside, 2003), noise sensitive land uses are defined to include schools, hospitals, rest homes, long-term care facilities, mental care facilities, residential uses, places of worship, libraries, and passive recreation areas. The Riverside County General Plan (County of Riverside, 2003) discourages these sensitive land uses in areas with background noise greater than 65 dBA.

City of Lake Elsinore

The city of Lake Elsinore Zoning Code, Chapter 17.78, *Noise Control*, prohibits construction on weekdays between the hours of 7 p.m. and 7 a.m. or at any time on weekends or holidays. The zoning code also states "where technically and economically feasible," construction activities shall be conducted in such a manner that the maximum noise levels at affected properties will not exceed those listed in table 36.

Table 36. City of Lake Elsinore construction noise standards. (Source: City of Lake Elsinore Zoning Code Chapter 17.78)

Type of Equipment	Maximum Noise Levels at Affected Properties (dBA)			
	Residential Properties (daily, except Sundays and legal holidays, 7 a.m. to 7 p.m.)			Business Properties (all days, all hours)
	Single-family	**Multi-family**	**Semi-residential/ Commercial**	
Mobile Equipment—Non-scheduled, short-term operation (less than 10 days) of mobile equipment	75	80	85	85
Stationary Equipment—Repetitively scheduled and relatively long-term operation (periods of 10 days or more) of stationary equipment.	60	65	70	75

Note: dBA – A-weighted decibel scale

In the city of Lake Elsinore General Plan (1990), noise sensitive land uses are defined to include residences of all types, hospitals, rest homes, convalescent hospitals, places of worship and schools. An exterior standard of 60 L_{dn} (day-night average sound level) is recommended in order to preserve the rural, natural and desired environment of Lake Elsinore. The City General Plan (1990) discourages residential development in areas with background noise greater than 65 L_{dn}.

San Diego County

In San Diego County, similar construction noise restrictions (San Diego Municipal Code Section 59.5.0401 through 0406) are required between 7:00 p.m. and 7:00 a.m. on Mondays through Saturdays and anytime on Sundays or any legal holidays with few exceptions. San Diego County also set a construction noise limit of 75 dBA during 12-hour period between 7:00 a.m. and 7:00 p.m. at residential properties. For operational noise, a set of noise level limits is provided in the same code based on a 1-hour average noise level for various land uses, including residential, commercial, and manufacture properties. For example, the noise limits for residential R-1 properties are 50 dBA between 7:00 a.m. and 7:00 p.m., 45 dBA between 7:00 p.m. and 10:00 p.m., 40 dBA between 10:00 p.m. and 7:00 a.m., respectively.

Orange County

In the Division 6 of Orange County Codified Ordinance, similar construction noise restrictions are required between 8:00 p.m. and 7:00 a.m. on Mondays through Saturdays and any time on Sundays or holidays. In addition, operational noise level limits, based on short-term periods ranged between 1 to 30 minutes, are provided for residential land uses. The noise limits in 30-minute period for residential properties are 55 dBA between 7:00 a.m. and 10:00 p.m. and 50 dBA between 10:00 p.m. and 7:00 a.m., respectively.

State of California

Based on CERES (1998), the LEAPS Project would substantially affect noise levels if it resulted in:

- exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.
- exposure of persons to or generation of excessive ground borne vibration or ground borne noise levels.
- a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.
- a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.
- for a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles or a public airport or public use airport, exposure of people residing or working in the project area to excessive noise levels.
- for a project within the vicinity of a private airstrip, exposure of people residing or working in the project area to excessive noise levels.

3.3.10.3 Environmental Consequences

Air Quality

Effects of Construction

Co-applicants' Proposal—Constructing an upper reservoir at the proposed Morrell Canyon site, a powerhouse at the proposed Santa Rosa site, and a 32-mile-long transmission alignment would result in air emissions, including carbon monoxide and other gaseous emissions associated with heavy equipment, delivery and dirt hauling trucks, worker vehicles, paints and coatings and dust from grading, surface preparation and earth-moving equipment. The co-applicants would comply with local and state requirements to minimize the effects of construction on air quality.

No agency or other entity proposed any measures to address potential effects on air quality. In comments on the draft EIS, EPA requests the inclusion of a general conformity analysis in the final EIS.

Effects Analysis

Development of the project would result in air emissions from construction equipment, earth moving activities, construction workers commutes, material deliveries and earth hauling. Based upon a description of construction activities presented in section 2, *Proposed Action and Alternatives*, the following parameters were estimated for the construction phase: types and number of construction equipment, number of construction personnel, and number of material delivery trips. Using these parameters and emission factors from South Coast AQMD (2005, 1993), air emissions from each component were calculated. The construction period and operational period is not anticipated to overlap.

Peak day emissions are the sum of the highest daily emissions from employee vehicles, fugitive dust sources, construction equipment and transport activities. For CO, VOC, NO_x, and SO, the emissions from the following construction activities were added: construction workers' commutes, use of delivery, hauling, and work trucks; and construction equipment use. For PM_{10}, the emissions from the following construction-related activities have been added: fugitive dust emissions from vehicle travel on paved and unpaved roads, earth moving operations, earth loading and unloading, and wind erosion of stockpiles and disturbed areas; and tailpipe emissions from construction workers' commutes; delivery, hauling and work trucks; and diesel-fueled construction equipment.

As shown in tables 37 and 38, there would be a short-term increase in fugitive dust and air emissions from construction activities during the construction period. However, air emissions during construction would not exceed the South Coast AQMD significance threshold.

Table 37. Estimated air emissions from construction activities. (Source: South Coast AQMD, 1993)

	Peak Day Emissions (pounds/day)				
Emission Source	**NO_x**	**VOC**	**CO**	**SO_2**	**PM_{10}**
On-road Emissions	524	35.8	251.9	5	10.3
Off-road Emissions	308.3	30.3	118.5	46.5	17.0
Fugitive Dust	NA	NA	NA	NA	9.3
Total Emissions	832.3	66.1	370.4	51.5	36.6
South Coast AQMD Significant Thresholds	1,542	75	26,203	150	304
Significant	No	No	No	No	No

Note: VOC – volatile organic compound

Table 38. Estimated air emissions from construction activities associated with alternate powerhouse locations. (Source: South Coast AQMD, 1993)

	Peak Day Emissions (pounds/day)				
Emission Source	**NO_x**	**VOC**	**CO**	**SO_2**	**PM_{10}**
On-road Emissions	524	35.8	251.9	5	10.3
Off-road Emissions	355.1	34.7	134.4	54.5	19.4
Fugitive Dust	NA	NA	NA	NA	10.7
Total Emissions	879.5	70.5	386.3	59.5	40.4
SCAQMD Significant Thresholds	1,542	75	26,203	150	304
Significant	No	No	No	No	No

In addition, construction activities (i.e., blasting and other activities) could result in temporary effects on surrounding air quality and meteorological conditions. Although none of these temporary effects is anticipated to have a significant effect on surrounding air quality, these activities may result in temporary restrictions in the use of nearby recreational activities due to reduced visibility caused by fugitive dusts and smoke. No agency or other entity proposed any measures to address potential effects on visibility. Compliance with local and state air pollution measures, including a fugitive dust control plan, would minimize these effects.

Staff Alternative—The facilities for Decker Canyon reservoir, the Ortega Oaks powerhouse site, and the pump-generating and ancillary equipment would be similar to those described previously for the co-applicants’ proposed Morrell Canyon upper reservoir and Santa Rosa powerhouse site. The Ortega Oaks powerhouse and construction laydown area would be a 58-acre site.

The staff alternative transmission alignment construction effects would be similar to those associated with the proposed alignment.

Optional Ortega Oaks or Evergreen Powerhouse—Because the Ortega Oaks and Evergreen powerhouse sites would have greater footprints, fugitive dust emissions and emissions from off-road vehicles would increase as discussed in the previous section. Selection of the Ortega Oaks or Evergreen powerhouse site would not result in a substantial difference in pumping requirements for the project. These additional emissions are presented in table 38 for the Evergreen since it has the largest potential effect due to the footprint. The additional emissions from this site would remain below SCAQM significance levels.

Effects of Operation

Co-applicants’ Proposal—Project operation would result in minor vehicle trips and electrical power consumption for O&M of proposed facilities as described below.

Class I Area Effects[74]

Prevention of Significant Deterioration (PSD) and New Source Review (NSR) regulations require an analysis of Class I visibility impacts and increment consumption for any source located within 100 kilometers (km) of a federal Class I area. The following five mandatory federal Class I Areas are located within 100 km of the proposed site location in the town of Lake Elsinore, Riverside County, California: the Agua Tibia Wilderness Area, the San Gorgonio Wilderness Area, the Joshua Tree Wilderness Area, the San Jacinto Wilderness Area and the Cucamonga Wilderness Area. The main concern in these areas would be the potential impact of the project on visibility and vegetation primarily due to fugitive dust emissions. It is anticipated that the air quality and visibility impacts of the proposed operation would be well below levels at which visibility and/or air quality impacts in a Class I area would be affected; however, due to the proximity of the site to these areas, a detailed impact analysis would need to be included in the permit application.

Effects Analysis

Air pollutant emissions associated with these O&M activities would be minimal and result in a slight increase over no build conditions, and would not exceed South Coast AQMD significance thresholds for operation described previously.

As previously discussed, the maximum pumping load to refill the proposed upper reservoir would be about 600 MW with typical operation closer to 500 MW, generally consumed during off-peak periods at night and on weekends. Pumping energy requirements would exceed generation, resulting in an average annual net generation deficit of approximately 312,000 MWh. This energy deficit would need to be offset by other forms of electrical generation. The typical generation mix for electric generation in California is presented in table 39.

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[74] Lands designated as Class I Areas under the Clean Air Act Amendments of 1977 are afforded the highest level of protection from air pollutants in the nation. These lands consist of national wildernesses (Forest Service), parks (National Park Service) and wildlife refuges (U.S. Fish & Wildlife Service) in existence at the time the amendment was passed. All other lands in the nation are designated as Class II.

Table 39. Typical electric generation mix for California. (Source: South Coast AQMD, 1993)

Generation	Overall (percent)
Natural Gas	41.90
Nuclear	12.90
Large Hydro	14.80
Coal	19.80
Renewable	10.60
Total	100

Most of these resources are committed during off-peak periods. However, it is likely in the future that coal- and natural gas-fired generation would be available at the margin and likely bracket the environmental effects of off-peak generation to supply pumped storage and represent reasonable options for such generation barring secure contracts with other resource types.

The overall emissions from the operation of the proposed action have been evaluated based upon best and worse-case emission scenarios—the best-case emission scenario being all electric generation supplied by gas-fired combined cycle turbines and the worst-case emission scenario being coal fired generation with operation of the pumps (1,872,000 MWh). Annual emissions for a no-action alternative have also been estimated assuming gas-fired generation using a simple cycle turbine. A simple cycle turbine plant was assumed because it is considered “state of the art” and is the most easily permittable and thus most likely generation source in the case of no-action. For the no-action alternative, annual emissions were calculated assuming that the generated (1,560,000 MWh) would need to be offset by the construction of a new facility. These emissions have been calculated using emissions factors from two sources: (1) state average emission factors presented in EPA’s Emissions & Generation Resource Integrated Database (eGRID) for emissions of NO_x and SO_2 (EPA, 2005a), and (2) worst-case emission factors by source type presented in EPA (1995) for other pollutants. Based upon this methodology, emissions from the proposed action (both scenarios) and no-action alternative are presented in table 40.

Table 40. Comparison of emissions between the co-applicants’ proposal and no action. (Source: EPA, 2005b)

Scenario	Generation Technology	Annual Generation (MWh)	Annual Emissions (tons/year)				
			CO	VOC	NO_x	SO_2	$PM_{10}/PM_{2.5}$
No-action Alternative	Gas-fired Simple Cycle Turbine	1,560,000	113.7	15.9	560.8	15.6	90.9
Proposed Action—Best Case	Gas-fired Combined Cycle Combustion Turbine	1,872,000	1,36.4	19.1	673.0	18.7	1,09.1
Proposed Action—Worst Case	Coal-fired Generation	1,872,000	120.6	8.0	6,250.6	6,354.9	2,653.6

Based upon the worst-case or coal-fired generation scenario, the proposed action would produce approximately 7 tons per year more carbon monoxide than the no-action alternative, about half the VOC emissions and considerably greater emissions for NO_x, SO_2 and PM_{10}/$PM_{2.5}$ assuming the no-action alternative used gas-fired simple cycle turbine generation technology.

Based upon the typical generation mix of California electric generation facilities, the proposed action would produce less CO emissions than the no action alterative based upon a natural gas combined cycle facility and all pollutants for the no-action alternative based upon a coal fired plant.

Staff Alternative—The Decker Canyon reservoir site would consist of a lined upper reservoir having a 240-foot-high main dam (60 feet higher than the proposed Morrell Canyon site) and a perimeter dike ranging up to 50 feet high (10 feet lower than Morrell Canyon). Since operation of the upper reservoir does not have associated air emissions, operation of an upper reservoir at this location would not affect air emissions. The Decker Canyon location is farther away from the hang gliding launch sites than the Morrell Canyon and we would expect the effects on wind pattern to be slightly less.

Because operation of the staff alternative transmission alignment would not result in emissions of air contaminants, it would not affect air emissions.

Optional Ortega Oaks or Evergreen Powerhouse—Because the Ortega Oaks powerhouse site would have a greater footprint, fugitive dust emissions and emissions from off-road vehicles would increase as discussed in the previous section. The co-applicants' proposal and the Ortega Oaks powerhouse site would not result in a substantial difference in pumping requirements for the project. Therefore, air emissions from operations at this site would not be affected. The effects of the Evergreen powerhouse site would be the same as those described for Ortega Oaks powerhouse site.

Noise

Effects of Construction on Noise

Construction noise represents a temporary effect on ambient noise levels. The dominant source of noise from most construction equipment is the engine, usually diesel, without sufficient muffling. In a few cases, such as rock drill or pavement breaking, noise generated by the process dominates (FTA, 1995).

Co-applicants' Proposal—The co-applicants propose to conduct all construction activities in accordance with the Noise Element of the *County of Riverside Comprehensive General Plan* (County of Riverside, 2005), city of Lake Elsinore construction noise standards, and any applicable codes or standards. The co-applicants propose to conduct blasting in a highly controlled manner involving time delays between numerous small microblasts to fracture rock without injecting material and to minimize noise effects on nearby residents.

Effects Analysis

According to aerial photographs of the region, it is evident that there are not many sensitive land uses, such as residences, schools/churches, parks, etc., as defined in the local noise codes and general plans, in the proximity of the proposed Morrell Canyon upper reservoir site. Most areas are mountainous and desolate, except for a few small housing developments and ranch homes, which are located approximately 1,000 feet or more from this site. The area surrounding the proposed Santa Rosa powerhouse site comprises residential communities to the north and northeast and Butterfly Elementary Visual and Performing Arts Magnet School, including a ball park associated with the school, to the northwest. The closest residential area to the proposed powerhouse site is an apartment complex located approximately 410 feet away. The elementary school and the field/ballpark associated with the school are located approximately 720 feet or more from the site. All other areas to the south consist of forested or undeveloped land.

Construction of the upper reservoir at the proposed Morrell Canyon site and a powerhouse at the proposed Santa Rosa site would result in increase of noise levels from proposed project construction activities in the San Mateo Wilderness Area, where people go for hiking and solitude and at sensitive land uses such as residences, schools/churches, parks, etc. During construction of proposed project components, the highest noise-generating activities are expected to be earth moving, including excavation, grading, and filling. For purposes of this noise effect analysis, based on the expected construction equipment, 88 dBA at 50 feet (operation of movable equipment, i.e., a dozer or a delivery/hauling truck) is assumed to be the most frequent noise levels generated during construction of the proposed project components. In addition, 98 dBA at 50 feet (operation of stationary equipment, i.e., rock drill) is assumed to be the maximum noise levels generated during construction of the proposed project components. At its closest point, the San Mateo Wilderness boundary is more than 400 feet away from the proposed upper reservoir perimeter dike.

Based on an assumed noise emission levels at 50 feet from the construction equipment, a standard acoustical equation[75] was then used to estimate the attenuation of noise with distance from the construction site to the nearest sensitive land uses.

Table 41 presents the estimated construction noise levels that would affect people at the nearest sensitive land uses for each project component site. It should be noted that the estimated noise levels shown in table 40 represent the worst-case scenario because the equation does not account for noise attenuation due to site topography (i.e., difference in elevation between the noise source and the receiver), presence of natural or human-made sound barriers, and ground conditions (hard versus soft surfaces).

Table 41. Minimum distances (in feet)/construction L_{max} noise levels (in dBA) at sensitive land uses. (Source: Staff)

	Closest Distance to the Sensitive Land Uses	**L_{max} at 50 feet (Rock Drill/Dump Truck)**	**L_{max} at Closest Residence (Rock Drill/Dump Truck)**
Ortega Oaks powerhouse	200–500	98/88	86/76
Proposed Santa Rosa powerhouse	400–500	98/88	80/70
Evergreen powerhouse	200–300	98/88	86/76

Note: dBA – A-weighted decibel scale

The estimated noise levels are compared to the city of Lake Elsinore’s construction noise standard for single-family residential properties for mobile equipment (i.e., 75 dBA). (A noise level of 88 dBA at 50 feet from the source attenuates to 76 dBA at 200 feet from the source.) As indicated in table 41, noise levels at the nearest sensitive land uses during construction of the proposed upper reservoir

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[75] $L_{max2} = L_{max1} - 20 \log (r2/r1)$

where:

L_{max1} = sound level at 50 feet, in dB,

L_{max2} = sound level at the boundary of the nearest noise sensitive land use (in dB),

r1 = 50 feet, and

r2 = distance to the boundary of the nearest noise sensitive land use (in feet).

and transmission lines are estimated to be 80 dBA during rock drill and 70 dBA or less during other construction activities associated with construction of the proposed Santa Rosa powerhouse. Rock drilling, if necessary, would only generate loud noises during early stages of the construction and will be substantially attenuated when the excavation goes deep into the ground.

Construction of tunnels and electricity generation facilities would all occur underground. Therefore, noise effects associated with construction of the powerhouse would be less than significant. Construction noise attributed to upper reservoir would be substantially attenuated before it reaches people at the sensitive land uses and not result in significant noise effects due to relative desolated receptor site locations and large distances between the receptor and reservoir site.

Based on construction traffic study for the proposed project, the projected increases in truck traffic volumes on Ortega Highway as the results of the construction of the proposed project would be 76 trucks per hour during peak traffic hours. Because the Ortega Highway would carry approximately 1,400 vehicles, including 140 trucks (10 percent trucks), during peak hours, the increase in trucks is approximately 50 percent of those under existing plus ambient condition. The increase in noise levels attributed to the construction trucks is proportional to logarithm of the truck traffic increase. It is estimated that the noise level increase attributed to the construction of the proposed project would be 2 dBA or less. A 2 dBA increase in noise levels is not perceptible to human ears (FHWA, 1995). Therefore, the construction traffic would not result in significant noise effects (see table 42).

Table 42. Noise level increase attributed to the construction of the proposed project. (Source: FHWA, 1995[76])

Road Segment	Hour	Capacity	Existing + Ambient Growth Volume Total/Truck	Estimated Project Related Increase in Truck Volume	Projected Noise Level Increase (dBA)
Ortega Highway east of South Main Divide Road	a.m. peak	2,000	1,417/142	76	2
	p.m. peak	2,100	1,187/119	76	2
Ortega Highway west of South Main Divide Road	a.m. peak:	2,000	1,417/142	10	0
	p.m. peak	2,100	1,187/119	0	0
Ortega Highway west of Grand Avenue	a.m. peak:	2,300	1,438/144	76	2
	p.m. peak:	2,300	1,115/112	76	2

Note: dBA – A-weighted decibel scale

In addition, the construction of the proposed project would likely involve construction of access roads to the proposed upper reservoir, the proposed underground powerhouse, and to the site of the inlet/outlet structure area at Lake Elsinore. The alignment of the access roads has not been determined but they would most likely be within street rights of way through the residential areas southwest of the

76 Caltrans' Traffic Noise Analysis Protocol (1998) defines substantial increase criteria as 12 dBA and adopts the FHWA noise abatement criteria (section 2.4.2 of the protocol).

Lake. Depending on the access road alignment, there may be residences or other sensitive land uses in close proximity to the construction activities.

Construction of the proposed transmission alignment would be along areas farther away from most of the sensitive land uses and would not result in significant construction noise effects. However, short-term impacts are anticipated at nearby sensitive land uses. Temporary construction activities would include the installation of concrete footings, cable wires, and the erection of poles using an excavator, dump truck, crane, and a wire stringing unit along a linear path. Estimated noise levels generated by the proposed construction equipment to be used to install transmission lines are provided in table 43 over a range of relative distances.

Table 43. Estimated noise levels during construction of transmission lines.

Equipment Type	Equipment Noise Level at a Reference Distance of 50 Feet	Relative Distance from Sensitive Land Uses	Distance Attenuated Noise Level
Excavator	85	100/500 feet	79/65
		500/1,000 feet	65/59
Dump Truck	91	100/500 feet	85/71
		500/1,000 feet	71/65
Crane	83	100/500 feet	77/63
		500/1,000 feet	63/57

Measures to avoid the installation of the poles for the transmission lines away from sensitive land uses would minimize the short-term impacts.

Compliance with the Noise Element of the *County of Riverside Comprehensive General Plan* (County of Riverside, 2005), the city of Lake Elsinore construction noise standards, and any applicable codes or standards during construction should minimize the effects on noise levels during construction. It is anticipated that adherence to these standards would involve notification to residences and schools in the immediate vicinity of the proposed power house site at least 1 week prior to the start of construction, e.g., via flyers. A telephone number for noise complaints would be included in this notification.

The co-applicants' proposal to conduct blasting in a highly controlled manner, involving creating time delays between numerous small micro-blasts so that each small explosion adds incrementally to the crest of the shock wave moving through the rock, would generate less noise and at lower decibels levels than traditional blasting.

Other measures that would reduce the effects of construction on noise levels include equipping all construction equipment with properly operating and maintained noise mufflers and intake silencers, consistent with manufacturers' standards. For construction activities projected to exceed the construction noise standards, the co-applicants could install temporary sound walls or acoustic blankets with a height of no less than 8 feet to reduce the residents' view of the construction effort. These sound walls or acoustic blankets should be designed to achieve a Sound Transmission Class (STC) of 27 or greater. The surface of the sound walls or acoustic blankets should present a solid face from top to bottom without any openings or cutouts.

Staff Alternative—Similar to the proposed project, construction noise attributed to upper lake reservoir associated with the Decker Canyon reservoir site would be substantially attenuated before it reaches the sensitive land uses and not result in significant noise effects. Any noise effects on users of the

San Mateo Wilderness Area would be less at the Decker Canyon location because the site is located farther away from the San Mateo Wilderness Area.

Similar to the proposed project, there would be short-term noise effects on nearby sensitive land uses. However, even where construction would occur at a distance less than 500 feet from private homes in La Cresta, noise levels would attenuate and be below maximum noise levels.

Optional Ortega Oaks and Evergreen Powerhouse—The immediate area surrounding the Ortega Oaks powerhouse site primarily consists of mountainous terrain to the south and some residential developments to the north, northeast, and northwest. The closest residential community would be located at an approximate distance of 720 feet. According to recent photographs and satellite imagery of the area, there are no parks, schools, or other sensitive land uses. As indicated in table 41, noise levels at the nearest sensitive land uses during construction of the alternative powerhouse site are estimated to be 75 dBA during rock drill and 65 dBA or less during other construction activities.

The land use in the adjacent to the Evergreen powerhouse site is primarily residential to the north. In fact, the closest residential community is approximately 205 feet from the center of the Evergreen powerhouse site. To the immediate northwest, there is some undeveloped land along with a small commercial area and a child care/school facility. This site is approximately 820 feet or more from the school. All other areas surrounding the Evergreen powerhouse site are forested/undeveloped lands. As indicated in table 41, noise levels at the nearest sensitive land uses during construction of the Evergreen powerhouse site are estimated to be 86 dBA during rock drill and 76 dBA or less during other construction activities.

Effects of Operations

Co-applicants' Proposal—

Effects Analysis

The operation of the proposed project would result in minimum increase in road traffic. The stationary noise source at the proposed Santa Rosa powerhouse site would be an overhead crane and auxiliary equipment, which would be designed with sufficient attenuation to meet County standards (i.e., 65 dBA in daytime and 45 dBA in nighttime) at the boundary of the nearest residential properties. The major machinery such as pumps/turbines, transformer, etc., associated with the powerhouse operations would be placed underground and would not affect noise levels on the surface. Therefore, noise effects associated with operation of the proposed project would not be significant after implementation of mitigation measures.

Not many sensitive land uses would be in the proximity of the proposed Morrell Canyon upper reservoir site and the proposed transmission alignment. As noted above, most these areas are mountainous and desolate, except for a few small housing developments and ranch homes that are at least 500 feet away.

Under wet weather conditions, high-tension transmission lines may generate audible noises. The audible noise emitted from high-voltage lines is caused by the discharge of energy that occurs when the electrical field strength on the conductor surface is greater than the "breakdown strength" (the field intensity necessary to start a flow of electric current) of the air surrounding the conductor. This discharge is also responsible for radio noise, a visible glow of light near the conductor, an energy loss known as corona loss, and other phenomena associated with high-voltage lines. The degree or intensity of the corona discharge and the resulting audible noise are affected by the condition of the air—that is, by humidity, air density, wind, and water in the form of rain, drizzle, and fog. Water increases the conductivity of the air and so increases the intensity of the discharge. Also, irregularities on the conductor surface such as nicks or sharp points and airborne contaminants can increase the corona activity. Aging or weathering of the conductor surface generally reduces the significance of these factors.

The higher voltages at which modern transmission lines operate have increased the noise problem to the point to which they have become a concern to the power industry. Consequently, these lines are now designed, constructed, and maintained so that during dry conditions they would operate below the corona-inception voltage, meaning that the line would generate a minimum of corona-related noise. In foul weather conditions, however, corona discharges can be produced by water droplets, fog and snow. For AC lines and voltages above 400-kV noise levels of 60 dBA or less at the edge of "right of way" can be annoying to the receptors nearby. However, it is estimated that corona noise would be decreased substantially and to the level of 40 dBA or less at most of the sensitive land uses, which are at distances of 1,000 feet or more from the proposed transmission alignment. For the people using trails in Cleveland National Forest, the noise from corona effects may be audible, but would only be temporary in nature and would not result in significant effects.

Staff Alternative—The effects of project operations on noise levels at the Decker Canyon site would be similar to the effects of operations at the proposed Morrell Canyon site and would not result in any noticeable effects on noise levels.

The staff alternative transmission alignment would have effects similar to the proposed transmission alignment and would not result in any noticeable effect on noise levels.

Optional Ortega Oaks or Evergreen Powerhouse—The Ortega Oaks or The Evergreen powerhouse site would have similar design layout and equipment usage; therefore, similar operation characteristics and noise levels would be expected. Noise effects associated with the operation at the Evergreen powerhouse would not be significant.

3.3.10.4 Unavoidable Adverse Effects

None.

3.4 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Irreversible effects are those that cannot be reversed except in the extreme long-term. Irreversible and irretrievable commitments of resources within the project area would be as follows:

- Construction of the project would eliminate about 15 acres of southern coastal oak woodlands.
- The visual impacts of the project structures and road/transmission alignments would be irreversible.

3.5 RELATIONSHIP BETWEEN SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

The proposed LEAPS Project is intended to provide a north to south interconnection between major east-west 500-kV transmissions in southern California and electrical peaking power generation for the duration of the license that would be granted for the project. There is also an option for relicensing the pumped storage project after the end of this term. The pumped storage project's potential effect on long-term productivity involves the conversion of about 368 acres of undeveloped forest lands, private in-holdings, and private lands and certain vegetative habitats into a developed industrial use. This conversion would diminish habitat values within these areas over the long run.

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COVER SHEET

FEDERAL ENERGY REGULATORY COMMISSION

FINAL ENVIRONMENTAL IMPACT STATEMENT
FOR HYDROPOWER LICENSE
Lake Elsinore Advanced Pumped Storage Project
Docket No. P-11858-002

Section 4
Developmental Analysis
Pages 4-1 through 4-28
FEIS

4.0 DEVELOPMENTAL ANALYSIS[77]

4.1 PROPOSED PROJECT ALTERNATIVES

4.1.1 Economic Assumptions

Under its approach to evaluating the economics of hydropower projects, as articulated in Mead Corporation, Publishing Paper Division (72 FERC ¶61,027, July 13, 1995), the Commission employs an analysis that uses present day price levels to compare the costs of the proposed project and likely alternative power sources, with no consideration for potential future inflation, escalation, or deflation beyond the license issuance date. The Commission's economic analysis provides a general estimate of the potential power benefits and costs of the project and its reasonable alternatives. The estimate helps to support an informed decision concerning what is in the public interest with respect to a proposed license.

For our economic analysis of the LEAPS Project, we used the assumptions, values, and sources shown in table 44. Information supporting the assumptions was provided in the Elsinore Valley MWD and Nevada Hydro (2005, 2004a).

Table 44. Assumptions for economic analysis of the LEAPS Hydroelectric Project.

Assumption	Value	Source
Dollar basis	2005	Staff
Period of analysis (years)	30	Staff
Term of financing (years)	20	Staff
Interest rate	9.50%	Co-applicants
Return on equity rate[a]	12%	
Discount rate[b]	9.50%	Staff
Debt:Equity ratio	70:30	Co-applicants
Depreciation	Modified Accelerated Cost Recovery Systems (150% early on)	Staff
Insurance rate[c]	0.23%	Co-applicants
Property tax rate[d]	1.73%	Co-applicants
Federal income tax rate	34%	Co-applicants
State income tax rate	8.84%	Co-applicants
Escalation after 2005	0%	Staff
Simple-cycle Combustion Turbine Parameters		
Heat rate (MMBTU/kWh)	10,000	Co-applicants
Cost of natural gas ($/MWh)	62.17	EIA (2005)
Variable O&M cost ($/MWh)	9.28	CEC (2003, as adjusted by staff)

[77] This is a standard section for Commission NEPA documents that does not necessarily reflect the methods or conclusions of the USFS staff on project economics. In this section, "we" means "Commission staff."

Assumption	Value	Source
Fixed cost component (capacity benefit) ($/MW)	$81,800	CEC (2003, as adjusted by staff)
Energy Value Parameters		
Off-peak energy value at south of path 15 ($/MWh)	$40.00	Platts (2005)
Peak energy value at south of path 15 ($/MWh) rate	$57.65	Platts (2005)
Higher demand peak energy value at south of path 15 ($/MWh)[e]	$69.18	Platts (2005)

[a] The co-applicants assumed an after tax return on equity of 15 percent. Recent rate makings in California led staff to choose a before tax return on equity of 12 percent for purposes of this analysis.

[b] The discount rate is assumed equal to the co-applicants' interest rate on debt.

[c] The co-applicants provided an insurance figure of $2,000,000, which staff divided by a project cost of $866,333,000.

[d] The co-applicants provided a property tax figure of $15,000,000, which staff divided by a project cost of $866,333,000.

[e] The ratio for higher demand peak energy value to peak energy value is 1.20.

4.1.2 Projected Energy Facility Costs for the No-action Alternative

The likely no-action alternative to the LEAPS Project that would provide a comparable amount of energy (1,560,000 MWh) and capacity is a 500-MW simple cycle turbine operating at a heat rate of about 10,000 Btu/kWh. Based on our review of recent energy prices in the state of California, such a project would have an annual cost of about $97.7 per MWh.

4.1.3 Projected Energy Facility Costs for the Co-applicants' Proposal

The co-applicants propose a pumped storage project with an upper reservoir located in Morrell Canyon and a powerhouse located at the Santa Rosa site. The detailed proposal is described in section 2.3. Staff independently reviewed the engineering costs associated with the LEAPS Project. Our review suggests that the co-applicants' estimated costs may be understated with regard to overburden excavation, disposal, and foundation preparation for the upper reservoir, the unit cost of tunnel excavation, the length of the steel-lined section, seismic design features for the penstocks, engineering and construction management, and the allowance provided for contingencies.

The co-applicants' upper reservoir cost estimate does not explicitly include items for overburden excavation and disposal, foundation preparation, the dam concrete face plinth, and reservoir lining and drainage measures. The concrete plinth may be included in the face concrete so we have not added costs for this component. Although the proposed concrete-faced rock fill dam is not one of the conceptual designs presented by the co-applicants in exhibit F (figure F-2), it is probably the most suitable dam type for a seismically active region and for a reservoir subject to the rapid filling and drawdown associated with a pumped storage facility. Our review questions the co-applicants' proposed use of a random earth fill dam because of the risk of settlement and cracking of the facing.

A concrete-faced rock fill dam would require excavation of the overburden down to sound bedrock over approximately two-thirds of the base. Assuming that the rock fill quantities shown in the co-applicants' cost estimate were measured to the bedrock surface and not to the ground surface, excavation of the 25 to 50 feet of overburden at the Morrell Canyon site could amount to 25 to 40 percent of the dam fill volume. It is unlikely that the overburden would yield significant quantities of material suitable for a concrete-faced rock fill dam and that the material would require disposal. Therefore, we have increased the co-applicants' cost estimate by adding $6,500,000 for overburden disposal (at Morrell Canyon only), $10,000,000 for additional excavation, foundation preparation, and preparation of the surface for lining, and $6,000,000 for additional quarrying and haulage of suitable fill.

The co-applicants show a unit cost for tunnel and penstock excavation of $125 per cubic yard. Recent contracts for hard rock tunneling suggest that a unit cost of $200 per cubic yard would be more realistic, particularly in view of the double handling required at the powerhouse shaft and the possibility that haulage to disposal would be required. The co-applicants show the penstock excavation for the steel-lined section of the tunnel as 600 feet. However, the drawings of the penstock alternatives and table of quantities presented in the license application indicate 2,500 feet of steel lining would be required. We are uncertain if the ground slope has been taken into account and suggest that the length of the steel-lined section should be at least 2,800 feet. Assuming two lengths of penstock, as the co-applicants propose, the total length of steel lining would be 5,600 feet, or about 10 times the length included in the co-applicants' cost estimate. We also question the co-applicants cost estimate for the tailrace tunnel through the rock-to-soft ground transition zone, and we are uncertain as to the co-applicants' intended diameter of the tailrace penstock. Constructing two tunnels of 125 feet length, 40 feet diameter, and 150 feet depth to permit safe crossing of this transition zone could add $13,600,000 to the cost of construction. Therefore, we have added $13,875,000 for the higher unit cost of excavation of the tunnel and penstock shafts, $51,000,000 for the longer length of the steel-lined section of the penstock, and $13,600,000 for the transition zone tunnels to the co-applicants' cost estimate. Additionally, we included $5,000,000 for seismic design features along the Willard Fault. We also determined that the co-applicants appear to have assumed three rather than two tunnels for purposes of estimating excavation costs. We have therefore reduced those costs by 1/6 or $25,722,000.

Finally, the co-applicants provided a contingency allowance of 20 percent in the license application, but only 2.28 percent in the revised cost estimate filed in response to the our request for additional information. The co-applicants' cost estimate does not appear to include costs for final designs, model tests, and construction management which would typically add 10 percent to overall project costs. The design is also at a very conceptual level. Contingencies of 30 percent and 15 percent would typically be added to the estimates for civil works, and mechanical and electrical equipment, respectively, at this stage of design development. Therefore, we have added contingencies of 30 percent and 15 percent to the co-applicants' cost estimate. Finally, we adjusted the financing and the other miscellaneous project cost categories to reflect the higher total capital costs.

We present our evaluation of these costs and the resulting total facility costs, excluding environmental measures, in table 45.

Table 45. Projected energy facility costs for the co-applicants' proposal (Morrell-Santa Rosa alternative, excluding environmental measures), including staff review items (*in italics*).

	Cost[a]	**Subtotal**
Site Preparation		
Co-applicants' cost	$15,425,000	$15,425,000

	Cost[a]	Subtotal
Upper Reservoir (Morrell Canyon)		
Co-applicants' cost	$59,275,000	
Overburden disposal	*$6,500,000*	
Additional excavation, foundation preparation and lining	*$10,000,000*	
Quarrying and additional haulage	*$6,000,000*	
Subtotal upper reservoir		$81,775,000
Tunnels and Shafts		
Co-applicants' cost	$154,332,000	
Lower total excavation length (reduction by one-sixth)[b]	*–$25,722,000*	
Higher unit cost of excavation	*$13,875,000*	
Additional steel liner costs	*$51,000,000*	
Willard Fault seismic mitigation	*$5,000,000*	
Transition zone shafts	*$13,600,000*	
Subtotal tunnels and shafts		$212,085,000
Powerhouse Cavern		
Co-applicants' cost	$62,570,000	$62,570,000
Powerhouse Auxiliary: Mechanical		
Co-applicants' cost	$5,725,000	$5,725,000
Powerhouse Auxiliary: Electrical		
Co-applicants' cost	$15,000,000	$15,000,000
Powerhouse Major Equipment		
Co-applicants' cost	$1,750,000	$1,750,000
Powerhouse Turbine Generators		
Co-applicants' cost	$64,200,000	$64,200,000
Lower Reservoir		
Co-applicants' cost	$17,448,000	$17,448,000
Subtotal major facilities		$475,978,000
Contingencies		
30 percent contingency on civil works	*$116,790,900*	
15 percent contingency on electrical-mechanical	*$13,001,300*	
Subtotal Contingencies		$129,792,200
Subtotal Without Transmission		$605,770,200
Transmission Line		
Co-applicants' cost	$309,654,000	$309,654,000
Additional staff contingency for transmission line	*$21,613,800*	

	Cost[a]	Subtotal
Construction Cost		$937,038,000
Elsinore Valley MWD Payment		
Co-applicants' cost	$1,329,000	
Additional payment associated with higher capital costs	*$450,600*	
Subtotal Elsinore Valley MWD payment		$1,779,600
Total Project Costs		$938,817,600
Feasibility study, associated site investigations, final design, model tests, and construction management	$93,703,800	$93,703,800
Project-related costs	$12,914,000	$12,914,000
Assumed environmental mitigation costs[c]	$0	$0
Interest during Construction		
Co-applicants' cost	$85,000,000	
Additional interest during construction with higher capital costs	*$36,489,800*	
Subtotal interest during construction		$121,489,800
Other Financing Costs		
Co-applicants' cost	$14,262,000	
Additional financing costs with higher capital costs	*$5,957,000*	
Subtotal other financing costs		$20,219,000
Financial Contingency		
Co-applicants' cost	$19,786,000	
Additional financing costs with higher capital costs	*$8,264,000*	
Subtotal financial contingency		$28,050,000
Development Fee		
Co-applicants' cost	$12,803,000	
Additional fees for higher capital costs	*$5,347,000*	
Subtotal development fee		$18,150,000
Subtotal Project Development Costs	$294,526,600	$294,526,600
Grand Total Project Costs		$1,233,344,200
Adjust to 2005 dollars		$1,283,171,300

[a] Costs are in 2003 dollars to permit a comparison with the co-applicants' cost estimate. Costs are converted to 2005 dollars in the final row.

[b] Lineal feet dimensions appear to reflect three rather than two conduit systems in Elsinore Valley MWD and Nevada Hydro (2005); however, additional analysis may be needed to resolve this issue including a complete review of all conduit quantities. Because there were changes in diameters as well we have made a one-sixth adjustment to the quantities rather than one-third.

[c] These costs are accounted for in a separate table.

4.1.4 Projected Energy Facility Costs for Staff Alternative

Commission staff and USFS staff suggest that a modified pumped storage project configuration with an upper reservoir located in Decker Canyon with the powerhouse located at Santa Rosa site may reduce environmental effects while maintaining a comparable facility cost. This alternative is described in section 2.6. Staff has assumed that the engineering review conducted for Morrell Canyon alternative would also apply to Decker Canyon alternative, although the details of the omitted items might be somewhat different. Therefore we have included the same set of additional cost estimates to the co-applicants' cost estimate. In addition we applied the cost differentials developed by the co-applicants for each of the construction elements in response to our AIR (Elsinore Valley MWD and Nevada Hydro, 2005). We present our evaluation of these costs and the resulting total facility costs, excluding environmental measures, in table 46.

Table 46. Projected energy facility costs for the staff alternative (Decker-Santa Rosa alternative excluding environmental measures), including staff review items (*in italics*).

	Cost[a]	Subtotal
Site Preparation		
Co-applicants' cost	$15,425,000	$15,425,000
Upper Reservoir (Decker Canyon)		
Co-applicants' cost	$80,021,300	
Additional excavation, foundation preparation and lining	*$10,000,000*	
Quarrying and additional hauling	*$6,000,000*	
Subtotal upper reservoir		$96,021,300
Tunnels and Shafts		
Co-applicants' cost	$170,065,000	
Lower total excavation length (reduction by one-sixth)[b]	*–$28,344,200*	
Higher unit cost of excavation	*$13,875,000*	
Additional steel liner costs	*$51,000,000*	
Willard Fault seismic mitigation	*$5,000,000*	
Transition zone shafts	*$13,600,000*	
Subtotal tunnels and shafts		$225,195,800
Powerhouse Cavern		
Co-applicants' cost	$61,410,000	$61,410,000
Powerhouse Auxiliary: Mechanical		
Co-applicants' cost	$5,725,000	$5,725,000
Powerhouse Auxiliary: Electrical		
Co-applicants' cost	$15,000,000	$15,000,000
Powerhouse Major Equipment		
Co-applicants' cost	$1,750,000	$1,750,000

	Cost[a]	Subtotal
Powerhouse Turbine Generators		
Co-applicants' cost	$64,200,000	$64,200,000
Lower Reservoir		
Co-applicants' cost	$17,448,000	$17,448,000
Subtotal major facilities		$503,335,100
Contingencies		
30 percent contingency on civil works	*$124,998,000*	$124,998,000
15 percent contingency on electrical-mechanical	*$13,001,300*	$13,001,300
Subtotal Contingencies		$137,999,300
Subtotal Without Transmission		$641,334,400
Transmission Line		
Co-applicants' cost	$308,794,000	$308,794,000
Additional staff contingency for transmission line	*$21,553,800*	$21,553,800
Elsinore Valley MWD Payment		
Co-applicants' cost	$1,329,000	
Additional payment associated with higher capital costs	*$516,400*	
Subtotal Elsinore Valley MWD payment		$1,845,400
Total Project Costs		
Feasibility study, associated site investigations, final design, model tests, and construction management	*$93,703,800*	$93,703,800
Project-related costs	$12,914,000	$12,914,000
Assumed environmental mitigation costs[c]	$0	$0
Interest during Construction		
Co-applicants' cost	$85,000,000	
Additional interest during construction with higher capital costs	*$40,926,000*	
Subtotal interest during construction		$125,926,000
Other Financing Costs		
Co-applicants' cost	$14,262,000	
Additional financing costs with higher capital costs	*$5,728,000*	
Subtotal additional financing costs		$19,990,000
Financial Contingency		
Co-applicants' cost	$19,786,000	
Additional financing costs with higher capital costs	*$7,947,000*	
Subtotal financial contingency		$27,733,000
Development Fee		
Co-applicants' cost	$12,803,000	
Additional fees for higher capital costs	*$5,142,000*	

	Cost[a]	Subtotal
Subtotal development fee		$17,945,000
Subtotal Project Development Costs	$301,676,200	$301,676,200
Grand Total Project Costs		$1,275,203,700
Total Adjusted to 2005 dollars		$1,326,722,000

[a] Costs are in 2003 dollars to permit a comparison with the co-applicants' cost estimate. Costs are converted to 2005 dollars in the final row.

[b] Lineal feet dimensions appear to reflect three rather than two conduit systems in Elsinore Valley MWD and Nevada Hydro (2005); however, additional analysis may be needed to resolve this issue including a complete review of all conduit quantities.

[c] These costs are accounted for in a separate table.

4.2 PROJECTED ENVIRONMENTAL COSTS

Staff developed estimates for the costs of environmental mitigation measures based on information provided by the co-applicants and agencies, and on staff experience with similar hydroelectric projects in California (refer to table 47). The details of the co-applicants' proposal, staff alternative, and agency recommendations are included in section 2.

Several of the items shown in table 47 appear similar. In these cases, the co-applicants may have proposed one measure to address a particular resource concern, an agency may have specified or recommended a slightly different measure addressing the same issue, and staff may have further modifications. The column titled "Staff Adopted" indicates the measures that would be included in the staff alternative.

The co-applicants estimated environmental mitigation capital costs at $14,450,000 (Elsinore Valley MWD and Nevada Hydro, 2005), including $6,450,000 for parks and recreation development and $8,000,000 for other environmental measure in 2003 dollars. Many of the co-applicants' environmental measures were not priced individually and had to be estimated by staff. We have footnoted those costs in table 47. We adjusted those costs by a factor or 1.04 to account for the effects of inflation between 2003 and 2005. After taking into account the unpriced measures, we estimate the annualized cost of environmental measures for the co-applicants' proposal to be about $13,681,100, based on an estimated capital cost of $84,201,100 and combined with $2,005,700 in operations and maintenance costs.

The estimated annualized cost of environmental measures for the staff alternative is about $12,207,500 based on an estimated capital cost of $72,159,200 combined with $2,279,100 in operations and maintenance costs.

Staff did not develop a full alternative for the Morrell Canyon location; however, we note that, should such an alternative be developed, several additional measures would likely be required by staff and agencies. Staff anticipates, for example, that a more sophisticated liner system, coupled with an upstream collection system and underdrain collection system for several known springs would potentially add in excess of $18,000,000 to the environmental costs. Additional measures such as relocation of the Morgan Trail and additional lands mitigation as shown in table 47 would further narrow the difference in cost between the Morrell and Decker upper reservoir locations.

None of the environmental measures proposed by the co-applicants, staff or agencies were deemed to have significant effects on energy generation or dependable capacity.

Table 47. Summary of capital and one-time costs, annual costs, and total annualized costs of environmental measures proposed by the co-applicants, included in the staff alternative, and recommended by others for the LEAPS Project. (Sources: Elsinore Valley MWD and Nevada Hydro, 2005, 2004a, and 2004b)

Measure	Entity	Capital and One Time Costs ($2005)	Annualized Operations and Maintenance Cost ($2005)	Total Annualized Cost ($2005)	Staff Alternative	Table Notes
Soils and Geology						
1. Retain board of three consulting geologists/engineers	Co-applicants	$500,000		$70,500	Yes	a
2. Conduct additional geotechnical studies	Co-applicants	$1,000,000		$141,100	Yes	
3. Prepare erosion control plan prior to construction and implement during construction.	Co-applicants	$230,000		$32,500	Yes	
4. Prepare and implement an erosion control plan over the term of the license	USFS, Riverside County Flood Control District	$70,000		$9,900	Yes	
5. Implement erosion control during construction and operation	Co-applicants	$1,922,900	$30,400	$301,700	Yes	
6. Implement erosion control during construction and operation including the staff alternative transmission alignment	Staff	$40,100	$1,200	$6,900	Yes	
7. Develop and implement a plan and design for construction of a system that will automatically detect a conduit or penstock failure and immediately shut off flow in the conduit or penstock at the headworks in the event of such a failure	Co-applicants	$91,000		$12,800	Yes	a
8. Develop a plan for clearing the reservoir area	Co-applicants	$35,000		$4,900	Yes	
9. Develop a plan to revegetate disturbed areas with native plant species beneficial to wildlife	Co-applicants	$30,000		$4,200	Yes	

Measure	Entity	Capital and One Time Costs ($2005)	Annualized Operations and Maintenance Cost ($2005)	Total Annualized Cost ($2005)	Staff Alternative	Table Notes
Water Resources (Quantity)						
10. Pay an annual lake management fee to Elsinore Valley MWD to maintain Lake Elsinore at 1,240 feet msl or above	Co-applicants		$1,872,000	$1,872,000	Yes	
11. Develop and implement a revised lake operating plan for Lake Elsinore, addressing increased minimum lake levels, flood control implications, and water supply issues	Staff	$200,000		$28,200	Yes	
12. Develop and implement a plan for the installation of drainage and flood control measures and any water detention structures to control storm runoff over the term of any license issued for the project	Co-applicants	$100,000		$14,100	Yes	a
13. Incremental additional program associated with upstream and seepage collection and delivery system and improved double liner system at Morrell Canyon	Staff	$18,000,000		$2,539,800	No	b
14. Develop and implement an upper reservoir and water conduit monitoring program to assess the effects of the upper reservoir liner and seepage collection systems, shafts, and tunnels on the groundwater levels and water quality, including installation of perimeter wells designed to establish groundwater levels and water quality prior to construction and to detect any changes after construction	Co-applicants	$500,000		$70,500	Yes	

Measure	Entity	Capital and One Time Costs ($2005)	Annualized Operations and Maintenance Cost ($2005)	Total Annualized Cost ($2005)	Staff Alternative	Table Notes
15. Include specific remediation measures in the upper reservoir and water conduit monitoring program to allow immediate action to be taken if water or non-native aquatic species are released from the upper reservoir into the San Juan Creek drainage	Interior, staff				Yes	c
16. Include specific provisions in the upper reservoir and water conduit monitoring program for groundwater exploration and aquifer characterization, consultation on groundwater inflow criteria, and to monitor groundwater levels during the construction and operation of the water conduits including the tunnels and penstocks that convey water between the upper reservoir and the powerhouse for 10 years or longer, if necessary, specifying remedial actions if monitoring reveals changes in groundwater or seepage into the tunnels	Staff and USFS	$110,000	$19,200	$34,700	Yes	d
17. Develop and implement a surface water resources manage plan to control and monitor project-related effects on water resources that support riparian vegetation on National Forest System lands	USFS	$200,000	$30,000	$58,200	Yes	
Water Resources (Quality)						
18. Develop and implement water quality plan to monitor DO and temperature in Lake Elsinore and Temescal during construction and operation	Co-applicants	$115,000	$15,000	$31,200	Yes	

Measure	Entity	Capital and One Time Costs ($2005)	Annualized Operations and Maintenance Cost ($2005)	Total Annualized Cost ($2005)	Staff Alternative	Table Notes
19. Develop and implement a plan to determine the toxicity of sediments in Lake Elsinore and to provide for proper handling and disposal if toxins are identified	Staff	$50,000		$7,100	Yes	
20. Prepare a hazardous substances spill prevention and control plan	Co-applicants USFS	$10,000		$1,400	Yes	
Aquatic Resources						
21. Employ a qualified specialist to monitor construction activities in the aquatic environment	Co-applicants	$130,000		$18,300	Yes	
22. Develop and implement a detailed plan for environmental monitoring during construction by a qualified specialist for aquatic and terrestrial resources	USFS	$20,000		$2,800	Yes	
23. Establish appropriate setbacks from streams, avoid sediment discharges, and implement BMPs to avoid conflicts with the USFS steelhead recovery efforts in San Mateo Creek	Co-applicants			$0	Yes	e
24. Remove/reduce fish population via netting or rotenone poisoning during construction	Co-applicants	$50,000		$7,100	No	
25. Design and install intake screens for fish consistent with NMFS	Co-applicants	$8,000,000	$10,000	$1,138,800	No	
26. Consult with FWS and CDFG to develop intake fish screen criteria as specified by NMFS and modified, if necessary, to ensure screening addresses bass and crappie and other resident fish species in Lake Elsinore	FWS	$10,000		$1,400	No	

Measure	Entity	Capital and One Time Costs ($2005)	Annualized Operations and Maintenance Cost ($2005)	Total Annualized Cost ($2005)	Staff Alternative	Table Notes
27. Establish limits of flow velocity rates of 1.5 to 1.8 feet per second at underwater intakes to reduce entrainment of sport fish	Co-applicants			$0	Yes	f
28. Monitor sport fish for entrainment and mortality for 1 year	Co-applicants		$9,300	$9,300	Yes	d
29. Monitor sports fish for entrainment and mortality for 1 year and once every 5 years over the term of the license and, based on the monitoring results, develop and implement a plan to mitigate effects on sport fish	Staff	$200,000	$33,800	$62,000	Yes	
30. Test behavioral avoidance devices if entrainment is significant	Co-applicants	$250,000	$9,100	$41,300	No	d,g
Terrestrial Resources						
32. Employ a qualified specialist to monitor construction activities in the terrestrial environment	Co-applicants	$300,000		$42,300	Yes	
33. Conduct wetland delineations and prepare a habitat mitigation and monitoring plan for Corps, CDFG, and USFS approval	Co-applicants	$60,000	$6,700	$15,200	Yes	d
34. Develop and implement plan to prevent and control weeds	Co-applicants	$100,000		$14,100	Yes	
35. Consult with the USFS to develop and implement a vegetation and invasive weed management plan	USFS	$20,000	$20,000	$22,800	Yes	
36. Develop a Lake Elsinore monitoring and remediation plan to eliminate or reduce impacts to nesting shorebirds, waterfowl, and other birds	Interior	$20,000	$20,000	$22,800	Yes	i

Measure	Entity	Capital and One Time Costs ($2005)	Annualized Operations and Maintenance Cost ($2005)	Total Annualized Cost ($2005)	Staff Alternative	Table Notes
37. Design and construct power line in accordance with APLIC et al. (1996)	Co-applicants, USFS	$20,000		$2,800	Yes	
38. Develop and implement bird-power line protection plan, following designs in the APLIC and FWS (2005) guidelines; develop and implement long-term avian protection plan	Staff		$20,000	$20,000	Yes	i
39. Conduct additional pre-construction special status plant and animal surveys for compliance with the Multi-Species HCPs.	Interior	$100,000		$14,100	Yes	
40. For Morrell Canyon, mitigate loss of special status habitats at 2:1 ratio (oak woodland 40 acres; coastal sage scrub 62 acres)	Co-applicants	$2,060,000	$2,100	$204,100	No	d,g
41. For Morrell Canyon, evaluate effects in terms of the Multi-Species HCP; mitigate based on equivalency analysis, minimum 1:1 ratio for habitat loss (203.5 acres)	Interior	$3,242,500	$4,200	$325,200	No	d,g
42. For Decker Canyon, evaluate effects in terms of the Multi-Species HCP; mitigate based on equivalency analysis, minimum 1:1 ratio for habitat loss (207.5 acres)	Interior	$3,212,500	$4,200	$322,300	Yes	d,g
43. For Morrell, mitigate any permanent loss of habitat on National Forest System lands at a minimum 1:1 ratio for riparian oak woodland, coastal sage scrub, and habitats that support listed species	USFS	$2,665,000	$3,500	$268,100	No	d,g

Measure	Entity	Capital and One Time Costs ($2005)	Annualized Operations and Maintenance Cost ($2005)	Total Annualized Cost ($2005)	Staff Alternative	Table Notes
44. For Decker Canyon, mitigate any permanent loss of habitat on National Forest System lands at a minimum 1:1 ratio for riparian oak woodland, coastal sage scrub, and habitats that support listed species	USFS	$2,635,000	$3,400	$265,100	No	d,g
45. Prepare and implement a habitat mitigation plan to meet habitat objectives and standards and for additional enhancement activities to offset the direct effects of construction	USFS	$20,000		$2,800	Yes	
46. Provide $500 per acre for project effects within Stephen's Kangaroo Rat Assessment Area (38.25 acres)	Co-applicants	$19,100		$2,700	Yes	
47. Annually review list of special status species	USFS	$10,000	$4,800	$6,200	Yes	g
48. Provide annual employee awareness training regarding special status plants and animals	USFS	$10,000	$10,000	$11,400	Yes	
49. Consult with FWS in developing final designs and measures to protect fish and wildlife	Interior	$10,000	$2,000	$3,400	Yes	j
50. In emergency, take immediate action to prevent or minimize further loss of fish and wildlife	Interior			$0	No	
51. Commission include ESA reopener provision in license	Interior			$0	No	k

Measure	Entity	Capital and One Time Costs ($2005)	Annualized Operations and Maintenance Cost ($2005)	Total Annualized Cost ($2005)	Staff Alternative	Table Notes
Recreation						
52. Prepare a detailed plan of construction sites and laydown areas relative to recreational safety.	Co-applicants, USFS			$0	Yes	l
53. Implement safety during construction plan and include daily inspections for fire plan compliance, public safety, and environmental protection	USFS				Yes	l
54. Install fencing around upper reservoir	Co-applicants	$74,000	$2,200	$12,600	Yes	
55. Provide interpretive signage at upper reservoir site	Co-applicants	$7,000	$200	$1,200	Yes	
56. Construct and maintain an ancillary structure to complement the firefighters memorial (visitors information center) at a USFS-site off Ortega Highway	Co-applicants	$49,900		$7,000	Yes	a
57. Grade/contour/prepare site at the construction laydown area or another area for future development by USFS or another entity as determined by the USFS	Co-applicants	$18,700		$2,600	Yes	
58. Develop recreation facility at the construction laydown area for upper reservoir and/or an alternate location	USFS	$144,200	$4,000	$20,100	Yes	d,g
59. Relocate portions of Morgan Trail if the upper reservoir is in Morrell Canyon	Co-applicants	$18,700		$2,600	No	a
60. Develop and implement a recreation plan, including a botanical garden/community park at Santa Rosa or Evergreen powerhouse sites	Co-applicants	$5,610,800		$678,500	Yes	g
61. Provide public tours at powerhouse at any of the powerhouse locations	Co-applicants		$18,700	$18,700	Yes	a

Measure	Entity	Capital and One Time Costs ($2005)	Annualized Operations and Maintenance Cost ($2005)	Total Annualized Cost ($2005)	Staff Alternative	Table Notes
62. Develop a hang glider landing site and provide for a community park if powerhouse is located at Ortega Oaks sites and a northern transmission alignment is selected.	Co-applicants	$5,610,800		$678,500	No because this alternative location not selected	
63. Implement recreation plan providing for land transfer, development of recreation facility and O&M funding for community park development and/or hang gliding facility	Staff		$125,400	$125,400	Yes	d
64. Develop and implement fish stocking program for Lake Elsinore	Co-applicants	$10,000	$20,000	$21,400	Yes	
Land Use and Aesthetic Resources						
65. Acquire easements, fee simple or leasehold interests in lands needed for project purposes by voluntary sale or conveyance to extent possible.	Co-applicants	$70,000		$9,900	Yes	m
66. Acquire and demolish or modify the multifamily residences nearest the proposed powerhouse at Santa Rosa.	Co-applicants				No	l
67. Prepare and implement visual resources plan	Co-applicants	$20,000		$2,800	No	a
68. Prepare and implement a scenery conservation plan to achieve the greatest degree of consistency with USFS High Scenic Integrity Objective	USFS	$20,000		$2,800	Yes	

Measure	Entity	Capital and One Time Costs ($2005)	Annualized Operations and Maintenance Cost ($2005)	Total Annualized Cost ($2005)	Staff Alternative	Table Notes
69. Develop, in consultation with Riverside County, and implement a plan to avoid effects to existing drainage facilities and to control any project-related drainage.	Co-applicants			$0	Yes included in plan for drainage and flood control measures	l
70. Additional excavation at Decker Canyon in lieu of trucking fill material uphill from powerhouse	Staff	$5,193,500		$732,800	Yes	
71. Achieve a balance of the excavation and fill materials at the Decker Canyon on reservoir site through additional excavation and dispose of all excavated material from all other project facilities off site	Co-applicants				Yes	l
72. Participate in installation of traffic signal at Grand Avenue / Ortega Highway intersection	Co-applicants			$0	No	n
73. For the Ortega Oaks power house location, dedicate and improve any additional rights-of-way	Co-applicants			$0	No	n
74. Develop and implement traffic management and control plans to address construction and access to and from the active construction sites	Co-applicants	$100,000	$10,000	$24,100	Yes	

Measure	Entity	Capital and One Time Costs ($2005)	Annualized Operations and Maintenance Cost ($2005)	Total Annualized Cost ($2005)	Staff Alternative	Table Notes
75. Install temporary roads on the National Forest System lands only with USFS approval and according to USFS policies, and remove, re-contour, and re-vegetate roads following construction except where the USFS authorizes continued use of the roads for transmission line maintenance	Co-applicants				Yes	l
76. Consult with the USFS to develop a project road and traffic management plan on National Forest System lands	USFS	$10,000		$1,400	Yes	
77. Consult with appropriate authorities to develop road and traffic management plan on non-National Forest System lands for USFS roads	Staff	10,000		$1,400	Yes	
78. Transmission tower placement plan	Staff	$100,000		$14,100	Yes	
79. Helicopter installation costs for co-applicants' proposed transmission alignment	Co-applicants	$1,368,900		$193,200	No	
80. Helicopter installation costs for staff alternative transmission alignment	Staff	$1,799,600		$253,900	Yes	
81. Incremental transmission alignment road costs for staff alternative transmission alignment	Staff	–$183,900		–$25,900	Yes	
82. Incremental underground powerline costs for the co-applicants' proposed alignment (based on an incremental cost of $10,400,000 per mile including contingency)	Co-applicants	$60,680,100		$8,561,900	No	

Measure	Entity	Capital and One Time Costs ($2005)	Annualized Operations and Maintenance Cost ($2005)	Total Annualized Cost ($2005)	Staff Alternative	Table Notes
83. Incremental underground powerline costs for the staff alternative transmission alignment (based on an incremental cost of $10,400,000 per mile including contingency)	Staff	$48,999,800		$6,913,800	Yes	
84. Comply with noise element of Riverside General Plan and other applicable codes and standards	Co-applicants				Yes	l
Cultural Resources						
85. Consult with SHPO and the USFS at least 180 days prior to commencement of any land-clearing or land-disturbing activities	Co-applicants	$10,000		$1,400	Yes	
86. Stop all land-clearing and land-disturbing activities in the vicinity of such properties where unidentified archaeological or historic properties are discovered during construction and consult with the SHPO or the USFS on USFS lands	Co-applicants	$120,000		$16,900	Yes	a
87. Implement measures proposed in the draft HPMP filed with the Commission.	Co-applicants	$420,000		$59,300	Yes	
88. Conduct paleontological monitoring of earth-moving activities on a part-time basis in locations that are sensitive for paleontological resources.	Co-applicants	$80,000		$11,300	Yes	
89. Prepare any recovered fossil remains to the point of identification, and prepare them for curation by the Los Angeles County Museum or San Bernardino County Museum	Co-applicants	$20,000		$2,800	Yes	

Measure	Entity	Capital and One Time Costs ($2005)	Annualized Operations and Maintenance Cost ($2005)	Total Annualized Cost ($2005)	Staff Alternative	Table Notes
90. Revise draft HPMP in consultation with the USFS and file a final HPMP for Commission approval within 1 year of any license issuance.	Staff	$20,000		$2,800	Yes	
Total Co-applicants' Proposed Measures		$84,201,100	$2,005,700	$13,681,100		
Total Staff Adopted Measures		$72,159,200	$2,279,100	$12,207,500		

[a] These costs are staff estimates based on the co-applicants' description of the measure.

[b] This cost applies to the liner in the upper reservoir only at the Morrell Canyon location.

[c] Cost of developing remediation measures assumed to be included in staff measure, item no. 16.

[d] This measure includes O&M costs that are not constant over our 30-year economic evaluation period that follows construction.

[e] Cost for this measure is assumed to be included in the development and implementation of the co-applicants' erosion control plan.

[f] We expect that the costs associated with the limits for velocities are included in the fish screen cost estimate.

[g] This measure includes capital costs incurred in other than year 1 or during original construction.

[h] We assume that the co-applicants will address drawdowns in the lake management plan.

[i] Staff has added monitoring to this Interior-proposed measure.

[j] We assume that this consultation is limited to project design.

[k] An ESA reopener is a legal matter that will be addressed by the Commission in any license that may be issued for the project.

[l] We assume this cost would be included in the co-applicants' overall construction cost.

[m] We assume this cost would be included in the co-applicants' overall construction cost except for land easements associated with the new transmission alignments which amounted to 28 acres times $2,500.

[n] We assume these costs are included in the co-applicants' costs for managing traffic to and from the construction sites.

We group expenditures on environmental measures by resource area and compare costs of the staff alternative to those of the co-applicants in table 48.

Table 48. Comparison of annualized costs of environmental measures by resource area and overall project costs. (Source: Staff)

Environmental Protection Measure	**Co-applicants' Proposal (2005 dollars)**	**Co-applicants' Proposal (2005 dollars per MWh)**	**Staff Alternative (2005 dollars)**	**Staff Alternative (2005 dollars per MWh)**
Soils and geology	$567,700	$0.36	$584,500	$0.37
Water resources				
Quantity	$1,956,600	$1.25	$2,077,700	$1.33
Quality	$32,600	$0.02	$39,700	$0.03
Aquatic	$1,214,800	$0.78	$92,400	$0.06
Terrestrial	$281,200	$0.18	$500,100	$0.32
Recreation	$744,600	$0.48	$887,500	$0.57
Land use and aesthetic resources	$8,791,900	$5.64	$7,931,100	$5.08
Cultural resources	$91,700	$0.06	$94,500	$0.06
Total Environmental	$13,681,100	$8.77	$12,207,500	$7.83

4.3 PROJECTED ENERGY COSTS

Both the co-applicants' proposal and the staff alternative would require a comparable amount of energy to power the pumps that raise water from the lower reservoir to the upper reservoir. In their most recent filing (Elsinore Valley MWD and Nevada Hydro, 2005), the co-applicants' estimate that 1,872,000 MWh of pumping energy would be required to generate 1,560,000 MWh of project energy. The co-applicants' did not refile the "Operational Spreadsheets" (Elsinore Valley MWD and Nevada Hydro, 2004a, exhibits A, B, C, D, F, and G) based on this slightly revised estimate, so we have assumed average values corresponding to the same 60 hours of turbine operation and 66 hours of pumping operation to analyze the energy costs associated with the LEAPS Project. Table 49 includes our analysis of the "Maximum Generation Scenario" as described in section 2.1.3. The co-applicants did not provide this type of analysis in its license application (Elsinore Valley MWD and Nevada Hydro, 2004a) or subsequent filings. Our analysis assumes operation over a typical week that includes peak hours from 6:00 a.m. through 10 p.m. (16 hours per week day). We assume that half of these hours are extra high demand periods and classify them as higher demand peak hours such as those that might be served by a rapidly dispatchable pumped storage hydro project. Energy generated during these hours is estimated to have a 20 percent premium compared to regular peak hours. The remaining hours (10:00 p.m. through 6:00 a.m.) are classified as off-peak hours as are all weekend hours. We recognize that these definitions are subject to change over time and that there may be seasonal differences between summer and winter periods. Furthermore, our analysis may be slightly optimistic since several holidays throughout the year

Table 49. Analysis of the pumping and turbining weekly cycles for the LEAPS Project. (Source: Staff)

Item	Hours	Energy Value ($2005)	Pumping Energy Required (MWh)	Cost of Pumping Energy ($2005)	Average Pumped Storage Generation (MWh)	Value of Pumped Storage Generation ($2005)
Higher demand peak hours	40	69.18	--	--	20,000	1,383,600
Peak hours	40	57.65	10,909	503,100	10,000	576,500
Off-peak hours	88	40.00	25,091	1,090,900	--	--
Total or average	168	51.15	36,000	1,594,000	30,000	1,960,100
Yearly			1,872,000	82,889,400	1,560,000	101,925,200

are classified as off-peak periods. Additionally, it may take up to an hour to switch from the turbining cycle to the pumping cycle. We have not included that level of refinement in our analysis.

We determine that over a typical week, the cost of generation to provide pumping energy during the periods specified by the co-applicants would be $1,594,000. On an annual basis this would amount to $82,889,400.

4.4 ECONOMIC COMPARISON

Based on the costs developed in sections 4.1 through 4.3, we estimate the total capital and annual costs for the co-applicants' proposal as shown in table 50. The co-applicants' proposal consists of the Morrell Canyon/Santa Rosa project configuration with staff's cost estimate adjustments, the TE/VS Interconnnect Project, and the co-applicants' proposed environmental measures. Similarly, we show the total costs for the staff alternative in table 51. The staff alternative consists of the Decker Canyon/Ortega project configuration, the mid-slope transmission alignment with up-slope segment, and environmental measures.

Table 52 compares the power value, annual costs, and net benefits of the no-action alternative, co-applicants' proposal and the staff alternative for the Leaps Project. The decrease in net benefits between the co-applicants' proposal and the staff alternative is about $2.99 per MWh.

Within the limits of the preliminary design of the project components, the overall costs of the co-applicants' proposed action and the staff alternative are within the same order of magnitude, although the staff alternative would be more costly. As shown in table 51, and discussed in section 4.4, the additional environmental measures and cost estimates would not significantly affect the project economics. During the final design phase of the project, the co-applicants would provide the engineering and cost estimate information to the Commission staff necessary to review the final design of each of the project components.

Table 50. Summary of projected annual costs and capital costs under the co-applicants' proposal. (Source: Staff)

Cost	Capital and One-time Costs	Annual Costs, Including O&M	Total Annualized Costs
Project cost excluding environmental measures	1,283,171,300		181,054,300
Environmental measures	84,201,100	2,005,700	13,681,100
Licensing cost	12,000,000		1,693,200
Total net investment	1,379,372,400		196,428,600
Materials and supplies		1,435,200	
Energy for pumping[a]		82,889,400	
Dam Safety Program		100,000	
Insurance[b]			
General and Administrative		561,100	
O&M contingency[c]		1,920,000	
Subtotal operations and maintenance costs		86,905,700	86,905,700
FERC fees[c]		1,200,000	1,200,000
Subtotal annual costs			88,105,700
Total			284,534,300

[a] Pumping energy is based on average energy values at SP-15 for August 2004 through July 2005, assuming pumping during all off peak hours (10 p.m. through 6 a.m., Monday through Friday including on into the next day) and additional pumping operations during 16 hours (4 hours Monday through Thursday) of regular peak hours in the final EIS plus 10 off-peak hours on Saturday.

[b] Insurance costs are rolled into the annualized cost of the total net investment based on the co-applicants' estimate of 0.23 percent of the overall project cost.

[c] We estimate FERC fees at $1,200,000. Additional fees may be added for the use of federal lands. We have reduced the co-applicants' O&M contingency by this amount.

Table 51. Summary of projected annual costs and capital costs under the staff alternative. (Source: Staff)

Cost	**Capital and One-time Costs**	**Annual Costs, Including O&M**	**Total Annualized Costs**
Project cost excluding environmental measures	1,326,704,600		187,196,800
Environmental measures	72,159,200	2,279,100	12,207,500
Licensing cost	12,000,000		1,693,200
Total net investment	1,410,863,800		201,097,500
Materials and supplies		1,435,200	
Energy for pumping[a]		82,889,400	
Dam Safety Program		100,000	
Insurance[b]			
General and administrative		561,100	
O&M contingency[c]		1,920,000	
Subtotal operations and maintenance costs		86,905,700	86,905,700
FERC fees[c]		1,200,000	1,200,000
Subtotal annual costs			88,105,700
Total			289,203,200

[a] Pumping energy is based on average energy values at SP-15 for August 2004 through July 2005, assuming pumping during all off peak hours (10 p.m. through 6 a.m., Monday through Friday including on into the next day) and additional pumping operations during 16 hours (4 hours Monday through Thursday) of regular peak hours in the final EIS plus 10 off-peak hours on Saturday.

[b] Insurance costs are rolled into the annualized cost of the total net investment based on the co-applicants' estimate of 0.23 percent of the overall project cost.

[c] We estimate FERC fees at $1,200,000. Additional fees may be added for the use of federal lands. We have reduced the co-applicants' O&M contingency by this amount.

Table 52. Summary of annual net benefits for the no-action alternative, co-applicants' proposal and staff alternative for the LEAPS Project. (Source: Staff)

	No Action	**Co-applicants' Proposal**	**Staff Alternative**
Dependable capacity (MW)	500	500	500
Capacity benefit ($/MW)	81,800	81,800	81,800
Annual capacity benefit ($2005)	40,900,000	40,900,000	40,900,000
Generation (MWh)	1,560,000	1,560,000	1,560,000
Annual energy benefits ($2005)	89,932,200	101,923,100	101,923,100
Dollars/MWh	57.65	65.34	65.34
Overall benefits ($2005)[a]	130,832,200	142,823,100	142,823,100
Dollars/MWh	83.87	91.55	91.55
Annual cost ($2005)	152,370,800	284,534,300	289,203,200
Dollars/MWh	97.67	182.39	185.39
Annual net benefit ($2005)[b]	–21,538,600	–141,711,200	–146,380,100
Dollars/MWh	–13.81	–90.84	–93.83
Change in annual net benefit relative to no-action alternative ($2005)		–120,172,600	–124,841,500
Dollars/MWh		–77.03	–80.03

[a] The Nevada Hydro Company has estimated combined transmission and pumped storage benefits as high as $178,000,000 per year (letter from R. Wait, Vice President, Nevada Hydro, Vista, CA, to M. Salas, Secretary, the Commission, Washington, DC, dated June 8, 2006) using a method where cost savings (i.e., benefits) would rise over time. Our standard approach is to use a constant dollar method as described in section 4.1.1.

[b] We have estimated net benefits based on time of day pricing as described in section 4.3. The net benefit for the no-action alternative is negative because under current economic assumptions the benefit from our assumed time of day pricing would not fully cover the estimated costs of a simple-cycle combustion turbine project.

4.5 COST OF ALTERNATIVE TRANSMISSION ALIGNMENTS

In this NEPA document, staff evaluated two transmission line alternatives in detail (as described in section 2) including:

- Revised co-applicants' proposed transmission alignment as described in this document
- Staff alternative transmission alignment as described in this document.

These two alternatives have a slightly different lengths and construction characteristics. The USFS is also evaluating the TE/VS Interconnect Project and alternatives in a separate document. Commission staff have analyzed the costs associated with the co-applicants' proposed transmission alignment and two alternative alignments. Table 53 summarizes the construction costs and characteristic for the three alternatives.

Table 53. Summary of construction costs and characteristics for the co-applicants' proposed and staff alternative transmission alignments. (Source: Staff)

Alignment	Overall Length (miles)	Buried Length (miles)	Helicopter Installed Length (miles)[a]	Conventional Transmission Line (miles)	Access Road Length (miles)[b]	Total Construction Cost ($2005)[c]
Revised co-applicants' proposed transmission alignment	32.1	3.2	24.9	4.0	10.8	$393,316,800
Staff alternative transmission alignment	31.7	2.1	25.5	4.1	9.3	$381,082,875

[a] This length results in additional cost for construction of transmission lines by helicopter in areas where slopes are greater the 15 percent.

[b] We assume that access road lengths are equal to 1.5 times the transmission line length and are required in areas with slopes less than or equal to 15 percent.

[c] Total construction costs include the applicants estimated transmission lines costs and contingency, additional staff contingency and other major construction items such as additional access roads, buried lines or helicopter aided construction. Certain environmental measures associated with erosion control, easements, and terrestrial lands mitigation, etc. are not included in this cost.

[d] We assume the co-applicants may have accounted for up to 50 percent of the helicopter aided construction costs in their cost estimate and have added an additional $1,984,100 for possibly unaccounted helicopter installation costs. We assume a transmission line tower every 1000 feet and that incremental helicopter costs would amount to one-half of $30,761 per tower.

[e] We assume that shorter line lengths in the area where slopes are greater than 15 percent result in saving of $30,761 per tower eliminated or in this case 3 towers or $92,300. We also account for longer access roads at $125,000 per mile or in this case $337,500. Because the overall transmission line is 1.2 miles longer, we also estimate an additional construction cost of $2,496,000.

[f] An additional 2-mile segment connects the main transmission line to the Santa Rosa powerhouse.

[g] The number of towers per mile were determine by GIS analysis for each alignment.

4.6 SENSITIVITY TO TRANSMISSION LINE FACILITY COST OF THE LEAPS PROJECT AND OTHER FACTORS

Although we do no have a clear assessment of the potential economic benefits from a 32-mile transmission line that would also potentially serve as an intertie, we concur that such a project would provide benefits to regional utilities and the co-applicants would likely be reimbursed for such benefits and services including elements such as increased reliability, and improved load flows. Studies conducted under the STEP concluded that an intertie, such as the TE/VS Interconnect Project, may lack the economic benefits to fully justify the costs. However these studies did not include significant strategic benefits such as improved reliability, better load diversity, improved fuel diversity, access to lower cost power resources, more firm power, better opportunity for power exchanges, and improved sharing of reserves. When these items are factored in by the co-applicants, perhaps the economics of the transmission line would improve to either a break-even or positive benefit.

If we assume the co-applicants were able to cover the facility costs associated with the transmission lines by contracts with regional utilities, we estimate that the economics of the pumped storage project would improve by 43.5 dollars per MWh for the staff alternative as shown in table 54. Besides including benefits for the proposed intertie, the co-applicants may take into account escalating gas prices over time, other ancillary benefits not considered by staff and improved knowledge developed from detailed site investigations to improve the economic outlook for the LEAPS Project.

Table 54. Summary of annual net benefits for the no-action alternative, co-applicants' proposal, and staff alternative for the LEAPS Project excluding transmission line construction costs. (Source: Staff)

	No Action	**Co-applicants' Proposal**	**Staff Alternative**
Dependable capacity (MW)	500	500	500
Generation (MWh)	1,580,000	1,580,000	1,560,000
Annual power value ($2005)	130,832,200	142,823,100	142,823,100
Dollars/MWh	83.87	91.55	91.55
Annual cost ($2005)[a]	152,370,800	212,268,100	219,163,500
Dollars/MWh	97.67	136.07	140.49
Annual net benefit ($2005)	–21,538,600	–69,445,000	–76,340,400
Dollars/MWh	–13.81	–44.52	–48.94
Decrease from table 51		–30.71	–35.13

[a] The annual costs have been reduced by the co-applicants' estimated transmission lines costs and contingency, additional staff contingency, and other major construction items such as additional access roads, buried lines or helicopter aided construction. Certain environmental measures associated with erosion control, easements and terrestrial lands mitigation, etc. are not included in this cost reduction.

In a filing of June 12, 2006, Nevada Hydro comments that besides having energy benefits similar to what staff estimates, the proposed LEAPS project would have ancillary service benefits that it estimates at about $9 million annually, based on the project's potential ability to integrate wind generation in the system.

We agree that operational flexibility of pumped storage projects give them an advantage of other types of generators to compete in the ancillary services market. This flexibility includes the ability for pumped storage projects to start up quickly, rapidly increase load, switch from pumping to generating, and shape the project's output to meet load requirements. Our problem in assigning specific value to the LEAPS project in these various ancillary markets is that the project can not perform these various functions at the same time—if the project is using its reservoir storage to integrate wind generation into the system, it cannot at the same time use its storage to maximize the capacity it supplies. So, absent a executed power purchase contract that details the proposed project operation, we've used an approach that assumes the storage from the project can be used weekly to displace gas-fired generation.

COVER SHEET

FEDERAL ENERGY REGULATORY COMMISSION

FINAL ENVIRONMENTAL IMPACT STATEMENT
FOR HYDROPOWER LICENSE
Lake Elsinore Advanced Pumped Storage Project
Docket No. P-11858-002

Section 5
Staff's Conclusions
Pages 5-1 through 5-42
FEIS

5.0 STAFF CONCLUSIONS[78]

When the Commission considers license proposals, besides looking at power and other developmental purposes—irrigation, flood control, water supply—it must also give equal consideration to the purposes of energy conservation, the protection, mitigation of damage to, and enhancement of fish and wildlife, the protection of recreational opportunities, and the preservation of other aspects of environmental quality. So far in this final EIS, we have described both the environmental effects and our estimated cost of building the proposed project and the staff alternative. Based on this analysis, we select the staff alternative as our preferred alternative. In this section, we examine the environmental effects and project costs of the alternatives and explain how we decided on the environmental measures we include in our preferred alternative.

During scoping and in comments on the draft EIS, many people commented about the potential effects of the co-applicants' proposed Morrell Canyon upper reservoir on Lion Spring, oak woodlands, and the use of existing trails and about the potential effects of the proposed transmission alignment on fire suppression activities, the use of existing hang gliding launch and landing sites, and adjacent residential communities. The staff alternative includes an alternative facility location for the upper reservoir as well as a revised transmission alignment developed by the USFS and Commission staff.

These alternative facility locations address many of the key issues raised during scoping and in comments on the draft EIS. Though the staff alternative transmission alignment may affect nearby residential communities to a greater extent than the proposed project, we prefer the revised staff alignment because the transmission alignment avoids as many private in-holdings within the Cleveland National Forest as possible while continuing to avoid the San Mateo Wilderness Area and to minimize encroachment on lands designated as back-country non-motorized and back-country motorized-use restricted in the Land Management Plan. For these reasons, we prefer the staff alternative to the co-applicant's proposed project.

Comparing the staff alternative to no-action, we find that we also prefer the staff alternative. The staff alternative would allow the co-applicants to construct and operate the project as a peak energy resource and as part of a long-term solution to southern California's transmission congestion bottlenecks. The Talega-Escondido/Valley-Serrano transmission line could provide up to 1,000 MW of import capability into the San Diego area with up to 500 MW of this imported power being supplied by the LEAPS Project during high-demand periods.

Although neither of the co-applicants currently has contracts with end use customers, licensing the LEAPS Project would allow the co-applicants the opportunity to compete in the power market for sale of the project's power and other ancillary benefits. Pumped storage projects store power during off-peak periods that can be provided rapidly during on-peak periods and may provide a valuable addition to the regional system. Besides the potential power and transmission benefits, the LEAPS Project, through the proposed lake management fee, would provide reliable funding for water to maintain the lake level targets specified in the Lake Elsinore Stabilization and Enhancement Project, which is necessary both to improve water quality in Lake Elsinore and to allow the pumped storage project to operate. The LEAPS Project also would fund annual stocking of sport fish in Lake Elsinore. The project-funded park facilities would also enhance recreational opportunities in the area.

As we've said, the staff alternative that we describe in this final EIS greatly reduces the environmental effects of the project as originally proposed. The staff alternative would substantially reduce but not eliminate the loss of southern coast live oak as shown in table 55. The effects on hang gliding activities would be mostly eliminated through the underground placement of the transmission

[78] In this section, "we" means the Commission staff.

lines in the vicinity of the USFS permitted launch sites and along the connection to the Santa Rosa powerhouse.

Construction and operation of the LEAPS Project as defined in the staff alternative would result in several unavoidable adverse impacts. Construction of the upper reservoir and powerhouse would cause the short-term disruption of traffic along Grand Avenue, Ortega Highway, and South Main Divide Road. Construction of the powerhouse would displace several residents and businesses located in buildings in close proximity to the construction site. The co-applicants propose to acquire these buildings and use them for construction offices. After construction, the co-applicants propose to return these buildings to the local building inventory. The construction of the transmission line would permanently displace a few residents whose property would need to be acquired for the right-of-way. Although the effects on aesthetics would be reduced by placing segments of the transmission line underground, construction of the transmission lines would introduce a permanent linear facility that would affect the aesthetics of the project area. The presence of the transmission line also could affect property values in the vicinity of the project facilities including about 450 parcels within 0.25 miles of the transmission alignment. The exact number of parcels requiring the acquisition of easements would depend upon the final placement of the line within the 500-foot-wide alignment considered in the EIS. The southern segment of the staff alternative transmission alignment is also within 3,000 feet of a private airstrip, which could render the airstrip unusable. Although the owner of the property would have to be compensated for loss of the property's use, people who currently use the strip for pleasure flying or commuting would lose that resource.

5.1 COMPARISON OF PROPOSED ACTION AND ALTERNATIVES

We summarize the key differences of the potential effects of the co-applicants' proposal and the staff alternative in table 55.

Table 55. Summary of key differences in the potential effects of the co-applicants' proposal and the staff alternative (Source: Staff)

	Upper Reservoir Comparison	
Resource/Issue	**Morrell Canyon (Co-applicants)**	**Decker Canyon (Staff)**
Area of effect	130-acre footprint; daily fluctuations of 40 feet and weekly fluctuations of 75 feet	120-acre footprint; daily and weekly fluctuations would be on the same order of magnitude as the upper reservoir at Morrell Canyon
	2.6 million cubic yards of fill needed for dam	3.0 million cubic yards of fill needed for dam
Fill materials		Less overburden at Decker Canyon would allow easier procurement of solid rock material for fill for dam and dike construction
Groundwater	Construction of tunnels for high pressure conduits could affect groundwater; design review of collection system for Lion Spring and effects on groundwater	Construction of tunnels for high pressure conduits could affect groundwater; no collection system would be required
Seismic hazards	Faults may control surface flows at the Morrell Canyon site	No faults have been identified at the Decker Canyon site and subsurface flow does not appear to be controlled by the presence of faults

	Upper Reservoir Comparison	
Resource/Issue	**Morrell Canyon (Co-applicants)**	**Decker Canyon (Staff)**
Surface water	Upper reservoir would interrupt stream flow	Same
Wetland and riparian habitat	Would affect 1.7 acres of waters of the U.S. and 4.8 acres of waters of the state, including Lion Spring; loss of these waters and associated riparian habitat would affect plant diversity and wildlife species; effects on downstream areas would be minimized by the water conveyance system under the reservoir	Would affect 0.3 acre of waters of the U.S. and 0.9 acres of waters of the state; no effects on springs or seeps; smaller effects on downstream areas because drainage area is smaller
Oak woodland communities	Would convert about 20 acres of southern coast live oak forest (500 to 600 individual trees over 8 dbh) to project use; would need to plant 20 acres to mitigate	Would convert about 5 acres of southern coast live oak forest to project use so effects would be similar to Morrell Canyon but on a smaller scale; would only need 5 acres to mitigate
Special status wildlife	Would convert 80 acres of chamise chaparral and 20 acres of southern coastal live oak to project facilities.	Would convert 95 acres of chamise chaparral and 5 acres of southern coastal live oak to project facilities.
Mountain lion	Would remove 100 acres of suitable mountain lion habitat from Core B; project operation and maintenance would not likely increase disturbance or risk of interaction over levels that currently result from traffic on South Main Divide Road and use of Morgan Trail	Would remove 100 acres of suitable mountain lion habitat from Core B; project operation and maintenance would represent a very small increase in disturbance, because no trails currently provide for recreation at Decker Canyon site
Munz's onion	No suitable habitat at reservoir site; however, South Main Divide Road in vicinity passes through a soil type that is known to support occurrences of this species	Same
Developed recreation facilities	Footprint would not include Morgan Trail trailhead with minimal effect on users of the trailhead during construction but trail would need to be re-routed either temporarily or permanently depending on final design	Morgan Trail would not have to be rerouted and because visitation is low, increased traffic on South Main Divide Road would have minimal effect on Morgan trailhead users
Dispersed recreation	Would affect hang gliders using the 2 most suitable of the 9 launch sites and waterside setting offered at Lion Spring	Would avoid effects on two most popular hang glider launch sites
	Would eliminate a natural looking canyon with oak woodland vegetation and replace it with a reservoir surrounded by a chain link fence; inconsistent with Retention VQO	The existing aesthetic resources within Decker Canyon are subordinate to Morrell Canyon and construction effects associated with building a reservoir in this location would be less than those at the Morrell site; development of the alternative site would not build over a mature oak-woodland riparian area (Lion Spring)
Traffic	Would achieve a balance of excavation to fill within the entire project site	Same

Resource/Issue	Upper Reservoir Comparison	
	Morrell Canyon (Co-applicants)	Decker Canyon (Staff)
Cultural resources	Would destroy or damage four prehistoric archaeological sites	No known sites at Decker Canyon location

Resource/Issue	Powerhouse Site Comparison		
	Santa Rosa (co-applicants and staff)	Ortega Oaks	Evergreen
Area of effect	30-acre site, 20-acre laydown, 340 depth of excavation	58 acres, inclusive of laydown; 320 depth of excavation; groundwater 30 to 70 feet	75 acres, 30-acre laydown, 290 depth of excavation
	327,500 cubic yards (includes 207,000 from the powerhouse cavern; 35,000 from the transformer gallery; 32,000 from the surge shaft; 500 from the vent shaft; and 53,000 from the powerhouse access shaft)	There will be similar values to Santa Rosa but about 33 percent more excavation for the tailrace tunnel, which would be about 86,450 cubic yards since the Santa Rosa tailrace tunnel is 65,000 cubic yards; also, the depth of excavation is slightly less than that of Santa Rosa	There will be similar values to Santa Rosa but about 10 percent less excavation for the tailrace tunnel, which would be about 58,500 cubic yards since the Santa Rosa tailrace tunnel is 65,000 cubic yards; also the depth of excavation is less than that of Santa Rosa
Special status plants	Construction of the powerhouse could affect Coulter's matilija poppy	Construction of tunnel between upper reservoir and powerhouse could affect Coulter's matilija poppy	No rare plants identified in vicinity of Evergreen powerhouse location
Wetland and riparian habitat	Would affect about 0.4 acre of waters of the U.S. and state	Same as Santa Rosa.	Would affect less than one-tenth of an acre of waters of the U.S. and state
Special status wildlife	Would affect 30 acres of coastal sage scrub and 20 acres of non-native grassland	Would affect 53 acres of non-native grassland and 5 acres of coastal sage scrub	Would affect 55 acres of non-native grasslands and 20 acres of coastal sage scrub
Future recreation use	Location of substation and above ground transmission lines from this location would affect hang gliding activities	Would affect use of hang gliding landing site during construction; would provide formal hang gliding landing site following construction	Would displace informal disperse recreational use at site

Resource/Issue	Powerhouse Site Comparison: Santa Rosa (co-applicants and staff)	Ortega Oaks	Evergreen
Land Use and Property values	Would permanently change use to utility and recreation use and preclude residential use specified in General Plan; would purchase, modify, and reuse adjacent private property (Santa Rosa Mountain Villa apartments) and buffer would reduce effect on property values	No effect on adjacent residential property values at Ortega Oaks	Either raze or use current Lakeland Childcare Center at the Lakeland Village Plaza for construction office resulting in displacement of child-related businesses and purchase/raze one single family home
Aesthetics	The powerhouse would be underground but the substation would be visible from surrounding residential and commercial properties	The powerhouse would be underground but the substation would be visible from the heavily used Ortega Highway	Same as Santa Rosa.
Aesthetics	All construction activities within this area would conflict with the Partial Retention VQO designated by the USFS; these effects would be short term and last for the duration of the construction	Construction activity at Ortega Oaks site would be visible from the Ortega Highway and a small portion of Grand Avenue in Lakeland Village; two prominent viewpoints to commuters in the area	Similar effects on the aesthetic resources as described above with respect to the proposed Santa Rosa site
Cultural Resources	Would affect two historic sites and one prehistoric archaeological site; could affect two historic buildings (vibration)	Would directly affect one prehistoric site	No known sites at Evergreen location

Resource/Issue	Transmission Alignment Comparison: Co-applicants’ Proposed Alignment	Staff Alternative Alignment
Area of effect	34.1 miles in length with 10.8 miles of temporary access roads and 5.2 miles of permanent access road	33.7 miles in length with 9.3 miles of temporary access roads and 4.1 miles of permanent access road
Fire suppression activities	Could interfere with USFS fire suppression activities	Would avoid interference with USFS fire suppression activities

Resource/Issue	Transmission Alignment Comparison Co-applicants' Proposed Alignment	Staff Alternative Alignment
Special status plants	Could affect Humboldt lily (Subarea 3); passes through potential habitat for Hammitt's clay-cress (Subarea 5). Pre-construction surveys could be conducted to prevent adverse effects during construction, but temporary access roads and permanent maintenance roads would substantially increase the risk of disturbance and habitat damage during project operation, if public access is not controlled	Could affect Humboldt lily (Subarea 3); avoids potential habitat for Hammitt's clay-cress (Subarea 5). Pre-construction surveys could be conducted to prevent adverse effects during construction, but temporary access roads and permanent maintenance roads would substantially increase the risk of disturbance and habitat damage during project operation, if public access is not controlled
Wetland and riparian habitat	Substation could affect about 1.1 acres of waters of the U.S. and state; effects from transmission towers would be minor as towers would be placed to avoid wetland and riparian habitat, but locations of access roads are unknown	Same
Special status wildlife	Substations would affect 35 acres and transmission line towers would affect 30 acres of potential habitat for special status species. About 10.3 miles of temporary access roads would affect an estimated 15.7 acres, plus indirect effects of construction (edge effects) and potential for disturbance (e.g., poaching, harassment) and habitat damage during operation, if public access is not controlled. Permanent maintenance road would affect 5.2 miles (9.5 acres)	Substations would affect 35 acres and transmission line towers would affect 30 acres of potential habitat for special status species. About 9.3 miles of temporary access roads would affect an estimated 13.5 acres, plus indirect effects of construction (edge effects) and potential for disturbance (e.g., poaching, harassment) and habitat damage during operation, if public access is not controlled. Permanent maintenance road would affect 4.1 miles (7.5 acres)
Mountain lion	Would remove about 21.25 acres of suitable mountain lion habitat from Core B for about 85 towers; although mountain lions may use roads for travel, construction of 5.2 miles of permanent and 10.8 miles of temporary access roads would substantially increase the risk of disturbance (e.g., poaching, harassment) and habitat damage during project operation, if public access is not controlled. Would cross proposed linkage 1 at Temescal Wash, but tower placement should not interrupt travel corridor	Same, except construction of 4 miles of permanent roads and 9.3 miles of temporary access roads would increase the risk of disturbance
Bird/T-lines	Northern portion (Temescal Wash/Lee Lake) of line presents a high risk to waterfowl; central portion siting either underground or behind ridgeline would minimize risk to raptors; southern portion poses moderate risk of collision where it would cross major drainages	Same

Resource/Issue	Transmission Alignment Comparison	
	Co-applicants' Proposed Alignment	**Staff Alternative Alignment**
Munz's onion	Would affect about 3.25 acres of potential habitat along the northern portion of the transmission line, about 23.2 acres at underground segment, and 35 acres at the northern substation. Pre-construction surveys could be conducted to prevent adverse effects during construction, but temporary access roads and permanent maintenance roads would substantially increase the risk of disturbance and habitat damage during project operation, if public access is not controlled	Same, except would affect about 15.1 acres at underground segment
Slender-horned spine flower, San Diego ambrosia, California Orcutt grass, San Jacinto Valley crownscale	Occurrences at Temescal Wash at Indian Creek and Alberhill (Subarea 1); vernal pool habitat may exist along southern segment of alignment (Subarea 8). Tower construction could affect about 3.25 acres of potential habitat. Pre-construction surveys could be conducted to prevent adverse effects during construction, but temporary access roads would substantially increase the risk of disturbance and habitat damage during project operation, if public access is not controlled	Same
Thread-leaved brodiaea	Occurrences in the vicinity of Tenaja Creek (Subarea 7). Tower construction could affect about 0.25 acre of potential habitat. Pre-construction surveys could be conducted to prevent adverse effects during construction, but temporary access roads would substantially increase the risk of disturbance and habitat damage during project operation, if public access is not controlled	Same.
Quino checkerspot butterfly	Substation and tower construction would affect 36.75 acres within designated critical habitat and about 0.75 acre of potential habitat; temporary access roads would substantially increase the risk of disturbance and habitat damage during project operation, if public access is not controlled	Same

Resource/Issue	Transmission Alignment Comparison: Co-applicants’ Proposed Alignment	Transmission Alignment Comparison: Staff Alternative Alignment
Arroyo toad and California red-legged frog	Construction of towers at Temescal Wash (north) and Los Alamos Canyon and Tenaja Creek (south) could adversely affect about 1.25 acres of potential arroyo toad habitat; but could avoid California red-legged frog habitat through siting. No effects on critical habitat for either species, but temporary access roads would substantially increase the risk of disturbance and habitat damage during project operation, if public access is not controlled	Same
Southwestern willow flycatcher and least Bell’s vireo	Occurrences at Temescal Wash and Tenaja Creek; construction of towers could affect about 1 acre of potential habitat. Access roads could also adversely affect habitat; temporary access roads would increase risk of disturbance and habitat damage during project operation, if public access is not controlled	Same
Coastal California gnatcatcher	Construction of northern substation and towers could affect 38.5 acres of habitat within proposed critical habitat; access roads could also adversely affect habitat; temporary access roads would increase risk of disturbance and habitat damage during project operation, if public access is not controlled.	Same
Stephens’ kangaroo rat	Construction of northern substation and towers could affect over 38.5 acres of habitat within the Stephens’ Kangaroo Rat Fee Assessment Area and Lake Mathews-Estelle Mountain Core Reserve; temporary access roads could also affect habitat and would increase the risk of disturbance and habitat damage during project operation, if public access is not controlled	Same except includes access roads with northern substation and towers
Developed recreation facilities	Would affect Wildomar OHV area and campground and these facilities would likely need to be closed during the first two years of construction (would be covered in the detailed site plan for construction)	Would avoid Wildomar OHV and campground locations; increased traffic due to construction would have minimal effects on users at these facilities
Dispersed recreation	Major effect on dispersed recreation would be in the vicinity of flight paths used by hang gliders; would present safety hazards; would result in considerable loss of hang gliding opportunities	Avoids some conflicts with hang gliding and FS land classifications where transmission line construction would be inconsistent with FS land management directives

Resource/Issue	Transmission Alignment Comparison	
	Co-applicants' Proposed Alignment	Staff Alternative Alignment
Aesthetics	Towers and corridors would be visible in the foreground, middleground and background; construction activities within the Cleveland National Forest would result in features which conflict with the Retention and Partial Retention VQO standards	Would introduce line, colors, and textures into the landscape that do not currently exist and this would not be consistent with Retention VQO and would be slightly more visible from key viewpoints than the co-applicants' proposed alignment
	The linear features of the lines would contrast with the mountain and within the Cleveland National Forest be in conflict with the VQOs; the towers, conductors and resulting footprint of the corridor would be visible from highly traveled roadways	Same. Also because the lines would be lower down on the mountain they would be closer to Lakeland Village and more visible from the community of Lake Elsinore
Future recreation use	Transmission alignment would affect use by hang gliders of both launch and landing areas but avoids residential areas	Would reduce conflicts with hang gliding uses
Roads	About 15.7 acres of temporary access roads could be revegetated; it is estimated that about 10.8 miles of road would be needed to service 32.1 miles of transmission line. About 5.2 miles (9.5 acres) would be needed for a permanent maintenance road along the underground segment	About 13.5 acres of roads could be revegetated; public use could adversely affect habitat along 9.3 miles of road. About 4.1 miles (7.5 acres) would be needed for a permanent maintenance road along the underground segment
Property values	Would adversely affect private property values up to 3 miles and 5 miles from where transmission alignment would cross or parallel private properties along northern portion and southern portion, respectively and would cross or be parallel within 0.25 mile about 8.6 miles of lands designated for residential development and may make these lands less desirable for development	Would adversely affect private property values up to 4 miles and 9 miles from where transmission alignment would cross or parallels private properties along northern portion and southern portion, respectively and would cross or be parallel within 0.25 acre of about 15.9 miles of land designated for residential development under the General Plan and may make these location less desirable for development
Land Use	Would be within 0.25 mile of 406 privately owned parcels and would cross or be adjacent to 6.1 miles of property zoned for residential use	Would be within 0.25 miles of 452 privately owned parcels and would cross or be adjacent to 13.4 miles of property zoned for residential use
Cultural resources	Northern segment could affect one prehistoric and two historic period archaeological sites; southern portion would not effect any known sites, but southern substation would affect one prehistoric site and sites in unsurveyed areas	Alignment has not been surveyed; could affect as yet unknown prehistoric sites

5.1.1 Co-applicants' Proposed Action

Project Facilities

- Construct an upper reservoir at Morrell Canyon based on the conceptual designs for alternate A.3.
- Construct a powerhouse at the Santa Rosa site based on the conceptual designs for the water conduit alternative H.3.
- Install a 500-kV line along the proposed transmission alignment.

Geology and Soils

- Retain a board of three or more qualified independent engineering consultants experienced in critical disciplines, such as geotechnical, mechanical, and civil engineering, to review the design specifications and construction of the project for safety and adequacy.
- Conduct additional geotechnical studies.
- Develop an erosion control plan prior to construction.
- Implement erosion control measures during construction.
- Develop and implement a plan for the design and construction of a system that would automatically detect conduit or penstock failure and, in the event of such a failure, immediately shut off flow in the conduit or penstock at the headworks.
- Develop and implement plans for clearing the upper reservoir area and re-vegetating disturbed areas with native plant species beneficial to wildlife prior to the start of any land-disturbing or land-clearing activities at the project.

Water Resources

- Develop and implement a upper reservoir and water conduit monitoring program to assess the effects of the upper reservoir liner and seepage collection systems, shafts, and tunnel on groundwater levels and water quality, including the installation of perimeter wells designed to establish groundwater levels and water quality prior to construction and to detect changes in groundwater levels and water quality after construction.
- Develop and implement a plan for installing drainage and flood control measures and any water detention structures to control storm run-off over the term of any license issued for the project.
- Pay an annual lake management fee to Elsinore Valley MWD to maintain Lake Elsinore at the minimum target elevation of 1,240 feet msl consistent with the goals of the Lake Elsinore Stabilization and Enhancement Project.[79]
- Develop and implement a dam safety monitoring program.[80]

[79] The co-applicants estimate this fee at $1.8 million per year and indicate that it is subject to further negotiations with the Elsinore Valley MWD.

- Prepare a hazardous substances spill prevention and control plan.
- Develop and implement a plan to monitor DO and temperature downstream of the tailrace in Lake Elsinore and in Temescal Wash during construction and operation.

Aquatic Resources

- During construction drawdown, remove or reduce the existing fish population via netting or rotenone poisoning.
- Retain a qualified biologist or natural resource specialist to serve as an environmental construction monitor to ensure that incidental construction effects on biological resources are avoided or limited to the maximum feasible extent.
- Establish appropriate setbacks from streams, avoid sediment discharge, and implement BMPs identified by the USFS to avoid any effects on the existing steelhead recovery efforts in the San Mateo Watershed as part of the erosion control plan.
- Design and install physical barrier screens consistent with NMFS criteria in areas of underwater intakes to prevent impingement and entrainment.
- Establish limits of flow velocity rates of underwater intakes of less than 1.5 feet per second reduce impingement and entrainment of fish.
- Conduct monitoring for 1 year to determine the extent of fish entrainment and mortality at the Lake Elsinore intake/outlet structures, and implement and test behavioral avoidance devices if entrainment is significant.

Terrestrial Resources

- Employ a qualified biologist and/or natural resource specialist to monitor construction activities and help prevent adverse effects on sensitive species or habitats.
- Conduct wetlands delineations and prepare habitat mitigation and management plans in consultation with the Corps, CDFG, and the USFS.
- Develop and implement a plan to prevent and control noxious weeds and exotic plants of concern in project-affected areas.
- Design and construct the transmission line to the standards outlined in 1996 by APLIC.
- Consult with the USFS and Interior to identify appropriate parcels for mitigation of habitat losses including 2:1 replacement ratio for about of 20 acres of oak woodlands and 1:1 replacement of 31 acres of coastal sage scrub.
- Provide compensation of $500 per acre for project effects within Stephens’ Kangaroo Rat Fee Assessment Area.

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[80] This co-applicant-proposed measure is more of an administrative measure and would be coordinated with the Commission’s Division of Dam Safety and Inspection and the California Department of Water Resources.

Recreational Resources

- Develop and implement a detailed site plan of construction sites and laydown areas relative to existing recreational facilities and specify contingencies for restricting public access to these areas and providing alternative facilities.
- Install fencing around the upper reservoir.
- Provide interpretive signage at the upper reservoir.
- Provide USFS with an ancillary structure that would complement the USFS firefighter's memorial along Ortega Highway.
- Grade, contour, and revegetate using native plants to return the site to pre-construction conditions or prepare the upper reservoir construction laydown area or another location for future development by the USFS or other entity as determined by the USFS.
- Relocate portions of the Morgan Trail (Forest Route 7-s-12) if the upper reservoir is located in Morrell Canyon.
- Develop and implement a recreation plan, including the construction of a botanical garden, and provision of powerhouse tours and other amenities at the Santa Rosa or Evergreen powerhouse location.
- Develop a hang glider landing site, provide for a community park, and public tours of the powerhouse if the powerhouse is located at the Ortega Oaks site and the proposed northern transmission alignment is used.
- Develop an annual fish stocking program for Lake Elsinore in consultation with FWS, CDFG, and the Joint Watershed Authority.

Land Use and Aesthetic Resources

- Acquire and modify the multi-family residences nearest the proposed powerhouse site (the Santa Rosa Villas in the case of the Santa Rosa powerhouse site and a single family home and Lakeland Village Plaza in the case of the optional Evergreen powerhouse site), provide relocation assistance, use properties for construction purposes or retain in vacant condition, and return to the regional housing inventory upon completion of construction to address potential adverse effects on residents during construction.
- Acquire fee simple or leasehold interests in lands needed for project purposes by voluntary sale or conveyance to the extent possible.
- Prepare a plan to avoid or minimize disturbances to the quality of the existing visual resource of the project area.
- Consult with the Riverside County Flood Control District and formulate and implement plans to avoid adversely affecting existing drainage facilities and to control any project-related drainage.
- Achieve a balance of excavation and fill materials at the project site by using excavated materials from the intake, powerhouse, penstock, tunnel, and upper reservoir excavations in the construction of upper reservoir dam and embankments.
- Participate in the installation of traffic signal at the Grand/Ortega intersection.

- If the Ortega Oaks power house location is selected, dedicate and improve any additional right-of-way along Ortega Highway that would be required to accommodate existing or anticipated future traffic volumes.
- Develop and implement traffic management and control plans to address construction traffic and access to and from active construction sites.
- Install temporary roads on National Forest System lands only with USFS approval and according to USFS policies and remove, recontour, and revegetate roads following construction, except where the USFS authorizes continued use of the roads for transmission line maintenance.
- Conduct all construction activities in accordance with the noise element of the County of Riverside Comprehensive General Plan, city of Elsinore construction noise standards and any applicable codes or standards.

Cultural Resources

- Consult with the SHPO or USFS at least 180 days prior to commencement of any land-clearing or land-disturbing activities within the project boundaries, other than those specifically authorized in the license, including recreational development at the project.[81]
- If previously unidentified archaeological or historic properties are discovered during the course of constructing or developing the project works or other facilities at the project, stop all land-clearing and land-disturbing activities in the vicinity of such properties and consult with the SHPO.[82]
- Implement measures proposed in the draft HPMP developed in consultation with the SHPO and USFS and filed with Commission, including provisions for the following: (1) completing pre-construction archaeological surveys in the APE; (2) determining the need for intensive surveys; (3) monitoring historic properties during construction; (4) appointing a tribal liaison; (5) studying the potential effects of ground acceleration on historic buildings; (6) developing a program to monitor archaeological sites for 5 years; and (7) developing a public interpretative program.
- Conduct paleontological monitoring of earth-moving activities on a part-time basis in locations that are sensitive for paleontological resources.
- Prepare any recovered fossil remains to the point of identification and prepare them for curation by the Los Angeles County Museum or San Bernardino County Museum.

5.1.2 Staff Alternative (Preferred Alternative)

The staff alternative consists of an upper reservoir at the Decker Canyon site a powerhouse at the Santa Rosa site, and a transmission alignment. The staff alternative includes most of the co-applicants' environmental measures, except for their proposed recreational measures associated with the Morrell Canyon upper reservoir site, the measure to remove or reduce the existing fish population via netting or rotenone poisoning during construction, and the installation of fish screens. We have expanded the scope,

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[81] If activity is on USFS lands, also consult with the USFS at least 180 days prior to commencement of any land-clearing or land-disturbing activities within the project boundaries, other than those specifically authorized in the license, including recreational development at the project.

[82] Also consult with the USFS, if archaeological site or historic property is identified on USFS lands.

added consultation requirements or otherwise modified the co-applicants proposed measures for erosion control, water quality monitoring for the conveyance system, entrainment monitoring, habitat mitigation ratios, noxious weed control, avian protection guidelines, and construction monitoring in aquatic and terrestrial environments. The staff alternative would include the following modified and additional environmental measures.

Project Facilities

- Construct an upper reservoir at Decker Canyon based on the conceptual designs for alternative B.2.
- Install a 500-kV transmission line along the staff alternative transmission alignment.

Geology and Soils

- Include specific provisions in the proposed erosion control plan that apply erosion control measures and BMPs to all construction locations including the upper reservoir, drainage and flood control locations, penstock tunnels, powerhouse, tailrace, inlet/outlet structure, transmission lines, and all associated construction laydown areas and temporary on-site borrow areas and for all subsequent ground disturbing activities over the term of the license.

Water Resources

- Develop and implement a revised lake operating plan for Lake Elsinore, addressing increased minimum lake levels, flood control implications, and water supply issues.
- Develop and implement a surface water resources management plan to control and monitor project-related effects on water resources that support riparian vegetation on National Forest System lands.
- Include specific remediation measures in the proposed upper reservoir and water conduit monitoring program to allow immediate action to be taken should water and non-native aquatic species be released from the upper reservoir into the San Juan Creek drainage.
- Include specific provisions in the proposed upper reservoir and water conduit monitoring program to explore the groundwater and characterize the aquifer, to consult on groundwater inflow criteria, and to monitor groundwater levels during construction and operation of the water conduits including the tunnels and penstocks that convey water between the upper reservoir and the powerhouse for 10 years or longer if necessary, specifying remedial actions if monitoring reveals changes in groundwater levels or seepage into the tunnels.

Aquatic Resources

- Develop and implement a detailed plan specifying the activities, locations, methods, and schedules that the qualified environmental construction monitor would use to monitor construction activities in aquatic environments.
- Conduct entrainment monitoring for 1 year and once every 5 years over the term of any license issued to the project to determine the extent of fish entrainment and mortality at the Lake Elsinore intake/outlet structures and provide the monitoring results to CDFG, FWS, the State Water Board and the Joint Watershed Authority, and, based on the results of entrainment monitoring, develop and implement a plan to mitigate for entrainment losses through measures, such as enhancing nearshore fish habitat or stocking fish, that would aid in establishment of naturally sustaining population of desirable sport fish.

Terrestrial Resources

- Develop and implement a detailed plan specifying activities, locations, methods and schedules the qualified environmental construction monitor would use to monitor construction in terrestrial environments.
- Develop and implement a vegetation and invasive weed management plan to prevent and control noxious weeds and exotic plants of concern in project-affected areas during construction and over the term of any license issued for the project.
- Develop and implement a Lake Elsinore monitoring and remediation plan to eliminate or reduce project-related effects, if any are identified, on nesting shorebirds, waterfowl, and other birds.
- Implement the proposed avian protection plan consistent with April 2005 avian protection plan guidelines and over the term of any license issued for the project.
- Conduct additional pre-construction special status plant surveys at transmission line tower sites and along transmission alignment access roads, consistent with the Multi-Species HCP.
- Prepare a habitat mitigation plan in consultation with the USFS, Interior, CDFG, and Riverside County to identify appropriate mitigation of habitat losses including a 1:1 replacement ratio for about 5 acres of oak woodlands, about 32 acres of coastal sage scrub, and about 216 acres of chaparral and grasslands.
- Consult with the USFS annually to review the list of special status species and survey new areas as needed.
- Develop and implement an annual employee awareness training program regarding special status plants and animals.
- Consult with the FWS during the process of developing final design drawings on measures to protect fish and wildlife resources.

Recreational Resources

- Develop and implement a safety during construction plan identifying potential hazard areas near public roads, trails, and recreation areas and facilities, and measures necessary to protect public safety and conduct daily inspections on National Forest System lands for fire plan compliance, public safety, and environmental protection.
- In consultation with the USFS, develop and implement a plan for a recreational facility at the construction laydown area used during construction of the upper reservoir on National Forest System lands or for an alternative use and/or location.
- Develop and implement a recreation plan that provides for transfer of cleared land to a local entity and development of recreation facilities at the powerhouse location and O&M funding sufficient to operate the facility.

Land Use and Aesthetics

- Develop and implement a plan to determine the toxicity of sediments in Lake Elsinore lakebed that would be disturbed by construction of the intake/outlet structure and to provide for appropriate handling and disposal if toxins are identified in the lakebed sediment prior to the commencement of the construction of the intake/outlet structure in Lake Elsinore.

- Achieve a balance of excavation and fill materials at the Decker Canyon reservoir site through additional excavation and dispose of all excavated materials from all other project facilities off site.
- Include in the proposed road and traffic management plan applicable on National Forest System lands, provisions addressing road construction, realignment, maintenance, use, and closure and identifying the co-applicants' responsibility for road maintenance and repair costs.
- Include in the proposed road and traffic management plan applicable on non-National Forest System lands, provisions addressing road construction, realignment, maintenance, use, and closure, as well as land management policies and practices associated with project-related roads during both construction and operations.
- Prepare and implement a scenery conservation plan to achieve the greatest consistency possible with the High Scenic Integrity Objectives of the Cleveland National Forest Land Management Plan.
- Develop and implement a transmission tower placement plan.

Cultural Resources

- Revise the draft HPMP in consultation with the SHPO, Tribes, BIA, the Lake Elsinore Historical Society, and the USFS and file a final HPMP for Commission approval within 1 year of license issuance.

Finally, Commission staff notes that the staff alternative includes all of the revised preliminary 4(e) conditions specified by the USFS and described in section 2.6.2, *USFS Section 4(e) Conditions*. Commission staff would supplement the following measure:

- Ensure all transmission facilities conform to APLIC et al. (1996) guidelines, including power lines to reduce risks of bird strikes. The co-applicants should conform to the April 2005 avian protection plan guidelines.

5.2 DISCUSSION OF KEY ISSUES

5.2.1 Project Facilities

Upper Reservoir

The co-applicants propose to locate the upper reservoir in Morrell Canyon. Our analysis shows that construction of an upper reservoir at the Morrell Canyon site would disrupt flows in the San Juan Creek drainage, displace Lion Spring, and remove more than 20 acres of southern coast live oak riparian forest. Oak woodlands are considered to support higher levels of biodiversity than any other terrestrial ecosystem in California and would be difficult to replace at the project site. Construction at this location would also remove 80 acres of chamise chaparral. Although abundant in the vicinity, conversion of chaparral to project use would reduce habitat available for the Santa Ana mountain lion population, which is at risk of extirpation because of rapid urban development. Recreational use at this location would be adversely affected because Morgan Trail, which accesses the San Mateo Wilderness Area, would need to be relocated either temporarily or permanently depending on the final design of this facility and because two of the most-used hang gliding launch sites (E and Edwards) would be closed or subjected to use restrictions during construction.

To avoid these potential adverse effects, the staff alternative would locate the upper reservoir in Decker Canyon. There would be no need to install a stream bypass conveyance system at this location because the footprint of the reservoir is situated at the very top of the watershed, with no established stream network entering the site. Only 5 acres of southern coastal live oak would be affected and less off-site mitigation for habitat loss would be required, and no rare plant species would be affected. Locating the upper reservoir at the Decker Canyon location would avoid construction effects on the use of the E and Edwards hang gliding launch sites.

Table 55 compares the potential effects at the proposed Morrell Canyon and Decker Canyon locations. We estimate that the overall energy facility and transmission line, including an upper reservoir at Decker Canyon, would have a cost of construction (which includes development costs but excludes the license and environmental measures) of about $1,326,722,000, about $43,550,700 more than our estimate for the cost associated with such a facility at the proposed Morrell Canyon location. Additionally, we estimate that significant water control costs at Morrell Canyon given its upstream drainage, upstream and groundwater collection systems, and potentially higher liner costs could add more than $18,000,000 to the cost, decreasing the cost advantage of the co-applicants' proposed alternative to about $20,500,000. Because these estimates are based on preliminary designs and cost estimates and additional geotechnical investigations may identify other issues, we consider the cost of construction at either site to be within a comparable range.

Powerhouse

In the draft EIS, we included an underground powerhouse at the Ortega Oaks site and a mid-slope transmission alignment in a staff alternative to the co-applicants' proposal. The Ortega Oaks site combined with routing the transmission lines along a mid-slope alignment and west of the USFS-permitted launching sites lessened the potential effects on hang gliding opportunities and provided an opportunity to provide a formal landing area. In comments on the draft EIS, the co-applicants and others point out that Riverside County approved a subdivision of 100-single family residential lots at Ortega Oaks in April 2004, including the 58-acre site proposed by the co-applicants for the powerhouse and substation. The co-applicants also filed a report on the comparative geological and geotechnical conditions at the three powerhouse sites (Genterra, 2006). This report concludes that the Ortega Oaks site offers the least desirable subsurface conditions of the three sites. Hang gliding advocates commented that the proposed 5-acre formal landing area at Ortega Oaks would be inadequate and would still present hazards associated with an aboveground substation and the above ground distribution lines.

Our intent on including the Ortega Oaks powerhouse site in the draft EIS staff alternative was to avoid displacing residents and disrupting or eliminating hang gliding opportunities. We concluded that the geological and geotechnical challenges at any of three sites could be addressed in the final designs. However, given the proximity to the existing residential community adjacent to the site, the approved subdivision of lands that comprise the site, and the fact it would not eliminate hazards to hang gliders, we have revised the staff alternative to include a powerhouse at the Santa Rosa location. Locating the powerhouse at the Santa Rosa site combined with burying the transmission line connection to the powerhouse (see discussion under Transmission Alignment) would avoid conflicts with existing and planned high-density residential communities. This alternative also would provide a clear path for hang gliding from the USFS-permitted launch sites along South Main Divide Road and the existing informal landing site at Ortega Oaks and would place the above ground substation away from the existing landing site.

Construction activity at the Santa Rosa powerhouse site would affect the adjacent Butterfield school population, increase traffic on Grand Avenue, and disturb two historic archaeological sites and one prehistoric archaeological site. Vibrations could affect two historic buildings. Implementation of the co-applicants' proposed erosion control plan with our recommended measures and adherence to local noise and air quality ordinances would keep the effects of construction activity within acceptable limits for noise and dust. Implementation of the programmatic agreement and associated HPMP for cultural resources would avoid, reduce, or mitigate adverse effects to the three archaeological sites and two historic buildings. It is important to note that National Register eligibility needs to be determined for the three affected archaeological sites. The construction activity would be short term. Operation of the project with an underground powerhouse at the Santa Rosa powerhouse site would introduce a new visual element (the substation) into a predominately low-density residential area instead of adjacent to a high-density residential development at the Ortega Oaks site.

Transmission Line

In response to comments on the draft EIS, the co-applicants revised their proposed transmission alignment. In response to comments, we revised the staff alternative transmission alignment as well. Table 55 compares the effects of the co-applicants’ proposed transmission alignment and the staff alternative transmission alignment

Both the proposed and staff alternative alignments now avoid conflicts with commercial enterprises along the northern segment and include underground segments to reduce potential effects on hang gliding activities at the USFS permitted hang gliding launch sites and egress from the Rancho Capistrano community. The staff alternative transmission alignment also reduces conflicts with the Cleveland National Forest Land Management Plan and USFS fire suppression activities. The co-applicants' proposed alignment reduces conflicts with residential subdivisions along the southern segment and would generally be less visible to area residents. From the connection with the SCE line for about 4 miles to the northern border of the Cleveland National Forest, the co-applicants’ proposed transmission alignment and the staff alternative transmission alignment follow the same route (see figures F-1 through F-4 in appendix F). About 2 miles of this segment of the alignment would run north/south on or adjacent to the existing Glen Eden Sun Club and the third phase of the planned Sycamore Creek community. Here, the overhead transmission lines would introduce a new unattractive visual element to subdivisions where utility lines are buried. As discussed in section 3.3.7.2 use of tree-type poles and non-reflective coatings could lessen the affects of above ground lines on adjacent residential areas, especially where the line runs adjacent to the Sycamore Creek and Glen Eden Sun Club communities. The transmission alignment under consideration in this EIS is a 500-foot-wide corridor within which the line and towers can be placed to minimize the potential effects on the aesthetics of adjacent communities within the requirement of the National Electric Safety Code. We considered whether to bury the entire 32-mile-long line and the 2-mile connection to the powerhouse. Burying the entire line would eliminate most of the visual effects (there would still be above ground substation connections) but would be cost prohibitive at an incremental cost in excess of $350 million. However, we recognize that there may be locations in close proximity to the alignment (such as Sycamore Creek or Glen Eden Sun Club) where the acquisition of easements may displace residents and where additional underground segments may be a feasible solution.

Within the Cleveland National Forest, the co-applicants’ proposed transmission alignment would cross mostly National Forest System lands on relatively inaccessible, rugged, and steep terrain of the Elsinore Mountains and surrounding foothills for about 28 miles and would include an underground segment (about 3 miles) in the vicinity of the hang gliding launch sites and Rancho Capistrano and connecting to the powerhouse. The staff alternative transmission alignment generally follows a similar north/south through the Cleveland National Forest but runs up to a mile more easterly to avoid interference with firefighting activities, back country non-motorized areas, and wilderness areas. The staff alternative transmission alignment would include an underground segment of about 2.1 miles in the vicinity of the hang gliding launch sites. The two routes are the same along about 4 miles of the southern end of the alignment to the connection with the SDG&E line.

Hang gliding advocates raised concerns about the potential effects the proposed transmission line as discussed in the draft EIS would have on the current hang gliding opportunities in the city of Lake Elsinore and Riverside County. We concluded in section 3.3.8 of the draft EIS that the hang gliding industry may contribute about $1 million per year to the local economy. The underground segments of both the co-applicants and staff alternative transmission alignments in the vicinity of the USFS-permitted launch sites and to the Santa Rosa powerhouse site address these concerns and greatly reduce effects on hang gliding activities.

The southern segment of the staff alternative transmission alignment avoids the San Mateo Wilderness area but runs in proximity to private residential properties, including the La Cresta community. As with the northern portion of the line, the final line and tower placement would be determined by the National Electric Safety Code and could include tree-type towers and non-reflective coatings to lessen the effects on adjacent communities. Again we considered whether to bury the line along this southern segment and concluded that the reduced effects on the visual resources (see figure D-7) did not justify the incremental cost of about $170 million.

As discussed in section 3.3.7, *Land Use and Aesthetic Resources,* the USFS has recently gone through an extensive public planning process to identify and develop policy for the forest. The Cleveland National Forest Land Use Plan is the framework designed to provide for management of USFS resources and values. The plan recognizes the potential for future development within the forest, and has designated certain lands as acceptable for various land uses, and sets guidelines for allowable alterations to the landscape. The plan provides for the preservation of certain unspoiled vistas and lands. This EIS discloses the effects of the proposed project on the USFS lands and indicates where it is incompatible with the approved plan. The Cleveland National Forest Land Management Plan may need to be amended to accept the project's inconsistencies while retaining the current plan's desired conditions and outcomes.

Overall, the staff alternative transmission alignment would reduce conflicts with USFS plan and fire suppression activities, hang gliding activities, and commercial enterprises. We recognize that, the co-applicants' proposed alignment is the less visible from key viewpoints in the wilderness area, along Ortega Highway, and from Lake Elsinore, but would still interfere with USFS fire suppression activities in several areas and would cross back-country non-motorized areas of the Cleveland National Forest. The staff alternative transmission alignment that would run parallel but east of the co-applicants' proposed alignment would avoid potential conflicts with fire suppression activities, although it would be more visible than the co-applicants' proposed alignment and would cross more private properties, many of which are in-holdings within the boundaries of the Cleveland National Forest. The proposed and staff alternative transmission line alignments are about the same length (about 32 miles with a 2 mile connection to the Santa Rosa powerhouse) and would involve comparable costs with the co-applicants alignment costing slightly more due to its longer overall length (34.1 miles versus 33.7 miles) and longer buried segment (5.2 miles versus 4.1 miles).

Both the co-applicants' proposed and staff alternative transmission alignments are considered as 500-foot-wide corridors within which the placement of transmission towers can be adjusted to avoid effects on buildings, sensitive habitats, riparian areas, viewsheds, and other environmental resources. The co-applicants propose to minimize the effects of the transmission line on environmental resources by placing towers outside of sensitive areas and riparian areas. The co-applicants also indicate that they would consider the use of tree-type towers in areas that cross or are adjacent to residential areas to reduce the visual impact of the transmission lines. Given these various considerations in the placing of towers, we recommend that the co-applicants prepare a transmission tower placement plan in consultation with the city of Lake Elsinore, Riverside County, the USFS, FWS, and CDFG. We estimate that this plan would entail a one time capital cost about $100,000 or $14,100 annualized and would be warranted as a means to ensure full consideration of the concerns of property owners, fish and wildlife resource agencies, and local governmental agencies about minimizing the effects of tower placements.

5.2.2 Construction Oversight

The co-applicants would be required to submit plans and specifications and a supporting design report prior to construction. The plans and specifications would describe how the project will be constructed and the supporting design report would ensure the proposed project structures are designed in accordance with the Commission's Engineering Guidelines and sound engineering practice. All project construction would be overseen by quality control personnel, independent of the contractor, as well as engineers from the Commission's Division of Dam Safety and Inspections – San Francisco Regional Office.

The co-applicants' proposal to retain a board of three qualified independent engineering consultants experienced in critical hydropower construction disciplines would ensure that design specifications are appropriate to the site and that construction would proceed in a reasonable and safe manner under either alternative. This is particularly critical given the additional geotechnical studies proposed by the co-applicants and the need to develop final design drawings for the project features included in the staff alternative. We estimate that it would cost about $1,500,000 for the additional geotechnical and engineering design and review board services prior to and during construction of the project under either alternative, or $211,600 annually.

5.2.3 Geology and Soils

The potential for slope erosion and sediment transport into streams exists at the proposed project construction sites under both alternatives. The co-applicants' proposed erosion control plan would include measures and BMPs designed to avoid or minimize erosion at all construction locations during project construction. BMPs would include the co-applicants' proposal for appropriate setbacks from streams and avoidance of sediment discharges into streams to avoid effects on the existing steelhead recovery efforts in the San Mateo Watershed.

USFS revised preliminary 4(e) condition no. 15 specifies a plan that includes measures to control erosion, stream sedimentation, dust, and soil mass movement during construction and operation of the project. Development and implementation of an erosion control plan that applies erosion control measures and BMPs to all construction locations (including the upper reservoir, drainage and flood control locations, penstock tunnels, powerhouse, tailrace, inlet/outlet structure, transmission lines, and all associated construction laydown areas and temporary on-site borrow areas during project construction) would minimize the effects of erosion on water resources and other environmental resources in the project area.

A Quality Control and Inspection Program, including the co-applicants' proposed erosion and sediment control plan for construction activities, would be submitted prior to construction under the staff alternative. The staff alternative also would specify that the erosion control plan be implemented for any subsequent maintenance and ground-disturbing activities over the term of any license issued for the project.

The potential exists for high-pressure water conduits or penstock to fail. The co-applicants' proposed system to detect a water conduit or penstock failure and immediately shut off flow in the conduit or penstock at the headworks would limit the potential effects of erosion at and down slope of the failure point.

Removing vegetative cover during construction could result in the loss of native plants beneficial to wildlife and could result in surface erosion at the construction sites. To address this concern, the co-applicants propose two plans in conjunction with the erosion control plan. These plans address reservoir clearing and revegetation of disturbed soils. The reservoir clearing plan would identify the location and acres of lands to be cleared, describe the vegetation to be cleared, describe resource management goals related to fish and wildlife enhancement, and describe and map disposal methods and locations. The revegetation plan would address plant species and densities to be used, fertilization and irrigation requirements, an effectiveness monitoring program, provision for filing monitoring reports, and procedures to be followed if monitoring reveals that revegetation is not successful. These plans would be valuable in minimizing adverse effects on existing soil and botanical resources and helping to re-establish appropriate plant communities. These plans would be consistent with USFS revised preliminary 4(e) condition no. 15, as described in section 3.3.1.2.

In section 3.3.4.2, we conclude that adding success criteria for replanting would improve the potential for restoring vegetation to its existing condition. Therefore, under the staff alternative the plan would specify that the co-applicants add a specific measure to the revegetation plan to identify criteria for success (e.g., percent coverage of desired species at specified time intervals) to provide the basis for determining which vegetation parameters to monitor as revegetation proceeds.

Under the staff alternative, the co-applicants would add a specific measure to the clearing plan to address stockpiling as clearing takes place and replacing topsoil after construction is completed. This step would provide additional support for re-establishment of native plant communities in native soils.

We estimate that the cost of developing the co-applicants' proposed erosion control plan would be about $32,500 annually and the cost to implement the proposed erosion control measures and BMPs during the construction of the project would be about $301,700 annually. The staff alternative would be $308,600 annually, or $6,900 more than the co-applicants' proposal. We estimate that the additional cost to implement the plan during the term of any license issued would be $9,900. We estimate that the cost of developing and maintaining the co-applicants' proposed conduit shut-down system would be $12,800 annually; the cost of their vegetative clearing plan would be $4,900 annually; and the cost of the revegetation plan would be $4,200.

5.2.4 Water Resources

Revised Lake Operating Plan

The co-applicants would pay an annual fee to the Elsinore Valley MWD to provide make-up water necessary to maintain lake elevations at 1,240 feet msl or above and would typically operate the project between lake elevations 1,240 and 1,247 feet msl under both alternatives.

The staff-recommended revised lake operating plan for Lake Elsinore would ensure that the measures related to make-up water, flood control, and project operations, in combination, would not produce unexpected consequences. Under the staff alternative the plan would, at a minimum, specify the amount and timing of minimum inflow for the make-up water and the point of discharge. In section 3.3.2.2, we conclude that the added volume of water from pumped storage operations (5,500 acre-feet) during flood seasons could raise the lake elevation several feet beyond the 1,249-foot msl elevation. Higher elevations could increase shoreline flooding and exacerbate the magnitude of spills into Temescal Wash and the Back Basin.

The co-applicants indicate that the annual lake management fee would be $1.872 million subject to further negotiation. We estimate that the cost of developing and implementing a revised lake operating plan over the term of any license issued would be $28,200 annually and would be necessary to address the effects of project operations of lake management. Developing and implementing a drainage and flood control plan as proposed by the co-applicants' and recommended by Riverside County would cost on additional $14,100 annually. As we said in section 3.3.2.2, these measures would assure that the reservoir levels would be within the operating range of the proposed project.

Preventing Interbasin Water Transfers

The storage of low quality Lake Elsinore water in the upper reservoir within the San Juan Creek Watershed has the potential to negatively affect water quality in the San Juan Creek. The co-applicants would monitor water quality and liner performance as part of their proposed upper reservoir and water conduit monitoring program (see discussion under Groundwater Monitoring). The co-applicants' plan to monitor the effectiveness of the drainage system/reservoir liner for the protection of existing flow conditions at the upper reservoir would provide for an early detection of leakage from the upper reservoir liner and drain system. This plan would meet most of the objectives of Interior's recommendation for monitoring and maintaining the upper reservoir to eliminate or reduce release of water and non-native aquatic species from the upper reservoir into the San Juan Creek drainage. However, the co-applicants' plan is silent with regard to steps to take if monitoring shows that the liner and drain are not effective. In section 3.3.2.2, we conclude that advanced planning for remedial steps would allow for a rapid response in the unlikely event of leakage. Under the staff alternative, at this plan also would include specific remediation measures that could be taken. Our estimate for the cost of this plan is provided at the end of the discussion on groundwater monitoring.

Groundwater Monitoring

The co-applicants identified groundwater monitoring as an important consideration in their technical reports and description of anticipated affects. They propose an upper reservoir and water conduit (tunnels, shafts, and penstocks) monitoring program that would assess the affects of project construction on ground water levels and water quality. The co-applicants' program calls for gathering information on groundwater levels and water quality prior to the start of construction, monitoring groundwater levels during project construction, and taking remedial steps to grout and seal any observed seeps during construction. Because the majority of the water conduits would be lined, we would not expect excessive seepage during project operation. However, seepage could occur. Under the staff alternative, the monitoring program would specify continued monitoring of ground water levels for at least 10 years following commencement of project operations and would specify what remedial steps would be taken should changes in groundwater levels be detected. Our alternative would also include the development of groundwater inflow criteria in consultation with the USFS as part of the characterization of the aquifer prior to construction of the project. We would consider this step to be consistent with the co-applicants' proposal to gather information about groundwater levels prior to the start of construction at the upper reservoir site.

Developing and implementing the co-applicants' groundwater monitoring program would have a capital cost of $500,000 that would be incurred during the construction period and during the first 2 years of project operation. This would result in an annual cost of $70,500. Including provisions in the groundwater monitoring program for groundwater exploration and aquifer characterizations, monitoring groundwater levels and water quality for at least 10 years after the start of operation, and specifying remedial actions as called for under the staff alternative would add an annual cost of $34,700. The additional cost would be justified to ensure that the reservoir and tunnel linings are effective in preventing seepage that could adversely affect groundwater levels and water quality in surface streams.

Surface Water Monitoring

Project construction could affect wetlands and riparian habitat. The USFS specifies in revised preliminary 4(e) condition no. 35 that the co-applicants develop and implement a water surface management plan to control and monitor project-related effects on water resources that support riparian vegetation on National Forest System lands. Following construction, interception of rainfall within the area occupied by the reservoir would reduce peak flows during extreme (i.e., 100-year) flood events by about 6 percent, as discussed in section 3.3.2.2. Effects would be greater just below the dam, and would diminish downstream. During most years, assuming that design features would not alter the natural hydrograph (i.e., flow volume and timing would be the same), and we do not anticipate any effects on downstream waters, streams, wetlands, or riparian habitat to result from project operation at the proposed Morrell Canyon site.

Implementation of USFS revised preliminary 4(e) condition no. 35 would provide baseline information about hydrology, water quality, riparian plant communities and wildlife in Decker Canyon or Morrell Canyon and would establish a mechanism for long-term monitoring to evaluate project effects on these resources. The condition indicates that the co-applicants should conduct inventories at both reservoir sites, although we note that if the Commission issues a license for the project, only one upper reservoir would be constructed. Implementation of a surface water management plan would provide baseline information that could be used for long-term monitoring and management.

Development and implementation of a water surface management plan add about $58,200 annually to the cost of the project but would be warranted.

Water Quality Monitoring

Project operations could affect temperature, DO, and nutrient cycling occurring in Lake Elsinore under both alternatives. In section 3.3.2.2, we conclude that operating the project would slightly improve DO levels in Lake Elsinore as a result of the mixing of denser, cooler water from the upper reservoir with the warmer water in Lake Elsinore. The co-applicants propose to monitor DO and water temperature in the tailrace area and Temescal Wash during and after construction of the project. However, the actual effect of project operations may be difficult to separate from the improvements in DO from implementation of the aeration program under the Lake Elsinore Stabilization and Enhancement Project. We estimate that the annual cost of water quality monitoring would be $31,200.

Spill Prevention Plan

The potential for the release of fuels, oils, lubricants, and other hazardous substances exists at the sites of project features during construction and during operation of the project under both alternatives. The co-applicants' proposal to prepare a hazardous substances spill prevention and control plan would prevent and minimize any effects associated with the handling of hazardous substances during project construction and operation. We estimate the cost to develop and implement this plan would be $1,400.

5.2.5 Aquatic Resources

Environmental Construction Monitor

The potential for slope erosion, sediment transport into streams, and hazardous substance spills exists at all the proposed construction sites under both alternatives. To address these concerns, the co-applicants propose to develop and implement a detailed plan for monitoring construction activities in aquatic and terrestrial environments by a qualified environmental construction monitor. USFS revised preliminary 4(e) condition no. 32 specifies that this plan should specify the activities, locations, and frequency of the monitoring that would occur. We conclude in section 3.3.3.2 that more specifics are needed to ensure that all the activities, locations, and frequencies of inspections are commensurate with the potential effects of project construction. Under the staff alternative, the detailed plan would describe the specific monitoring activities, locations, and frequencies. We estimate that the co-applicants' annual costs for environmental monitoring during construction would be $18,300 for aquatic resources and $42,300 for terrestrial resources. We estimate that the annual cost for developing our more detailed plan would be about $20,000, or about $2,800 more than the co-applicants' proposal for construction monitoring. These cost estimates would be the same under either alternative.

Entrainment Prevention Measures

Operation of the project has the potential to entrain fish at the intake/outlet structure in Lake Elsinore. The co-applicants' propose a program to install screens in the areas of the intake structures, to monitor entrainment over a 1-year period, and to test and implement devices that would decrease entrainment if significant entrainment is documented, and reduce the potential project-related mortality of fish in Lake Elsinore. The co-applicants propose to adhere to the NMFS' design criteria for salmonids in designing and installing the intake fish screen. Lake Elsinore contains resident fish such as carp, threadfin shad, bass and crappie, and the Joint Watershed Authority intends to stock largemouth bass, black crappie, Sacramento perch, and bluegill. Screen design criteria for these resident species have not been studied, however, assuming that NMFS approach velocity criteria of 0.8 feet per second were used (fish longer than 2.36 inches), the screens would need to be quite large in relation to the tailrace tunnels, and are likely not feasible for the Lake Elsinore Project. Without screens, the co-applicants state the approach velocity for the intakes will range from 1.5 to 1.8 cfs and entrainment would occur.

We estimate that the co-applicants' annual cost to design and install fish screens would be between $4 and $15 million for each tailrace tunnel, based on cost information provided by Washington DFW (2005). Assuming costs near the low end of the range and adding $10,000 per year for O&M results in an annual cost of $1,138,800. We estimate the cost of additional consultation with the agencies would add about $1,400 annually.

Besides screening, other measures to provide entrainment could be considered. However, the costs of implementation of other behavioral devices cannot be estimated at this time, as it is not known which species might need to be targeted, such devices are highly dependent upon site-specific characteristics, and are as yet highly experimental and costly.

As discussed in section 3.3.3, *Fisheries Resources*, without more information on the exact location, distance from shore, depth and orientation of the intake/outlet structure to the surface and shore we can only generalize the potential impacts to the Lake Elsinore fishery from entrainment. If the intake structure were to be placed on the shoreline where juvenile fish would encounter the intake while foraging or cruising, the likelihood for entrainment is higher than if the structure were placed farther away from shore where juvenile fish are less likely to be found. Also, we note that many of the sport fish in the lake will continue to originate from stocking efforts, and most will be large enough to avoid entrainment, so that project effects on adult stocks is likely to be small. In addition, unlike river systems, the intake/outlet structure area is small in relation to the overall size of the lake, and fish would need to actively swim into the area in order to be vulnerable to entrainment. Therefore the likelihood of significant impacts from entrainment is low.

The relatively high costs and technical challenges of installing intake screens and/or experimental behavioral devices, as well as the changing nature of the fish populations in the lake due to efforts by the Joint Watershed Authority, make it difficult to assess the impact of the pump storage project would have on Lake Elsinore fish populations over the life of the license. Measures described by the Fisheries Management Plan developed by the Joint Watershed Authority seek to change the existing population structure and fish populations in the lake over a 20-year planning horizon as a result of bio-manipulation techniques, stocking activities, and habitat enhancement measures. As a result of these non-project-related activities the species of fish present in the lake subject to entrainment over time would likely change. Therefore, in lieu of physical fish barriers or screens, the staff alternative includes provisions for monitoring the intakes for entrainment for a period of 1 year after the project is put into operation, and again once every 5 years as recommended by the State Water Board. Such monitoring would provide information on the level of project impacts from entrainment over time. We recommend the co-applicants provide the monitoring results to and consult with CDFG, FWS, the State Water Board, and the Joint Watershed Authority to assess and, based on monitoring results, develop measures to mitigate for project impacts to the existing fishery. A report describing the results of the entrainment study and recommended measures to mitigate for any project impacts on the fishery in Lake Elsinore should be submitted to the Commission for approval. Measures to be implemented could range from making improvements to nearshore habitat including the establishment of aquatic and emergent vegetation, placement of log cribs and/or brush structures, placing spawning gravels where appropriate and providing spawning benches for bass as described in the Joint Watershed Authority Fisheries Management Plan. Coordinating activities with the Joint Water Authority and CDFG would help to ensure that activities are consistent with local and regional efforts to improve the sport fishery in Lake Elsinore.

We estimate that monitoring sports fish for entrainment and mortality once every 5 years as recommended by staff would cost about $9,300. We estimate that the development and implementation of a plan to mitigate the effects of entrainment, including measures consistent with the Joint Watershed Authority Fisheries Management Plan, would be $33,800 annually.

5.2.6 Terrestrial Resources

Special Status Plants and Animals

The co-applicants propose to employ a construction monitor to assist in identifying measures to protect native plants and wildlife, starting with pre-design conferencing and continuing through completion of the project. Interior's recommendation 10(a)-1 would provide specifically for consultation with FWS during project design to identify measures that may be needed to protect fish and wildlife. Implementation of USFS revised preliminary 4(e) condition nos. 29 and 30 would continue these benefits to terrestrial resources through the term of the license by providing for annual employee awareness training, annual review of species' status, consultation with USFS on the need for new surveys, and implementation of protective measures, if needed.

The staff alternative includes pre-construction surveys for special status plants and animals in areas that have not been covered yet or that have not been thoroughly covered during previous surveys. These surveys should also cover Multi-Species HCP narrow endemics, riverine/riparian, and Criteria Area Study species, to allow Riverside County to evaluate project consistency with this plan. The measures identified above would provide adequate protection for special status plants and animals, including federally listed species, from project design through any new license period. These actions would be consistent with Interior's request for consultation with FWS in designing measures to protect fish and wildlife, with Interior's and Riverside County's recommendations for an analysis of consistency of the project with the Multi-Species HCP.

Interior recommends that the co-applicants immediately halt project construction or operation if situations arise where fish or wildlife are being harmed or endangered, but the recommendation does not define what would constitute such an emergency or specify methods for determining whether harm or endangerment are occurring. This concern would be appropriately addressed, under either alternative, in the construction monitoring plan described above.

We estimate that the annual cost of the staff alternative measures for monitoring special status plants and animals would be about $14,100 for pre-construction surveys; $6,200 for annual reviews of species status; and $11,400 annually for employee awareness training, or about $31,700 annually for all three measures.

Noxious Weeds and Exotic Plants

The co-applicants propose to design and implement an integrated pest management plan to prevent the introduction of weeds during construction and to control any populations of weeds that are identified near construction sites during project implementation. USFS revised preliminary 4(e) condition no. 33 is very similar, specifying that the co-applicants should consult with the USFS to develop and implement a plan to monitor and control noxious weeds and non-native invasive species, but the USFS specifies this plan should be continued through any license period. USFS also indicates that the vegetation and invasive weed management plan should be consistent with guidance provided in the Cleveland National Forest Land Management Plan, including consulting with USFS to design and conduct an invasive non-native plant and noxious weed risk assessment, using weed lists that are current at the time of survey (USFS, 2005b). Implementation of USFS revised preliminary 4(e) condition no. 29, which provides for annual employee awareness training, would apply to noxious weeds and invasive non-native plants, as well as to special status plants, as described above. Section 3.3.4.2, *Noxious Weeds and*

Exotic Plants, provides information about the minimum requirements of USFS revised preliminary 4(e) condition no. 29.

Although the co-applicants may not propose to construct any new project features during the license period, routine project maintenance could cause ground disturbance at project facilities, and project-related traffic would pose a risk of introducing and spreading weeds. Public use of any access roads would have an especially high potential for adverse effects because it would likely be difficult to control. Implementation of a noxious weed management plan throughout the term of any new license for both USFS and non-USFS lands within the project boundary would reduce these risks and help to protect native plant communities and wildlife habitat values. This approach would minimize planning costs and would provide coverage for weeds and invasive exotic plants throughout the project area, as a whole.

We estimate the annual cost of developing and implementing the co-applicants' noxious weed control plan would be $14,100. We estimate the additional annual cost of developing and implementing the plan under the staff alternative would be $22,800.

Habitat Mitigation

The co-applicants propose to provide mitigation for the loss of high-value habitats at a ratio of 2:1 for oak woodlands and 1:1 for coastal sage scrub. The co-applicants do not propose mitigation for habitats, such as chamise chaparral and non-native grassland, because they are abundant in the project area. The co-applicants propose to mitigate wetland and riparian habitat effects. They would conduct formal wetland delineations when the final location of each project feature has been determined, and then prepare a habitat mitigation management plan for approval by the Corps, CDFG, and the USFS. We estimate the annual cost for the co-applicants' plan would be $15,200.

Interior recommends that the co-applicants evaluate consistency of the project with the existing Multi-Species HCP and Stephens' Kangaroo Rat HCP, and with the North County Multi-Species HCP, which is under development. Interior recommends the co-applicants conduct an in-depth equivalency analysis to determine adequate mitigation ratios for effects that may occur within the Multi-Species HCP area. Interior indicates that in these areas the minimum ratio for mitigation would be 1:1. Riverside County also recommends an evaluation of consistency with the Multi-Species HCP.

The USFS revised preliminary condition no. 38 species a minimum mitigation ratio would be 1:1 for riparian oak woodland, coastal sage scrub, and habitats that are sensitive or support listed species, as well as the development of a habitat mitigation plan.

The staff alternative includes mitigation at a minimum ratio of 1:1 for oak woodlands and for coastal sage scrub and an equivalency analysis as specified by USFS and recommended by Interior. Although chamise chaparral and non-native grasslands vegetation cover types are currently abundant in the project area and in southern California, they provide habitat for native plants and wildlife, including many special status species. They are undergoing rapid development as a result of human population growth. We recommend replacing them at a 1:1 mitigation ratio, to reduce the project's contribution to cumulative habitat loss. The staff alternative's mitigation ratio would be consistent with Interior and USFS recommendations in terms of compensation ratios. Under the staff alternative the co-applicants would conduct formal wetland delineations when the location of each project feature has been determined. The co-applicants would also consult with the Corps regarding formal delineation of effects on Lake Elsinore. When the delineations are complete, the co-applicants would consult with the agencies to develop and implement a habitat mitigation and management plan. The habitat mitigation management plan would focus to the extent possible on replacing wetland acreage, functions, and values in-kind and on site. Where this is not possible, habitats associated with Lake Elsinore would provide a range of opportunities for wetland enhancement.

In developing cost estimates for habitat mitigation of project effects that occur on non-National Forest System lands under any alternative, we have assumed the co-applicants would acquire (in fee title or via conservation easements) private lands that are degraded or under threat of development, and transfer those lands into reserves that could be managed over the long-term by a non-governmental organization or public land trust. This approach would ensure the protection and management of large blocks of land and habitat linkages, would offer greater benefits to wildlife, and could be managed more economically than small, scattered parcels in individual ownership. The USFS revised preliminary 4(e) condition no. 38 specifies that mitigation should occur in the project area; otherwise, the highest priorities would be the Elsinore "Place," the Trabuco Ranger District, or the Cleveland National Forest. Thus, mitigation for project effects that occur on National Forest System lands may focus on private in-holdings.

We estimate that the capital cost of these measures at Decker Canyon for habitat mitigation under the staff alternative would total $3,212,500 with an annual cost of $322, 300 including $4,200 for O&M, as compared to the co-applicants' Morrell Canyon proposal with an estimated capital cost of $2,060,000 and annual cost of $204,100, resulting in an overall annual cost increase of $118,200.

Avian Protection Plan

The co-applicants propose to design the transmission line features to be consistent with guidelines developed by APLIC et al. (1996). USFS revised preliminary 4(e) condition no. 34 specifies this approach, also, and specifies marking the power lines if they are adjacent to Lake Elsinore or in a flyway where bird strikes may occur. In section 3.3.4.2, *Environmental Consequences* in *Terrestrial Resources*, we conclude that there is moderate risk of avian collision along several segments of both the co-applicants and staff alternative transmission alignments. The co-applicants should make use of Avian Power Line Interaction Committee's publications, including *Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 1996* and *Mitigating Bird Collisions with Power Lines: The State of the Art in 1994*. We note that APLIC and FWS (2005) recently completed new guidelines for the development of avian protection plans. These guidelines would assist the co-applicants with initial design and alignment of the transmission line and in design of a long-term plan for monitoring. A pre-construction evaluation of the transmission line design and alignment would be needed to identify high-risk crossings, where markers or bird diverters could be used to reduce the risk of bird collisions with the transmission line. A long-term plan for monitoring and managing risks, based on recent recommendations developed by APLIC and FWS (2005), could be used to track the effectiveness of measures that are implemented to protect birds. Results of monitoring could be used to identify problem spans or poles and allow for retrofitting where needed. The cost of the staff alternative measure to develop the avian protection plan would be $20,000, or $2,800 annually, the same cost as estimated by the co-applicants. The additional annual cost of implementing the plan over the term of the license under the staff alternative would be about $20,000.

Lake Elsinore Monitoring and Remediation Plan

The co-applicants do not propose any measures to address potential project-related effects to nesting shorebirds, waterfowl, or other birds at Lake Elsinore. Under the proposed operations, Lake Elsinore would fluctuate about 1 foot daily and about 1.7 feet weekly. Interior recommends that the co-applicants consult with FWS and CDFG to develop a plan to eliminate or reduce effects on nesting shorebirds that might be affected by water surface fluctuations. The plan would include monitoring to allow early detection of effects, immediate steps to remedy effects, timing and performance criteria, and annual reporting to FWS and CDFG. In section 3.3.4.2, *Environmental Consequences, Terrestrial Resources*, we conclude that habitat along the Lake Elsinore shoreline is generally not suitable for nesting waterfowl, although City of Lake Elsinore staff report that black-necked stilts, avocets, and killdeer (ground-nesters that use scrapes in bare soils or sparsely vegetated areas) do nest in undisturbed areas around the lake. With implementation of the Lake Elsinore Stabilization and Enhancement Project, year-to-year water-level fluctuations would be reduced and Lake Elsinore would no longer dry up in drought years. Under these circumstances, additional riparian vegetation, such as cattails, tule, and willows may be able to establish along the shoreline. Improvements in riparian habitat could increase its suitability for nesting shorebirds, waterfowl, and other birds. For these reasons, the staff alternative would incorporate Interior's recommendation, and would further recommend that the co-applicants consult with the resource management agencies and other interested parties (FWS, CDFG, Riverside County, City of Lake Elsinore) to develop and implement the plan. We estimate that the initial capital cost to develop the staff alternative plan would be $20,000 and the cost of implementing the plan would be $20,000 annually, resulting in an overall annual cost of $22,800.

5.2.7 Threatened and Endangered Species

As discussed in section 3.3.5.2, *Threatened and Endangered Species*), several federally listed species may occur in the project area. MBA conducted focused surveys for listed plants and animals between 2001 and 2006, and found no occurrences[83]. However, MBA's surveys did not cover all areas that would be affected by project construction, primarily because transmission alignments have been modified since the surveys were conducted, and the locations of many project features (e.g., access roads, helicopter fly yards, overhead/underground transition stations, pulling and tensioning stations) have not yet been determined. Some areas were excluded from survey due to private ownership, difficult access, or impenetrable vegetation. Thus, we have no evidence to support a conclusion that the project would not adversely affect any listed species that may be present. As discussed in section 5.6.4 (Endangered Species Act), we therefore find that the project may adversely affect San Diego thornmint, San Diego button-celery, spreading navarretia, Nevin's barberry, Munz's onion, slender-horned spineflower, San Diego ambrosia, California Orcutt grass, thread-leaved brodiaea, San Jacinto Valley crownscale, Quino checkerspot butterfly, arroyo toad, southwestern willow flycatcher, least Bell's vireo, coastal California gnatcatcher, and Stephens' kangaroo rat. Construction of some project features would occur within designated critical habitat for Quino checkerspot butterfly, proposed critical habitat for coastal California gnatcatcher, and a Core Reserve for the Stephens' kangaroo rat. Construction would also affect suitable habitat for these species, outside designated areas.

Operation of the project may also adversely affect listed species. Although temporary access roads would be obliterated, it is difficult to prevent OHV use, once a road has been cleared. OHV use directly affects soils and vegetation, promotes the introduction and spread of noxious weeds and invasive non-native plants, increases the risk of wildfire, and causes noise disturbance. Helicopter access for regular maintenance of the transmission line would also cause noise disturbance, but effects would be short-term and local.

To mitigate for project effects on listed species, the co-applicants propose to pay the $500-per-acre fee required within the Stephens' Kangaroo Rat Fee Assessment Area. Interior 10(j)-3 recommends a minimum of 1:1 mitigation for any habitat impacts that occur inside the Core Reserve for this species. We estimate that construction would convert about 38.25 acres of Stephens' kangaroo rat habitat to project use. The staff alternative includes this acreage as part of the recommended habitat mitigation described above (section 5.2.6, *Habitat Mitigation*).

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[83] MBA did not conduct surveys for bald eagles, because they are rarely present in the project area. Rather than surveying for Stephens' kangaroo rat, the co-applicants elected to assume presence and provide mitigation. MBA observed Munz's onion "adjacent to the project right-of-way" at one location at the northern end of the transmission alignment. Although not observed during MBA's surveys, the Forest Service has records of coastal California gnatcatcher in the vicinity of the north end of the transmission alignment.

Interior's 10(a) recommendation no. 1 calls for the co-applicants to consult with FWS regarding protection, mitigation, and enhancement measures for fish and wildlife, as designs for the LEAPS Project are developed. Under the staff alternative, we recommend the co-applicants consult with FWS (and the USFS, on National Forest System lands) to design and conduct pre-construction surveys in areas that have not already been thoroughly covered; prepare detailed survey reports and maps for FWS (and the USFS) review and comment; and use this information to design and locate project features to avoid or minimize adverse effects on listed species and their habitat. We are recommending that if listed species are present, the co-applicants consult with the agencies to develop and implement a plan for annual consultation and implementation of protective measures (e.g., maintenance timing restrictions) to continue through any new license period. At a minimum, the plan should identify BMPs to be implemented during construction and operation, and provide mechanisms for monitoring, reporting, and adaptive management. We are also recommending the co-applicants develop road management and vegetation management plans, which should also be protective of listed species, if any are present.

We estimate the cost of the staff measure to consult with FWS would be $3,400 annually. We estimate the annual cost of the Stephens' kangaroo rat fee for the co-applicants' proposal (38.25 acres) would be $2,700

5.2.8 Recreational Resources

Hang Gliding

The co-applicants propose to place the transmission lines underground in the vicinity of the USFS permitted hang gliding launch areas. The staff alternative transmission alignment also would include an underground segment in this area. Lake Elsinore is a very popular location for hang gliding. The site possesses unique atmospheric conditions that create this opportunity and the site has become one of the best locations for this activity in the world. Both alignments would avoid placing transmission lines between the most popular launch sites and the informal landing site just west of the proposed Ortega Oaks powerhouse site and would allow for the continuation of world-class hang gliding and parasailing opportunities in the Lake Elsinore region.

We estimate that the additional cost associated with burying the transmission line underground for 4.1 miles in the vicinity of the USFS permitted hang gliding launch sites would be $48,999,800 or $6,913,800 annually.

Developed Recreational Facilities at the Upper Reservoir

It is not the intent of the co-applicants to provide new water-based recreational activities at the upper reservoir. The focus during construction would be to ensure the safe use of existing roads, trails, and nearby recreational areas during construction. Following construction, the co-applicants would install a fence around the perimeter of the upper reservoir to prevent public access. The co-applicants' would install an ancillary structure, at a USFS-site off Ortega Highway, provide interpretive signage, and provide a cleared parcel at the upper reservoir or at another site to the USFS for future recreational development. USFS revised preliminary 4(e) condition no. 27 specifies that the co-applicants develop and implement a recreational development facility plan for a day-use recreational facility at the construction laydown area used to construct the upper reservoir. The co-applicants filed an alternative 4(e) condition that would broaden the USFS revised preliminary 4(e) conditions no. 27 to allow the co-applicants to provide an another site near the upper reservoir.

We conclude in section 3.3.6.2 that developing a recreational facility on the site used for the construction laydown area or another site near the upper reservoir would accommodate visitors who are coming to the area, visiting the upper reservoir, or viewing Lake Elsinore. Providing a formal recreational area would reduce pollution by providing visitors with facilities for disposing of trash and human waste, protecting vegetation and soil by controlling the locations where vehicles may travel and park, and reducing the potential for fires by providing cleared areas for parking. Because day-use facilities do not currently exist in this area, this facility, along with an ancillary structure such as a visitor center, and signage, would meet the needs of visitors who are coming to the upper reservoir area by providing a few basic conveniences while protecting natural resources from the effects of wide-spread dispersed recreational use.

Fencing the upper reservoir would result in an annual cost of $12,600. We estimate that the annual cost of the co-applicants' proposed ancillary structure (visitor center) and signage would be $7,000 and $1,200, respectively. We estimate the cost of developing and implementing the staff alternative plan for a recreational facility at the upper reservoir would have a capital cost of $144,200 and annual costs of $4,000, resulting in an overall annual cost of $20,100 beyond what the co-applicants propose.

Developed Recreational Facilities at the Powerhouse

The co-applicants propose to provide cleared lands and funding for the construction of recreational facilities at the powerhouse location. The co-applicants would consult with the USFS and local agencies to determine the type of community recreational facility to provide at the selected powerhouse. At the proposed Santa Rosa powerhouse site, the co-applicants would also provide a botanical garden and powerhouse tours to promote awareness of water conservation and use of drought-resistance plant species. In section 3.3.6.2, we conclude that the co-applicants' proposed measures would provide recreational opportunities that currently do not exist in these locations. Under both the co-applicants' proposal and the staff alternative, the existing informal hang gliding landing area at the Ortega Oaks location would remain available and any future development at that subject would be subject to local plans. Because the staff alternative would place the powerhouse at the Santa Rosa site (as opposed to the Ortega Oaks location) and would bury the transmission lines in the vicinity of the launching sites and the connection to the powerhouse, we do not include any provision for a formal hang gliding landing area our recommended recreation plan.

The co-applicants would not provide funding for the O&M of the facilities unless they remain in public ownership and are located on National Forest System lands. The co-applicants are willing to retain ownership and be responsible for O&M subject to a determination whether such ownership and operation would be authorized under the Elsinore Valley MWD's existing special district authority for developments not in public ownership and not located on National Forest System lands. We conclude in section 3.3.7.2 that relying on funding that may or not be available to local agencies would not provide certainty that the facilities would be properly maintained through the period of the license. The staff alternative includes a recreation plan for the facility development that includes financial commitments to provide for O&M funding in the event that intended sources of O&M funding are either insufficient or unavailable.

We estimate the cost of providing public tours at the powerhouse would be $18,700. We estimate that the capital cost of the co-applicants' proposed recreational facilities at the Santa Rosa powerhouse site would be $5,610,800 (including land acquisition costs) and the annual cost would be $678,500. We estimate that the additional cost of the staff alternative measure to provide O&M funds for this recreational facility would be about $125,400 annually.

Recreational Angling at Lake Elsinore

The Joint Water Authority's Program Environmental Impact Report includes a detailed Fish Management Plan with objectives to improve the sport fishery in Lake Elsinore. The co-applicants' proposal to provide funds in support of the annual fish stocking program recommended in the Joint Watershed Authority's Fish Management Plan would enhance recreational fisheries in Lake Elsinore. We conclude in section 3.3.3.2 that the stocking of predators to carp and threadfin shad, consistent with the

Fish Management Plan, would reduce populations of those species and allow more game fish to survive, enhancing recreational angling opportunities. We estimate the annual cost for the co-applicants' proposed stocking program would be $21,400.

5.2.9 Land Use and Aesthetics

Road and Traffic Management

The construction and operation of the proposed project facilities and about 32 miles of transmission lines across federal and private properties and access to project facilities would require the construction of an estimated 10.8 miles of temporary access roads and 1.0 mile of permanent access roads, the exact location of which are not identified at the current level of planning. We anticipate that about 9.3 miles of temporary roads to access the staff alternative's mid-slope transmission alignment would be constructed in part on National Forest System lands, and would also intersect with numerous existing roads on non-National Forest System lands.

USFS revised preliminary 4(e) condition no. 26 specifies the development and implementation of a road and traffic management plan for all USFS roads and unclassified roads needed for project access that would be constructed on National Forest System lands. The plan, to be developed in consultation with the USFS, would identify and map the roads, describe their purpose and use, explain maintenance levels and responsibilities show the locations and status of any gates or barricades, demonstrate authorization for their use, and assess their condition. The plan would specify maintenance and management standards that would provide for traffic safety and minimize erosion and damage to natural resources.

We conclude in section 3.3.7.2 that a plan would be needed to ensure the proper use and maintenance of both temporary and permanent roads necessary to access the project facilities. The staff alternative includes a provision to specify the exact segments of roads that would serve the project and the permanent roads that would need to be included in the project boundary.

Public access (and OHVs, in particular) would create the potential for trampling and soil compaction, dumping, vandalism, noise disturbance, harassment, poaching, collision, wildfire, and introduction of weeds. For this reason, under the staff alternative, the land and road management plan would include methods for closing and obliterating temporary roads following construction; minimizing adverse effects of project-related use; identifying areas of specific concern; providing for regular patrol and enforcement to ensure that closed roads area not being used by the public; and provide for long-term monitoring, reporting, and changes to the plan, as needed. The staff alternative includes a road management plan for non-National Forest System lands that would address the same issues.

The co-applicants propose to achieve a balance of excavated materials and fill at the entire project site and propose to haul up to 776,000 cubic yards of fill along Ortega Highway and South Main Divide Road to the upper reservoir site. In section 3.3.7.2, we conclude that hauling this volume of fill material on Ortega Oaks Highway and South Main Divide Road to the upper reservoir site would significantly affect the flow of traffic on this busy crossroad between Lake Elsinore the California coast. Instead of overtaxing this road, the staff alternative calls for the co-applicants to excavate additional depth at the Decker Canyon upper reservoir site to provide the fill deficit for the dam construction. We estimate that about 10 additional feet would need to be excavated to provide sufficient fill for the dam. Achieving the balance of excavation and fill entirely at the upper reservoir site would greatly reduce the construction truck traffic on Ortega Highway.

The co-applicants also propose several specific measures to improve traffic flow on Grand Avenue and Ortega Highway during construction and to prepare and implement traffic management and control plans. The staff alternative would specify that the co-applicants develop, with County of Riverside Transportation Department consultation, and implement a road and traffic management plan for non-USFS roads that: (1) details plans to manage construction at road crossings and along access roads; (2) provides a schedule for the volume and timing of construction traffic; (3) describes methods for closing and obliterating temporary roads following construction; (4) minimizes adverse impacts of project-related use; (5) identifies areas of specific concern; and (6) provides for monitoring, reporting, and changes to the plan during the 4.5-year construction period.

We estimate that the annual cost associated with the staff alternative additional excavation at Decker Canyon to achieve the excavation and fill balance at the upper reservoir site would be $732,800. The initial cost of developing co-applicants' traffic plans would be $100,000 with an annual cost of $24,100. The staff alternative traffic plans would add $20,000 initial costs and $2,800 to the annual costs.

Sediment Sampling in Lake Elsinore

Excavations in Lake Elsinore to construct the intake/outlet structure would disturb lakebed sediments that could contain toxins. Water quality testing in Lake Elsinore did not include testing lakebed sediment for toxicity. In section 3.3.7.2, we conclude that excavated material from the lakebed should be disposed of off site. The toxicity of these sediments is unknown. Toxic materials require special handling and disposal. The staff alternative would specify that the co-applicants develop a plan to sample lakebed sediments for toxicity prior to construction and, if toxins are identified, for proper handling and disposal. We estimate that the annual cost for the staff alternative sediment sampling plan would be $7,100 and would be necessary to protect the public from exposure to potentially toxic materials.

Visual Resources Plan

Construction of the proposed project would introduce new visual elements to the landscape both during and following construction. The co-applicants propose to develop and implement a visual resources management plan. The co-applicants' proposed plan would be similar to the scenery conservation plan specified in the USFS revised preliminary 4(e) condition 37. We conclude that such a plan prepared in consultation with the USFS, under either alternative, would help to ensure that the design and materials proposed for project facilities on USFS-lands and any subsequent changes to the project facilities are compatible with the USFS' Land Management Plan's High Scenic Integrity Objectives and related standards for new construction in National Forests. We estimate that the annual cost for the co-applicants' proposed visual resources management plan would be $2,800.

Project Boundary

The co-applicants do not include Lake Elsinore within the proposed project boundary as defined in the exhibit G boundary maps for the project. Lake Elsinore is an integral part of the pumped storage project, serving as the lower reservoir. Under either alternative, inclusion of Lake Elsinore within the project boundary would provide for a complete unit of development. At the conceptual level of design, the co-applicants have not identified the location of temporary access roads for construction or permanent access roads for project operations. Access roads to project facilities, whether public, private, or USFS-owned, would need to be included in the project boundary, under either alternative, when the final exhibit G drawings are filed with the Commission. We assume this cost is included in the co-applicants' $12,000,000 allocated to relicensing.

5.2.10 Cultural Resources

Construction at the project sites has the potential to destroy or disturb historic properties. The co-applicants would consult with the USFS or SHPO prior to any ground-disturbing activities and would implement a stop-work procedure if unanticipated discoveries occur during construction. Given that known sites occur near project construction sites, we assume that over a 4.5-year construction period, one or more unanticipated discoveries would occur. The draft HPMP filed with the Commission in April 2005, includes measures to: (1) complete pre-construction archaeological surveys in the APE; (2) determine the need for intensive surveys; (3) monitor historic properties during construction; (4) appoint a tribal liaison; (5) study the potential effects of ground acceleration on historic buildings; (6) develop a program to monitor archaeological sites for 5 years; and (7) develop a public interpretative program. The co-applicants also would conduct limited paleontological studies at sensitive locations during construction and prepare any fossil remains for curation by a local museum. In section 3.3.9.2, we conclude that co-applicants' proposal, as reflected in the draft HPMP, and including modifications under the staff alternative, would mitigate or avoid adverse effects on historic properties. These measures would address the site-specific needs to take into account historic properties during the construction and operation of the project under either alternative.

The staff alternative would specify that the co-applicants develop and implement a final HPMP that incorporates provisions to avoid or mitigate effects to known and as yet unknown historic properties. The plan would be developed in consultation with the SHPO, Tribes, the BIA, and the USFS, and other entities as appropriate. USFS revised preliminary condition no. 28 specifies that the HPMP accurately define the APE, including the effects of implementing the Section 4(e) condition. As discussed in section 3.3.9.2, the co-applicants' proposed HPMP would address the procedures and substantive requirements of Section 106 of the National Historic Preservation Act. The Commission would execute a Programmatic Agreement providing for the filing of the final revised HPMP with 1 year after license. Shortly thereafter, the final HPMP would then be implemented.

We estimate that the costs for the co-applicants' proposed consultation would be $1,400, the annual cost for addressing unanticipated discoveries during construction would be $16,900, the annual costs for implementing the co-applicants draft HPMP would be $59,300, and the paleontological studies would cost $14,100. We estimate the additional annual cost of filing the final HPMP under the staff alternative would be $2,800.

5.3 FISH AND WILDLIFE AGENCY RECOMMENDATIONS

5.3.1 Recommendations Pursuant to Section 10(j) of the FPA

Under Section 10(j) of the FPA, each hydroelectric license issued by the Commission would include conditions based on recommendations provided by federal and state fish and wildlife agencies for the protection, mitigation, and enhancement of fish and wildlife resources affected by the project.

Section 10(j) of the FPA states that whenever the Commission finds that any fish and wildlife agency recommendations is inconsistent with the purposes and requirement of the FPA or other applicable law, the Commission and the agency shall attempt to resolve any such inconsistency, giving due weight to the recommendation, expertise, and statutory responsibilities of such agency.

By letter dated April 22, 2005, Interior provided three fish and wildlife recommendations. Table 56 lists Interior's recommendations and presents Commission staff's conclusion as to whether each recommendation is within the scope of Section 10(j), an estimate of the annual cost of each recommendation, and the decision about whether or not to recommend adopting each recommendation as part of the staff alternative. When a recommendation is not adopted, we provide a rationale. Recommendations that Commission staff consider outside the scope of Section 10(j) have been considered under Section 10(a) of the FPA and are addressed in the specific resource sections of this document. The staff alternative includes all current recommendations that Commission staff found to be within the scope of Section 10(j).

Table 56. Fish and wildlife agency Section 10(j) recommendations. (Source: Staff)

No.	Recommendation	Agency	Within the Scope of 10(j)?	Annualized Cost	Commission Staff Recommending?
1.	Lake Elsinore monitoring and remediation plan to reduce or eliminate impacts to nesting shorebirds	Interior	Yes	$22,800	Yes
2.	San Juan Creek drainage monitoring and remediation plan to eliminate or reduce release of water and non-native species from the upper reservoir into San Juan Creek	Interior	Yes	$74,000	Yes
3.	Consistency with existing and proposed HCPs	Interior	No, not a specific measure to protect fish and wildlife	$0	No

Note: HCP – Habitat Conservation Plan

5.3.2 Recommendations Pursuant to Section 10(a)(1) of the FPA

Our recommendation not to adopt Interior 10(j) no. 3 is based on our finding that we could not evaluate the environmental effects that would result from recommending consistency of the LEAPS Project with HCPs that have not yet been developed. Although we do not adopt Interior 10(j) no. 3, we anticipate that our recommendations for specific measures for terrestrial resource protection and mitigation will meet Interior's objectives regarding consistency of the LEAPS Project with existing HCPs. In some cases (e.g., minimum habitat compensation ratios), our recommendations may be more stringent than those that would be required under the Multi-Species HCP, because the Commission's view of acceptable resource trade-offs may differ from the views of the Multi-Species HCP signatories.

In addition to it's section 10(j) recommendations, Interior filed 3 recommendations under section 10(a) for (1) consultation with the FWS on completion of project plans and designs for measures to protect, mitigate damages to, and enhance fish and wildlife, (2) notification to FWS and remedial actions under emergency or special conditions arise where fish or wildlife are being killed, harmed, or endangered, and (3) a request for a specific ESA reopener in any license issued for the proposed project. As discussed in section 5.2.6, the staff alternative measures would provide adequate protection for special status plants and animals, including federally listed species, starting at project design and extending through the term of any license issued for the project.

5.4 CONSISTENCY WITH COMPREHENSIVE AND OTHER RESOURCE PLANS

Section 10(a)(2) of the FPA requires the Commission to consider the extent to which a project is consistent with federal and state comprehensive plans for improving, developing, and conserving waterways affected by the project. Under section 10(a)(2), federal and state agencies filed comprehensive plans that address various resources in California. Fourteen of these plans address resources relevant to the LEAPS Project:

California Advisory Committee on Salmon and Steelhead Trout. 1988. Restoring the balance. 1988 annual report. Sausalito, California. 84 pp.

California Department of Fish and Game. 1996. Steelhead restoration and management plan for California. February 1996. 234 pp.

California Department of Parks and Recreation. 1998. Public Opinions and Attitudes on Outdoor Recreation in California – 1997. March 1998. 72 pp. and appendices.

California Department of Parks and Recreation. 1988. California Outdoor Recreation Plan. Sacramento, California. June 1988. 223 pp.

California Department of Parks and Recreation. 1994. California Outdoor Recreation Plan -1993. Sacramento, California. April 1994. 154 pp. and appendices.

California Department of Water Resources. 1983. The California water plan: projected use and available water supplies to 2010. Bulletin 160-83. Sacramento, California. December 1983. 268 pp. and attachments.

California Department of Water Resources. 1994. California water plan update. Bulletin 160-93. Sacramento, California. October 1994. Two volumes and executive summary.

California State Water Resources Control Board. 1975. Water quality control plan report. Sacramento, California. Nine volumes.

California—The Resources Agency. Department of Parks and Recreation. 1983. Recreation needs in California. Sacramento, California. March 1983. 39 pp. and appendices.

Forest Service. 1986. Cleveland National Forest land and resources management plan. Department of Agriculture, Corona, California. February 1986.

State Water Resources Control Board. 1999. Water quality control plans and policies. Adopted as part of the State Comprehensive Plan. April 1999. Three enclosures.

Fish and Wildlife Service. Canadian Wildlife Service. 1986. North American waterfowl management plan. Department of the Interior. May 1986. 19 pp.

Fish and Wildlife Service. Undated. Fisheries USA: The recreational fisheries policy of the U.S. Fish and Wildlife Service. Washington, DC. 11 pp.

National Park Service. 1982. The nationwide rivers inventory. Department of the Interior, Washington, DC. January 1982. 432 pp.

5.5 RELATIONSHIP OF LICENSE PROCESS TO LAWS AND POLICIES

5.5.1 Section 401 of the Clean Water Act—Water Quality Certification

By letter dated March 16, 2005, the co-applicants applied to the State Water Board for Water Quality Certification for the LEAPS Project, pursuant to Section 401 of the Clean Water Act. On March 1, 2006, the co-applicants withdrew and refiled individual requests for water quality certifications for both the LEAPS and the TE/VS Interconnect projects. The Water Quality Certification is now due on March 1, 2007.

5.5.2 Section 18 of the Federal Power Act—Authority to Require Fishways

Section 18 of the FPA, 16 USC Section 811, states that the Commission shall require the construction, maintenance, and operation by a licensee of such fishways as the secretaries of Commerce and the Interior may prescribe. By letter dated April 22, 2005, Interior reserved its authority to amend prescriptions. The Secretary of Commerce did not file any fishway prescriptions for this project.

5.5.3 Section 4(e) of the Federal Power Act

Because the proposed LEAPS Project would occupy lands of the Cleveland National Forest and lands administered by BLM and the DOD, the USFS, DOD, and BLM have authority to impose conditions under Section 4(e) of the FPA. The USFS provided preliminary license conditions for the LEAPS Project by letter dated April 27, 2005 and revised preliminary Section 4(e) conditions on June 23, 2006.

The USFS provided 25 standard USFS conditions and 10 project-specific conditions. Condition nos. 1 through 25 are standard conditions that would involve obtaining USFS approval on final project design and changes, yearly consultation with the USFS to ensure the protection and development of natural resources, restrictions and protective measures that should be in place, and project O&M procedures that would enable continued project operations to be consistent with applicable provisions of the Cleveland Nation Forest Land Management Plan.

Condition nos. 26, 27, 28, 33, 34 35, and 36 pertain to development of plans for use of USFS-managed lands (including road and traffic management, recreation facilities, heritage resources, vegetation and invasive weeds management, wildlife management, surface water management, and ground water management). Condition no. 29 pertains to project-specific consultation with the USFS regarding annual employee awareness training pertaining to natural resource issues of importance to the Cleveland National Forest. Condition no. 30 pertains to updates regarding USFS special status plants and wildlife, monitoring needs of existing and future special status species. Condition no. 31 pertains to an action plan for ground-disturbing activities that are not addressed in this EIS. Condition no.32 pertains to the development of detailed monitoring plans.

5.5.4 Endangered Species Act

Section 7 of the ESA requires federal agencies to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or result in the destruction or adverse modification of the critical habitat of such species. By letter dated April 22, 2005, Interior indicated that the federally threatened coastal California gnatcatcher and the federally endangered arroyo toad, Stephens' kangaroo rat, and Munz's onion are known to occur within the project vicinity. No individuals of these species were observed during surveys associated with the project. We also evaluated the effect of the project on other listed species that may occur in the project area (table 57). Table 57 summarizes our determinations regarding the effect of the proposed action on these species, based on the analyses presented in section 3.3.5, *Threatened and Endangered Species*, and our recommendations as presented in section 5.2, *Comprehensive Development and Recommended Alternative*.

Table 57. Summary of species and critical habitat findings under the staff alternative.

Species	Species Status	Species Finding	Critical Habitat Finding
Southern California steelhead (*Oncorhynchus mykiss*)	E	Likely to adversely affect	Not likely to adversely affect
San Diego thornmint (*Acanthomintha ilicifolia*)	T	Likely to adversely affect No effect	No effect
San Diego button-celery (*Eryngium aristulatum* var. *parishii*)	E	Likely to adversely affect No effect	No effect

Species	Species Status	Species Finding	Critical Habitat Finding
Mexican flannelbush (*Fremontodendron mexicanum*)	E	No effect	No effect
Spreading navarretia (*Navarretia fossalis*)	T	Likely to adversely affect No effect	No effect
Nevin's barberry (*Berberis nevinii*)	E	Likely to adversely affect No effect	No effect
Munz's onion (*Allium munzii*)	E	Likely to adversely affect	No effect
Slender-horned spine flower (*Dodecahema leptoceras*)	E	Likely to adversely affect	No effect
San Diego ambrosia (*Ambrosia pumila*)	E	Likely to adversely affect	No effect
California Orcutt grass (*Orcuttia californica*)	E	Likely to adversely affect	No effect
Thread-leaved brodiaea (*Brodiaea filifolia*)	T	Likely to adversely affect	No effect
San Jacinto Valley crownscale (*Atriplex coronata* var. *notatior*)	E	Likely to adversely affect	No effect
Quino checkerspot butterfly (*Euphydryas edith quino*)	E	Likely to adversely affect	Likely to adversely affect
Arroyo toad (*Bufo californicus*)	E	Likely to adversely affect	No effect
California red-legged frog (*Rana aurora draytonii*)	T	No effect	No affect
Southwestern willow flycatcher (*Empidonax traillii extimus*)	E	Likely to adversely affect	No effect
Least Bell's vireo (*Vireo bellii pusillus*)	E	Likely to adversely affect	No effect
Bald eagle (*Haliaeetus leucocephalus*)	T	Not likely to adversely affect	No effect
Coastal California gnatcatcher (*Polioptila californica*)	T	Likely to adversely affect	Likely to adversely modify proposed critical habitat
Stephens' kangaroo rat (*Dipodomys stephensi*)	E	Likely to adversely affect	Likely to adversely affect

The basis for our findings is summarized below.

Southern California Steelhead

We conclude that the construction of the LEAPS Project may affect, but would not likely adversely affect the southern California steelhead or steelhead habitat. Only the lower 6 or 7 miles of San Mateo Creek are accessible to southern steelhead trout and spawning occurs in the downstream reach during periods of significant precipitation. Steelhead trout have not been identified in the tributaries to San Mateo Creek that would be crossed by transmission lines. A combination of BMPs during construction and water quality monitoring during the life of the project would reduce, but not eliminate, the potential risk of adverse impacts from the downstream transport of sediments.

Mexican Flannelbush

We conclude that the construction of the LEAPS Project would have no effect on Mexican flannelbush, because no suitable habitat is located at sites where project features would be constructed

San Diego Thornmint, San Diego Button-Celery, Mexican Flannelbush, Spreading Navarretia, and Nevin's Barberry

We conclude that construction and operation of the LEAPS Project is likely to adversely affect San Diego thornmint, San Diego button-celery, spreading navarretia, and Nevin's barberry. Based on a comparison of the known range and habitat associations of these species with the project area's location, elevation, soils, and vegetation cover types, we think it is unlikely that they occur in the project area. However, because these plants are rare, their habitat requirements are not as well understood as many other native species, and it is possible that they are present. None were identified during MBA's surveys. MBA's surveys covered many, but not all, of the areas that would be disturbed by construction. For this reason, we recommend that the co-applicants conduct pre-construction surveys at all sites where ground disturbance would occur. If these species are identified, we recommend the co-applicants consult with FWS (and the USFS, if plants are located on National Forest System lands) to determine how project features could be re-sited or re-aligned to avoid impacts. Flexibility in project design and implementation of construction BMPs (such as those discussed in section 3.3.4.2, Vegetation) should minimize the risk of adverse effects during construction. To minimize the risk of adverse impacts during operation, we recommend the co-applicants develop and implement a threatened and endangered species management plan. The plan should specify protective measures, including road management and weed management, a monitoring program, and mechanisms for consultation, reporting and adaptive management. Such a plan would reduce, but would not eliminate, the potential for adverse effects during the life of the project, as a result of fuel management activities, road and transmission line maintenance, and unauthorized public use of temporary and permanent access roads.

Munz's Onion, Slender-horned Spine Flower, San Diego Ambrosia, California Orcutt Grass, Thread-leaved Brodiaea, and San Jacinto Valley Crownscale

We conclude that construction of the LEAPS Project is likely to adversely affect Munz's onion, slender-horned spine flower, San Diego ambrosia, California Orcutt grass, thread-leaved brodiaea, and San Jacinto Valley crownscale. Suitable habitat for these species occurs in the project area. None of these species were observed during MBA's surveys. MBA's surveys covered many, but not all, of the areas that would be disturbed by construction. For this reason, we recommend pre-construction surveys and development and implementation of a threatened and endangered species management plan, as described above.

Quino Checkerspot Butterfly

We conclude that construction of the LEAPS Project is likely to adversely affect the Quino checkerspot butterfly and designated critical habitat. MBA's surveys did not indicate the presence of any Quino checkerspot butterflies, but about 1.75 acres of designated critical habitat for this species would be removed to install transmission line towers at the northernmost end of the proposed transmission alignment and 35 acres would be removed to build the northern substation near Lee Lake. Construction of three transmission towers outside designated critical habitat would remove about 0.75 acre of potential habitat in the same vicinity. Construction of temporary access roads could affect additional habitat. Vegetation management and unauthorized public use of temporary access roads, if any are constructed in butterfly habitat, could adversely affect habitat quality during project operation. Implementation of BMPs during construction and protective measures such as weed management and road management would reduce, but not eliminate, the risk of adverse effects through the life of the project.

Arroyo Toad

We conclude that construction of the LEAPS Project is likely to adversely affect the arroyo toad, which is known to occur in Los Alamos Creek and Tenaja Creek, and could also occur in Temescal Wash. No occurrences of this species are documented at sites that would be affected by construction, and MBA's surveys did not indicate the presence of any arroyo toads in the project area. However, about 1.0 acre of potential habitat may be removed for the construction of five transmission towers where the proposed transmission alignment would cross these creeks. Construction of temporary access roads could affect additional habitat. Vegetation management and unauthorized public use of temporary access roads, if any are constructed in arroyo toad habitat, could adversely affect habitat quality during project operation. Implementation of BMPs during construction and protective measures such as weed management and road management plans would reduce, but not eliminate, the risk of adverse effects through the life of the project.

California Red-legged Frog

We conclude that construction of the LEAPS Project would not affect the California red-legged frog. Although Los Alamos Creek and Tenaja Creek could provide suitable habitat, there are no known occurrences in either watershed, and MBA's surveys did not indicate the presence of this species. Only one population (three adult males) of California red-legged frogs is known to exist in Riverside County, and none are known in Orange or San Diego counties. FWS considers the potential for recovery in southern California to be low because there are few existing populations, habitat is generally of medium quality, and threats to its existence are high, due to human activities and competing land uses (FWS, 2002).

We conclude that construction of the project would not affect designated critical habitat. No designated critical habitat exists in Riverside, Orange, or San Diego counties.

Southwestern Willow Flycatcher and Least Bell's Vireo

We conclude the project is likely to adversely affect the southwestern willow flycatcher and least Bell's vireo. These species were not detected during surveys, but suitable habitat is present along the transmission line route, and construction of transmission towers could affect about 0.5 acre of riparian shrub at Temescal Wash and Tenaja Creek crossings. Construction of temporary access roads could affect additional habitat. Vegetation management and unauthorized public use of temporary access roads, if any are constructed in southwestern willow flycatcher or least Bell's vireo habitat, could adversely affect habitat quality during project operation. Implementation of BMPs during construction and protective measures such as weed management and road management plans would reduce, but not eliminate, the risk of adverse effects through the life of the project.

Bald Eagle

We conclude the project may affect, but would not likely adversely affect, the bald eagle. Under current conditions, bald eagles are rarely seen in the project area. Construction would not remove habitat, alter the prey base, or increase disturbance. The presence of a transmission line would represent a very low level of risk, because it would be designed to minimize the risk of electrocution and collision. As bald eagle populations in the state and in the county increase, however, bald eagle use may be more frequent, and monitoring would be needed to ensure that avian/power line interactions could be identified and addressed without delay.

Coastal California Gnatcatcher

We conclude that construction of the LEAPS Project is likely to adversely affect the coastal California gnatcatcher. No coastal California gnatcatchers were observed during the co-applicants' surveys, but the USFS has documented occupied habitat along the northern segment of the proposed transmission line. Construction of transmission towers would affect about 38.5 acres of designated critical habitat along the northern segment of the transmission alignment and at the northern substation, about 1 acre nearby, and about 30.5 acres of potential habitat at the Santa Rosa powerhouse site. Construction of temporary access roads could affect additional habitat. Vegetation management and unauthorized public use of temporary access roads, if any are constructed in coastal California gnatcatcher habitat, could adversely affect habitat quality during project operation. Implementation of BMPs during construction and protective measures such as weed management and road management plans would reduce, but not eliminate, the risk of adverse effects through the life of the project.

Stephens' Kangaroo Rat

We conclude the project is likely to adversely affect the Stephens' kangaroo rat. The co-applicants did not conduct surveys for this species, but it is known to occur in Riverside County. Construction of transmission towers and the northern substation would affect about 38.5 acres of habitat within the Stephens' Kangaroo Rat Fee Assessment Area or Lake Mathews-Estelle Mountain Core Reserve. Construction of temporary access roads could affect additional habitat. Vegetation management and unauthorized public use of temporary access roads, if any are constructed in Stephens' kangaroo rat habitat, could adversely affect habitat quality during project operation. Implementation of BMPs during construction and protective measures such as weed management and road management plans would reduce, but not eliminate, the risk of adverse effects through the life of the project. We are also recommending the co-applicants provide habitat mitigation at a ratio of 1:1 for losses of chaparral and non-native grasslands, coastal sage scrub, and oak woodland.

Consultation with the U.S. Fish and Wildlife Service

By letter dated June 9, 2006, FWS concurred with our finding of "no effect" on Mexican flannelbush, "not likely to adversely affect" the bald eagle, and "not likely to adversely affect" California red-legged frog critical habitat. FWS did not discuss our findings of "likely to adversely affect" Quino checkerspot butterfly, coastal California gnatcatcher, and Stephens' kangaroo rat. FWS disagreed with our findings of either "no effect" or "not likely to adversely affect" regarding all the other species discussed above, and requested additional information about the project. Table 58 shows the requests and our responses.

Table 58. Information requested in FWS letter dated June 9, 2006, and staff responses. (Source: Staff)

Requested Information	Staff Response
Identification of which alternative represents the proposed action submitted for consultation	The staff alternative is the action submitted for consultation.
Information about the proposed locations of access roads, habitat that would be affected, any survey results, and analysis of effects associated with road building, use and maintenance on federally listed species	Locations of many project features have not been finalized at this time. We recommend the co-applicants consult with FWS (and the USFS, on National Forest System lands) to design and conduct surveys where they are needed; prepare detailed reports and maps for FWS (and USFS) review and comment; and design project features to avoid or minimize adverse effects on listed species. We recommend that if listed species are present, the co-applicants consult with the

Requested Information	Staff Response
	agencies to develop and implement a threatened and endangered species management plan. We also recommend development and implementation of road management and vegetation management plans that should be protective of listed species, and habitat mitigation at a minimum ratio of 1:1 for all habitats that are converted to project use.
Information about vegetation management measures, and how they would affect listed species	Detailed information about vegetation management is not available at this time, but we recommend development and implementation of plans to manage vegetation and noxious and invasive weeds.
Information about noxious weed control, and how it would affect listed species	Detailed information about vegetation management is not available at this time, but we recommend development and implementation of plans to manage vegetation and noxious and invasive weeds.
Information about project effects on the Stephens' kangaroo rat Core Reserve lands	This information is shown in figure 15 and discussed in section 3.3.5.2. The staff alternative recommends 1:1 mitigation for impacts on chaparral and non-native grasslands.
Analysis of effects on arroyo toad that could occur in the event of a dam failure with release of water into San Juan Creek, and remediation measures that would be implemented.	Effects of a dam break on arroyo toads have not been studied in depth. We conclude the risk of a failure is small because the dam would be designed to comply with the Commission's Engineering Guidelines for the Evaluation of Hydropower Projects as well as State criteria. High hazard dams such as those proposed for the LEAPS Project must be able to safely pass the probable maximum flood, and to withstand the maximum credible earthquake. Both the Commission and the State of California routinely inspect dams and the Commission requires a rigorous dam safety review during the design process and every 5 years during project operations. However, the staff alternative includes a recommendation for the co-applicants to develop and implement a monitoring and remediation plan for San Juan Creek, as discussed in section 5.2.4, *Preventing Interbasin Water Transfers*.

5.6.5 National Historic Preservation Act

Relicensing is considered an undertaking within section 106 of the National Historic Preservation Act, as amended (P.L.89-665; 16 USC 470). Section 106 requires that every federal agency "take into account" how each of its undertakings could affect historic properties. Historic properties are districts, sites, buildings, structures, TCPs, and objects significant in American history, architecture, engineering, and culture that are eligible for inclusion in the National Register. As the lead federal agency for issuing a license, the Commission is responsible for ensuring that the licensee will take all necessary steps to "evaluate alternatives or modifications" that "would avoid, minimize, or mitigate any adverse effects on historic properties" for the term of any license involving the project. The lead agency also must consult with the SHPO(s), as well as with other land management agencies where the undertaking may have an effect, and with Indian tribes who may have cultural affiliations with affected properties involving the undertaking. The overall review process involving Section 106 is administered by the Advisory Council on Historic Preservation, an independent federal agency.

To meet the requirements of Section 106, the Commission will execute the Programmatic Agreement to take into account the effects on historic properties from the operation of the LEAPS Project. The terms of the Programmatic Agreement would ensure that the co-applicants would address and treat all historic properties identified within the project area through the HPMP. The HPMP entails ongoing consultation involving historic properties for the license term.

COVER SHEET

FEDERAL ENERGY REGULATORY COMMISSION

FINAL ENVIRONMENTAL IMPACT STATEMENT
FOR HYDROPOWER LICENSE
Lake Elsinore Advanced Pumped Storage Project
Docket No. P-11858-002

Section 6
Literature Cited
Pages 6-1 through 6-14
FEIS

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COVER SHEET

FEDERAL ENERGY REGULATORY COMMISSION

FINAL ENVIRONMENTAL IMPACT STATEMENT
FOR HYDROPOWER LICENSE
Lake Elsinore Advanced Pumped Storage Project
Docket No. P-11858-002

Section 7
List of Preparers
Pages 7-1 through 7-2
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COVER SHEET

FEDERAL ENERGY REGULATORY COMMISSION

FINAL ENVIRONMENTAL IMPACT STATEMENT
FOR HYDROPOWER LICENSE
Lake Elsinore Advanced Pumped Storage Project
Docket No. P-11858-002

Section 8
List of Recipients
Pages 8-1 through 8-28
FEIS

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COVER SHEET

FEDERAL ENERGY REGULATORY COMMISSION

FINAL ENVIRONMENTAL IMPACT STATEMENT
FOR HYDROPOWER LICENSE
Lake Elsinore Advanced Pumped Storage Project
Docket No. P-11858-002

Appendix A
USFS Review of Special Use Permit Application
Pages A-1 to A-2
FEIS

APPENDIX A

Review of Special Use Application for the Transmission Line Proposal Relative to the Need for Federal Land and Non-Federal Alternatives

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REVIEW OF SPECIAL USE APPLICATION FOR THE TRANSMISSION LINE PROPOSAL RELATIVE TO THE NEED FOR FEDERAL LAND AND NON-FEDERAL ALTERNATIVES

Nevada Hydro Company and Elisnore Valley Municipal Water District have filed an application with the Cleveland National Forest for a “stand alone” transmission line authorization. The U.S. Forest Service (USFS) has accepted this application and is evaluating this proposal in conjunction with the hydropower license application filed with the Federal Energy Regulatory Commission. When the USFS screens proposals, the need for federal land is evaluated to determine if the proposal is in the public interest. In the case of the “transmission line only” proposal, the applicants provided information used to evaluate other alternative alignments that were reasonably available to the applicant that did not require National Forest System lands. This appendix briefly summarizes the information considered by the USFS.

San Diego Gas & Electric Company proposed the Valley Rainbow transmission line interconnection project in 2001. Although the project was denied by the California Public Utility Commission (CPUC) in 2003, the CPUC staff released a preliminary report on the alternatives screening analysis in November 2002. The co-applicants have incorporated this information into the license application, Volume 3 of 6, Attachment 3. The analysis identified and screened 45 alternatives, including non-wires alternatives. The analysis identified 33 alternative routes that would provide the 500-kilovolt interconnection proposed by the LEAPS Project, 12 of those alternatives required use of National Forest System lands. The proposed routes on the National Forests were significantly constrained. Many crossed wilderness areas or tribal lands, which are essentially unavailable for development. Those routes that did not have wilderness or tribal lands are primarily those routes that have evolved into the alternatives considered in the LEAPS analysis.

Of the 21 alternative routes that did not need National Forest System lands, 15 crossed tribal lands that were not available for development. The remaining six routes were also constrained by land ownership, historic sites, habitat reserves, and displacement of homes and businesses along the right-of-way.

Given the numerous constraints on locating transmission line corridors in the Lake Elsinore area, the USFS concluded during the application screening that National Forest System lands are necessary for the proposed interconnect. It is also evident that alternative locations are not reasonably available to the co-applicants. For the purposes of this analysis, the range of alternatives includes several different routes that were designed to respond to specific issues while meeting the purpose and need of the project. Alternative routes that cross wilderness areas, tribal lands, or densely populated urban areas are not reasonably available to the proponent, and will not be considered in detail.

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COVER SHEET

FEDERAL ENERGY REGULATORY COMMISSION

FINAL ENVIRONMENTAL IMPACT STATEMENT
FOR HYDROPOWER LICENSE
Lake Elsinore Advanced Pumped Storage Project
Docket No. P-11858-002

Appendix B
Need Determination for 500-kV Transmission Line
Pages B-1 to B-26
FEIS

APPENDIX B

Need Determination for the Lake Elsinore Advanced Pumped Storage (LEAPS) Project's Talega-Escondido/Valley-Serrano 500-kV Transmission Line

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NEED DETERMINATION FOR THE LAKE ELSINORE ADVANCED PUMPED STORAGE (LEAPS) PROJECT'S TALEGA-ESCONDIDO/VALLEY-SERRANO 500-kV TRANSMISSION LINE

EXECUTIVE SUMMARY

The Final Application for License of the Lake Elsinore Advanced Pumped Storage Project (LEAPS) includes a proposal to build a 500-kilovolt (kV) transmission line interconnection from Southern California Edison (SCE) north of the project to San Diego Gas & Electric (SDGE) south of the project known as the Talega-Escondido/Valley-Serrano (TE/VS) 500-kV transmission line. This paper reviews available documentation about the need for the TE/VS transmission line between these two utilities and determines if consensus exists among the various stakeholders regarding the reliability of and economic need for this transmission line, its preferred location, and implementation timing.

California's existing transmission system links power generation resources with customer loads in a complex electrical network that must balance supply and demand on a moment-by-moment basis. An efficient and robust transmission system is required not only to help deliver the lowest-cost generation to consumers but also to stimulate competitive behavior in energy markets, pool resources for ancillary services, and provide emergency support in the event of unit outages or natural disasters. Some of the problems facing the transmission system in the area of the LEAPS Project include congestion on major paths, which prevents optimal economic operation of the system, and constraints such as power flow restrictions, which affect both the economic and reliable operation of the system, in major load centers such as San Diego.

Various state agencies and regional planning groups recently have studied the need for SDGE to import additional electric power beginning in 2005. Of these agencies and planning groups, the Southwest Transmission Expansion Plan (STEP), SDGE, and California Independent System Operators (CAISO) have conducted the most current and applicable studies.

The STEP studies conducted in 2003 indicate that a new 500-kV line into San Diego would be necessary to serve future load growth. Many STEP participants believe that the existing transmission system in this area is inadequate to fully deliver all the new generation that has been developed. By enhancing the capability of the transmission system, new, clean, and efficient generation would be available to service future load growth and replace older and less efficient generation.

The STEP examined several options for routing a new transmission line into San Diego, including several alternative routes from Imperial Valley into San Diego, known as the Imperial Valley-San Diego Expansion Plan (ISEP) Project, as well as the proposed TE/VS transmission line associated with the LEAPS Project. Detailed analyses (powerflow and stability) and economic (production costs) studies were conducted for each of these options. The STEP found that neither project had annual benefits large enough to offset its costs; however, the STEP did not analyze the strategic project benefits[1] of these projects, which could improve the projects' economic outlook.

Korinek (2003) re-enforces the need to increase San Diego's import capability, which is currently limited to 2,850 megawatts (MW), to cover an estimated reliability deficiency of 291 MW in 2007. This

[1] Strategic benefits include reliability, load diversity, fuel diversity, access to lower cost power plants, firm power purchase, economy energy and surplus hydro purchases, power exchanges and reserve sharing.

deficiency, based on G-1/N-1[2] reliability criteria, is primarily due to the inability to permit the 500-kV Valley-Rainbow transmission line (Valley-Rainbow transmission line, which, from an electrical network viewpoint, is almost identical to the TE/VS transmission line), combined with increasing loads in San Diego.

In February 2002, the Office of Ratepayer Advocates (ORPA), under the California Public Utilities Commission (CPUC), completed its assessment of the Valley-Rainbow transmission line and found that the project affords negligible reliability benefits in at least the next 5 years (Sierra Energy & Risk Assessment, 2002). However, it appears that after SDGE performed additional analyses in 2003, SDGE can justify this project as marketable in the 2010 time frame, based on its ability to relieve transmission congestion and improve power import capability into the San Diego area.

In May 2004, Kyei (2004) completed, *Comparative Reliability Evaluation for Alternative New 500-kV Transmission Lines into San Diego,* a study that evaluated the relative reliability benefits of the TE/VS transmission line and the most technically desirable alternative for a new line from Imperial Valley into San Diego (i.e., the ISEP transmission line). The results of Kyei (2004) revealed that either the TE/VS transmission line or the ISEP transmission line would substantially increase the capability to import electricity (from 2,850 MW to 3,600 MW with all lines in service) to the San Diego area.

A combination of the TE/VS and ISEP transmission lines would provide additional benefits, such as a 3,800-MW import capability. SDGE's long-term plan is to identify a way to connect the western end of the ISEP transmission line with the southern end of the TE/VS transmission line, creating one continuous path (see figure 4 in main text).

Based upon our review of available documentation, it appears that the TE/VS transmission line interconnection between the SCE and SDGE transmission systems would be an appropriate long-term solution to southern California's transmission congestion bottlenecks as well as the transmission-constrained, generation-deficient San Diego area. The TE/VS transmission line could provide 1,000 MW of import capability into the San Diego area with up to 500 MW of this import power being supplied by the LEAPS Project during high-demand periods.

[2] Specifically, the 500-kV Valley-Rainbow Project was proposed to mitigate a CAISO reliability criteria violation that could result from an overlapping outage involving the single largest generator and the single largest transmission line serving the San Diego area. The problem is known technically as a G-1/N-1 violation. The G-1/N-2 violation was identified through transmission planning studies that SDGE, the CAISO, and other parties conducted jointly as part of the CAISO grid planning process. Those studies for 2005–2010 showed that in the case of a heavy summer peak load, an outage of SDGE's largest generation project (Encina 5 at 329 MW) followed by an outage of the Southwest Power Link would result in a generation deficiency in the San Diego area, requiring the CAISO to drop customer load.

1.0 INTRODUCTION

This paper summarizes analyses of and testimony and reports about San Diego Gas & Electric's (SDGE's) proposed 500-kilovolt (kV) Talega-Escondido/Valley-Serrano (TE/VS) transmission line and determines if consensus among agencies and utilities exists regarding reliability and economic need for this new transmission line associated with the LEAPS Project. A brief discussion regarding this author's opinion of whether the TE/VS transmission line falls within the Federal Energy Regulatory Commission's (Commission's or FERC's) definition of a primary line is followed by information about the need for electric transmission and how the TE/VS transmission line would help this need, a general discussion of transmission path reliability and congestion and how these issues relate to SDGE's system, a discussion of generation deficiency along with SDGE's generation outlook, load demand forecast for SDGE through the year 2008, and SDGE's proposed solution for the demand for electricity.

In this paper, we draw upon information from documents about transmission lines prepared by the California Energy Commission, the California Public Utilities Commission (CPUC), the Electricity Oversight Board (EOB), the California Power Authority (CPA), the California Independent System Operator (CAISO), and SDGE.

1.1 PURPOSE

The Final Application for License of the Lake Elsinore Advanced Pumped Storage (LEAPS) Project includes a proposal to build a 500-kV transmission line interconnection from Southern California Edison (SCE) north of the project to San Diego Gas & Electric (SDGE) south of the project, referred to herein as the TE/VS transmission line. The TE/VS transmission line is SDGE's proposed alternative to the CPUC-denied Valley-Rainbow transmission line. Although the Valley-Rainbow transmission line and the TE/VS transmission line are often referred to as the Near-Term Interconnection (NTI) Project, in this paper, we refer to each project by their separate names.

California's existing transmission system links power generation resources with customer loads in a complex electrical network that must balance supply and demand on a moment-by-moment basis. An efficient and robust transmission system is required not only to help deliver the lowest-cost generation to consumers but also to stimulate competitive behavior in energy markets, pool resources for ancillary services, and provide emergency support in the event of unit outages or natural disasters. Some of the problems facing the transmission system in the area of the LEAPS Project include congestion on major paths, which prevents optimal economic operation of the system, and constraints such as power flow restrictions, which affect both the economic and reliable operation of the system, in major load centers such as San Diego.

Various state agencies and regional planning groups recently have studied the need for SDGE to import additional electric power beginning in 2005. Of these agencies and planning groups, the Southwest Transmission Expansion Plan (STEP)[3], SDGE, and CAISO have conducted the most current and applicable studies.

The purpose of this report is to summarize the reliability and economic need assessments for the TE/VS transmission line associated with the LEAPS Project. We reference documentation prepared for

[3] STEP is a collaborative ad-hoc voluntary study group whose membership is open to all interested stakeholders. The organization, which was created by the CAISO, exists for the benefit of its members and the value that they derive in achieving planning, coordination and implementation of a robust transmission system between the Arizona, southern Nevada, Mexico and southern California areas. STEP has no staff and its members (i.e., stakeholders, project sponsors, transmission owners, regulatory agencies, and Regional Transmission Operator/Independent System Operators) complete the required work.

the Valley-Rainbow transmission line because the TE/VS transmission line associated with the LEAPS Project is electrically similar, has similar reliability and need issues, and would receive similar technical and regulatory scrutiny (attachment 1).

1.2 POINT OF JUNCTION

To determine the portion of the TE/VS transmission line that would fall under the FERC definition of a project transmission line and therefore be included in the LEAPS Project's license application, a determination of where the project's point of junction occurs is necessary. The Commission's license must include all of the facilities necessary for the proper operation of the project including the project primary facilities or lines transmitting the project's power to the point of junction with the interconnected primary transmission system.

1.2.1 Project Transmission Line

The Commission defines a project transmission line as a transmission line that transmits power from a licensed waterpower project or other hydroelectric project authorized by Congress to the point of junction with the distribution system or with the interconnected primary transmission system. To understand the point of junction, we also need to know the definition of a distribution system and a primary transmission system.

A distribution system is the portion of an electric system that is used to deliver electric energy from points on the transmission or bulk power system to the customers. An interconnected primary transmission system is an interconnected group of electric transmission lines and associated equipment used to move or transfer of electric energy in bulk between points of supply and points at which the electricity is transformed for delivery to ultimate consumers, or is delivered to electric systems of others.

Simply stated, the Commission considers transmission facilities to be part of a distribution system or interconnected primary transmission system if the facilities are necessary to serve utility system customers or are necessary to perform another obligatory power system function. These other obligatory power system functions include:

- Improving system reliability,
- Reducing transmission grid congestion, and
- Reducing energy costs.

1.2.2 Project Primary Facilities/Lines

Only facilities that carry project power and are not part of the distribution or interconnected transmission system can be categorized as project primary lines. Similarly, the Commission considers transmission facilities as being primary project facilities if (1) they are necessary to get all of the project power to market, and (2) their continued existence is not assured because (a) they are not necessary to serve utility system customers, and (b) they are not necessary to perform another obligatory power system function.

1.2.3 500-kV Point of Junction

The Commission must ensure the permanence of all the transmission facilities needed to carry the project power to market. These permanent transmission facilities are the project primary lines that connect the project to the point of junction. This project has three probable outcomes regarding the definition of the point of junction depending upon which of the following scenarios occurs as the final outcome. The first two scenarios assume that the TE/VS transmission line is not licensed and is constructed separately from the LEAPS Project. The third scenario assumes that the TE/VS transmission line is licensed and is constructed separately.

1.2.3.1 Interconnection to the Northern Primary Transmission System

Extending a 500-kV transmission line from the LEAPS Project generators north to SCE's 500-kV Valley-Serrano transmission line would define the point of junction at a new substation approximately 16 miles west of the existing 500-kV Valley substation. The length of the project primary line under this scenario is approximately 13 miles.

1.2.3.2 Interconnection to the Southern Primary Transmission System

Extending a 500-kV transmission line from the LEAPS Project generators south to SDGE's 230-kV Talega-Escondido transmission line would define the point of junction at a new 500-kV/230-kV substation approximately 14 miles west of the previously proposed 500-kV/230-kV Rainbow substation. The length of the project primary line under this scenario is approximately 19 miles.

1.2.4 Change in Point of Junction Definition after Initial Determination is Made

If the interconnection is made to either the northern or southern route, as described above, and at a later time, the remaining southern or northern portion of the TE/VS transmission line is completed, the complete line would be able to carry non-project power. The licensee could file to amend the license to exclude all of the TE/VS transmission line, except the short segment from the powerhouse substation to the TE/VS transmission line.

1.2.5 115-kV Point of Junction

The LEAPS license application also includes two 115-kV ties to the existing Lake Elsinore 115-kV transmission system. It appears that these transmission lines would not fall within the licensing authority of the Commission because (1) the lines most likely would carry some non-project power in the form of loop flow, depending upon the configuration and power flow characteristics of the 115-kV grid; (2) the lines are not necessary to get all of the project power to market (the 500-kV system is designed for this purpose and the 115-kV system does not have the capacity to transmit all of the project power [500 MW] to the market); and (3) the lines may be necessary to perform another obligatory power system function. However, this condition alone does not qualify it as a primary project facility.

1.3 LEAPS PROJECT'S NEED FOR 500-kV VOLTAGE

The LEAPS Project will generate up to 500 MW of electricity during the day at peak energy-use times. At a minimum, the LEAPS Project would require a transmission line with enough capacity to transmit power from the power generation source to the point of junction with the interconnected primary transmission system. In this location, there are only two choices for transmitting this amount of power—a 230-kV line or a 500-kV line. Because of the much higher cost of building the line at either voltage level underground, only overhead construction has been considered. Power system engineers often use the concept of surge-impedance loading (SIL) as a convenient way of comparing the approximate load-carrying capability of lines of different voltage levels. SIL is approximately equal to loading where the line's loss in reactive power due to load current is equal to the reactive power generated by its capacity. Figure 1 below illustrates the relationship between the power transmission capacity of a single conductor/phase 500-kV transmission line over various line lengths versus transmitting the same power over a single conductor/phase and a two-conductor/phase 230-kV transmission line.

Figure 1 indicates that at a line length of approximately 30 miles, the 500-kV voltage line would transmit greater than 2,000 MW, the single conductor 230-kV line would transit less than 500 MW, and the two conductor 230-kV line would transmit slightly more than 500 MW. Although SIL gives a general idea of the load capability of a line, it is usual to load short lines (300 miles or less) appreciably above the SIL. For a 30-mile-long line, this could be a 200 percent to 250 percent increase in loading above that shown in figure 1. Therefore, strictly from a line loading point of view, either the 230-kV or 500-kV voltage would be acceptable to transmit the project's 500 MW into the utility grid.

The next issue to address is where the Commission-defined point of junction occurs and the voltage that would be the most appropriate to use.

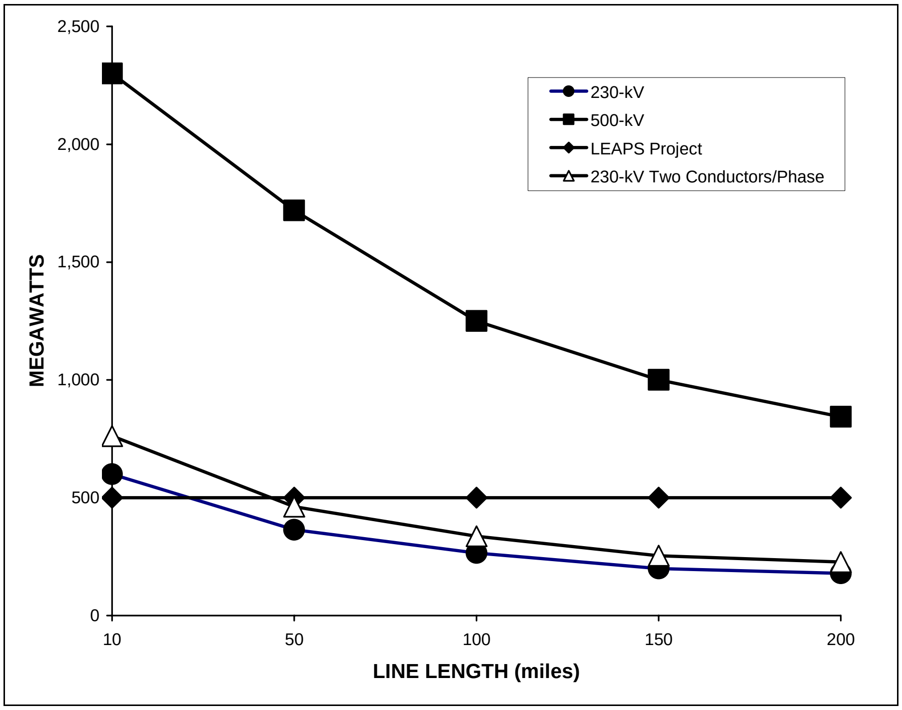

Figure 1. Electric power transmission capacity limitations based on surge impedance loading.

1.3.1 Southern Point of Junction

If the point of junction ultimately occurs at the southern tie point, a voltage selection of 230-kV might be justified; however, because the SDGE expansion plan calls for the addition of this line at 500-kV, it is likely that this line would be constructed on a 500-kV right-of-way width using 500-kV towers and insulators producing little cost difference from the 500-kV option. The 230-kV plan would also result in greater reactive power[4] requirements and increased system losses. See the section 3.0, *Conclusions*, for more detail about using 230-kV as the selected voltage.

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[4] Reactive Power is an abstract quantity used to describe a certain type of power flow in an electric power system. It is measured in reactive volt-ampere's (VAr) not watts. In an alternating current (AC) system both the current (I) and voltage (V) are sinusoidal. Useful power (P) is the product of the current and voltage (e.g., P = I * V) and is measured in watts. If there is a phase separation between the current and voltage, the total power (VA) will have to "work harder" to produce the equivalent useful power if they were in phase. Reactive power is described as the amount of power required to overcome the phase shift between the current and voltage. It is generally regarded as waste power because it is used to "energize" the circuit to allow it to do useful work. Substantial effort is made to control the reactive power levels to minimize costs. This is typically accomplished through automatic switching of capacitors and reactors.

1.3.2 Northern Point of Junction

If the point of junction ultimately occurs at the northern tie point, a voltage selection of 230-kV cannot be justified based on an economic basis because no 230-kV source exists at SCE's Valley substation. A 230-kV option would require construction of a 500/230-kV substation at or near the Valley substation or connection to SCE's Mira Loma or Dever's 230-kV substation at much higher costs since these substations would require a longer 230-kV transmission line connection. See section 3.0, *Conclusions*, for more detail about using 230-kV as the selected voltage.

1.3.3 Interconnection to the Separately Permitted TE/VS Transmission Line

If the point of junction ultimately would occur at the separately licensed and constructed TE/VS transmission line at a location less than 1 mile south west from the LEAPS powerhouse substation, a voltage selection of 230-kV still would not appear to be justified because any savings that could be realized when building a 1 mile length of 230-kV transmission line, rather than a 500-kV transmission line, would be overcome by the additional cost of building two substations; one substation would step the generator voltage up to 230-kV the second would step the voltage up from 230-kV to 500-kV.

1.4 NEED FOR A NEW 500-kV TRANSMISSION LINE

Major transmission lines undergo considerable regulatory review and a lengthy permitting process. Because of the length of the planning, assessment, licensing, and construction processes for transmission line facilities and the rapidly disappearing corridor options, CAISO and SDGE recommend, as a minimum, licensing the TE/VS transmission line as soon as possible because of the imminent need for reliable import of electricity into the San Diego area and the rapidly disappearing opportunities for procuring new right-of-way corridors.

The exact timing of when the TE/VS transmission line would be needed is not clear from an economic need standpoint because of the lack of market models to adequately forecast and "prove" its need and to justify this project as a market-driven economically beneficial project. However, the need for the transmission line appears imminent to meet anticipated electrical demands in the 2010 time frame.

Previous attempts to license an electrically equivalent 500-kV transmission line on a different right-of way were denied for various reasons, including uncertainty about future benefits and evaluation methodologies that did not recognize the strategic value of transmission, present worth valuation that discounted the long-term benefits of long-lived transmission assets, and use of average conditions in long-term planning studies that discount the substantial insurance benefits[5] of transmission projects (attachment 1).

SDGE proposes to use the TE/VS transmission line as an alternative to the CPUC-denied Valley-Rainbow transmission line to provide the following benefits:

- Meet current and future reliability needs as defined by Western Electricity Coordinating Council,
- Provide access to renewable energy resources,
- Potentially reduce energy costs for the citizens of California,
- Remove congestion on the existing bulk power system,

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5 Insurance benefits are those derived from a transmission line's ability to lessen the impact of an event that has an unacceptable impact on the power system, no matter how unlikely the occurrence of this event may be.

- Greater access to potentially lower-cost and diverse energy resources,
- Reduce reliability must run (RMR)[6] costs, and
- Balance resource plan.

Our discussion focuses on the ability of both the TE/VS transmission line and the LEAPS Project to meet reliability needs, provide access to renewable and other energy resources, and relieve transmission congestion.

1.4.1 Transmission Reliability and Congestion

Transmission congestion, which ultimately causes higher transmission delivery costs, occurs when the amount of power that can be transferred over a line or path is constrained by the operating limit of the line or path. For example, congestion limits the amount of relatively low-cost electricity that can be imported into California from the Pacific Northwest or the Desert Southwest, or between major load centers in California. As a result, more expensive in-state or local generation sources must be used to meet load demands. The CPUC has identified the San Diego area as a transmission-constrained area, an area that must rely heavily on local generation to meet power needs because of a shortage of capacity on transmission lines to import power when needed.

1.4.1.1 General

The addition of new generation resources to a grid can create new congestion problems or aggravate existing ones, both affect the reliability of the system. When a new power plant is proposed, the Participating Transmission Owners (PTOs) and CAISO evaluate if the power plant’s interconnection to the transmission grid would adversely affect system reliability. Downstream reliability effects typically occur when new generators connect to the transmission system overloading transmission lines, transformers, circuit breakers, and other system components and causing violations of accepted reliability criteria.

Violation of these reliability criteria can result in system outages. Some reliability criteria violations may be mitigated by employing measures that would curtail generation from the new power plant during emergency conditions. Other violations may require transmission line expansion or replacement, or the addition of transformers, circuit breakers, or other system components. At some point, it becomes necessary to identify more costly long-term solutions, such as transmission expansions, to address congestion problems. Analyses of the SDGE system indicate that during peak-loading periods, it is anticipated that the existing import capabilities would be transmission-constrained.

[6] To prevent potential market power abuses, the CAISO requires key generators to sign RMR contracts that require the generators to operate at specific fixed prices during times specified by the CAISO. An important issue is anticipating higher than expected increases in RMR costs in the SDGE area.

1.4.1.2 SDGE

The San Diego area has about 2,300 MW of local or in-basin generation. With a peak load of about 4,500 MW, the San Diego area must import electricity from outside its area to meet the major portion of its peaking requirements. The following three major transmission paths[7], Path 44, the Southwest Power Link, and Path 45, supply these requirements (see figure 2).

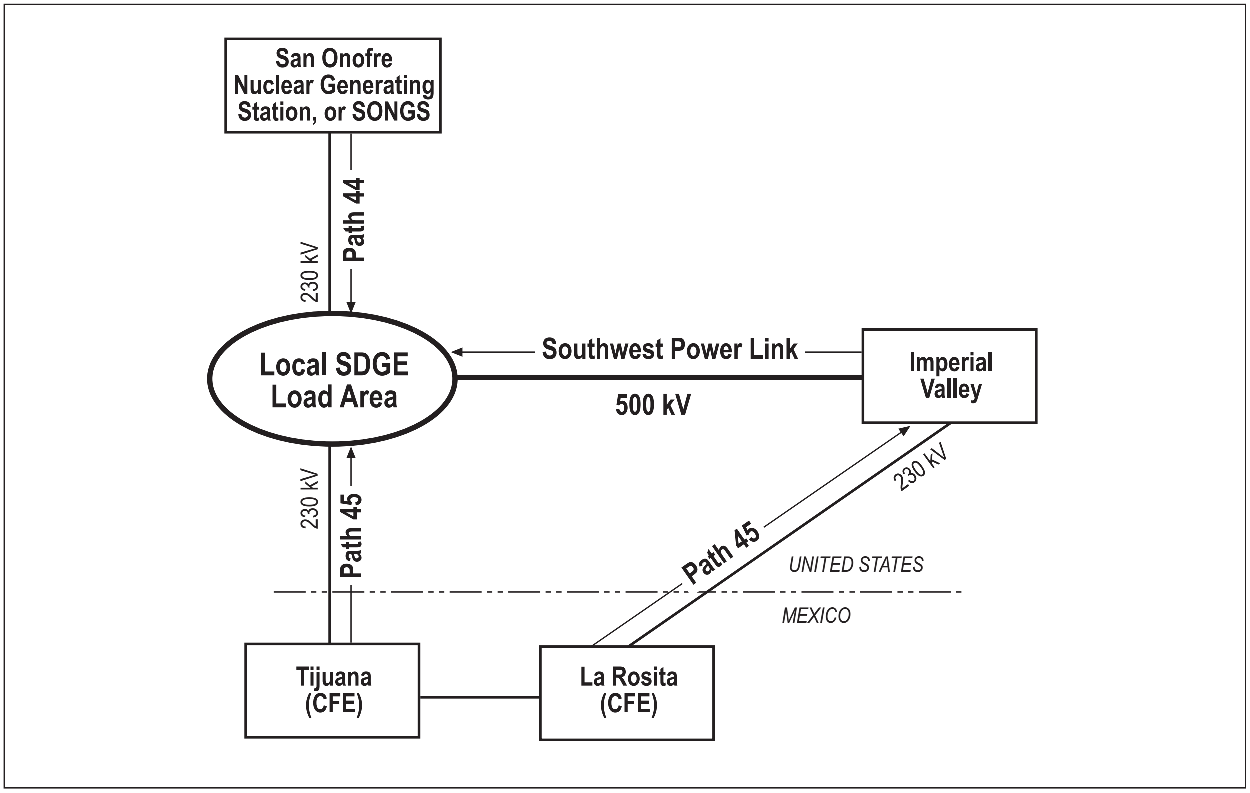

Figure 2. SDGE transmission import paths.

- Path 44, consisting of five 230-kV transmission lines, connects San Diego with the San Onofre Nuclear Generating Station (SONGS) and is San Diego's only major connection with the CAISO grid. The five lines have a transfer capability of approximately 2,200 MW.
- Southwest Power Link, the second connection, is the 500-kV transmission system that connects San Diego to generation resources in Arizona via the North Gila and Imperial Valley substations.
- Path 45, which connects SDGE to northern Mexico, is a system of 230-kV transmission lines that run north-south and connect SDGE to the Commission Federal de Electricidad (CFE) system and transmission lines that run east-west across Baja California. Path 45 has a path rating of 400 MW during heavy peak summer conditions and 800 MW winter peak.

[7] A transmission path is one or multiple transmission line(s) connecting a CAISO-designated local reliable area to the transmission grid.

1.4.2 Generation Deficiency

Generation-deficient areas are RMR[8] areas that lack sufficient generation to meet expected demand. Deregulation resulted in the majority of the generating plants being sold to third parties that did not have this requirement as part of their purchase of the plants. To maintain local area reliability, the ISO created RMR contracts to ensure generating plant availability. In general, the RMR contracts give the ISO the right to call on the units for a specified price. CAISO (2004) provides additional details about California's RMR methodology.

Generation-deficiency combined with a transmission-constrained condition makes an area extremely vulnerable to disruptions of internal generation supplies and disruptions of transmission facilities supplying imports from outside of the service area. Generation deficiency is more important to address than transmission constraints because generation-deficient areas are more likely to sustain low-reserve margins, which would defer retiring a unit. One can retire a unit in a transmission-constrained area provided the area has a sufficient reserve margin.

1.4.3 SDGE's In-basin Generation Supply

CAISO classifies San Diego as a local reliability area and as an RMR area. As a local reliability area, San Diego is characterized by limited in-basin generation (i.e., the generation within the San Diego area that is not reliant on imported energy) and by limited transmission access to generation resources outside the area. During the CPCN hearings for the Valley-Rainbow transmission line, parties discussed the supply forecast and reviewed existing in-basin generation, anticipated new (i.e., from project that are licensed) and proposed (i.e., pre-licensed projects) generation and anticipated retirements. The availability of several projects was discussed in the hearings and debated by the parties, including South Bay Unit 4, Encina, Ramco peaking units, Navy units, Otay Mesa Project, and proposed power plants in Baja California, Mexico. The decision acknowledged that there was much uncertainty about anticipated new and proposed generation and future retirements. Some of the issues raised are discussed below.

1.4.3.1 Existing SDGE Basin Generation

SDGE has 2,348 MW of in-basin generation available in the San Diego area, including 1,635 MW of gas-fired, base-load generation at the Encina and South Bay facilities; 215 MW of combustion turbines; 220 MW of peaking facilities; and 175 MW of cogeneration. The 1,635-MW Encina and South Bay facilities are relatively older, inefficient, and only marginally competitive facilities compared to new generation facilities coming online outside of the San Diego area. Further, all but 220 MW of the 1,635 MW from the Encina and South Bay facilities are classified by the CAISO as RMR output, and these facilities must perform as directed by CAISO contracts.

1.4.3.2 Retired Generation

SDGE raised concerns before the CPUC about the future of much of San Diego's in-basin generation. In a petition to the CPUC concerning its decision about the Valley-Rainbow transmission line, SDGE raised concerns about the status and availability of a number of existing generation facilities, the status of the Otay Mesa Project, and the cost of future RMR contracts. Duke Energy placed its South Bay Unit 4 (221 MW) in cold storage in early 2003 until further notice. Duke's rationale for this step was

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[8] Prior to deregulation of the electric industry in California, the individual PTOs had full control of all their generating plants. If a Grid Planning Criteria Violation was found, it was possible to eliminate the violation by either building new transmission lines or ensuring that a particular generating plant was on-line. The PTOs would then look at the economics of building new transmission lines against ensuring that the generating plant would be available to run. In a many cases, the availability of the plant was the preferred solution because the PTO had the ability to ensure that the plant was available.

the inability of South Bay 4 to compete effectively, especially in the face of anticipated new power plants such as Otay Mesa and Palomar. Another consideration in choosing to temporarily mothball South Bay 4 may be that the unit was not selected by the CAISO for an RMR contract for the 2003 period. In addition to the Encina Project, there is also a concern that because of age, efficiency problems, competitive pressures, and environmental issues, the owners of Encina and South Bay facilities may opt to retire more of those units as newer and more efficient generating units come on-line.

1.4.3.3 Anticipated New Generation

Three large new generation projects with more than 2,200 MW of gas-fired generation could be available to the San Diego area in the 2005–2006 time frame. These projects include:

- new projects with 1,000[9] of generation located near Mexicali in northern Mexico and scheduled for commercial operation by mid-2003;
- 510-MW Otay Mesa Project located in southern San Diego County; and
- 546-MW Sempra Palomar Project, which was approved by the California Energy Commission on August 6, 2003.

SDGE has signed interconnection agreements for power from both the Otay Mesa Project and the new projects near Mexicali, Mexico. The three projects could provide SDGE the new generation necessary to accommodate additional basin retirements and provide additional reliability margins in the event that new transmission facilities are not permitted by the CPUC.

SDGE’s peak load demand forecast, which determines the magnitude of its congestion problems and the general timing of proposed longer-term transmission expansion solutions, is discussed below.

1.4.4 Demand Forecast

In the review of the Valley-Rainbow transmission line during the CPCN hearings, the CPUC held that the 5-year demand forecast currently used by SDGE should be applied. SDGE and CAISO had argued that a 10-year demand forecast would be more appropriate; however, the CPUC concluded that forecasts of both generation supply and demand are more uncertain when moving beyond 5 years and that greater uncertainty exists with a longer planning horizon. SDGE noted in the hearings that the demand might have been skewed as a result of conservation efforts that occurred after the blackouts in 2001. Numerous reports prepared for the California Energy Commission regarding transmission project planning and policy as well as STEP and CAISO analyses indicate that the 5-year period for transmission planning does not appear to be adequate in addressing transmission planning and policy issues. A more appropriate planning horizon would be 8 to 10 years (EPG and CERTS, 2003).

1.4.5 Long-term Outlook of Supply and Peak Demand for 2004–2008

SDGE’s computation of its local reliability need is summarized for 2005 through 2008 in table 1. These data were taken from attachment 3 to D. Korinek’s testimony filed April 15 2003 (Korinek, 2003). Line A shows SDGE’s one-in-ten-year peak weather forecast, Line B shows SDGE’s import limit given its single largest transmission contingency (N-1), and Line C shows generation within SDGE’s service territory given its single largest generation contingency (G-1). Line D, was computed by adding the figures from Lines B and C and subtracting the value from Line A, shows the amount of new generation or import capability that SDGE would need each year to meet its local reliability criterion. Line E shows the impact of the addition of substantial transmission facilities on SDGE’s local reliability needs.

[9] SDGE only has contracted for 1,000 MW of the plants’ total output of 1,500 MW.

Reduced local generation needs are shown in Line F, which reflects the assumption that substantial new transmission investments are available at this time.

Table 1. SDGE's computation of its local reliability need. (Source: Korinek, 2003)

Description	Year 2005	2006	2007	2008	Formula
A. One in ten load forecast	4,504	4,624	4,726	4,844	
B. Existing import limit with N-1	2,500	2,500	2,500	2,500	
C. Existing in-basin generation with G-1	1,935	1,935	1,935	1,935	
D. Reliability need (G-1 / N-1)	–69	–189	–291	–409	B + C – A
E. Transmission addition	0	0	0	700	
F. Reliability surplus / Deficiency	–69	–189	–291	–291	D + E

Note: Negative values indicate a deficiency in generation and import availability.

In prepared direct testimony on SDGE's Grid Reliability Capacity Request for Proposal, Mr. Kevin Woodruff, Principal of Woodruff Expert Services, states that upon review of SDGE's load forecast and projected area resources, he finds that the projected load growth (2.8 percent per year) during the period from 2004 to 2008 is higher than that for the years thereafter, which is 1.9 percent per year. In addition to the excessive load growth, he believes that substantial adjustments to the projected area resources (additional generation) could reduce or defer SDGE's purported local reliability need beyond 2007, also deferring the need for substantial new transmission investments (Woodruff Expert Services, 2004).

Mr. Woodruff's testimony is reflected by Mr. David Geier, Vice President of SDGE's Electric Transmission and Distribution, in an August 2004 presentation before the California Energy Commission. Mr. Geier stated that SDGE could need a new 500-kV transmission line as early as 2010 for reliability and interconnection of renewable and other energy resources. Mr. Geier also mentioned that the timing for this project is subject to many variables, including demand projections and generation additions and retirements.

2.0 PROPOSED SOLUTION

2.1 TE/VS TRANSMISSION LINE

The LEAPS Project would use more than 500 MW of electricity to pump water from Lake Elsinore at night and generate 500 MW of electricity during the day at peak energy-use times. Elsinore Valley Municipal Water District and the Nevada Hydro Company propose to connect to a newly constructed 500-kV transmission line (see figure 3) approximately 32 miles long traveling north of the project connecting to an existing transmission line owned by SCE (the 500-kV Valley-Serrano transmission line) and running south of the project to existing transmission lines owned by SDGE (the 230-kV Talega-Escondido transmission line).

SDGE proposes to use the proposed TE/VS transmission line as an alternative to the CPUC-denied Valley-Rainbow transmission line to interconnect the its existing 230-kV transmission system at a new substation in northern San Diego County with the existing SCE Serrano-Valley 500-kV transmission system in western Riverside County (see figure 4).

Following are the major elements of the proposed TE/VS transmission line:

- A new 32-mile-long 500-kV transmission line with an approximate 1,600 MW rating that interconnecting a new SDGE Talega-Escondido substation to a new SCE South Valley substation;
- A new NTI substation that interconnects the proposed TE/VS transmission line with the SDGE's existing 230-kV and 69-kV transmission systems;
- A new South Valley substation that interconnects the proposed TE/VS transmission line with SCE's existing Serrano-Valley 500-kV transmission line;
- A new Talega-Escondido 230-kV transmission line that loops into the new NTI 500-kV substation;
- New 500-kV transformers at NTI substation; and
- Additional SDGE 230-kV and 69-kV system improvements.

2.2 PROPOSED IMPLEMENTATION

SDGE's reliability problems largely have resulted from the load and generation characteristics of the San Diego electricity system. CAISO has classified SDGE as a local reliability area and as an RMR area. As a local reliability area, San Diego has limited in-basin generation and limited access to generation resources outside the area. These limitations make the area extremely vulnerable to supply disruptions of internal generation and imported power. Because of limited generation resources, SDGE's electricity markets also lack sufficient competitiveness to prevent the exercise of market power by key generators under certain peak loading conditions.

To prevent potential market power abuses, the CAISO requires key generators to sign RMR contracts that require them to operate at specific fixed prices during times specified by the CAISO. An important issue is anticipating higher than expected increases in RMR costs in the SDGE area. This issue was raised by SDGE after the December 19, 2002, denial of the CPCN when SDGE filed a Petition to Modify the Valley-Rainbow Decision and a Petition for Rehearing. The CPUC findings in the decision indicated that for purposes of G-1/N-1 reliability criteria planning, existing in-basin generating units should be assumed to continue to be available during the critical planning period (5 years) in the absence of specific convincing evidence to the contrary. The CPUC decision denied the project a CPCN without prejudice saying the project was not needed at this time because SDGE will continue to meet the WECC/NERC reliability criteria during the relevant planning horizon (5 years) and that the project cannot be justified on the basis of providing economic benefits to ratepayers.

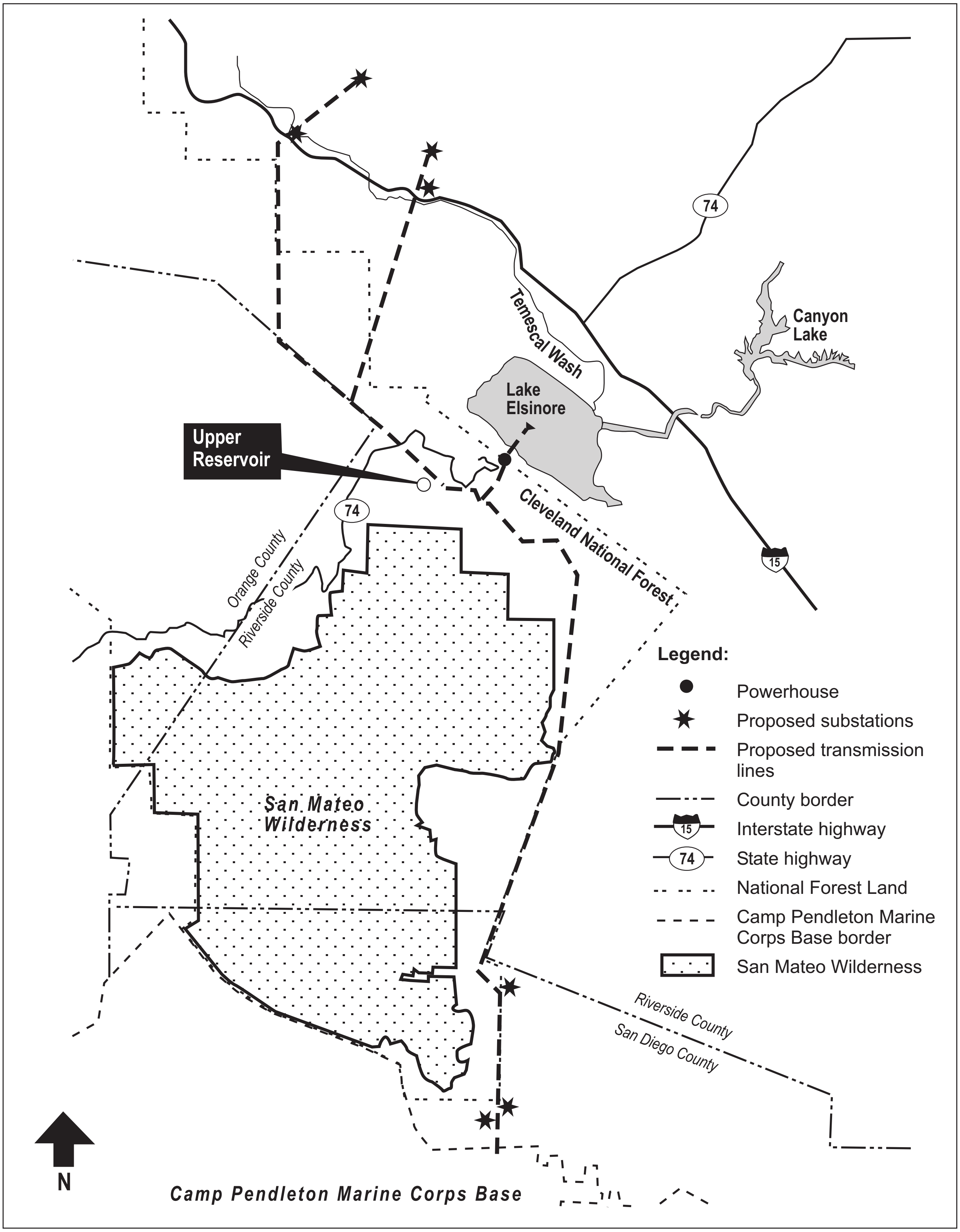

Figure 3. LEAPS Project—proposed project facility locations.

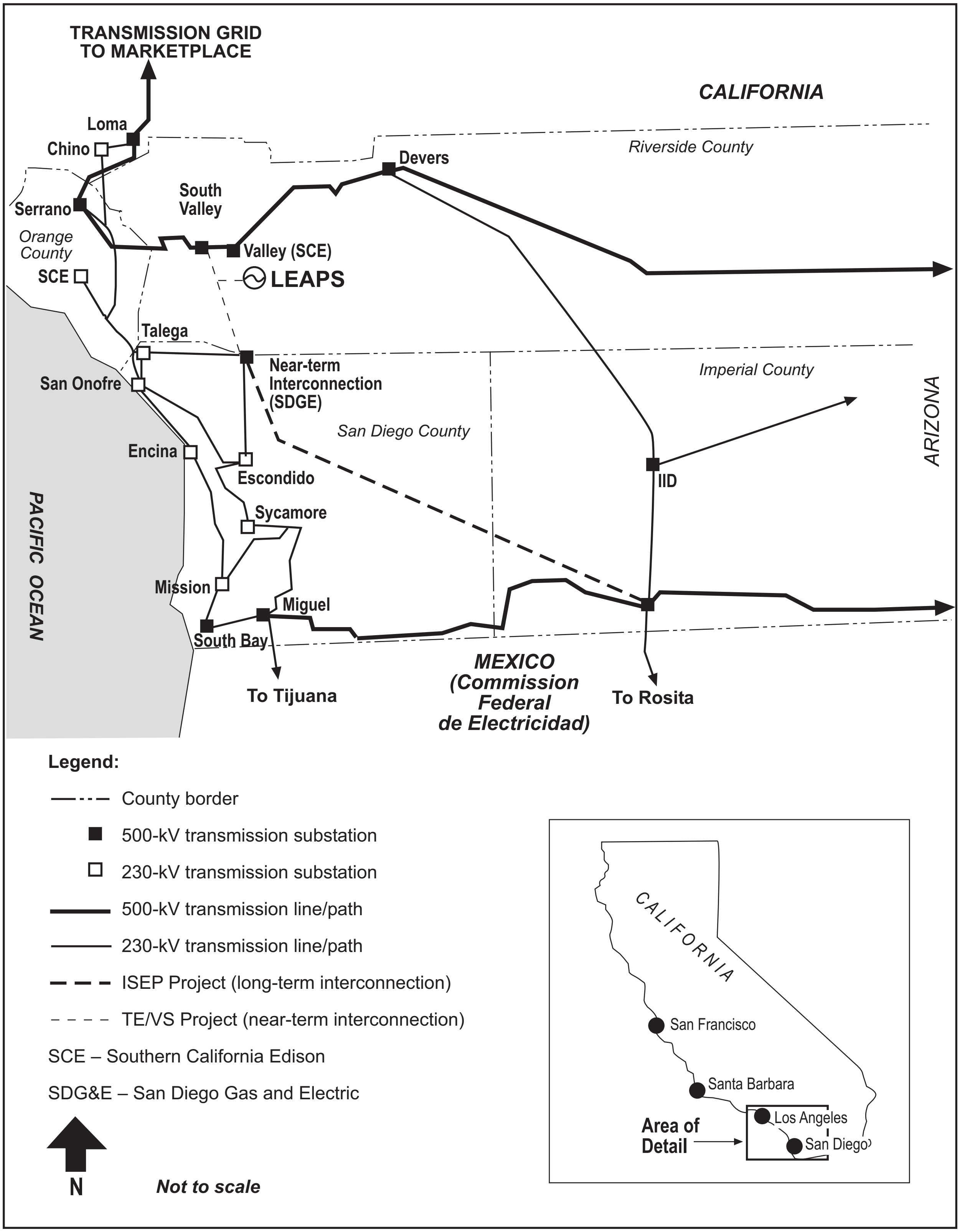

Figure 4. 500-kV long-term interconnection. (Source: Korinek, 2003, as modified by staff)

It appears that strong consideration should be given to a 10-year relevant planning horizon and that the economic benefits of the project should be evaluated as discussed in CAISO and LE (2003), *A Proposed Methodology for Evaluating the Economic Benefits of Transmission Expansions in a Restructured Wholesale Electricity Market.*

Whether or not the TE/VS transmission line is needed for reliability under the N-1/G-1 criterion requires a comparison of the expected demand for electricity in the SDGE service are (generally referred to as load) and the expected availability of electricity in that service are (generally referred to as resources). The resources available to serve load consist of electricity generated by in-area power plants and electricity generated at out-of-area- power plants and imported into the area on transmission lines. The N-1/G-1 criterion tests whether available resources will service peak load when the largest local generation[10] resource is unavailable and the most critical transmission line suffers an outage.

In SDGE's service area, the Encina power plant (Unit 5) is the most significant (largest) in-area generator. Loss of this unit is the G-1 condition. An outage along the Southwest Power Link between the Imperial Valley Substation and the Miguel Substation is the utility's most critical transmission network element outage. Loss of this line is the N-1 condition. The N-1/G-1 reliability criterion provides that SDGE should be able to continue to serve load even when the Encina Unit 5 or an equivalent amount of local generating capacity is off-line and the Southwest Power Link between the Imperial Valley Substation and the Miguel Substation.

In testimony before the CPUC in February 2002, Sierra Energy & Risk Assessment (2002) believes that because of SDGE's lack of certainty over the timing of new generation development in or near its service territory, SDGE considered its only option was to construct a new transmission addition. Sierra Energy & Risk Assessment (2002) additionally protests that SDGE's only justification for the TE/VS transmission line appears to be based on is its belief that it cannot control the generation market; therefore, its only means to ensure adequate generation for customers is to significantly increase import capability.

Furthermore, Sierra Energy & Risk Assessment (2002) stated its belief that the transmission solution is a mutual benefit to both SDGE and CAISO but not necessarily the ratepayers as follows:

> The ISO operates the transmission grid and performs the dispatch function, but it does not own transmission or generation facilities. SDGE owns its transmission lines and its retained generation facilities, but has no ability (at the present) to build new generation facilities. The ISO will naturally welcome all transmission additions that improve its ability to operate the system reliably. The utility's (SDGE) only option to meet system needs that it can control and also earn a return on is the transmission investment. At the same time, ratepayers have no assurance that transmission is the least cost answer to SDGE's electric system needs, because neither the ISO nor the utility have examined alternatives to the Project.

Subsequently, November 2002, SDGE prepared and filed the *Valley-Rainbow Interim Preliminary Report on Alternatives Screening* where it identified and screened approximately 45 alternative ranging from minor routing adjustments to alternative system voltages, system designs, and routing options, as well as non-wires alternatives (CPUC, 2004).

In an April 2003 presentation at the Integrated Energy Policy Report Committee Workshop, SDGE's Transmission Planning Manager, David Korinek, stated that the SDGE system is a generation-deficient, transmission-constrained area with its import paths limited to 2,500 MW on Path 44 and 1,120 MW on the Southwest Power Link (figure 2).

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[10] A standard WECC criteria.

Import issues were debated in the CPUC hearings for the CPCN. The CPUC concluded in their decision that CFE will have a strong incentive to upgrade the capacity of its east-west transmission lines in order to make room for its own east-to-west transfers and these upgrades will increase the ability of SDGE to rely on through-flow and exports from Mexico in the future. However, these issues were not supported by SDGE, or the CAISO, nor were they addressed as findings in the Alternate Decision by Commissioner Duque (Aspen Environmental Group, 2004).

Because of its generation-deficient, transmission-constrained area, SDGE issued a request for proposal (RFP) for bids to meet energy needs in the San Diego region beginning in 2005. The RFP invited prospective bidders to respond with proposals for demand reduction and renewable or fossil-fuel plants under a 10-year power-purchase agreement. SDGE received roughly 3000-MW of potential bids that came from outside of their service area: 2,600 MW from the SCE service area and 600 MW from the Salton Sea.

It is Mr. Korinek's opinion that none of this renewable power can be imported into the San Diego area due to the congestion of the existing paths until the year 2010. However, there are two projects that could address this problem prior to that time:

1. Transmission associated with the LEAPS Project could possibly provide 1,000 MW of import capability (200 MW of solar power and 25–50 percent of the 2,400 MW of wind power) into the San Diego area. This value would be reduced depending upon the level of generation provided by the LEAPS Project.
2. The ISEP transmission line, which is a new line from the Imperial Valley in parallel with the exiting 500 Southwest Power Link into the San Diego area, could potentially import 600 MW of geothermal renewable energy from the Salton Sea.

SDGE's long-term plan is to identify an environmentally permittable and economically feasible method of connecting these two projects together, i.e., the southern end of the LEAPS 500-kV line to the western end of the new Imperial Valley to San Diego 500-kV line, creating one continuous path (figure 4).

The STEP has analyzed the LEAPS Project separately and in conjunction with the Imperial Valley-to-San Diego transmission alternatives. Neither project was found to have annual benefits large enough to offset its costs. Strategic benefits (e.g., reliability, load diversity, fuel diversity, access to lower cost power plants, firm power purchase) were not analyzed in the study and could improve the projects' economic outlook (California Energy Commission, 2004a).

2.3 ECONOMIC AND STRATEGIC BENEFITS

It is not within the scope of this paper to determine the specific economic and strategic benefits of the TE/VS transmission line; however, these benefits need to be determined in light of policy recommendations as contained in the 2004 California Energy Commission's Integrated Energy Policy Report (California Energy Commission, 2004b). Improvements in the assessment of transmission costs and benefits include the ability to:

- Capture the long useful lives of transmission assets, which remain in service for 30 to 50 years or more,
- Explore various methods that quantitatively and qualitatively capture long-term strategic benefits, and
- Use an appropriate social discount rate to assess costs and benefits of transmission investments.

2.3.1 Transmission Assets Have Long Economic Lives

Transmission projects have very long economic lives, staying in service for 30 to 50 years and sometimes longer. The timeframe for evaluating the costs and benefits associated with transmission investments must be longer than the 10 years currently used in determining the need for transmission projects. Although a 10-year timeframe may seem an improvement over the 5-year horizon used to disapprove the Valley-Rainbow transmission line, it remains seriously inadequate to properly evaluate such long-lived public assets.

2.3.2 Strategic Benefits

Transmission planners now recognize that many existing bulk transmission projects provide strategic benefits that were not foreseen or were not evaluated either quantitatively or qualitatively in the planning and permitting processes. Some of these benefits include insurance against contingencies during abnormal system conditions, price stability and mitigation of marketer power, the potential for increased reserve resource sharing, environmental benefits, reduction in generation infrastructure needs, and achievement of state energy policy objectives in commercializing renewable resources. The transmission interconnections to the Pacific Northwest and the Desert Southwest during the past 30 years have provided benefits well in excess of their costs. Many of these benefits were not calculated as part of these projects' economic evaluation when the projects were approved because they are difficult to measure and monetize. It is important to develop appropriate methodologies for quantifying as many of these strategic benefits as possible.

Although some of the strategic benefits of projects cannot be easily quantified, there are qualitative aspects that should be recognized and presented to decision makers, who can use this information to make fully informed decisions about the expected present and future value of transmission projects. In the future, all strategic benefits (qualitative and quantitative) of transmission projects must be fully included when evaluating proposed projects so that decision makers may accurately weigh a project's costs and benefits.

2.3.3 Social Discount Rate

The Energy Commission believes using a social discount rate is an appropriate approach for valuing the long useful life and the public good nature of transmission projects. The costs and benefits of transmission lines under the restructured market are no longer limited to a sponsoring utility or its retail customers, as they were when utilities were vertically integrated. On the CA ISO grid, the costs of transmission upgrades are now spread among all users through transmission access charges. The benefits of these transmission investments cannot be denied to any retail customer or generation owner, and as a result, transmission lines have increasingly become a public good.

However, the current discount rate used to evaluate transmission projects at the CA ISO and CPUC is based on the utility industry's opportunity costs of capital, which effectively shortens the period over which benefits accrue. Decision makers must weigh the costs and benefits to society over the full useful life of these capital-intensive projects. Doing otherwise biases the decision against investment.

It should be noted that The Utility Reform Network (TURN) believes that the strategic benefits cited do not use a social discount rate. Furthermore, TURN states that it is preferable to incorporate the strategic benefit factors into the benefit/cost methodology, rather than change the discount rate. It is TURN's position that the ISO has already undertaken an extensive estimate of market power mitigation in its proposed Transmission Economic Assessment Methodology (TEAM) method (Schilberg and Florio, 2004) and that using a social discount rate to incorporate this benefit would mean double-counting of this factor.

2.3.4 Distributional Effects of Transmission Benefit Measurement

The benefits of a transmission expansion can accrue to both suppliers and consumers and can involve significant welfare transfers between these groups or between locations. Therefore, it is important to measure producer and consumer benefits on a regional basis and to understand how the welfare of these groups shifts under a transmission expansion. For example, a transmission expansion that has a significant impact on reducing market power will, for the most part, simply shift cost savings from producers to consumers. A conventional social welfare objective in which producer and consumer welfare are given equal weights would show very little net benefit because such a criterion does not consider the distribution effects. It only measures the net effect. However, public policy makers generally do care about distributional effects and therefore benefit measures that reflect the distributional effects are essential to the methodology.

A CAISO document sets out the principles of cost benefit analysis and provides three benefit measures for policy makers to consider in evaluating a transmission expansion: (1) an approach that gives equal weight to both consumer and producer surplus (i.e., the conventional social welfare objective), (2) an approach that gives equal weight to consumer benefits and the competitive portion of producer benefits (i.e., ignores any benefits that accrue to suppliers from market power), and (3) an approach that only looks at benefits to consumers. Since different decision makers can take different views of the merits of these measures, the most useful output from the transmission valuation methodology will be the building blocks necessary to evaluate the given transmission investment project under all three different objective functions (CAISO and LE, 2003).

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3.0 CONCLUSIONS

It is crucial that potential transmission projects are identified as early as possible, evaluated, and, if feasible, expedited through the permitting process as quickly as possible before the opportunity for corridor acquisition is lost or becomes prohibitively expensive due to the rapid population grow. The construction of the TE/VS transmission line raises three important questions:

3.1 WHY BUILD THE TE/VS TRANSMISSION LINE INTERCONNECTION AT 500 kV INSTEAD OF 230 KV?

SDGE's 2003 Grid Planning Assessment proposed several new 230-kV projects to allow them the import of additional power in a cost-effective, reliable manner. It was stated in this report that all practical 230-kV alternatives had been exhausted and the ability to efficiently expand SDGE's import capability through internal system upgrades would require many lower voltage "band-aid" type upgrades in 2004 and beyond, which are not efficient or cost-effective, or would require load shedding contrary to the CA ISO grid planning criteria and standards. Since no 230-kV source exists at SCE's Valley substation, a 230-kV option would require construction of a 500/230-kV substation at or near Valley or connection to SCE's Mira Loma or Dever's 230-kV substation at costs similar to those determined for the Mira Loma and Dever's 500-kV options. To integrate with its long-term expansion needs, SDGE would still have to build the line using 500-kV design, and initially operate it at 230 kV. A 230-kV plan would also result in significantly greater reactive power requirements and increased system losses.

3.2 IS THE TRANSMISSION LINE NEEDED IN BOTH DIRECTIONS?

The LEAPS Project would only require that the transmission line be constructed only in one direction, i.e. either north to SCE's system or south to SDGE's system. In review of testimony and report findings, it is apparent that (1) SCE is not in favor of a 500-kV interconnection to its Valley substation (Schmus, undated); and (2) SDGE needs additional in-area generation resources. Therefore, the southern route is the indicated choice. However, the maximum benefit to both the CAISO and SDGE would be derived from completing the total connection between the TE and VS transmission lines. The second connection would also add the benefits listed above (i.e., reliability, reduced congestion, improved access).

3.3 WHY WOULD THE CPUC APPROVE THE TE/VS TRANSMISSION LINE WHEN IT DENIED THE RVI LINE THREE TIMES?

The TE/VS line has two primary advantages over the previously proposed RVI line: (1) it has 500 MW of new generation to offer SDGE; (2) it is being proposed for construction in a later time frame when estimated loads are higher, transmission constraint issues are greater and in-area generation resources are more known to be limited and therefore likely to have greater economic benefit, especially if a 10- to 30-year economic life and the line's strategic benefits are considered

3.4 SUMMARY

San Diego has about 2,300 MW of local or in-basin generation and a peak load of about 4,500 MW. It must rely on imports from outside the San Diego area to meet the major portion of its peaking requirements. SDGE requested and has received bids for roughly 3000-MW of potential projects from outside their service area starting in 2005. These import requirements are currently being met by Path 44 with a rating of 2,500 MW and the Southwest Power Link with a rating of 1 120 MW. The loss of either of these two paths and their largest in-basin generator (G-1/N-1) jeopardizes the SDGE system reliability.

It appears that the TE/VS transmission line interconnection between the SCE and SDGE transmission systems could be an appropriate long-term solution to Southern California's transmission congestion bottlenecks as well as the transmission-constrained, generation-deficient San Diego area. The transmission line could provide 1,000 MW of import capability into the San Diego area with up to 500 MW of this import power being supplied by the LEAPS Project during high-demand periods. Combined with SDGE's proposed Imperial Valley to San Diego 500-kV Expansion Plan Project, the two lines would provide a total of 3,600 MW that could be imported into the San Diego area.

To further support our analysis of transmission issues, we have requested additional information. During the course of our NEPA document process, staff will monitor developments and planning of transmission issues affecting this project.

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ATTACHMENT 1

HISTORY OF VALLEY-RAINBOW PROJECT

In 2000 and early 20001, SDGE began to have serious difficulty providing power to its clients on a reliable and consistent basis. During this period, outages occurred frequently and electricity prices increased because of inadequate electricity supply, changes in the operation of electricity markets, and other market power problems. As a result, programs were implemented to help stimulate conservation, and electricity demand dropped significantly through early 2002. Since then, electricity prices have moderated, and power demand has started to rebound and is expected to continue to increase in coming years. Although reliability and price problems have not reoccurred recently, both the CAISO and SDGE anticipate future problems with providing electricity unless the physical system is modified and market-related issues are addressed.

SDGE and the CAISO proposed the Valley Rainbow Project to reliably deliver electricity to the San Diego area in the future and to mitigate a CAISO reliability criteria violation that requires the CAISO to drop customer load. The Valley Rainbow Project would have connected SDGE's existing 230-kV transmission system at a new Rainbow substation in northern San Diego County with SCE's existing 500-kV transmission system at the Valley substation in western Riverside County.

In March 2001, SDGE filed an application with the CPUC for a CPCN for the Valley Rainbow Project, and in December 2002, the project was denied without prejudice as not needed for reliability purposes (CPUC Decision 02-12-066). On January 23, 2003, SDGE filed two petitions: an Application for Rehearing of San Diego Gas & Electric Company Decision of 02-12-066 and a Petition to Modify Decision of 02-12-066. On May 12, 2003, the CPUC issued a decision denying rehearing of the Valley Rainbow decision and on June 5, 2003, the CPUC issued a decision denying the Petition to Modify the Decision.

SDGE is currently in the process of studying multiple alternatives to the original proposal, including two alternatives being considered in the STEP process. The TE/VS 500-kV Transmission Line is one of those projects. The ISEP is the other (Aspen Environmental Group, 2004).

The same transmission corridor through the National Forest (intended to facilitate construction of the Valley Rainbow Project shown as the Trabuco District Alternative figure 3-4 of the application) could be used for the LEAPS Project. Currently, the licensing process underway deals with both the hydroelectric plant and the transmission lines that would be used to connect that plant to the electric grid. There has been discussion at the EVMWD Board and at CAISO of having this transmission route be a substitute for the originally proposed Valley Rainbow Project (Korinek, 2003).

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COVER SHEET

FEDERAL ENERGY REGULATORY COMMISSION

FINAL ENVIRONMENTAL IMPACT STATEMENT
FOR HYDROPOWER LICENSE
Lake Elsinore Advanced Pumped Storage Project
Docket No. P-11858-002

Appendix C
Revised U.S. Forest Service Preliminary Section 4(e) Conditions
Pages C-1 to C-24
FEIS

APPENDIX C

Revised U.S. Forest Service Preliminary Section 4(e) Conditions

File Code: 2770-2
Date: June 22, 2006

Magalie R. Salas
Secretary
Federal Energy Regulatory Commission
888 First Street NE
Washington, DC 20426

Via Electronic Filing

RE: Revised Forest Service Preliminary Section 4(e) Conditions, FERC No. 11858

Dear Secretary Salas:

Enclosed for filing are the Forest Service Revised Preliminary Terms and Conditions for inclusion in the Final EIS. This filing is in response to your notice of Draft EIS Publication, and is consistent with the schedule we filed with our preliminary conditions. We plan to file Final 4(e) conditions within 60 days of publication of the Final EIS.

It is important that the record support our Final Conditions. We have added several additional conditions that were not included in the Draft EIS, so filing revised preliminary conditions will allow us to work with Commission staff to include those conditions in the analysis developed for the Final EIS. We also expect to work closely with staff to respond to the many comments filed on the Draft EIS, and we expect the analysis that results from that work will further support our Final Conditions. Specifically, we have added conditions to address surface and groundwater management, scenery conservation, and habitat mitigation.

Enclosure 1 contains the Revised Preliminary 4(e) Terms and Conditions found to be necessary for the adequate protection and utilization of the Cleveland National Forest. Applicable comprehensive plans include the Cleveland National Forest Land and Resource Management Plan (2006).

Several key components of the proposed project are on reserved lands that are part of the Cleveland National Forest. If the Commission chooses to license this project, they must make an independent determination that the proposed project or the selected alternative is consistent with the purposes of the reservation. The Forest Service offers the following background for the Commission's consideration.

The increased urbanization, ranching, mining, agricultural, and timber production within California in the late 1800's often resulted in significant flooding of downstream areas, affecting commerce as well as communities in Southern California. There also was a public realization of the need for reliable water sources to maintain viability of the developing industries and municipalities. Following the enactment of the Desert Lands Act of 1877 and the Wright Act of 1887, large land parcels with water rights were acquired, first by timber and cattle interests and later by farmers and communities. Under the Wright Act, water districts were formed to divert and deliver water to developing cities, particularly in Southern California. The Forest Reserve

Act, passed in 1891, authorized the establishment of forest reserves from forest and range lands in public domain.

In 1893, President Harrison withdrew 109,920 acres of public domain lands in the Santa Ana Mountains (The Trabuco Canyon Forest Reserve). These lands were specifically withdrawn for watershed protection. After the establishment of the Trabuco Canyon Reserve and The San Jacinto Forest Reserve in 1897, these areas were designated as a National Forest in 1908 and named in honor of President Grover Cleveland.

The Organic Act of June 4, 1897, stated that 'no national forest shall be established, except to improve and protect the forest within the boundaries, or for the purpose of securing favorable conditions of water flows', and established the National Forests to initially halt wasteful exploitation of the public lands and forests. Though opposition by vested interests slowed progress, policies dealing with timber management, mining, watershed protection, wildlife management, grazing, and recreation emerged and evolved into the multiple-use concept practiced now. However, the Cleveland National Forest, located in Southern California, was atypical. Created with public support, it was from the beginning a watershed forest; all of its problems and policies centered on protection of the watersheds which provide water to the surrounding agricultural areas and towns, especially the city of San Diego. It was to protect their watersheds that Californians immediately began demanding Forest Reserves. The Cleveland National Forest became one of the first in the new system and had its basis in the 50,000 acre Trabuco Canyon Forest Reserve, created by President Harrison in February 1893 (The Journal of San Diego History , Fall 1975, Volume 21, Number 4).

Based on our review, we would conclude that project features that would eliminate critical watershed components such as riparian areas and springs would not be consistent with the purposes of the reservation. The staff alternative, which avoids impacts to unique riparian habitat, and provides transmission line locations that would not hinder fire suppression actions necessary to protect watershed values, would be consistent with the reservation.

Please contact Virgil Mink at (951) 736-1811 ext. 3277 if you have any questions.

Sincerely,

/S/ BETH G.
PENDLETON
(FOR)

BERNARD WEINGARDT
Regional Forester

Enclosure

Enclosure 1

PACIFIC SOUTHWEST REGION
USDA FOREST SERVICE
Revised preliminary 4(e) TERMS AND CONDITIONS AND 10(a) Recommendations

Lake Elsinore Advance Pump Storage Hydroelectric Project
FERC Project No. 11858

Index

REVISED PRELIMINARY 4(e) Terms and Conditions

Lake Elsinore Advanced Pumped Storage Hydroelectric Project
FERC Project No. 11858

I. Introduction

The Forest Service hereby submits its Revised Preliminary 4(e) Terms and Conditions (Conditions) and Section 10(a) recommendations, as applicable, for the Lake Elsinore Advanced Pumped Storage Hydroelectric Project (FERC Project No. 11585), in accordance with 18 CFR 4.34(b)(1)(i). Wording in [brackets] in these conditions indicates that the Forest Service determined that this portion of the condition was not within its jurisdiction; however the Forest Service recommends it be included in the license under Section 10(a) of the Federal Power Act.

Section 4(e) of the Federal Power Act states the Commission may issue a license for a project within a reservation only if it finds that the license will not interfere or be inconsistent with the purpose for which such reservation was created or acquired. This is an independent threshold determination made by FERC, with the purpose of the reservation defined by the authorizing legislation or proclamation (see Rainsong v. FERC, 106 F.3d 269 (9th Cir. 1977). The Forest Service, for its protection and utilization determination under Section 4(e) of the FPA may rely on broader purposes than those contained in the original authorizing statutes and proclamations in prescribing conditions (see Southern California Edison v. FERC, 116F.3d 507 (D.C. Cir. 1997)). These terms and conditions are based on those resource and management requirements enumerated in the Organic Administration Act of 1897 (30 Stat. 11), the Multiple-Use Sustained Yield Act of 1960 (74 Stat. 215), the National Forest Management Act of 1976 (90 Stat. 2949), and any other law specifically establishing a unit of the National Forest System or prescribing the management thereof (such as the Wilderness Act or the Wild and Scenic Rivers Act), as such laws may be amended from time to time, and as implemented by regulations and approved Land and Resource Management Plans prepared in accordance with the National Forest Management Act. Specifically, the 4(e) conditions are based on the Land and Resource Management Plan (as amended) for the Cleveland National Forest, as approved by the Regional Forester of the Pacific Southwest Region.

Pursuant to Section 4(e) of the Federal Power Act, the Secretary of Agriculture, acting by and through the Forest Service, considers the following conditions necessary for the adequate protection and utilization of the land and resources of the Cleveland National Forest. License articles contained in the Federal Energy Regulatory Commission's (hereinafter referred to as the Commission) Standard Form L-2 (revised October 1975) issued by Order No. 540, and dated October 31, 1975, cover general requirements. Section II of this document includes standard conditions deemed necessary for the administration of National Forest System lands. Section III covers specific requirements for protection and utilization of National Forest System lands and shall also be included in any license issued.

II. Standard Forest Service Conditions

Condition No. 1— Requirement to Obtain a Forest Service Special-Use Authorization

The Licensee shall secure a special-use authorization from the Forest Service for the occupancy and use of National Forest System lands. The licensee shall obtain the executed authorization before beginning ground-disturbing activities on National Forest System lands.

The licensee may commence ground-disturbing activities authorized by the license and special-use authorization no sooner than 60 days following the date the licensee files the Forest Service special-use authorization with the Commission, unless the Commission prescribes a different commencement schedule.

In the event there is a conflict between any provision of the license and Forest Service special-use authorization, the special-use authorization shall prevail to the extent that the Forest Service, in consultation with the Commission, deems necessary to protect and utilize National Forest System resources.

Condition No. 2—Modification of 4(e) Conditions After Biological Opinion or Water Quality Certification

The Forest Service reserves the right, after notice and opportunity for comment, to modify these conditions, if necessary, to respond to any Final Biological Opinion issued for this Project by the United States Fish and Wildlife Service, NOAA Fisheries, or any Certification or permit issued for this Project by the State Water Resources Control Board or Army Corps of Engineers.

Condition No. 3—Forest Service Approval of Final Design

Before any new construction of the Project occurs on National Forest System lands, the Licensee shall obtain prior written approval of the Forest Service for all final design plans for Project components, which the Forest Service deems as affecting or potentially affecting National Forest System resources. The Licensee shall follow the schedules and procedures for design review and approval specified in the conditions herein and in the Special Use Permit. As part of such written approval, the Forest Service may require adjustments to the final plans and facility locations to preclude or mitigate impacts and to insure that the Project is either compatible with on-the-ground conditions or approved by the Forest Service based on agreed upon compensation or mitigation measures to address compatibility issues. Should such necessary adjustments be deemed by the Forest Service, the Commission, or the Licensee to be a substantial change, the Licensee shall follow the procedures of Article 2 of the license. Any changes to the license made for any reason pursuant to Article 2 or Article 3 shall be made subject to any new terms and conditions of the Secretary of Agriculture made pursuant to Section 4(e) of the Federal Power Act.

Condition No. 4—Approval of Changes

Notwithstanding any Commission approval or license provisions to make changes to the Project when such changes directly affect National Forest System lands, the Licensee shall obtain written approval from the Forest Service prior to making any changes in any constructed Project features or facilities, or in the uses of Project lands and waters, or any departure from the requirements of any approved exhibits filed with the Commission. Following receipt of such approval from the Forest Service, and at least 60 days prior to initiating any such changes or departure, the Licensee shall file a report with the Commission describing the changes, the reasons for the changes, and showing the approval of the Forest Service for such changes. The Licensee shall file an exact copy of this report with the Forest Service at the same time it is filed with the Commission. This article does not relieve the Licensee from the amendment or other requirements of Article 2 or Article 3 of this license, nor shall it affect the Licensee’s obligation to comply with Commission requirements.

Condition No. 5—Consultation

Each year between February 15 and April 15, the Licensee shall consult with the Forest Service with regard to measures needed to ensure protection and utilization of the National Forest resources affected by the Project. Within 60 days following such consultation, the Licensee shall file with the Commission evidence of the consultation with any recommendations made by the Forest Service. The Forest Service reserves the right, after notice and opportunity for comment, to require changes in the Project and its operation through revision of the 4(e) conditions that require measures necessary to accomplish protection and utilization of National Forest resources.

When Forest Service section 4(e) conditions require the Licensee to file a plan with the Commission that is approved by the Forest Service, the Licensee shall provide the Forest Service a minimum of 60 days to review and approve the plan before filing with the Commission. Upon Commission approval, the Licensee shall implement Forest Service required and approved plans.

Condition No. 6—Surrender of License or Transfer of Ownership

Prior to any surrender of this license, the Licensee shall provide assurance acceptable to the Forest Service that Licensee shall restore any project area directly affecting National Forest System lands to a condition satisfactory to the Forest Service upon or after surrender of the license, as appropriate. The restoration plan shall identify the measures to be taken to restore National Forest System lands and shall include adequate financial mechanisms to ensure performance of the restoration measures.

In the event of any transfer of the license or sale of the Project, the Licensee shall assure, in a manner satisfactory to the Forest Service, that the Licensee or transferee will provide for the costs of surrender and restoration. If deemed necessary by the Forest Service to assist in evaluating the Licensee's proposal, the Licensee shall conduct an analysis, using experts approved by the Forest Service, to estimate the potential costs associated with surrender and restoration of any Project area directly affecting National Forest System lands to Forest Service specifications. In addition, the Forest Service may require the Licensee to pay for an independent audit of the transferee to assist the Forest Service in determining whether the transferee has the financial ability to fund the surrender and restoration work specified in the analysis.

Condition No. 7—Hazardous Substances Plan

Within one year of license issuance, or prior to any ground disturbing activities, the Licensee shall file with the Commission a plan approved by the Forest Service for hazardous substances storage, spill prevention, and spill cleanup for Project facilities on or directly affecting National Forest System Lands. In addition, during planning and prior to any new construction or maintenance not addressed in an existing plan, the Licensee shall notify the Forest Service, and the Forest Service shall make a determination whether a plan approved by the Forest Service for oil and hazardous substances storage and spill prevention and cleanup is needed.

At a minimum, the plan must require the Licensee to (1) maintain in the Project area, or at an alternative location approved by the Forest Service, a cache of spill cleanup equipment suitable to contain any spill from the Project; (2) to periodically inform the Forest Service of the location of the spill cleanup equipment on National Forest System lands and of the location, type, and quantity of oil and hazardous substances stored in the Project area; (3) to inform the Forest Service immediately of the nature, time, date, location, and action taken for any spill affecting National Forest System lands, and Licensee adjoining property when such spill could reasonably be expected to affect National Forest System lands, and (4) provide annually to the Forest Service a list of Licensee project contacts.

Condition No. 8—Use of Explosives

Use of explosives shall be consistent with state and local requirements.

1. The Licensee shall use only electronic detonators for blasting on National Forest System lands and Licensee adjoining property, except near high-voltage powerlines. The Forest Service may allow specific exceptions when in the public interest.
2. In the use of explosives, the Licensee shall exercise the utmost care not to endanger life or property and shall comply with the requirements of the Forest Service. The Licensee shall contact the Forest Service prior to blasting to obtain the requirements from the Forest Service. The Licensee shall be responsible for any and all damages resulting from the use of explosives and shall adopt precautions to prevent damage to surrounding objects. The Licensee shall furnish and erect special signs to warn the public of the Licensee's blasting operations. The Licensee shall place and maintain such signs so they are clearly evident to the public during all critical periods of the blasting operations, and shall ensure that they include a warning statement to have radio transmitters turned off.
3. If stored on National Forest System lands. the Licensee shall store all explosives in a secure manner, in compliance with State and local laws and ordinances, and shall mark

all such storage places "DANGEROUS—EXPLOSIVES”, or in any alternative manner approved by the Forest Service. Where no local laws or ordinances apply, the Licensee shall provide storage that is satisfactory to the Forest Service and in general not closer than 1,000 feet from the road or from any building or camping area unless otherwise approved by the Forest Service.

4. When using explosives on National Forest System lands, the Licensee shall adopt precautions to prevent damage to landscape features and other surrounding objects. When directed by the Forest Service, the Licensee shall leave trees within an area designated to be cleared as a protective screen for surrounding vegetation during blasting operations. The Licensee shall remove and dispose of trees so left when blasting is complete. When necessary, and at any point of special danger, the Licensee shall use suitable mats or some other approved method to smother blasts.

Condition No. 9—Fire Prevention, Response, and Investigation

A. Hazardous Vegetation Fuel Treatment Plan

Within one year of license issuance or prior to any ground disturbing activities, the Licensee shall file with the Commission a plan approved by the Forest Service for Hazardous Vegetative Fuel Treatment on or directly affecting National Forest System lands. The purpose of the plan shall be to reduce the potential for wildfires originating at Project facilities, and to protect Project facilities from adjacent wildfires. At a minimum, the Hazardous Vegetative Fuel Treatment Plan shall:

1. Analyze fuel loading on Cleveland National Forest lands [and other project lands] that extend from the edge of each Project facility area (excluding the area around reservoir shorelines). Maintain fuel profiles within the project area consistent with plan standards set forth in the Cleveland Forest Land Management Plan, guidelines for development and maintenance of wildland urban interface defense and threat zones, and California Public Resource Code.
2. Identify fuel treatment methods to mitigate identified hazard fuels. Such treatment methods shall generally be limited to thinning of small trees, removing excess brush, and reducing fuel load and continuity of surface and ladder fuels.
3. Include a map and schedule of treatments.
4. Assure fire prevention measures will conform to water quality protection practices as enumerated in USDA, Forest Service, Pacific Southwest Region, Water Quality Management for National Forest System Lands in California-Best Management Practices.

The Licensee is responsible for implementing the approved plan.

B. Fire Prevention and Response Plan

Within one year of license issuance or prior to any ground disturbing activities, the Licensee shall file with the Commission a Fire Prevention and Response Plan that is approved by the Forest Service, and developed in consultation with appropriate State and local fire agencies. The plan shall set forth in detail the Licensee’s responsibility for the prevention (excluding fuel treatment as described above), reporting, control, and extinguishing of fires in the vicinity of the Project resulting from Project operations.

At a minimum the plan shall address the following categories:

1. Prevention
    - Availability of fire access roads, community road escape routes, helispots to allow aerial firefighting assistance in the steep canyon, water drafting sites and other fire suppression strategies.
    - Address fire danger and public safety associated with project induced recreation, including fire danger associated with dispersed camping, existing and proposed developed recreation sites, trails, and vehicle access.

2. Emergency Response Preparedness
    - Analyze fire prevention needs including equipment and personnel availability.

4. Reporting
    - Licensee shall report any project related fires to the Forest Service within 24 hours.

5. Fire Control/Extinguishing
    - Provide the Forest Service with a list of the locations of available fire suppression equipment and the location and availability of fire suppression personnel.

Assure fire prevention measures will conform to water quality protection practices as enumerated in USDA, Forest Service, Pacific Southwest Region, Water Quality Management for National Forest System Lands in California-Best Management Practices or its successor.

C. Investigation of Project Related Fires

The Licensee agrees to fully cooperate with the Forest Service on all fire investigations. The Licensee shall produce upon request all material and witnesses not subject to attorney client or attorney work product privilege, over which the Licensee has control, related to the fire and its investigation including:

- All investigation reports
- All witness statements
- All photographs
- All drawings
- All analysis of cause and origin
- All other, similar materials and documents regardless of how collected or maintained

The Licensee shall preserve all physical evidence, and give custody to the Forest Service of all physical evidence requested. The Forest Service shall provide the Licensee with reasonable access to the physical evidence and documents the Licensee requires in order to defend any and all claims, which may arise from a fire resulting from project operations, to the extent such access is not precluded by ongoing criminal or civil litigation.

Condition No. 10—Road Use by Government

The United States shall have unrestricted use of any road over which the licensee has control, within the project area for all purposes deemed necessary and desirable in connection with the protection, administration, management, and utilization of National Forest System lands or resources. When needed for the protection, administration, and management of Federal lands or resources, the United States shall have the right to extend rights and privileges for use of the right-of-way and road thereon, to States and local subdivisions thereof, as well as to other users. The United States shall control such use so as not to unreasonably interfere with the use of the road by the Licensee, safety or security uses, or cause the Licensee to bear a share of costs disproportionate to the Licensee's use in comparison to the use of the road by others.

Condition No. 11—Road Use

The Licensee shall confine all vehicles being used for project purposes, including but not limited to administrative and transportation vehicles and construction and inspection equipment, to roads or specifically designed access routes, and approved construction and staging areas, as identified in the Road and Traffic Management Plan (Condition No. 26). The Forest Service reserves the right to close any and all such routes where damage (impacts beyond the expected and approved disturbance) is occurring to the soil or vegetation, or, if requested by Licensee, to require reconstruction/construction by the Licensee to the extent needed to accommodate the Licensee's use. The Forest Service agrees to provide notice to the Licensee and the Commission prior to road closures, except in an emergency, in which case notice will be provided as soon as practicable.

Condition No. 12—Maintenance of Improvements

The Licensee shall maintain all its improvements and premises on National Forest System lands to standards of repair, orderliness, neatness, sanitation, architectural character, and safety consistent with applicable Forest Service guidelines and acceptable to the Forest Service. Disposal will be at an approved existing location, except as otherwise agreed by the Forest Service.

Condition No. 13—Safety during Project Construction

Sixty days prior to ground-disturbing activity related to new Project construction on or affecting National Forest System Lands, the Licensee shall file a Safety During Construction Plan with the Commission that is approved by the Forest Service that identifies potential hazard areas and measures necessary to protect public safety. Areas to consider include construction activities near public roads, trails and recreation area and facilities.

The Licensee shall perform daily (or on a schedule otherwise agreed to by the Forest Service in writing) inspections of Licensee's construction operations on or affecting National Forest System while construction is in progress. The Licensee shall document these inspections (informal writing sufficient) and shall deliver such documentation to the Forest Service on a schedule agreed to by the Forest Service. The inspections must specifically include fire plan compliance, public safety, and environmental protection. The Licensee shall act immediately to correct any items found to need correction to be incompliance with the license.

Condition No. 14—Pesticide Use Restrictions

Pesticides may not be used to control undesirable woody and herbaceous vegetation, aquatic plants, fish, insects, and rodents on National Forest System lands without the prior written approval of the Forest Service. The Licensee shall submit a request for approval of planned uses of pesticides on National Forest System lands. The request must cover annual planned use and be updated as required by the Forest Service. The Licensee shall provide information essential for review, including a forest-specific pesticide risk assessment, in the form specified. Exceptions to this schedule may be allowed only when unexpected outbreaks of pests require control measures that were not anticipated at the time the request was submitted. In such an instance, an emergency request and approval may be made.

The Licensee shall use on National Forest System lands only those materials registered by the U. S. Environmental Protection Agency for the specific purpose planned. The Licensee must strictly follow label instructions in the preparation and application of pesticides and disposal of excess materials and containers.

Condition No. 15—Erosion Control Plan

During planning and before any new construction or non-routine maintenance projects with the potential for causing erosion and/or stream sedimentation on or affecting National Forest System Lands, the Licensee shall file with the Commission an Erosion Control Measures Plan that is approved by the Forest Service. The Plan shall include measures to control erosion, stream sedimentation, dust, and soil mass movement attributable to the Project.

The plan shall be based on actual-site geological, soil, and groundwater conditions and shall include:

1. A description of the actual site conditions;
2. Detailed descriptions, design drawings, and specific topographic locations of all control measures;
3. Measures to divert runoff away from disturbed land surfaces;
4. Measures to collect and filter runoff over disturbed land surfaces, including sediment ponds at the diversion and powerhouse sites;

5. Revegetating disturbed areas in accordance with current direction on use of native plants and locality of plant and seed sources;
6. Measures to dissipate energy and prevent erosion; and,
7. A monitoring and maintenance schedule.

Upon Commission approval, the Licensee shall implement the plan.

Condition No. 16—Valid Claims and Existing Rights

This license is subject to all valid rights and claims of third parties. The United States is not liable to the Licensee for the exercise of any such right or claim.

Condition No. 17—Compliance with Regulations

The Licensee shall comply with the regulations of the Department of Agriculture for activities on NFS lands, and all applicable federal, state, county, and municipal laws, ordinances, or regulations in regards to the area or operations on or directly affecting NFS lands, to the extent those laws, ordinances, or regulations are not preempted by federal law.

Condition No. 18—Protection of United States Property

The Licensee shall exercise diligence in protecting from damage the land and property of the United States covered by and used in connection with the license.

Condition No. 19—Indemnification

The Licensee shall indemnify, defend, and hold the United States harmless for any violations incurred under any applicable laws and regulations or for judgments, claims, or demands assessed against the United States caused by the construction, maintenance, or operation of the project works or of the works appurtenant or accessory thereto under the license. The licensee's indemnification of the United States shall include any loss by personal injury, loss of life or damage to property in connection with the construction, maintenance, or operation of the project works or of the works appurtenant or accessory thereto under this license. 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. Upon surrender, transfer, or termination of the license, the Licensee's obligation to indemnify and hold harmless the United States shall survive all valid claims for actions that occurred prior to such surrender, transfer or termination.

Condition No. 20—Surveys, Land Corners

The Licensee shall avoid disturbance to all public land survey monuments, private property corners, and forest boundary markers. In the event that any such land markers or monuments on National Forest System lands are destroyed by an act or omission of the

Licensee, in connection with the use and/or occupancy authorized by this license, depending on the type of monument destroyed, the Licensee shall reestablish or reference same 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.

Further, the Licensee shall ensure that any such official survey records affected are amended as provided by law.

Condition No. 21—Damage to Land, Property, and Interests of the United States

The Licensee has an affirmative duty to protect the land, property and interests of the United States from damage arising from the Licensee’s construction, maintenance, or operation of the project works or of the works appurtenant or accessory thereto under the license.

The Licensee is liable for all damages, costs and expenses associated with damage to the land, property and interests of the United States occasioned by the construction, maintenance, or operation of the project works or of the works appurtenant or accessory thereto under the license, including but not limited to damages, costs and expenses resulting from fire. Such damages, costs and expenses shall include, but not be limited to:

1. Fire suppression costs
2. Rehabilitation and restoration costs
3. Value of lost resources
4. Abatement costs
5. Investigative and administrative expenses
6. Attorneys' fees

The Licensee’s liability under this condition shall not extend to acts or omissions of parties outside of the Licensee’s control. Licensee’s contractors or employees of contractors are not considered parties outside the Licensee’s control. Damages will be determined by the value of the resources lost or impaired, as determined by the Forest Service. The basis for damages will be provided to the Licensee. The licensee shall accept transaction registers certified by the appropriate Forest Service official as evidence of costs and expenses. The Licensee shall have an opportunity to review the basis for the Forest Service’s damages, costs and expenses, and to meet and confer with the Forest Service to resolve any questions or disputes regarding such damages, costs and expenses. After the opportunity for review, the Licensee shall promptly pay to the United States such damages, costs and expenses upon written demand by the United States.

Condition No. 22—Risks and Hazards

As part of the occupancy and use of the project area, the Licensee has a continuing responsibility to reasonably identify and report all known or observed hazardous conditions on or directly affecting NFS lands that would affect the improvements, resources, or pose a risk of injury to individuals. Licensee will abate those conditions, except those caused by third parties not related to the occupancy and use authorized by the License. Any non-emergency actions to abate such hazards on National Forest

System lands shall be performed after consultation with the Forest Service. In emergency situations, the Licensee shall notify the Forest Service of its actions as soon as possible, but not more than 48 hours, after such actions have been taken. Whether or not the Forest Service is notified or provides consultation; the Licensee shall remain solely responsible for all abatement measures performed. Other hazards should be reported to the appropriate agency as soon as possible.

Condition No. 23—Crossings

Except as otherwise authorized, the Licensee shall maintain existing crossings as required by the Forest Service for all roads and trails that intersect the right-of-way occupied by linear Project facilities (powerline, penstock, ditch, and pipeline) on or affecting National Forest System lands.

Condition No. 24—Access

The Forest Service reserves the right to use or permit others to use any part of the licensed area on National Forest System lands for any purpose, provided such use does not interfere with the rights and privileges authorized by this license or the Federal Power Act.

Condition No. 25—Signs

The Licensee shall consult with the Forest Service prior to erecting signs related to safety issues on National Forest System lands covered by the license. Prior to the Licensee erecting any other signs or advertising devices on National Forest System lands covered by the license, the Licensee must obtain the approval of the Forest Service as to location, design, size, color, and message. The Licensee shall be responsible for maintaining all Licensee-erected signs to neat and presentable standards.

III. Project Specific Forest Service Conditions

Condition No. 26—Road and Traffic Management Plan

Within one year of license issuance or prior to any ground disturbing activities, the Licensee shall file with the Commission a plan approved by the Forest Service for management of all Forest Service and unclassified roads required by the licensee to access the project area. The Project Road and Traffic Management Plan shall include:

1. Identification of all Forest Service roads and unclassified roads on National Forest System Lands needed for project access, including road numbers.
2. A map of all Forest Service roads and unclassified roads on National Forest System land used for project access, including digital spatial data accurate to within 40 feet, identifying each road by Forest Service essential for review road number.

3. A description of each Forest Service road segment and unclassified roads on National Forest System land needed for project access including:

    - Termini
    - Length
    - Purpose and use
    - Party responsible for maintenance
    - Level of maintenance
    - Structures accessed
    - Location and status of gates and barricades, if any
    - Ownership of road segment and underlying property
    - Instrument of authorization for road use
    - Assessment of road condition and licensee reconstruction needs
    - Rehabilitation of temporary access disturbance
    - Temporary access locations will be gated to prevent unauthorized public vehicle access

Provisions for the licensee to consult with the Forest Service in advance of performing any road construction, realignment, maintenance, or closure involving Forest Service roads.

The licensee shall cooperate with Forest Service on the preparation of a condition survey and a proposed maintenance plan subject to Forest Service approval annually; beginning the first full-year after the Road and Traffic Management Plan has been approved.

[The licensee shall use non-Forest Service roads in accordance with applicable state, county, city, and/or local authority standards.]

The Road and Traffic Management Plan shall identify the licensee's responsibility for road maintenance and repair costs commensurate with the licensee's use and project-induced use. The Road and Traffic Management Plan shall specify road maintenance and management standards; that provide for traffic safety, minimize erosion and damage to natural resources, and that are acceptable to the Forest Service.

Licensee shall be responsible for any new construction, realignment, closure, or other road management actions proposed by the licensee in the future, subject to Forest Service standards in effect at the time, including related studies, analyses or reviews required by Forest Service.

Upon Commission approval, the Licensee shall implement the plan.

Condition No. 27—Recreation Facilities and Administration

Within one year of license issuance, the licensee shall file with the Commission a Recreation Facility Development Plan, approved by the Forest Service, for a recreation facility at the project equipment and material laydown area on National Forest System lands or for an alternative use and/or location as may be approved by the Forest Service.

Condition No. 28 – Heritage Resources Management Plan

The Licensee shall file with the Commission, within one year following license issuance, or prior to any ground disturbing activities, a Heritage Resources Management Plan (HRMP), approved by the Forest Service, for the purpose of protecting and interpreting heritage resources. The HRMP is tiered to a Programmatic Agreement, to which the Forest Service will be a signatory, as defined by 36 CFR 800, and implements regulations of the National Historic Preservation Act. The Licensee shall consult with the State Historic Preservation Officer, Native American Tribes, Forest Service, and other applicable agencies and communities during the preparation of the Plan. The HRMP shall accurately define the area of potential effects, including effects of implementing Section 4(e) conditions, Native American traditional cultural values, and Project-induced recreational impacts to archaeological properties on or affecting National Forest System lands. The HRMP shall also provide measures to mitigate the identified impacts, including a monitoring program, a patrolling program, and management protocols for the ongoing protection of archaeological properties.

If, prior to or during ground-disturbing activities or as a result of project operations, items of potential cultural, historical, archaeological, or paleontological value are reported or discovered, or a known deposit of such items is disturbed on National Forest System lands, the Licensee shall immediately cease work in the area affected. The Licensee shall then: (1) consult with the California State Historic Preservation Officer (SHPO) and the Forest Service about the discovery; (2) prepare a site-specific plan, including a schedule, to evaluate the significance of the find and to avoid or mitigate any impacts to sites found eligible for inclusion in the National Register of Historic Places; (3) base the site-specific plan on recommendations of the SHPO, the Forest Service, and Secretary of the Interior's Standards and guidelines for Archaeology and Historic Preservation; (4) file the site specific plan for Commission approval, together with the written comments of the SHPO and the Forest Service; and (5) take the necessary steps to protect the sites from further impact until informed by the Commission that the requirements have been fulfilled.

Upon Commission approval, the Licensee shall implement the plan.

Condition No. 29—Annual Employee Awareness Training

The licensee shall, beginning the first full calendar year after license issuance, provide annual employee awareness training in coordination with the Forest Service. The goal of the training shall be to familiarize the licensee's maintenance and operations staff with local Forest Service issues. Topics to be covered in this training include local resource issues, special status species, invasive weeds, procedures for reporting to the Forest Service, and Forest Service orders that pertain to the Cleveland National Forest lands in the vicinity of the project.

Information on special status species and invasive weeds and their locations in the project area shall be provided to licensee's field personnel.

Condition No. 30—Special Status Species

The Licensee shall, beginning the first full calendar year after license issuance, in consultation with the Forest Service, annually review the current list of special status plant and wildlife species (species that are, Forest Service Sensitive, Cleveland National Forest Watch List, or U.S. Fish and Wildlife Service Federally listed) that might occur on National Forest System Lands in the project area directly affected by project operations. When a species is added to one or more of the lists, the Forest Service, in consultation with the Licensee, shall determine if the species or un-surveyed suitable habitat for the species is likely to occur on such National Forest System Lands. For such newly added species, if the Forest Service determines that the species is likely to occur on such National Forest System Lands, the Licensee shall develop and implement a study plan in consultation with the Forest Service to assess the effects of the Project on the species. The Licensee shall prepare a report on the study including objectives, methods, results, recommended resource measures where appropriate, and a schedule of implementation, and shall provide a draft of the final report to the Forest Service for review and approval. The Licensee shall file the report, including evidence of consultation, with the Commission and shall implement those resource management measures required by the Commission.

Condition No. 31—Ground Disturbing Activities

Ground disturbing activities on or affecting National Forest System lands may proceed only after appropriate NEPA analysis and documentation completion. If the licensee proposes new activities to the Commission not previously addressed in the Commission's NEPA analysis processes, the licensee, in consultation with the Forest Service, shall determine the scope of work, and the potential project related effects and whether additional information is required to proceed with the planned ground disturbing activity. The licensee shall enter into a collection agreement with the Forest Service under which the licensee shall fund the Forest Service staff time required for staff activities related to the analysis and documentation of the proposed activities.

Condition No. 32—Environmental Monitoring and Adaptive Management

The licensee shall, within six months after license issuance, or as otherwise indicated, and in consultation with the Forest Service and appropriate governmental agencies, develop detailed monitoring and adaptive management plans consistent with the applicable conditions provided herein. The licensee shall provide the final detailed plans, along with all agency comments received and an explanation for any such comments not incorporated, to the Commission for final approval. The licensee shall perform the environmental monitoring and adaptive management as approved by the Commission. It is anticipated that certain details of the environmental monitoring (e.g., specific years of sampling and/or specific study sites) and management may need modification during development of detailed study plans or during subsequent implementation of the environmental monitoring. All such modifications shall be developed in consultation with the Forest Service and appropriate governmental agencies, and approved by these agencies and provided to the Commission before implementation. Where years are specified, year one is the first full calendar year after issuance of the new license.

Condition No. 33 -- Vegetation and Invasive Weed Management Plans

Within one year of license issuance, or prior to any ground disturbing activities, the Licensee shall file with the Commission a Vegetation and Invasive Weed Management Plan developed in consultation with the Forest Service and the appropriate government agencies. Invasive weeds will be those weeds identified in the California Department Food and Agriculture (CDFA) code, and other non-native species of concern identified by the Forest Service and other resource agencies. The plan will address both aquatic and terrestrial invasive weeds within the project boundary and adjacent to project features directly affecting National Forest System lands including roads and distribution and transmission lines.

1) The Invasive Weed Plan will include and address the following elements:

- Inventory and mapping of new populations of invasive weeds using a Forest Service compatible database and GIS software. The Invasive weed GIS data layer will be updated annually and shared with other resource agencies.
- Weed risk assessment.
- An Integrated Pest Management approach for invasive weed control (IPM evaluates alternatives for managing forest pest populations, based on consideration of pest-host relationships).
- Development of a schedule for control of all known A, B, Q (CDFA) and selected other invasive weed species, designated by resource agencies.
- On-going monitoring of known populations of invasive weeds for the life of the license in locations tied to Project actions or effects, such as road maintenance, at project facilities, O&M activities, new construction sites, etc. to evaluate the effectiveness of re-vegetation and invasive weed control measures.
- Action and/or strategies to prevent and control spread of known populations or introductions of new populations, such as: 1) public education and signing, 2) vehicle/equipment wash stations, 3) use of certified weed-free hay or straw for all construction or restoration needs, and 4) avoidance of use of gravel and fill from known weed infested borrow pits.

New infestations of A & B rated weeds shall be controlled within 12 months of detection or as soon as is practical and feasible. At specific sites where other resource objectives need to be met, all classes of invasive weeds may be required to be treated.

Monitoring will be done in conjunction with other project maintenance and resource surveys, so as not to require separate travel and personnel. Monitoring information, in database and GIS formats, will be provided to the Forest Service as part of the annual consultation on affected National Forest resources (Condition No. 5). To assist with this monitoring requirement, training in invasive plant identification will be provided to Project employees and contractors by the Forest Service to assure that project staff is aware of the current location of invasive weeds and how to identify the invasive weeds likely to occur in the project area.

Licensee shall restore/revegetate areas where treatment has eliminated invasive weeds in an effort to eliminate the reintroduction of invasive weed species. Project-induced ground disturbing activities shall be monitored annually for the first 3 years after disturbance to detect and map new populations of Invasive weeds.

2) The Vegetation Management plan shall include and/or address the following elements:

- Hazard tree removal and trimming;
- Powerline/transmission line clearing to comply with electrical safety and fire clearance requirements;
- Vegetation management for native habitat and biodiversity improvement;
- Revegetation of disturbed sites (including plant palette, planting methods, plant densities, propagation materials, and plant maintenance);
- Soil fertility and moisture analysis, soil grading, soil amendments, soil protection and erosion control, including use of certified weed free straw;
- Use of clean, weed free seed with a preference for locally collected seed,;
- Use of approved mixes of plant species native to the Cleveland National Forest for restoration or erosion control purposes;
- Irrigation amounts, methods, and schedule;
- Pest treatment, monitoring, and prevention methods and schedule;

Upon Commission approval, the Licensee shall implement the plan.

Condition No. 34—Wildlife Management

The licensee shall, within one year after license issuance, implement the following raptor/avian safety measures on National Forest System lands or on areas directly affecting National Forest System lands to maintain and enhance existing native wildlife species potentially affected by the project:

- All power lines, power stations, and other facilities on or affecting National Forest System lands shall be constructed to conform with the "Suggested Practices for Raptor Protection on Power Lines" by the Avian Powerline Interaction Committee (1996), including marking the power lines themselves if they are adjacent to Lake Elsinore or in a flyway where bird strikes may occur.

Condition No. 35—Surface Water Resources Management Plan

The Licensee shall within 6 months after license issuance file with the Commission a Water Resources Management Plan that is approved by the Forest Service, for the purpose of controlling and monitoring the Project-related effects to water resources on National Forest System lands, which are related to the Licensee's activities. The purpose of the plan is to protect ground water related surface water and other ground water dependent resources. At a minimum the plan shall:

1. Develop in consultation with and approved by Forest Service technical specialists and their consultants an inventory of springs and other water courses within 1 mile of Morrell and Decker canyon and their related riparian areas. The inventory shall include water chemistry and physical analysis in addition to monthly and annual hydrographs. Riparian

areas shall be delineated and inventoried. Inventories shall include flora and fauna specific to each water source and shall also include special indicator species (i.e. spring snails), as required by the Forest Service technical specialists, which describe the overall health of the system.

2. Develop and implement in consultation with and approved by Forest Service technical specialists and their consultants a riparian vegetation and surface water monitoring plan addressing springs and other surface water courses in the canyon selected for the storage portion of the Pumped Storage Project and their associated riparian areas. Baseline data prior to initiation of the project shall be obtained for both water quantity and quality because project activities could alter groundwater levels and quality, with subsequent alteration of surface water dynamics. The surface water monitoring should include intermittent as well as any perennial systems, and should be done no less frequently than monthly. Surface water monitoring stations shall be established at locations (e.g., at bedrock outcroppings) that would be unlikely to become unusable due to sedimentation or erosion. Riparian vegetation monitoring shall include quantifying extent of riparian vegetation associated with springs, streams, and other riparian areas. The monitoring plan shall be in effect upon approval for pre-construction so that baseline data can be established and shall continue for the entire duration of the project while in construction, and for the post construction period as long as project related impacts to groundwater and/or surface waters are anticipated by the Forest Service technical specialists and their consultants.

Condition No. 36— Groundwater Management Plan

Within one year of license issuance the Licensee shall file with the Commission a plan approved by the Forest Service for the management of groundwater and the associated surface waters on or affecting National Forest System lands. The purpose of the plan shall be to reduce the potential for groundwater extraction or contamination and related effects to surface water resources. At a minimum, the Groundwater Management Plan shall:

1. Develop in consultation with and approved by the Forest Service technical specialists and their consultants a groundwater exploration and aquifer characterization plan which includes the use of existing data as well as installation of additional exploration boreholes and monitoring wells, aquifer testing (which includes water quality) and geophysics as deemed necessary to determine baseline data, construction monitoring data and post construction monitoring data for the area potentially impacted by the project.
2. Groundwater inflow criteria for tunneling will be established by the Forest Service in consultation with the co-applicants. Inflow criteria will be approved by the forest service prior to construction.
3. Develop and implement, in consultation with and approved by the Forest Service, a plan to monitor and control groundwater levels and tunnel inflows for the duration of the construction of the penstocks and tunnels and for a minimum of 10 years post construction unless it can be determined that construction related impacts no longer exist. This plan may include, but is not limited to, the development and use of a groundwater model as well as the installation and use of in-tunnel piezometers, monitoring wells, and seepage collars (or other means to control longitudinal flows along the tunnel).

4. Develop in consultation with and approved by the Forest Service technical specialists and their consultants a groundwater testing and monitoring program for the lined reservoir which will detect seepage from the reservoir into the groundwater and riparian areas. This monitoring program will remain in place for the life of the permit project.
5. Develop in consultation with and approved by the Forest Service technical specialists and their consultants a groundwater testing and monitoring program for the tunnel (unless a final impervious liner is installed prior to commissioning) which will detect seepage from the tunnel liner into the groundwater and riparian areas. This monitoring program will remain in place for the life of the permit project.

Condition No. 37 – Scenery Conservation Plan

Within one year after license issuance, or prior to any ground disturbing activities, the Licensee shall file with the Commission a Scenery Conservation Plan that is approved by the Forest Service. The purpose of the Plan is to identify actions that will minimize the project's visible disturbance to the naturally established landscape. Implementation of the Plan will achieve the greatest degree of compatibility possible with the Cleveland National Forest Land and Resource Management Plan Scenic Integrity Objectives.

In order to achieve the greatest consistency with the "High" Scenic Integrity Objective (natural appearing conditions), the project shall integrate the following design recommendations into the Scenery Conservation Plan:

- **Powerline** - Transmission lines shall be nonspecular (nonreflective) and dark as possible. The towers shall be custom-colored with a flat, nonreflective finish, to visually blend with the native vegetation colors and be as visually transparent as possible within the natural landscape pattern. Towers shall be designed to minimize their visual prominence and contrast to the natural landscape. Vegetation and ground clearing at the foot of each tower and between towers will be limited to the clearing necessary to comply with electrical safety and fire clearance requirements. Mitigation will be incorporated to reduce the visual impact of vegetation clearing.
- **Reservoir** – The upper storage reservoir shall be surrounded by a berm with irregular form and profile to reflect the local topography, which shall also be revegetated with adjacent native species. Screen views into the reservoir that may otherwise be visible along the adjacent sensitive roadways (South Main Divide and Ortega Highway), recreation areas, trails and wilderness. Security fencing shall be colored to blend with the planted/restored native vegetation.
- **Roads** - New temporary roads (maximum 15% ground slope) or roads needing reconstruction/expansion shall be configured to minimize the creation of cut/fill slopes, and where such slopes are created, they shall be immediately treated to minimize their level of scenery disturbance. These treatments may include construction of structural elements designed to blend with the adjacent natural scenery, or revegetation with native species.
- **Penstock Pipes** – Penstocks shall be located in underground tunnels and any associated ground disturbance shall be reshaped to natural appearing contours and revegetated with native species.

- **Structures –** All structures and structural elements, that may be constructed as part of the Project shall be designed, located, shaped, textured, colored and/or screened as necessary to minimize their visual contrast, blend, and complement the adjacent forest and community architectural character.

The Licensee may be required to provide photorealistic visual simulations of proposed designs and mitigation measures to demonstrate their effectiveness in achieving Land and Resource Management Plan Scenic Integrity Objectives for the Elsinore Place as viewed from sensitive viewsheds. Where project features create unavoidable scenery effects that are inconsistent with those Scenic Integrity Objectives, additional scenery enhancement activities approved by the Forest Service shall be performed in the nearest suitable areas to offset the direct effects of those project features.

Condition No. 38 -- Habitat Mitigation Plan

Within 1 year from license issuance or prior to any ground disturbing activities, and before starting any activities the Forest Service determines to be of a land-disturbing nature on or affecting National Forest System land, the Licensee shall file with the Commission a Habitat Mitigation Plan approved by the Forest Service. This plan must identify requirements for construction and mitigation measures to meet Forest Service habitat objectives and standards. Where project features create unavoidable effects that are inconsistent with Cleveland National Forest Land and Resource Management Plan Habitat Objectives, additional enhancement activities shall be performed to offset the direct effects of project construction.

The enhancements would be most appropriately located within the project area, but if opportunities are not fully available there, then alternatively and in order of priority, to be located elsewhere within the Elsinore "Place", the Trabuco Ranger District, or the Cleveland NF. The plan also must include dates for accomplishing these objectives and standards and must identify needs for and timing of any additional studies necessary. The plan must consist of the following minimum mitigation ratios for permanent loss of habitat:

1:1 for habitats that are sensitive or support listed species
1:1 for coastal sage scrub
1:1 ratio for riparian oak woodland

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COVER SHEET

FEDERAL ENERGY REGULATORY COMMISSION

FINAL ENVIRONMENTAL IMPACT STATEMENT
FOR HYDROPOWER LICENSE
Lake Elsinore Advanced Pumped Storage Project
Docket No. P-11858-002

Appendix D
Visual Simulations
Pages D-1 to D-22
FEIS

APPENDIX D

Visual Simulations

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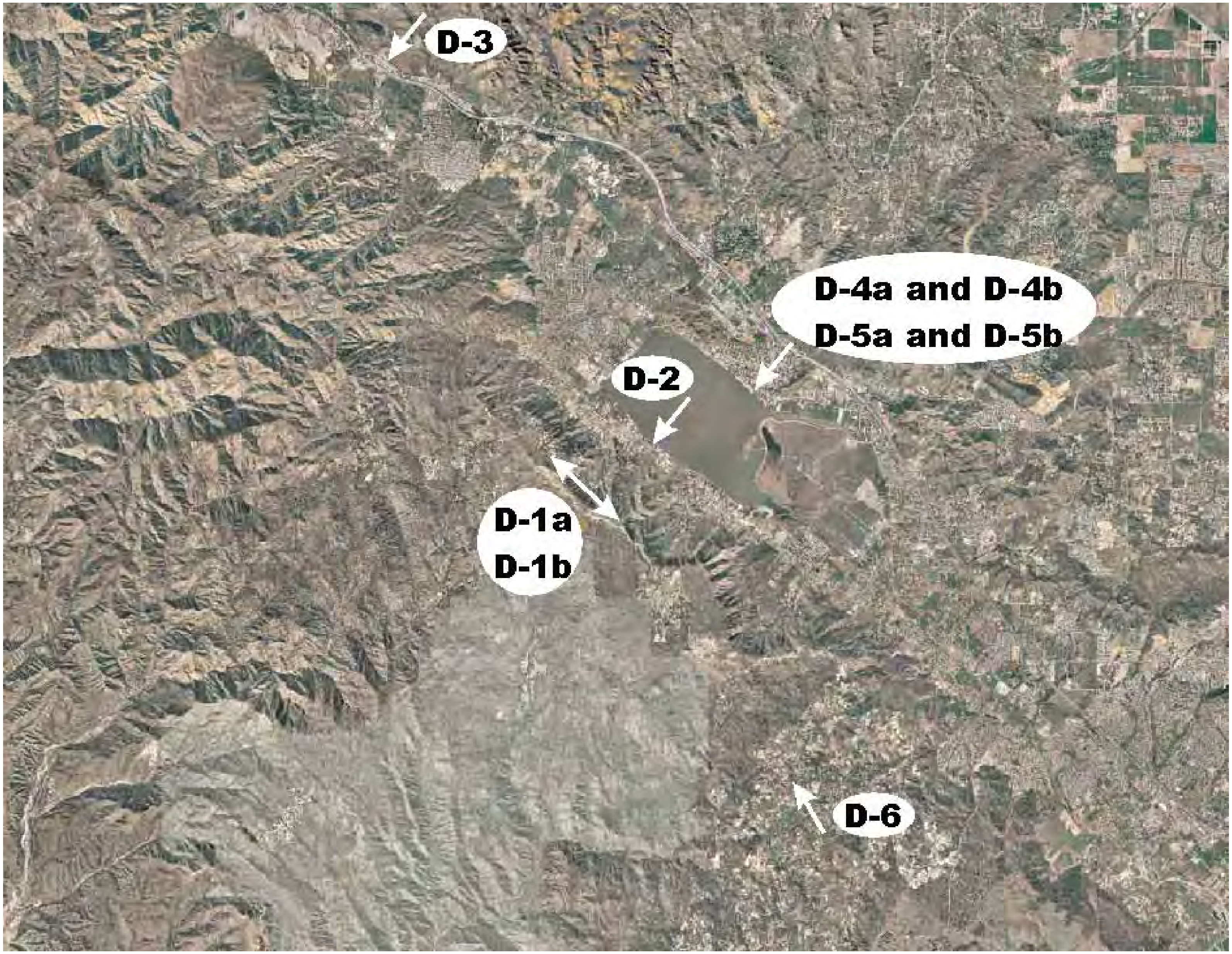

Location of viewpoints for photo simulations D.1-a through D.6

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D.1-a–Decker Canyon upper reservoir site looking north along South Main Divide Road, Before and After

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D.1-b–Decker Canyon upper reservoir site looking south along South Main Divide Road, Before and After

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D.2–Santa Rosa Powerhouse Site looking west from Grand Avenue, Before and After

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D.3–Northern sub-station looking west from I-15, Before and After

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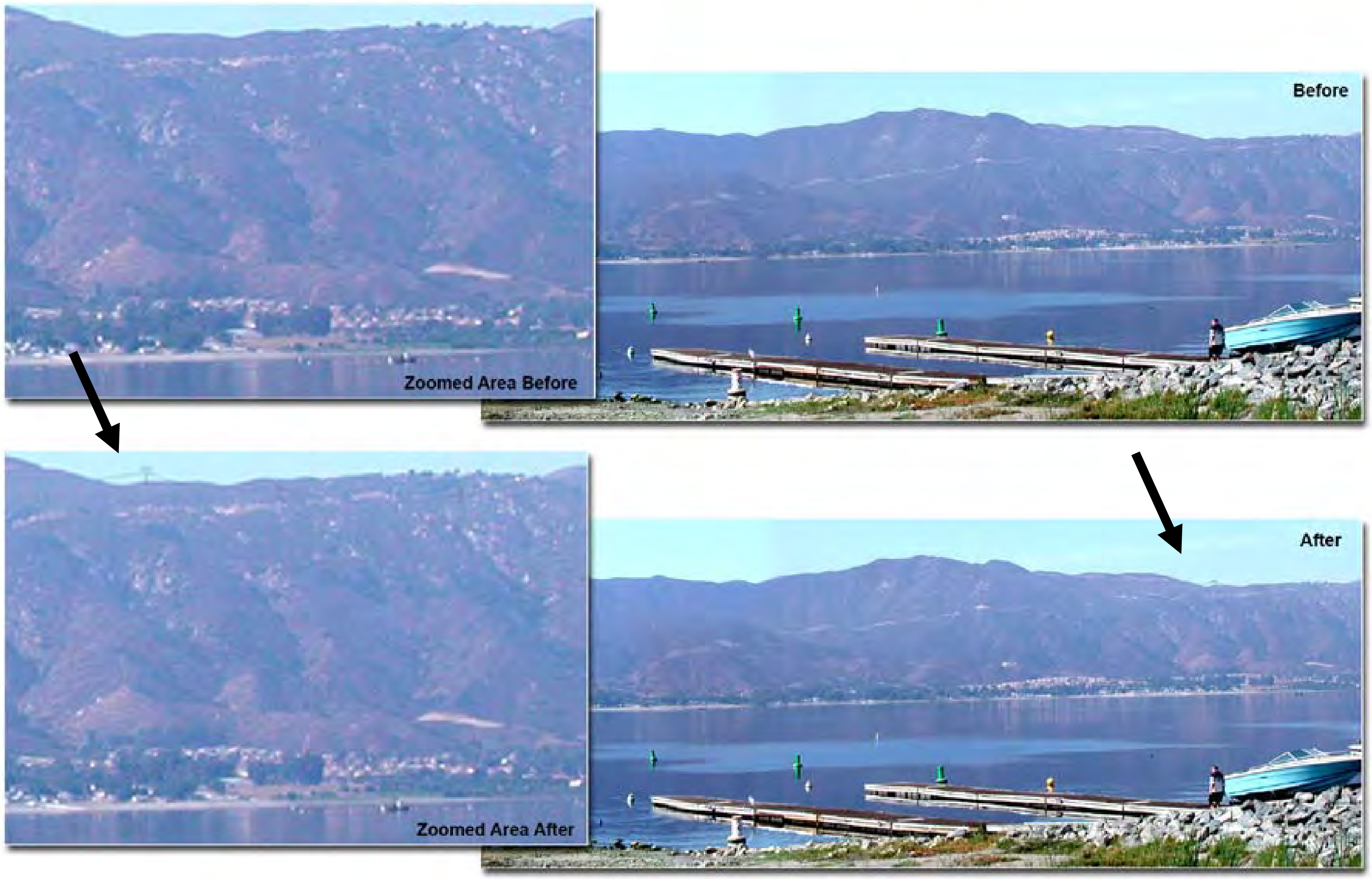

D.4-a–Co-Applicants proposed transmission alignment, northern segment, looking west from Lake Elsinore boat ramp, Before and After

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D.4-b–Co-Applicants proposed transmission alignment, southern segment, looking west from Lake Elsinore boat ramp, Before and After

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D.5-a–Staff alternative transmission alignment, northern segment, looking west from Lake Elsinore boat ramp, Before and After

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D.5-b–Staff alternative transmission alignment, southern segment, looking west from Lake Elsinore boat ramp, Before and After

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D.6-a–Co-Applicants proposed transmission alignment, southern segment, looking west from La Cresta, Before and After

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D.6-b–Staff alternative transmission alignment, southern segment, looking west from La Cresta, Before and After

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COVER SHEET

FEDERAL ENERGY REGULATORY COMMISSION

FINAL ENVIRONMENTAL IMPACT STATEMENT
FOR HYDROPOWER LICENSE
Lake Elsinore Advanced Pumped Storage Project
Docket No. P-11858-002

Appendix E
Comments on the Draft Environmental Impact Statement and the October 3, 2006, Public Notice for the Lake Elsinore Advanced Pumped Storage Project, Project No. 11858-00
Pages E-1 to E-92
FEIS

APPENDIX E

**Comments on the Draft Environmental Impact Statement
and the
October 3, 2006, Public Notice
for the
Lake Elsinore Advanced Pumped Storage Project
Project no. 11858-002**

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APPENDIX E

COMMENTS ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE LAKE ELSINORE ADVANCED PUMPED STORAGE PROJECT PROJECT NO. 11858-002

The Federal Energy Regulatory Commission (Commission or FERC) issued its draft environmental impact statement (EIS) for the licensing of the Lake Elsinore Advanced Pumped Storage Project (LEAPS Project) on February 17, 2006. The Commission requested comments be filed by April 25, 2006. In addition, the Commission conducted two public meetings on April 4 and 5 in the cities of San Juan Capistrano and Lake Elsinore. In this appendix, we summarize the written comments received; provide responses to those comments; and indicate, where appropriate, how we have modified the text in the final EIS. We grouped the comment summaries and responses by topic for convenience. The following entities filed comments on the draft EIS:

Commenting Entity	Filing Date
Elsinore Hang Gliding Association	March 6, 2006
Robert V. Wills	March 13, 2006
Michael Wayne Smith	March 23, 2006
Bill Soderquist, Elsinore Hang Gliding Association	March 25, 2006
Jeeni Criscenzo	April 4, 2006
Nick Bimbo et al. (letter filed by 13 individuals)	April 5, 2006
Elsinore Valley Municipal Water District	April 6, 2006
Palomar Observatory	April 7, 2006
Elsinore Hang Gliding Association	April 11, 2006
Endangered Habitat League	April 12, 2006
Jay Scott et al. (letter filed by 33 individuals)	April 17, 2006
John and Soma Stickler	April 17, 2006
LaCresta Property Owners Association	April 19, 2006
John Pecora	April 19, 2006
County of Riverside	April 20, 2006
Michael Hilberath et al. (letter filed by five individuals)	April 20, 2006
Peter Dawson	April 21, 2006
U.S. Department of the Interior	April 21, 2006
Deanna and Charles Whitney	April 22, 2006
David Anderson	April 24, 2006
Elsinore Testing of Experimental Aircraft Mechanisms, Inc. (Francis Hoffman)	April 24, 2006
Friends of the Forest (Trabuco District)	April 24, 2006
Douglas Pinnow	April 24, 2006

Commenting Entity	Filing Date
California Regional Water Quality Control Board, Santa Ana	April 25, 2006
California Department of Fish and Game	April 25, 2006
Center for Biological Diversity, Sierra Club	April 25, 2006
City of Lake Elsinore	April 25, 2006
Elsinore Valley Municipal Water District (two letters)	April 25, 2006
Fernandez Parties[a]	April 25, 2006
Chris Hyland	April 25, 2006
Robert and Susan Konoske	April 25, 2006
Jerry Mosier	April 25, 2006
Lake Elsinore United School District	April 25, 2006
Natural Resources Defense Council	April 25, 2006
Pacific Clay Industries	April 25, 2006
Rancho Capistrano Property Owners Association	April 25, 2006
Linda Lou and Martin Ridenour	April 25, 2006
State Water Resources Control Board	April 25, 2006
California Native Plant Society (Orange County Chapter)	April 26, 2006
Jon Johnson	April 26, 2006
Andrew and Sandra Mauthe	April 26, 2006
San Diego Gas & Electric Company	April 26, 2006
Edith Stafford	April 26, 2006
Edwin Thorell	April 26, 2006
David Voss	April 26, 2006
Scott Werner	April 26, 2006
Ruth Atkins	April 27, 2006
Bruce Campbell	April 27, 2006
Lake Elsinore Sailing Club	April 27, 2006
Lakeland Village/Wildomar Redevelopment Project Area Committee	April 27, 2006
Anna Lee	April 27, 2006
Pechanga Band of Luiseno Indians	April 27, 2006
U.S. Environmental Protection Agency	April 27, 2006
U.S. Marine Corps (Camp Pendleton)	April 27, 2006
County of Orange	May 1, 2006
Luis Stahl	May 1, 2006
Honorable Darrell Issa , Honorable Ken Calvert, Honorable Mary Bono, Honorable Duncan Hunter	May 2, 2006
Charles Jancic	May 3, 2006

Commenting Entity	Filing Date
US Army Corps of Engineers, Los Angeles District	May 8, 2006
Elsinore Valley Municipal Water District	May 31, 2006

[a] Miller, Staff, & Regalia filed on behalf of Friesian Focus, LLC, the Fernandez Trust, and Joseph and Joan Fernandez (collectively "Fernandez Parties").

In addition to the above-listed filings, 95 individuals from the project area filed letters in opposition to the proposed project citing general concerns. These individuals are listed at the end of Appendix E. Also, organizations and individuals filed several letters echoing the same themes. We summarize these letters as follows:

(1) On April 25, 2006, the Commission received 1,905 letters from individuals across the country outside of the project area requesting that the Commission adopt the No-action Alternative. These individuals oppose the potential destruction of wilderness-quality and oak trees in Morrell Canyon, the potential effects on world class hang gliding opportunities, and the potential effects on nesting shorebirds in one of Riverside County's most important wildlife reserves.

(2) The San Diego Chapter of the Sierra Club filed 151 postcards from residents of San Diego County on April 25, 2006, and the Los Angeles Chapter of the Sierra Club filed 430 comment cards (signed by 430 individuals) on April 27, 2006, saying that we need to preserve both Decker and Morrell canyons in the Santa Ana mountains and stop the proposed pumped storage project from destroying a prized recreational area and drowning the rare southern oak forest.

(3) By letters filed on April 26 and 28, 2006, 200 individuals from the project area oppose the proposed project citing concerns about risks to the environment, property, and people. Specifically they state that the project would violate the Cleveland National Forest Land Management Plan and would harm the San Mateo Wilderness Area, create a risk of flooding, complicate fire fighting, encourage off-road vehicle trespass, and put hang gliders at risk. They also question the need for the project, the competence of the co-applicants, and the adequacy of the environmental studies completed in support of the project. They urge adoption of the No-action Alternative for a project anywhere in the Cleveland National Forest. These individuals are listed at the end of Appendix E.

These general letters provide comments similar to those comments provided in the letters listed above. We address all the issues, as appropriate, in the final EIS. Comments regarding purely editorial issues are addressed in the final EIS and are not summarized below.

GENERAL

Comment 1: Ninety-five regional residents filed letters with general comments about consideration of alternative energy sources and the potential effects of the proposed project on the environmental and recreational resources of Decker and Morrell canyons, including the disturbance of natural springs, removal of California live oak trees, interruption of use of hiking trails and hang glider launch sites, and interference with fire fighting activities; changes in the water quality and recreational boating use on Lake Elsinore; on the property values, and aesthetics qualities. These regional residents encourage the Commission to take no action.

Response: We appreciate the general comments put forth by regional residents and have addressed them, as appropriate, throughout the final EIS.

Comment 2: David Voss, Charles and Deanna Whitney, and other individuals question how the Commission could issue a license to an entity that has had no prior experience in the construction and operation of a pumped storage facility and transmission line.

Response: Under the Federal Power Act (FPA), any citizen, municipality, corporation, or Indian tribe can apply for a hydropower license. The Commission will consider whether the Nevada Hydro Company (Nevada Hydro) and the Elsinore Valley Municipal Water District (Elsinore Valley MWD), as co-applicants, can comply with the terms of a license and safely manage and operate the project to provide efficient and reliable service in any order issued for this project.

PURPOSE AND NEED

Comment 3: Jenni Criscenzo states that the conclusions of the draft EIS are in direct conflict with the goals of the San Diego Association of Governments as published in May 2003 in *Energy in 2030: The San Diego Regional Energy Strategy*. She also states that as an energy consumer, the LEAPS Project is in conflict with the State law (SB 1037) that requires all utilities to meet their unmet resource needs first with energy efficiency and demand reduction resources that are cost-effective, reliable, and feasible. She points out that Southern California Edison (SCE) and San Diego Gas & Electric Company (SDG&E) might not actually be permitted to purchase power generated by LEAPS after meeting all of their legal and regulatory requirements.

Response: If the Commission decides to grant a license to the project, it is the responsibility of the co-applicants to then secure a power purchase agreement.

Comment 4: The Friends of the Forest question how the Commission can accept a license application that includes a transmission line that the Commission does not have the authority to grant.

Response: The Commission has authority to license a transmission line from a waterpower project to the "point of junction" with the interconnected primary transmission system, in this case the SDG&E and the SCE systems. Appendix B-7 provides further explanation of this project's point of junction. We have deleted paragraph 1.2.3.3 on page B-8 from the final EIS as the Talega-Escondido/Valley Serrano 500 kilovolt (kV) Interconnect Project (TE/VS Interconnect) transmission line is not being proposed as a separately permitted transmission line.

Comment 5: Pacific Clay and the Center for Biological Diversity state that the statement of Purpose and Need in the draft EIS is inadequate because it does not provide a meaningful discussion of why the project is the best comprehensive plan for improving and developing Lake Elsinore; whether the project forwards the purposes of energy conservation, the protection of fish and wildlife, and promotion of recreation; and whether there are feasible alternative energy sources or other feasible project locations. They state that there is no discussion of the likelihood of a transmission line only portion of the project going forward without the hydropower portion.

Response: Section 1.2.1 of the draft EIS describes the current and future demand for electricity in the California-Mexico Power area of the Western Electricity Coordinating Council (WECC) and the specific role that a pumped storage project could play in helping to meet the future energy demand. The draft EIS is intended to disclose the potential effects of the proposed project on the environmental resources of the projects. The draft EIS provides an analysis of the effects of each project component, including the transmission line, as summarized in table 53. Decisions about whether or not to license the proposed LEAPS Project or the TE/VS Interconnect will be addressed in any license order issued by the Commission and in any Record of Decision issued by the USFS.

Comment 6: The Friends of the Forest state that there is no market for large-scale pumped storage projects, citing four examples of projects licensed by the Commission between 1991 and 1997 for which the Commission terminated the licenses because construction had not begun. They request that the final

EIS include information about pumped storage projects licensed by the Commission during the past 20 years.

Response: Whether pumped storage projects licensed by the Commission during the past 20 years have been built or terminated is not relevant to current proceeding. An applicant may apply for a license for a pumped storage project and the Commission must consider any application on a case-by-case basis that meets the regulatory requirements.

Comment 7: The Friends of the Forest and Charles and Deanna Whitney point out that SDG&E has eliminated the LEAPS Project transmission alignment as a preferred route in the Southwest Transmission Expansion Plan (STEP) process, finding it not suitable from a construction and maintenance point of view; that the Los Angeles Department of Water and Power and Imperial District have announced the Green Path Project; and that a new 775-megawatt (MW) combined power plant is under construction less than a mile from the Valley substation. They conclude that Nevada Hydro has overstated its case relative to the need for power.

Response: The proposed transmission line is currently a primary line associated with the proposed advanced pumped storage facility. The draft EIS states that the WECC anticipates that 6,783 MW of new capacity would come on line in the next 10 years, including the combined power plant under construction near the Valley substation. About 390 MW of hydroelectric pumped storage, not including the LEAPS Project, is included in this forecast. Of interest is not the amount of new capacity, but the type of capacity that would be provided by pumped storage. Pumped storage generates and stores power during off-peak periods that can be provided rapidly during on-peak periods when supplies of energy are tight.

Comment 8: The State Water Resources Control Board (State Water Board) states that the final EIS should compare the estimated consumer energy costs of the project with the estimated consumer energy costs resulting from the development of a 500-MW gas-powered combined cycle facility with peaking abilities in the South Coast Region. It states that this comparison should include a discussion of the relative project footprints and the cost and feasibility of mitigation for each.

Response: Our developmental analysis considers the No-action Alternative to include a 500-MW gas-powered simple cycle turbine. We refer to "Comparative cost of California central station electricity generation technologies" (CEC, 2003) as the basis for making this selection. The document describes simple-cycle turbines as operating in a peaking mode, which staff concludes is a reasonable basis for comparison to pumped storage projects. The document estimates that 50 acres would be required for a 100-MW simple-cycle combustion turbine plant. A 500-MW plant would likely require less than 250 acres due to economies of scale. Such a plant would require emissions controls and various environmental permits.

Comment 9: The State Water Board states that staff should take note of the recent agreement of seven utilities to underwrite the economic and environmental studies for a transmission line that would bring electricity to California from out-of-state generation sources, known as the "Frontier Line." The cost and need for the TE/VS Interconnect Project should be considered in light of the "Frontier Line" Project and its place in the STEP.

Response: We note that the transmission system expansion alternatives proposed under the "Frontier Line" Project would partially address energy transmission needs in the Western states. However, the project's feasibility study and conceptual plan were only recently announced (April 2006) and will take approximately 12 months to complete. Therefore it is premature to consider it in the final EIS.

Comment 10: Bill Soderquist, on behalf of the Elsinore Hang Gliding Association, presented a list of new power projects that have gone online or are due to go online since the project was proposed. He states these projects are adequate to supply the new demand.

Response: We appreciate the research by Mr. Soderquist into new power projects serving the California area. Our basis for the Need for Power section of the draft EIS is the *10-Year Coordinated Plan Summary: Planning and Operation for Electric System Reliability* (WECC, 2005). We note that table 30 on page 49 of this document provides information similar to the information provided by Mr. Soderquist and that project generation additions and retirements are included in the WECC analysis. We continue to rely on the WECC assessment that says by 2014, California will have to add 6,783 MW of new capacity of which pumped storage could be a part.

Comment 11: The Army Corps of Engineers (Corps) recommends adding to the final EIS an explicit explanation of why a 500-MW capacity facility is needed, as opposed to a lesser amount of capacity.

Response: We previously requested clarification on the selection of the proposed installed capacity from the co-applicants. The co-applicants responded in Clarification (4) (c) to their November 12, 2004, deficiency letter response that the 500-MW facility optimizes the site and available equipment configurations, doing so in an economical manner**.** We note that for pumped storage the amount of capacity installed is highly sensitive to the power purchasers' load shape, and the co-applicants have not indicated who would purchase the energy generated by the project.

Comment 12: Edwin Thorell states that power production can be better produced by using "peakers" powered from methane produced by Elsinore Valley MWD's plant. He also states that solar power and wind power are better investments than the proposed project.

Response: As noted in the draft EIS, forecasts of new capacity do not treat wind power as firm capacity because of the intermittent nature of wind. Although other sources of energy may evolve, the co-applicants propose a pumped storage facility and our need for power addresses the role of pumped storage in the energy resource mix for the region.

Comment 13: The Natural Resources Defense Council states that the project's use of nuclear power and its associated environmental effects must be examined under the National Environmental Policy Act (NEPA).

Response: The co-applicants have not indicated that they have generation contracts with nuclear power providers at this time and, in any event, the environmental effects associated with nuclear power would have been disclosed in the NEPA analysis associated with the Nuclear Regulatory Commission's proceeding.

PROCEDURAL

Comment 14: Nevada Hydro requests that the *Cover Sheet* and *Abstract* be revised to state that the project transmission lines are located in Orange and San Diego counties. It also requests that figure 1 show the locations of the pumped storage facility as well as the proposed transmission alignment.

Response: We have revised the *Cover Sheet* and *Abstract* to include all the counties within which the proposed project is located. We have revised figure 1 to expand the project location box to include the transmission component of the proposed project.

Comment 15: Nevada Hydro requests that the *Purpose of Action* discussion on page 1-1 of the draft EIS be revised to say that the Commission and the USFS have agreed to participate as cooperating agencies in the preparation of an EIS for the LEAPS Project and for the TE/VS Interconnect Project so that the EIS can by used by the Commission, the USFS, and other agencies as the environmental basis for any and all actions that may be required from those federal agencies from whom discretionary actions are required.

Response: The Commission invited the USFS to participate as cooperating agency for the preparation of an EIS for licensing of the LEAPS Project. The LEAPS Project, as proposed by the co-applicants, includes an upper and lower reservoir, water conduits, a powerhouse, tailrace channel, an intake/outlet structure, and 30 miles of transmission lines. The co-applicants also filed a separate special use permit application with the USFS for permission to occupy Cleveland National Forest lands to construct and operate the stand alone TE/VS Interconnect Project. The jointly prepared EIS will provide the environmental disclosures necessary for the Commission to make a decision on whether to issue a hydropower license and, if it so chooses, for the USFS to make a decision on whether to issue a special use permit to allow the LEAPS Project to occupy Cleveland National Forest lands. The Commission is not cooperating with the USFS on any decision related to the transmission alone project.

Comment 16: The Friends of the Forest point out that it filed a motion to intervene on June 2, 2004, but was not listed as an intervener on page 7 of the draft EIS.

Response: We have corrected this oversight and have listed Friends of the Forest in the list of interveners in the final EIS.

Comment 17: The Friends of the Forest question why the Commission chose not to use the Docket ER06-278 service list to notify parties in the P-11858 proceeding that ER06-278 had been opened for comments and interventions. They request that the record of ER06-278 be made part of the record in the P-11858 proceeding.

Response: These are two separate Commission proceedings with separate dockets and service lists.

Comment 18: Many individuals state that they did not receive any written notice that their property was in the path of the transmission alignment and question whether proper notification procedures have been followed.

Response: The co-applicants followed the Commission's notification requirements under 18 CFR § 4.32(a)(3)(i)(A). The Commission issued a public notice on October 3, 2006, to all owners of record to ensure that every owner who could be directly affected by the proposed and alternative transmission alignments (presented in the final EIS) received notification and had an opportunity to comment on the proposed and alternative actions prior to issuance of the final EIS.

Comment 19: Riverside County recommends that an additional public hearing be held in the local area because many people were forced to stand outside and were unable to hear the proceedings at the only Commission-conducted public hearing previously held.

Response: As noted by others in attendance, the alternative sites for the public meeting were no larger than the neutral site selected for the meeting. We note that everyone who wished to speak at the public meetings held on April 4 and 5, 2006, was able to do so and everyone who wished to file written comments could do so. Transcripts from the scoping meetings and the public meetings on the draft EIS are available on eLibrary through the Commission's web site.

Comment 20: Riverside County requests that it be notified of any and all additional hearings and be provided future reports prepared for this project so that it has the opportunity to review and coordinate regarding project-related effects on Riverside County activities.

Response: Riverside County filed a motion to intervene and as such will receive all Commission issuance and other filings in this proceeding.

Comment 21: The Fernandez Parties state that the Commission does not have authority over the Interconnect Project, and therefore that portion of the project needs to be redirected to the California Public Utilities Commission.

Response: The co-applicants propose a pumped storage project with a primary transmission line to convey the energy produced to the grid. Until an interconnection with the grid is achieved, the primary line is clearly within the Commission's authority to license.

PROPOSED ACTION AND ALTERNATIVES

Comment 22: SDG&E states that the final EIS should evaluate the statement in section 2.2 of the draft EIS: "Pumped storage does not depend on fossil fuels and is not subject to supply disruptions" to determine the fuel source for unit at margin during off-peak pumping periods since the project is a net consumer of energy. The Center for Biological Diversity also expresses this concern.

Response: The co-applicants have stated their intent to pursue off-peak generating sources, such as geothermal, wind, and other non-fossil based energy sources. We recognize that until they negotiate a power sales agreement, the final off-peak fuel mix would not be fully defined. We have therefore modified the statement referenced accordingly. We note that as long as there is water in the upper reservoir, it can be dispatched for power; however, once empty, the project is dependent on electricity for refill.

Comment 23: Nevada Hydro suggested several modifications to the proposed project including: (1) using a single high pressure conduit rather than two parallel high pressure conduits from the upper reservoir to the powerhouse; (2) changing the proposed generator voltage from 13.8 kV to 16 kV and changing oil-filled cables to gas-insulated cables; and (3) accelerating the construction schedule from 4.5 to 3 years. Nevada Hydro also revised its proposed transmission alignment: (1) to relocate the southern substation from the Tenaja area to an area south of the existing Case Springs Fire Station within the existing SDG&E right-of-way; (2) to include underground segments near the hang gliding launch areas and between the upper reservoir and the powerhouse; (3) and to provide preliminary tower sites along the revised proposed alignment.

Response: In subsequent clarification communication with Commission staff (personal communication, D. Kates, Nevada Hydro, Vista California, and James Fargo, Commission, Washington, DC, on May 26, 2006), Nevada Hydro indicated that the co-applicants were not formally modifying their proposed action to include changes to the high pressure conduit design or to accelerate the construction schedule. Therefore, we present only the co-applicants' revised transmission alignment and analyze the effects of this proposed alignment along with the preliminary tower placements in the final EIS.

Comment 24: Nevada Hydro requests that several measures proposed by the co-applicants in the license application and subsequent filings be deleted, modified, or clarified as follows:

(1) Nevada Hydro no longer proposes to develop and implement a revised lake operating plan for Lake Elsinore, addressing increased minimum lake levels, flood control implications, and water

supply issues; instead, Nevada Hydro proposes to work cooperatively with the agencies in authority (pages 2-13 and 5-11 of the draft EIS).

(2) Nevada Hydro requests the deletion from the EIS the measure to reduce the maximum operational drawdown during summer months following a winter with below-normal precipitation to control algal blooms that could result in fish kills (pages 2-14 and 5-12 of the draft EIS) because the co-applicants no longer propose this measure.

(3) Nevada Hydro requests that the proposed measure to acquire and demolish the multi-family residences nearest the proposed powerhouse site to address potential adverse effects on residents during construction (pages 2-15 and 5-13) be clarified to state that it pertains to the Santa Rosa site and be modified to allow the co-applicants to use these properties to provide relocation assistance or for construction purposes, and to return these properties to the regional housing inventory or other productive uses, following completion of construction.

(4) Nevada Hydro states that it is currently the co-applicants' objective to achieve a balance of excavation and fill materials (pages 2-15 and 5-13 of the draft EIS) but requests that this objective be a target rather than an absolute requirement because it may be difficult to achieve for the construction of the transmission line.

(5) Nevada Hydro states that it agrees to provide a fair-share contribution toward the installation of a traffic signal at the Grand Avenue/Ortega intersection but requests that the appropriate state or local agency establish the need for the signal, develop plans and cost estimates, identify the proportion of costs associated with the proportion of project-related traffic use and that the co-applicants contribute funding rather than be responsible for implementation of the improvement.

(6) Finally, Nevada Hydro asks that the proposed measure to conduct all construction activities in accordance with the noise element of the county of Riverside Comprehensive General Plan and city of Lake Elsinore construction noise standards be revised to allow the co-applicants to conduct 24-hour construction operations subject to further noise studies demonstrating that, as proposed or modified, no sensitive receptors would be exposed to noise that exceeds the locally established standards.

Response: We removed the proposed measure to prepare a revised lake operating plan for Lake Elsinore from the co-applicants' proposed measures in section 2.3.6 and have added this measure to the staff alternative in section 2.4.3.2. We have deleted the proposed measure to reduce the maximum operational drawdown during summer months following a winter with below-normal precipitation. We concluded in the draft EIS that this measure is not necessary because the lake level would be maintained at or above 1,240 feet mean sea level (msl). We have revised the text in section 2.3.6 and 5.1.1 to indicate that housing acquired within the construction right of way could be returned to the regional housing market upon completion of construction. The staff-recommended measure only pertains to achieving a balance of excavation and fill materials at the upper reservoir. We would expect that the specifics for participating in the installation of any traffic signal would be addressed in the co-applicants' proposed road and traffic management plan. In their comments on the draft EIS filed on April 25, 2006, the co-applicants suggested and then withdrew their suggestion during a clarifying phone call with Commission staff on May 26, 2006, to accelerate the construction schedule, eliminating any need for studies to demonstrate that 24-hour construction would not violate local ordinances.

Comment 25: Linda and Martin Ridenour comment that the figures 2 and 3 in the draft EIS do not show the many homes, apartments, and schools that would be affected by the proposed project, the individual lakeside properties that would be affected, or the exact location of the inlet/outlet structure. They also comment that figures 5 and 6 do not include enough detail and suggest that the final EIS include a satellite map showing the location of houses near the transmission lines so that people can comment on the effect on their properties.

Response: Figures 2 and 5 show the approximate location of the inlet/outlet structure in Lake Elsinore. Appendix F of the final EIS includes aerial photographs that show the co-applicants' proposed and staff alternative transmission alignments. These aerial photographs also were sent to property owners of record within 0.25 mile of the co-applicants' proposed and staff alternative transmission alignments.

Comment 26: Nevada Hydro points out that some language in the draft EIS (e.g., page 3-136) is inconsistent with the co-applicants' proposal and with USFS preliminary 4(e) condition no. 28 that would provide a day-use area at either the upper reservoir construction staging and laydown area or elsewhere.

Response: USFS revised preliminary 4(e) condition no. 27 adopts the co-applicants' alternative 4(e) language and now allows for an alternative location for the day-use area. We have revised the final EIS to eliminate the inconsistent language in the terrestrial resources analysis.

Comment 27: Linda and Martin Ridenour provide comments on the USFS 4(e) conditions citing the need for detailed plans in order to evaluate effects. They comment that a special use permit should not be granted without more detailed information about vegetative fuel management, road and traffic management, recreational facilities (how will the USFS specified facility relate to the county trail system?), protection of historic properties, and protection of wildlife (information on the Pacific flyway).

Response: Site-specific analysis would be required before issuance of a special use authorization. A vegetation fuel treatment plan (condition no. 9), a vegetation and invasive weed management plan (condition no. 33), road and traffic management plan (condition no. 26), recreation facilities and administration plan (condition no. 27), historic properties management plan (condition no. 28), and a wildlife management plan (condition no. 34) would be required prior to construction and within 1 year of any license issued. The only system trail that may be affected is the Morgan Trail, which has been analyzed within the draft EIS (section 3.3.6.2).

Comment 28: Nevada Hydro states that, as described in section 2.3.4 of the draft EIS, the staff alternative transmission alignment would be a circuitous rather than a linear configuration that would require additional tower fortifications and additional temporary or permanent access roads. Nevada Hydro also suggests that figures 5 and 6 show a corridor rather than a specific transmission alignment.

Response: Commission and USFS staff modified the staff alternative transmission alignment to provide a more linear configuration and to minimize effects on the wilderness area and back-country non-motorized areas within the Cleveland National Forest. The figures included in volume 1 of the license application identified the primary transmission line as a transmission alignment and we describe the proposed route as an alignment in the EIS to be consistent. We consider the alignment to represent a 500-foot-wide corridor with a 200-foot-wide permanent right-of-way.

Comment 29: Nevada Hydro assumes that the staff-recommended measure for a plan to determine the toxicity of sediments in the lakebed relates only to the lake area that would be directly impacted by construction activity and only to the identification of toxins above actionable levels and does not encompass the entire lake or extend beyond areas of direct disturbance. Nevada Hydro requests that the measure be clarified to reflect these assumptions.

Response: Your assumptions are correct, and we have revised section 2.4.3.2 in the final EIS to clarify the scope of the recommended plan.

Comment 30: Nevada Hydro provides updated information on the housing development at Ortega Oaks and states that subdivision approvals in April 2004 and unknown to the co-applicants would increase both the cost and the complexity of constructing the powerhouse at the Ortega Oaks site substantially. Nevada Hydro states that if the license is restricted to the Ortega Oaks site, there would remain an unresolved question concerning whether the co-applicants could feasibly and reasonably secure the Ortega Oaks site. Nevada Hydro also points out that its study reports show that of the three powerhouse sites, the Ortega Oaks site possesses the least desirable subsurface conditions, (i.e., the site offers greater geotechnical challenges and design-level obstacles). Nevada Hydro requests that both the Commission license and the USFS permit authorize use of either the Santa Rosa or Evergreen powerhouse sites in the event that the Ortega Oaks property cannot be feasibly or reasonably acquired.

Response: We have reviewed your filing including the information about the permitted housing development at the Ortega Oaks powerhouse location. Based on this new information and on other considerations, the staff alternative now includes the Santa Rosa powerhouse location.

Comment 31: Nevada Hydro states that the Decker Canyon upper reservoir site offers the most direct (and least expensive) connection to the Ortega Oaks powerhouse site. If that site is not feasibly acquired, the Decker Canyon upper reservoir site would not offer the most direct (and least expensive) connection to either the Santa Rosa or Evergreen powerhouse sites. It states that as the distance between the upper reservoir and powerhouse increases, so does the penstock tunnel length between these two facilities. Because tunneling costs represent one of the greatest construction line-item costs, it is important to maintain relative proximity between the powerhouse and upper reservoir. Nevada Hydro provides a wetland delineation report in the April 15, 2006, filing (attachment F) that states "While some minor differences in the overall species composition and structure of the drainage features exist, their functions are considered similar." Nevada Hydro states that given the findings of the wetland delineations, the avoidance of jurisdictional waters, in and of itself, does not provide a supportable basis for the selection of one upper reservoir site over the other. Further, because Decker Canyon contains 0.3 acre of waters of the United States, it does not meet the definition of a practicable alternative pursuant to 40 CFR 230.10.

Response: We have reviewed the new information on wetlands provided in attachment F to your comments on the draft EIS. The potential effect on wetlands is only one of several issues we considered in determining the effects of the construction and operation of the upper reservoir at the Decker Canyon and Morrell Canyon locations. We continue to conclude that construction of the upper reservoir at Morrell Canyon would have greater effects on Lion Spring, oak woodlands, and recreational use of trails and hang gliding launch sites.

Comment 32: Nevada Hydro states that if the Ortega Oaks powerhouse site cannot be acquired, the staff alternative transmission alignment would need to be modified to facilitate connection to either the Santa Rosa or Evergreen powerhouse sites. With the exception of the northernmost segment, Nevada Hydro does not have any objection to the staff alternative transmission alignment. However, it continues to believe that, with the exception of that segment located near the area now used as a principal launching site by hang gliders, the co-applicants originally proposed and now revised transmission alignment would result in lesser impacts on existing homes located near the base of the Elsinore Mountains. With regard to the northernmost segment of the staff alternative transmission alignment, Nevada Hydro points out land use conflicts with Pacific Clay Products and housing developments at Horsethief Canyon and Alberhill Ranch and requests that Commission staff revise the staff alternative transmission alignment to adopt the northernmost segment of the co-applicants' proposed/revised alignment that avoids these land use conflicts.

Response: We have considered all the comments made in response to the draft EIS and have revised the staff alternative transmission alignment. We agree that your alignment to the north of the Cleveland National Forest and to the south along the existing SDG&E route would avoid conflicts with Clay Products and housing developments. The staff alternative transmission alignment as shown in figure 5 and figures F-1 through F-4 in appendix F of the final EIS would follow the same alignment as the co-applicants' proposed alignment at both the northern (north of the Cleveland National Forest) and southern ends. Within the Cleveland National Forest, the staff alternative transmission alignment would still be to the east of your alignment, but generally to the west of the private in-holdings within the forest. We also would place the line underground near the hang gliding launch sites, but for a shorter distance just past the egress to Rancho Capistrano.

Comment 33: Nevada Hydro points out that figures 5, 8, 12, and 15 in the draft EIS show the transmission alignments east of the Cleveland National Forest instead of within the jurisdictional boundary of the forest.

Response: Our intention was for the alignment to be within the Cleveland National Forest. All of the figures in the final EIS have been revised to show the co-applicants' and staff's revised alternative transmission alignments. In addition, aerial photographs showing the proposed and staff alternative transmission lines have been added as appendix F to the final EIS.

Comment 34: The Environmental Protection Agency (EPA) indicates the alternatives analysis for the LEAPS Project needs to be expanded to include alternative sites, alternative technologies, and sustainable approaches that would avoid or minimize effects on waters of the United States while providing peak energy. It recommends that the final EIS include: (1) a clear, concise purpose statement for the project that allows for the analysis of alternatives that avoid waters to the extent practicable; (2) an expansion of the alternatives analysis to consider other alternative sites, technologies, and sustainable approaches within a reasonable market area; and (3) a discussion of appropriate mitigation measures for those effects that are unavoidable.

Response: Our alternatives analysis is adequate. The purpose of the project is to provide an advanced pumped storage facility for the generation of energy during off-peak energy use periods for delivery and use during peak energy use periods. This is clearly stated in the draft EIS. Under the no-action alternative, other forms of generation would be needed to meet future needs during peak energy use periods. We include in the draft EIS alternative locations for the upper reservoir, powerhouse, and transmission lines. We considered two transmission alignments in the draft EIS and, based on public and agency comments, both the co-applicants and staff have revised the proposed and staff alternative transmission alignments to address issues raised in the comments on the draft EIS including conflicts with businesses, housing developments, wetlands, oak woodlands, fire fighting protocols, recreational use of hang gliding launch sites and trails, and the aesthetic effects on wilderness and back country areas. The development of transmission alignments under consideration in the final EIS took into account the need to efficiently convey power while avoiding as many effects on environmental resources as possible.

Comment 35: The Corps recommends the final EIS include project alternatives with reduced effects on waters of the United States and a detailed discussion of practicability in terms of engineering, cost, and logistics as part of the section 404 analysis. If these requirements are not met in the final EIS, the Corps states it would conduct its own analysis before reaching a final permit decision.

Response: The co-applicants provided additional technical studies in their filing of April 25, 2006, including delineations of jurisdictional waters and wetlands at the Decker Canyon and Morrell Canyon upper reservoir sites. We include this information along with a new figure 14 that shows the location of waters of the United States and the state of California at the upper reservoir sites. In section 3.3.4.2, we conclude that construction at the Decker Canyon reservoir site would have a smaller effect on waters of the United States than construction at the proposed Morrell Canyon site. Due in large part to this finding, we include the Decker Canyon reservoir site in the staff alternative. We conducted a detailed review of the engineering assumptions, costs and logistics of the construction of both the proposed and staff alternative facilities and presented the information about the practicability of this alternative in section 4.1 of the draft EIS.

Comment 36: The California Department of Fish and Game (CDFG), the Fernandez Parties, the Center for Biological Diversity, and Pacific Clay believe that the Commission did not explore all project alternatives and that the co-applicants have not fully explored the cost and feasibility of implementing other renewable options that would be less detrimental to the environment. CDFG further states that it does not concur with the draft EIS finding that the generation of renewable power by the placement of a hydroelectric facility within a location as environmentally sensitive and valuable as Morrell Canyon and the Cleveland National Forest is more beneficial than producing the required additional electricity via gas-fired means in non-sensitive areas.

Response: We did not conclude that a Morrell Canyon upper reservoir was a preferred location nor did we conclude that the project was more beneficial than producing electricity via other means, but rather concluded on page 5-1 of the draft EIS that both the staff alternative and co-applicants' proposal would likely be more expensive than a combustion turbine alternative.

Comment 37: The State Water Board agrees the Morrell Canyon upper reservoir option is the more environmentally sensitive and the Decker Canyon option is the least environmentally sensitive; however, the effects of the project on Decker Canyon must be fully analyzed by further footprint assessments.

Response: The co-applicants filed the results of their wetland delineations at the upper reservoir locations in appendix F to their comments on the draft EIS. We have included this new information in the final EIS and have added a new figure 14 that shows jurisdictional wetlands in relation to the alternative footprints for the upper reservoir in Decker Canyon. The USFS filed revised preliminary 4(e) conditions on June 23, 2006, that include plans for pre-construction surveys and post-construction monitoring of ground and surface waters at the upper reservoir location. We discuss these preliminary conditions in the final EIS. These pre-construction surveys may result in modifications to the footprint of the upper reservoir at Decker Canyon.

Comment 38: Francis Hoffman, on behalf of the Elsinore Testing of Experimental Aircraft Mechanism, and Robert and Susan Konoske question why an alternative placing transmission lines completely underground was not included in the draft EIS. Mr. Hoffman further states that placing the transmission lines underground would make them less terrorist-vulnerable. The Fernandez Parties also question why the draft EIS did not include alternatives that would: (1) route the lines outside the Cleveland National Forest, such as along Interstate 15; (2) place the transmission lines completely underground; or (3) avoid placement of substations and transmission towers and lines near private property.

Response: As stated in section 2.5.3 of the draft EIS, we considered several variations for the transmission alignment that included placing segments underground to avoid conflicts with hang gliding activities. We cited cost as the primary reason for eliminating these alternatives. Based on comments on the draft EIS and subsequent filings by the co-applicants, both the co-applicants' proposed and staff alternative transmission alignment would place the transmission line underground near the hang gliding launching and landing areas and along the east-west connection to the powerhouse location. However, we find that placing the entire length underground would still be cost-prohibitive, adding $320 million to the project costs. Interstate 15 was not considered as a viable alternative for an overhead route because of Caltrans written policy that issuing a Utilities Permit for a Freeway Aerial (UF) transmission line requesting a longitudinal encroachment is normally not permitted. In reviewing the co-applicants consideration of alternative transmission alignments we concluded that there were no alignments that would entirely avoid proximity to existing or planned residential communities, even when going deeper (west) into the Cleveland National Forest.

Comment 39: CDFG states that because the project is contingent on the installation of the transmission line once the final alignment has been determined, a detailed analysis of the effects associated with the transmission line should be included in the EIS.

Response: Both the draft and final EIS include our assessment of the effects of the proposed and staff alternative transmission alignments on environmental resources.

Comment 40: Robert and Susan Konoske cite information presented on page 3-133 of the draft EIS that 11.1 acres of vegetation would be disturbed by the construction of temporary roads to install the transmission line. They question whether one can build 30 miles of transmission line with only 6.1 miles of temporary roads (they assume the roads will be 15 feet wide, whereas the authors of the draft EIS assume the temporary roads would be 12 feet wide).

Response: In the draft EIS we estimated that along the 5.1 miles of the proposed transmission alignment having slopes less than 15 percent the conventional installation of transmission lines would require 7.6 miles (not 6.1 miles) of temporary access roads. Straight road width estimates vary from 12 feet wide (see the Antelope-Pardee 500-kV Line Draft EIR/EIS [CPUC/USFS, 2006]) to 14-feet wide (see SDG&E's Sunrise Powerlink 500-kV Project Application [SDG&E, 2006]). Roadway widths also range from 14 to 20 feet-wide at curves to allow safe movement of construction equipment and vehicles (SDG&E, 2006, Chapter 2). At structure sites located in rugged terrain with grades that exceed 15 percent, small vehicles and manual labor delivered via helicopters will be used during construction. Approximately 78 percent of the co-applicants' proposed alignment and 80 percent of the staff alternative transmission alignment presented in final EIS is expected to have structures located on grades exceeding 15 percent. Based on this, we estimate that 10.8 and 9.3 miles of temporary road would be needed for the two alignments. This is an increase over the estimated 7.6 and 10.3 miles of temporary roads presented in the draft EIS and reflects the longer lengths of both the revised co-applicants and staff alternative transmission alignments.

Comment 41: The Honorable Darrell Issa, Ken Calvert, Mary Bono, and Duncan Hunter in comments in support of the LEAPS Project request that FERC adopt the co-applicants' proposed transmission line because it minimizes the visual impact on several existing and proposed housing developments. They comment that keeping the proposed line farther in the Cleveland National Forest is a better option than siting the line close to those developments.

Response: The mid-slope transmission alignment presented in the draft EIS crossed major planned subdivisions in Horsethief Canyon and at Ortega Oaks, mining operations of the Pacific Clay Company, as well as dozens of private in-holdings west of Grand Avenue and in the vicinity of the residential area at LaCresta. This initial alignment was designed to minimize interference with fire suppression activities, avoid designated wilderness and back country non-motorized areas in the Cleveland National Forest, and reduce effects on hang-gliding activities. Commission and USFS staff developed a revised staff alternative transmission alignment in response to hundreds of complaints about the proximity of our mid-slope transmission alignment to private residential and commercial development. Our revised staff alternative transmission alignment avoids as many private in-holdings with the Cleveland National Forest as possible while continuing to avoid the San Mateo Wilderness Area and to minimize encroachment on lands designated as back-country, non-motorized and back-country, motored-use restricted in the Land Management Plan. The staff alternative transmission alignment lies within 0.25 mile of 452 privately-owned parcels while the co-applicants proposed alignment lies within 406 privately-owned parcels, with the major difference being along the southern segment of the alignments where the staff alternative avoids crossing back country areas. The figures presented in appendix F compare the co-applicants' proposed and staff alternative transmission alignments.

Comment 42: Jon R. Johnson recommends an alternate transmission line alignment that extends to the lower portion of the mid-slope alignment approximately 0.5 mile to the north and then ascends the slope to the north of Edwards launch site. He states that this would allow the lines to cross the Main Divide Road in an area where the terrain is flat on both sides of the road, allowing greater fire fighting ability and residents to pass during a fire.

Response: We appreciate your suggestions on how best to route the proposed transmission line near Edwards launch site. The staff alternative transmission alignment was modified in the final EIS to address concerns about fire fighting and hang gliding safety.

Comment 43: Rancho Capistrano Property Owners Association and Bruce Campbell recommend analysis of alternate transmission line routes along the freeway corridor or in the wilderness area away from homes and roads.

Response: Both the co-applicants' and staff alternative transmission alignments now include underground segments near the egress to the community of Rancho Capistrano, and the staff alternative transmission alignment, which is under consideration in the final EIS, now avoids private in-holdings in the Cleveland National Forest. However, there is no provision in the Wilderness Act that would allow for the inclusion of a power transmission line within the designated San Mateo Wilderness. Transmission line alignments along freeway corridors were not considered in the draft EIS**.** I-15 was not considered as a viable alternative for an overhead route because of Caltrans written policy that issuing a Utilities Permit for a Freeway Aerial (UF) transmission line requesting a longitudinal encroachment is normally not permitted. This information can be found at:
http://www.dot.ca.gov/hq/traffops/developserv/permits/encroachment_permits_manual/index.html

Comment 44: SDG&E requests a more specific location map of the site of the southern substation be included in the final EIS with an aerial photograph base at a scale more useful for a detailed site review. SDG&E needs a better map to determine that the location, site characteristics, and environmental conditions are feasible from engineering and cost perspectives and that environmental and permitting issued can be addressed in a timely and cost-effective manner.

Response: Appendix F of the final EIS includes a more specific location map shown on an aerial base or U.S. Geological Survey (USGS) map at a scale that is more useful for a detailed site review.

Comment 45: SDG&E requests the final EIS include a discussion on why the south substation site and SDG&E substation site alternatives were eliminated from consideration.

Response: The SDG&E substation alternative shown on figure 8 was erroneously shown as an existing substation. It was eliminated because its purpose and location were replaced by the alternative substation shown in the revised figure 8. The alternative substation was included in the staff alternative mid-slope alignment and its various environmental issues were discussed in the draft EIS. The co-applicants have filed a revised transmission alignment that includes their preferred southern substation site. The co-applicants' preferred location is generally underneath or adjacent to the existing SDG&E 230-kV transmission line partially within, or directly adjacent to, the boundaries of Camp Pendleton, east of the existing Case Springs Fire Station (No. 28).

Comment 46: SDG&E requests a clarification on the type of habitat depicted in table 15 (pages 3-114 and 3-115) that would be affected by the construction of the southern substation—disturbed or chaparral.

Response: We have added headers to table 15 in the final EIS to clarify that the proposed southern substation is currently disturbed, and that the alternative southern substation location is characterized by chaparral.

Comment 47: SDG&E expressed its concern that a 25-acre 500/230-kV substation site may not be large enough for planned project and future equipment.

Response: We reviewed the Single Line Diagram, General Arrangement and conceptual Grading Plan for the Central East Substation (as shown in the Sunrise Powerlink Application [SDG&E, 2006]) and performed a conceptual layout based on the 500-kV and 230-kV equipment components in the southern substation to arrive at a revised site requirement of 50 acres. This value was found to be consistent when compared to the Antelope Substation (as shown in SCE's Antelope-Pardee 500 kV Transmission Line Project Application [CPUC/USFS, 2006]).

Comment 48: SDG&E requests that additional detail be provided for the south substation and that SDG&E be allowed to provide input on its requirements to ensure that the impact analysis is as accurate and complete as possible.

Response: In their filing of April 25, 2006, the co-applicants requested based on continuing discussions with SDG&E, Camp Pendleton, and additional engineering studies, the relocation of the proposed southern substation from the Tenaja area to an area south of the existing Case Springs Fire Station, within the existing SDG&E right-of-way and beneath SDG&E's existing 230-kV lines, within or adjacent to Camp Pendleton. This alignment was originally alternative 5 as shown on figure 8 of the EIS and is now included as part of both the co-applicants proposed and staff alternative transmission alignment. In the co-applicants' System Study of equipment quantities and capacities, the southern substation would contain two 500-kV breaker-and-a-half bays, two 1,000 MVA 500/500-kV phase-shift transformers, two 1,000 MVA 500/230-kV transformers, and two 230-kV breaker-and-a half bays. If licensed, Nevada Hydro would consult with SDG&E directly about the design of the southern substation.

Comment 49: SDG&E requests the final EIS disclose the status of the March 16, 2005, application for water quality certification under section 401.

Response: The status of the application for water quality certification as of the date of issuance of the final EIS is discussed in section 2.4.2.3 of the final EIS.

Comment 50: Edith Stafford asks if the proposed project is consistent with the California Water Code 71663.5 (b) and (d), which she interprets to mean that: (1) a water district can generate power for its own purposes and may sell surplus power to a public or private entity that is engaged in the distribution or sale of power and (2) a water district may not acquire property employed in the generation of power for public or private utility purposes, except by mutual agreement between the district and the owner of that property. Linda and Martin Ridenour also point out that Elsinore Valley MWD does not have eminent domain authority and must acquire property through mutual agreement. They request that the final EIS include documentation that allows Elsinore Valley MWD to provide electric power generation.

Response: The co-applicants are required to comply with federal, state, and local laws and regulations. We note that Nevada Hydro also is an applicant and is not a water district. Any license issued by the Commission would include the use of eminent domain if necessary to allow the co-applicants to build the project and to sell the power generated by the project, subject to all the necessary state and federal permits.

PROJECT SAFETY

Comment 51: Riverside County states that project licensing should not occur until there is sufficient project design to determine the boundaries of the dam inundation area and it is assured that potential effects can be mitigated. Precise inundation maps and flows resulting from a potential dam/dike break should be provided to the Riverside County Fire Department, Office of Emergency Services so that these plans can be reviewed for compliance with local and state regulations. Lake Elsinore United School District is also concerned with the lack of discussion in the draft EIS regarding flooding danger from a potential dam break.

Response: Figure 10 in the draft EIS shows the potential extent of inundations that could result from a dam or dike break. This figure was developed from a more detailed study included in the license application. If the project is issued a license, the licensees would need to prepare more detailed dam break studies and coordinate with local agencies to develop an emergency action plan.

Comment 52: Mr. Campbell asks whether the USFS would use more toxic fire retardants in the future as a result of any limitations on fire fighting that might result from the construction and maintenance of the transmission lines.

Response: The proposed location of the towers and lines may result in less efficient firefighting in the area and could result in less or more retardant used overall. USFS indicates that a variety of fire suppression techniques will be used to control, contain, and suppress wildland fires.

ENVIRONMENTAL CONSEQUENCES/GENERAL

Comment 53: The Natural Resources Defense Council and Pacific Clay state that the project's effects are not discussed in the draft EIS at a sufficient level of detail. The Center for Biological Diversity and the Orange County Chapter of the California Native Plant Society also question how an informed decision can be made about the proposed action until more knowledge is provided by detailed habitat studies, mitigation, and monitoring plans. EPA states that the draft EIS does not provide sufficient information to demonstrate that any of the build alternatives represent the least environmentally damaging practicable alternative. The State Water Board, the Fernandez Parties, Pacific Clay, and SDG&E also indicate that several studies and mitigation measures identified in the draft EIS should be conducted prior to issuance of the final EIS instead of deferred until after license issuance. The Fernandez Parties state the draft EIS was prepared prematurely because the co-applicants' proposal is in the conceptual planning stage and does not include information needed to adequately assess potential effects.

Response: The draft and final EIS include a sufficient level of detail to assess the potential effects of the proposed project on environmental resources in the project area. We acknowledge that facility designs are still conceptual. We are confident that the level of information provided in the proceeding is sufficient to allow Commission and USFS staff to make an informed judgment of the relative effects of the alternative project configurations. Any license issued by the Commission and any permit issued by the USFS would include requirements to complete studies and resolve the details of any outstanding environmental issues prior to the commencement of construction.

Comment 54: Riverside County, Pacific Clay, the Center for Biological Diversity, and Lake Elsinore Unified School District state that the draft EIS does not supply specific locations and acreages to be affected by construction laydown areas during development of the powerhouse, the upper reservoir, the intake/outlet tunnels, and acreages affected during construction of the transmission lines or upstream detention basin. The absence of a detailed plan limits the ability of reviewers to completely assess the potential effects resulting from the project and the adequacy of mitigation measures. Pacific Clay states that the draft EIS should be withdrawn, revised, and recirculated for no less than 120 days for public review and comment.

Response: The draft and final EIS include specific information on the staging and laydown area acreage that would be affected by the alternative project configurations. The type and amount of vegetative cover that would be affected are shown in table 15 of the draft EIS and have been revised to account for the revised proposed and staff alternative transmission alignments in the final EIS.

Comment 55: The State Water Board questions if the co-applicants would be willing to have an open license until environmental effects are known because much of the environmental documentation and plans have been deferred to post licensing.

Response: We are not sure what you mean by an open license. Any license order issued by the Commission would specify the location of project facilities and require the completion of any outstanding environmental studies specified in mandatory conditions, final design drawings, and plans to protect environmental resources prior to the commencement of construction. In addition, any license issued for the project would include a requirement for a detailed plan, developed in consultation with the resource agencies, for environmental construction monitoring in aquatic and terrestrial environments.

Comment 56: Pacific Clay states that the project outlined in the draft EIS varies from the projects outlined in Scoping Documents 1 and 2, specifically the deletion of a "preferred project" designation, deletions, amendments, and alterations to the project alternatives, and the inclusion of the "staff alternative" at the last minute. It states that because the text of the draft EIS does not match the information from the April 5, 2006, Commission public meeting and because the draft EIS does not contain detailed maps or figures, it was unable to determine where the staff's alignment occurs and therefore is unable to assess potential effects.

Response: In their license application, the co-applicants identified a preferred project, which is treated as the proposed action in the draft EIS. Commission and USFS staff developed a staff alternative based on the analysis of the proposed action and action alternatives presented in the license application. The staff alternative evolved from scoping meeting comments and technical review of the potential effects of the proposed action and alternatives. Following the public meeting and review of comments filed on the draft EIS, Commission and USFS staff developed a revised staff alternative transmission alignment that now avoids conflicts with Clay Products. The Commission issued a notice on October 3, 2006, to property owners affected by the revised alignments and included a detailed aerial-based map with the notice. Property owners were afforded 30 days to comment and the comments are summarized in this appendix and addressed in the final EIS.

Comment 57: Nevada Hydro and a number of agencies expressed concerns about coordination with CEQA. CDFG recommends that the final EIS address the state's concerns pursuant to CEQA and EPA recommends the Commission coordinate with state and local agencies to prepare one document that combines NEPA with state and local environmental impact statement requirements like CEQA. Riverside County also recommends that the draft EIS be rewritten as an EIS/EIR to satisfy CEQA and recirculated for review and comment. The State Water Board states that final designs and sediment control plans and measures should be developed and included in the final EIS or they can not consider it mitigation under CEQA. EPA states that in order to be CEQA compliant, the final EIS should identify and describe all appropriate mitigation measures and contingency measures (if such measures are deemed necessary by monitoring results), referencing any that are adopted into the record of decision and stating whether all practicable means to avoid or minimize environmental harm have been selected. Nevada Hydro requests that the final EIS and the USFS' Record of Decision contain an explicit acknowledgement that federal law authorizes the use of the FERC/USFS document either in whole or in part, in fulfillment of any state-imposed environmental disclosure requirements such as those associated with California Environmental Quality Act (CEQA) and section 1500.4(n) and (o), 1500.5(h), 1506.2, and 1506.4 of CEQ regulations implementing NEPA.

Response: Elsinore Valley MWD is the lead agency for CEQA review. In the EIS, we have addressed all of the CEQA requirements to the extent possible given the information provided in the license applications. The Commission is considering the overall proposal in the EIS. If licensed, the licensees would need to provide the details associated with many of the mitigation measures in the plans recommended by staff and specified by USFS that would be developed in consultation with the federal and state resource agencies and local agencies.

Comment 58: The city of Lake Elsinore states that the EIS should include a condition that the construction of power generating facilities occurs before the construction of the transmission lines.

Response: The sequence of construction would be considered in any license issued by the Commission for this proposed project.

Comment 59: The city of Lake Elsinore recommends an adaptive management plan be developed and implemented which includes a rigorous 3-year post-construction monitoring program, mitigation measures in the event that the project causes unanticipated and ecologically significant environmental effects, establishment of a third-party administered fund for the protection of habitat, and the establishment of an independent scientific oversight panel.

Response: USFS revised preliminary 4(e) condition no. 32 (Environmental Monitoring) includes the type of construction monitoring and adaptive management program that you recommend. The detailed monitoring plan would be developed in consultation with resource agencies.

GEOLOGICAL AND SOIL RESOURCES

Comment 60: Pacific Clay states that the geology, soils, and erosion analysis in the draft EIS is inadequate because project facility sitings have not been finalized, geophysical survey data has not been confirmed, stream crossings have not been mapped, no studies or data are provided to support conclusions regarding the effects of lake level fluctuations on Lake Elsinore shorelines, and proper mitigation is not proposed. Pacific Clay also is critical of the analysis in the draft EIS regarding applicable requirements of state and local agencies, effects on local storm drainage facilities, formulation of mitigation to control erosion and surface runoff, and secondary effects of migration measures because it defers the analysis to post-licensing.

Response: The draft and final EIS include a sufficient level of detail to assess the potential effects of the proposed project on environmental resources in the project area. We acknowledge that facility designs are still conceptual and additional geotechnical studies are proposed. We do identify stream crossings in section 3.3.2.2 of the draft EIS and evaluate the potential effects on stream crossings in the water resources section. The co-applicants filed additional information including studies of the potential effects of lake level fluctuations (Anderson, 2006) that have been added to the final EIS. The level of information provided in the proceeding is sufficient to allow Commission and USFS staff to make an informed judgment of the relative effects of the alternative project configurations. Any license issued by the Commission and any permit issued by the USFS would include requirements to complete studies and resolve the details of any outstanding environmental issues prior to the commencement of construction.

Comment 61: The State Water Board states that the upper reservoir clearing plan should be developed for the final EIS so that the public and agencies can determine if the plan would mitigate or address those affects identified in the draft EIS. It states that the final EIS should discuss spoil storage areas, storm runoff management, and spoil stabilization measures.

Response: The upper reservoir clearing plan would be developed in consultation with the state and federal resource agencies and filed with the Commission prior to the commencement of any construction. This plan would include the specifics relative to the location and management of spoil storage areas.

Comment 62: SDG&E states that over the term of the license, sediment transport at velocities of 40 feet/second (on page 3-52 of the draft EIS) would cause significant corrosion on most pipe materials and requests this design be reassessed.

Response: We agree that the design of the upper reservoir would need to provide for an emergency spillway or overflow pipeline of sufficient size and durability to control waters during a maximum probable flood. Design details of this nature are generally addressed during the final design phase and are subject to an external engineering board of review. The example cited by staff in the draft EIS was provided simply to illustrate the large diameter and high velocities that would be involved in controlling such a hydrologic event. In the final EIS we've modified our example to reflect a pipe size that results in water velocities that would not be detrimental to an overflow pipe, should that be the design solution.

Comment 63: The State Water Board states that the final EIS should disclose the type and materials to be used for the cofferdam in the construction of the tailrace/intake structure and whether or not the cofferdam would require the driving of sheet-piling into the lakebed sediments.

Response: The draft EIS indicates that the co-applicants would use a cofferdam; however, the material specifications for the cofferdam would be submitted in the final design plans, which would be reviewed by the independent board of engineers, the Commission, and applicable agencies, including the State Water Board.

Comment 64: The city of Lake Elsinore notes that the draft EIS does not address the potential effects that higher average water elevations would have on Lake Elsinore's levee system.

Response: Alteration to the lake's water surface elevations were evaluated under the Environmental Impact Report for the Lake Elsinore Stabilization and Enhancement Project. A key objective of that project is the stabilization of the water level of Lake Elsinore, by maintaining the lake elevation within a desirable operating range (minimum of 1,240 feet msl to a maximum of 1, 247 feet msl). The proposed LEAPS Project does not intend to operate outside of the lake levels evaluated in the Lake Elsinore Stabilization and Enhancement Project and therefore should not affect the levee system. Also, we have recommended that any license issued for the project include a requirement for a revised lake operating plan to include the pumped storage project operations.

Comment 65: The State Water Board points out an inconsistency in the project description regarding vegetation management along the transmission alignment. It notes that in several places the EIS says that vegetation clearing or management is not proposed; however, on page 3-20, the EIS states that periodic vegetation clearing may be needed due to high fire risk. The State Water Board requests clarification so it can assess the potential for erosion and sedimentation of streams. The Center for Biological Diversity also comments on the analysis of the effects of vegetation clearing and raises concerns about the lack of analysis of the potential effects of fire abatement activities on soils and soil productivity. It further comments that the final EIS include specific details about the BMPs to be taken to protect the integrity of stream ecosystems during construction and operation of the project.

Response: The co-applicants do not propose to clear vegetation under the transmission line, but fuel management in the future may require manipulation to reduce the risk of fire. Methods selected for fuel management would depend on site-specific factors (e.g., vegetation type, slope, aspect, access), and could include grazing, prescribed fire, or mechanical means to create and maintain firebreaks. Existing firebreaks that intersect the proposed alignment would also be maintained, as needed. We have revised the final EIS to reflect these factors.

Comment 66: The Center for Biological Diversity notes that during 2004-2005 winter storms, numerous transmission line towers located on steep slopes experienced substantial damage. It recommends that the final EIS discuss the risks to property, life, and the environment as well as the costs associated with maintaining and repairing the extensive lengths of transmission lines. It also asks that the EIS disclose whether there have been similar lengths of transmission line installation and maintenance via helicopter at other locations.

Response: If licensed, the co-applicants would be required to develop and file with the Commission an emergency action plan to avoid risks to property, life, and environment in case of emergencies. About 12 miles of the Valley–Serrano 500-kV Transmission Line cross the Trabuco Ranger District of the Cleveland National Forest in an east-west alignment. Much of the line was constructed by and is presently maintained using helicopters.

Comment 67: Riverside County indicates that no geotechnical studies are provided to determine whether soils excavated during construction of the powerhouse would qualify for use in the construction of the upper reservoir main dam or perimeter embankment. Determining whether a balance can be achieved between excavation and fill materials onsite can not be determined without further testing of subsurface soils.

Response: We agree that additional geotechnical studies would be necessary to determine whether soils excavated from the powerhouse sites would be suitable to use as fill for the upper reservoir dam. However, we conclude in the draft EIS that transporting excavated materials from the powerhouse to the upper reservoir site would tax the local traffic and roads and recommend that excavated materials from the powerhouse construction be disposed of off-site. We recommend a balance of excavated and fill be achieved at the Decker Canyon upper reservoir site.

Comment 68: Riverside County states that the draft EIS fails to identify and quantify the subsurface effects on project components that may result from the active faults in the project location.

Response: We discussed seismic considerations for project construction and operation in the *Geology and Soils* section of the draft EIS (on page 3-26), as well as in the Developmental Analysis section (at pages 4-2 and 4-3). Specific potential effects of the faults that we mentioned in our analysis include damage to project infrastructure or construction-related equipment, or injury or loss of life of construction crews.

Comment 69: The State Water Board and Pacific Clay state that it appears to be necessary to answer the questions and disclose the answers regarding seismic issues in the construction of the proposed Santa Rosa powerhouse and tailrace/intake structures due to the cost of the proposed project. The Lake Elsinore United School District is critical of the discussion in the draft EIS regarding the potential affect of a seismic event on the project and mitigation, including its ability to withstand an earthquake and the risk of a high-pressure water line rupture. The EPA recommends the final EIS indicate geologic/seismic hazard mapping would be completed before the Commission licenses this project in order to ensure that site and mitigation selection is based upon this information.

Response: We discussed seismic considerations for project construction in the Developmental Analysis section (on pages 4-2 and 4-3), and made cost adjustments to reflect those considerations. In its March 2006 report appended to the April 25, 2006, filing by Nevada Hydro, Genterra Consultants indicate that faults may lie beneath all three powerhouse sites and that detailed investigations of faulting would be undertaken once the powerhouse location is selected. These additional studies were proposed by the co-applicants and recommended by the staff in the draft EIS as part of the final design process. The final designs process would include detailed geologic and seismic studies and analyses, which would be reviewed by the Commission and appropriate agencies prior to the commencement of any construction.

Comment 70: The State Water Board states that deferring analysis and mitigation regarding dam breach and dike failure is inconsistent with CEQA, whereas Pacific Clay states it is inadequate under NEPA.

Response: The draft EIS includes a summary of the dam break and inundation analysis developed by the co-applicants and included in the license application. Figure 10 on page 3-31 of the draft EIS shows the potential inundation that could result from a dam or dike failure. The information provided in the draft EIS is sufficient to address the potential effects of the unlikely occurrence of a dam breach or dike failure. If the project is issued a license, the licensees would need to prepare more detailed dam break studies and coordinate with local agencies to develop and file with the Commission's Division of Dam Safety and Inspections, an emergency action plan.

WATER RESOURCES

Water Quantity

Comment 71: The U.S. Department of the Interior (Interior) comments that relative to table 3 in the draft EIS, the monthly streamflow statistics for the USGS gage no. 11070500 for the entire period of record (1916-2004) are available on the USGS web site. It also notes that the gage number in the table is incorrect.

Response: We have corrected the gage no. in table 3 to read "11070500" to be consistent with the text. Although a long period of record for this gage is available, considerable development has occurred in the basin and it appears that the 30 years from 1975 through 2004 would be more representative of current hydrologic conditions. Additionally, a 30-year representative period of record is fairly common in hydrology and in this case, more appropriate for our analysis of the effects of the proposed project operations on lake level.

Comment 72: Interior points out that the highest peak flow recorded at USGS gage no. 11072100, Temescal Creek near Corona, since the construction of the flood control improvements in the 1990's is now 4,030 cfs recorded on January 9, 2005.

Response: We have made this suggested edit to the final EIS.

Comment 73: Interior comments that figure 11 does not accurately depict the frequency curve for Lake Elsinore lake level elevations under current conditions and mis-labels elevation of 1,263.3 feet msl.

Response: We have corrected the mislabeled elevation on figure 11. The curve shown is an elevation-duration curve based on daily values. Interior argues that the 100 year flood value of 1,263.3 feet msl should correspond to the 1-percent value; however, flood analyses are based on the record high for each year and are based on instantaneous maximum elevations for the year (a different type of analysis). The correct definition of a 1-percent exceedance elevation in the context of this curve would be the elevation equaled or exceeded at least 365 days out of a 100-year period of record.

Comment 74: Nevada Hydro provides a technical analysis of the potential water quality impacts of the LEAPS Project on Lake Elsinore (Anderson, 2006) that concludes that the LEAPS Project could either enhance or impede dissolved oxygen (DO) conditions, suspended sediments, and the development of an aquatic macrophyte community; however, the overall effects are still unclear at this time. The report recommended that additional heat calculations be performed and an ecological model conducted. As such, Nevada Hydro requests that any additional water quality studies that might be required as a condition of any license be limited to the LEAPS Project and not required of a transmission stand alone project.

Response: Because both aspects of the proposed project— as a complete unit of development, the hydropower and the transmission line—would require a license, they are both subject to license conditions that could include monitoring.

Comment 75: The Santa Ana Regional Water Quality Control Board (Santa Ana Water Board) indicates that, other than the payment of money each year to buy water to stabilize lake levels, the other claims of water quality improvement provided by the Lake Elsinore Stabilization and Enhancement Project, as stated in the draft EIS, would occur even if the project does not move forward. Therefore, the Santa Ana Water Board requests the final EIS indicate how much water can be purchased through the lake management fee and how it would affect lake levels.

Response: The effect on lake levels was summarized in figure 11 of the draft EIS. The lake management fee provides a vehicle for paying for supplemental water which we estimate to be from 4,000 acre-feet to 15,000 acre-feet depending on the water year. Replacement water would come from wells and would be primarily from recycled water by year 2020. We assume that the management fee would pay for the water needed to maintain water level targets included in the plan.

Comment 76: The State Water Board states that the draft EIS does not describe the area of relicted lakebed (fluctuation zone) that would result from the drop in water elevation on Lake Elsinore from project operations. It states that the final EIS should include an assessment based on bathymetry data that discloses the areal extent of the expanding shoreline due to project operations at various lake levels, including drought years.

Response: We have revised section 3.3.1.2 of the final EIS to include new information (Anderson, 2006) on the areal extent of the shoreline migration resulting from the daily and weekly fluctuation of the water surface elevation under proposed project operations.

Comment 77: The Santa Ana Water Board would like a discussion in the final EIS on the project's policy of operation during low lake levels, such as occurred during the drying cycle from 1941 to 1973 when Lake Elsinore regularly dried up.

Response: The co-applicants have specified that the minimum operating level for the LEAPS Project would be 1,240 feet msl. The project would not operate below this level. A comparison of operations under baseline and 2020 conditions is provided in section *3.3.2.2, Environmental Consequences Water Quantity*.

Comment 78: Nevada Hydro comments that the description in section 3.3.2 on page 3.51 of the draft EIS that the co-applicants propose to operate the lower reservoir (Lake Elsinore) between 1,240 and 1,249 feet msl is incorrect. Nevada Hydro requests that the text be clarified to state that the operational range of the proposed project is 1,240 to 1,247 feet msl and that any operation of Lake Elsinore would be independent of the proposed projects and would be undertaken by the Elsinore Valley MWD, operating in conjunction with other agencies and acting separately from the hydropower project. Further, Nevada

Hydro states that as proposed, the facility operators would pay to Elsinore Valley MWD a lake management fee. Under the provisions of an operating agreement to the operator, the Elsinore Valley MWD would maintain Lake Elsinore at a minimum depth of 1,240 feet msl. Therefore Nevada Hydro states that the two energy projects would have no direct obligations or responsibilities with regard to the active management of Lake Elsinore.

Response: We have revised the text in the final EIS to read that the co-applicants propose to operate the project within the fluctuation range of 1,240 and 1,247 feet msl. We respectfully disagree that the co-applicants would have no responsibilities relative to the operation of Lake Elsinore. Under any license issued for the LEAPS Project, Lake Elsinore would be part of the complete unit of development in that it is required for the operation of the project and a revised operating plan for the pumped storage operation would be necessary.

Comment 79: The Center for Biological Diversity states that an increase in the maximum water levels to 1,249 feet msl could potentially have impacts on flooding within the city of Lake Elsinore and requests that the final EIS address this public safety issue.

Response: The co-applicants propose to operate the pumped storage consistent with the target minimum and maximum lake levels of 1,240 and 1,247 msl recommended in the Lake Elsinore Stabilization and Enhancement Project. As proposed, the pumped storage project operations would not increase the maximum target lake level. We have revised section 3.3.2.2 of the final EIS to reflect the co-applicants' intent. We recommend that the co-applicants develop a revised lake operating plan for Lake Elsinore. This plan would address how the Elsinore Valley MWD would operate Lake Elsinore to meet the objectives of the pumped storage operations within the target elevations established by the Lake Elsinore Stabilization and Enhancement Project and to make sure that the operation of the project would not have unintended consequences such as flooding. We further describe this plan in section 5 of the final EIS.

Comment 80: Riverside County states that the proposed reservoir/dam could potentially impound flood waters during the rainy season and design of the reservoir/dam should accommodate the flooding and normal operating volume.

Response: A FERC-licensed project must have a spillway designed in accordance with the Commission's Engineering Guidelines and the spillway must accommodate appropriate flood conditions. More detailed hydrologic design would be conducted for the effects of flood waters at the licensed upper reservoir site. Normal operations are accommodated by the co-applicants' proposed reservoir preliminary designs.

Comment 81: SDG&E indicates the proposed water level fluctuations at Lake Elsinore, as described on p. 3-54, are in conflict with the Fisheries Management Plan and recommends a water level management plan be developed to mitigate for effects on target sport fisheries.

Response: Actions proposed in the Fisheries Management Plan anticipate the stabilization of lake level fluctuations between 1,240 feet msl and 1,247 feet msl. The proposed project will operate within those lake levels. However daily flow fluctuations of 1 foot during the week and to 1.7 feet during the weekends would likely prevent many submergent plant species from establishing within the fluctuation zone and rooted shallow-water vegetation that provides spawning, rearing, foraging, and cover from predators would continue to be limited, particularly in the shallow, southern area of the lake.

Comment 82: EPA and the Center for Biological Diversity recommend that the final EIS include more detailed information regarding the potential effects of the Morrell Canyon reservoir on groundwater resources and discuss measures to mitigate any adverse effects to groundwater and to potential construction problems. EPA also recommends that the final EIS analyze how the Morrell Canyon reservoir site alternative would affect upstream and downstream flows, flows from Lion Spring, and designated beneficial uses.

Response: We recognize that additional information on groundwater characterization may be developed, once a preferred site for the upper reservoir is selected. We recommend the Decker Canyon site over the Morrell Canyon site. On page 5-24 of the draft EIS we described a groundwater monitoring program that would address potential impacts on ground water at either upper reservoir site. We summarized information on hydrology from the license application and responses to additional information requests in the affected environment section of the draft EIS. In response to the draft EIS, the USFS filed revised preliminary 4(e) conditions including a new condition that specifies the development of a groundwater management plan. The USFS plan would include studies to determine baseline groundwater conditions prior to the commencement of construction.

Comment 83: The State Water Board states that additional groundwater studies should be conducted at the Decker Canyon site because only geologic assessments for groundwater have been conducted. Pacific Clay is critical of the analysis in the draft EIS regarding the effects of operation on groundwater and the effects of the failure of the proposed liner system on groundwater in the San Juan Basin, groundwater recharge, and potential make-up water. EPA recommends the final EIS include the leak detection monitoring and mitigation plan, including action levels and response measures that would be required for the types of leaks that could occur and demonstrate the long-term effectiveness of the reservoir liner and leak detection system.

Response: We respectfully disagree. Our cost estimate in the draft EIS does address site-specific geological and groundwater conditions. Implementation of the staff recommended upper reservoir and water conduit program to monitor groundwater and implementation of USFS revised preliminary condition no. 36 specifying a groundwater management plan would address the concerns about the long-term operation of the reservoir liner.

Water Quality

Comment 84: The Corps indicates that the draft EIS does not include a quantification of waters of the United States that could be affected by the project and no mitigation to offset losses of waters of the United States. It recommends this information be included in the final EIS.

Response: We have added new information to section 3.3.4.2 about waters of the United States at the Morrell Canyon and Decker Canyon reservoir sites and their functions and values, based on reports filed by the co-applicants as attachments to their comments on the draft EIS. New figure 14 shows the jurisdictional waters relative to the proposed and alternative upper reservoir locations.

Comment 85: Riverside County states that the proposed intake/outtake structure at Lake Elsinore should be designed to ensure disturbance of sediments in the bottom of the lake are avoided to the satisfaction of the city of Lake Elsinore and the Santa Ana Regional Water Quality Control Board (Santa Ana Water Board).

Response: The co-applicants propose maximum velocities at the intake/outflow structure not exceed 1.5 feet per second. We recommend the co-applicants consult with the Santa Ana Water Board and local authorities prior to final design approval by the board of three qualified engineers. Additionally, agency and governmental approval could be included as part of the permitting of all dredging and work to be performed in waters of the U.S. (including the intake/outflow structures) which would be the responsibility of the Corps and also would include consultation with other agencies.

Comment 86: The Santa Ana Water Board requests that the final EIS include a discussion of the BMPs that would be used to adequately reduce effects to water quality from the construction of the intake/outflow structures.

Response: In the event of a license being issued, the co-applicants would need to develop an erosion control plan in consultation with the agencies for Commission approval; the erosion control plan would detail the specific BMPs to be implemented to reduce the potential effects of the construction of the intake/outflow structures on water quality.

Comment 87: The State Water Board states that the co-applicants should have conducted soil toxicity assessments on lakebed sediments and the results disclosed in the draft EIS. It also states that, contrary to what is stated on page 3-66 of the draft EIS, there is the potential for effects on water quality and beneficial uses from the release of nutrients and potentially other chemicals during the construction of the tailrace/intake structure. The State Water Board also states that the draft EIS is not clear on what effects the discharges from the outlet pipes will have on the lake's water quality standards.

Response: We considered the degree to which lakebed sediments might be disturbed during the installation of the cofferdam and the construction of the tailrace/intake structure and our analysis indicates that typically very little disturbance would result because excavation would occur in an area physically separated from Lake Elsinore by the cofferdam. We would not expect the release of toxins during this construction. However, fish samples have shown toxins below actionable levels and that is an indication that there could be toxins in the lakebed sediments. Therefore, we recommend, that the lakebed sediments be tested for toxicity prior to the disposals or reuse of the lakebed sediments. We have provided a more detailed description of the proposed construction activity and the potential effects from the construction of the intake/outflow structure in the final EIS. As far as operational effects from flows in the intake/outflow structure with respect to water quality standards we discussed the effects of operations on pages 3-68 and 3-69 of the draft EIS.

Comment 88: The Santa Ana Water Board indicates that the draft EIS states that the co-applicants require target minimum water surface elevation of 1,240 feet msl to operate the pump storage project. The Santa Ana Water Board comments that it was stated that operating the project at lower lake levels would degrade water quality unacceptably. The Santa Ana Water Board requests that a firm commitment of what lake levels the project would operate at to adequately protect the lake water quality.

Response: The co-applicants propose to operate the pumped storage project consistent with the Lake Elsinore Stabilization and Enhancement Project between elevations 1,240 and 1,247 feet msl. Further, the co-applicants propose and we recommend payment of an annual management fee to the Elsinore Valley MWD to maintain the minimum target elevation at 1,240 feet msl. If the project is licensed with either the proposed action or the staff alternative, the licensees would be required to maintain lake levels at or above 1,240 feet msl.

Comment 89: The Friends of the Forest and the Center for Biological Diversity criticize the level of analysis and the conclusions drawn in the draft EIS concerning the potential effects of project operations on the re-suspension of sediments in Lake Elsinore. They also question whether the project proponents can demonstrate whether the project can operate without exceeding existing Total Maximum Daily Load (TMDL) limitations.

Response: The Lake Level Stabilization and Enhancement Project was developed in response to the listing of Lake Elsinore as impaired which triggered development of a TMDL. It is our understanding that the LEAPS Project is related to the Lake Elsinore Stabilization and Enhancement Project, which has received local governmental and agency support, including the city of Lake Elsinore and the Riverside County. Other environmental documents show that current programs developed to improve water quality (lake level stabilization, axial-flow pumps, and line diffusers) would be beneficial to water quality. Considering the role the proposed project could play in the overall lake water quality, we concluded in the final EIS that the proposed project operations would provide incremental benefits to the same water quality parameters the other programs target through improved mixing of the water column. Furthermore, the thousands of bottom feeding carp in Lake Elsinore are responsible for stirring up sediments throughout the entire lake bottom, not just localized areas as proposed under both the Lake Level Stabilization and Enhancement Project and the LEAPS Project. To clarify the relationships between the proposed action, approved programs, and the existing biotic community, we have augmented the discussion on the potential effects of project operations on the re-suspension of sediments in section 3.3.2.2 of the final EIS (beginning on page 3-67 of the draft EIS).

Comment 90: Mr. Pinnow comments that Elsinore Valley MWD supports the costly program of carp removal because these bottom-feeding fish stir up sediments and yet the potential effects of project operations on the disturbance of sediments could be far more serious than the effects of carp. He points out that computer modeling could be used to study this potential and ensure that the worse-case scenario involving massive fish kills does not occur. He further suggests that the co-applicants be required to post a bond or procure insurance that would compensate home and business owners in an around Lake Elsinore for loss of property values as a result of any decline in the water quality of Lake Elsinore caused by the LEAPS Project.

Response: Carp are considered a nuisance species to the lake with almost 500,000 pounds removed as recently as 2003. We conclude that the proposed project would supply oxygenated water to the sediment-water interface improving nutrient conditions at the bottom of the lake. Further, the intake-outlet structure would be located in a fixed location near the western shoreline and flows into Lake Elsinore would occur within the same linear area on a daily basis whereas carp graze and stir up sediments across the entire lakebed. Additionally, the axial flow program implemented under the Lake Elsinore Stabilization and Enhancement Project is designed to destabilize the water column by applying downward currents toward the lakebed, which would also disturb sediments. Environmental review of this program considered the objectives to be beneficial to water quality. The kinetic energy of the water flowing into and out of the intake structure would further assist in mixing the water column. We discuss the effects of operations on page 3-67 of the draft EIS.

Regarding the co-applicants’ requirement to secure insurance for property surrounding Lake Elsinore, it is our understanding that the LEAPS Project is contingent upon the lake levels that are planned to be met under the Lake Elsinore Stabilization and Enhancement Project, which has received local governmental and agency support, including the support of the city of Lake Elsinore and the Riverside County. As discussed in our response to Comment 89, we concluded in the final EIS that the proposed project operations would provide incremental benefits to the same water quality parameters as the other programs.

Comment 91: The Santa Ana Water Board states that recent studies on Lake Elsinore show that under the proposed project operation the southern portions of the lake would experience greater daily shoreline migration than the rest of the lake with an estimated 40 foot average daily shoreline migration when the project operates. The shallow embayments in the southern part of the lake would experience the greatest daily oscillation in exposed sediments, up to hundreds of feet. Because the draft EIS did not address the effects of wave action on the exposed shoreline in the southern part of the lake, CRWQCB recommends further discussion of the effects of increased turbidity from the raising and lowering of the shoreline be included in the final EIS.

Response: Based on Anderson (2006), it is our understanding that the shoreline migration would range from 8 feet to over 100 feet depending on location and shoreline configuration; however, because the amount of shoreline subject to the large shoreline exposures (of up to 100 feet) represents a small percentage of the shoreline length (less than 10 percent) that is predominately located along the southern shore within an embayment with west facing exposure, any increases in turbidity or suspension of fine grained sediments would largely be confined to these protected areas and only marginally effect the turbidity within the main water body of Lake Elsinore. At the same time stable lake levels may be beneficial to these areas by promoting macrophytes or riparian vegetation growth which may promote an evolution of the shoreline substrate in these areas from barren, sandy soils susceptible to wave actions suspending sediments to an aquatic vegetation induced stable substrate that traps suspended materials and prevents future sediment suspension improving water quality. We have modified the text in the final EIS to include this discussion.

Comment 92: The Santa Ana Water Board states that the draft EIS has not taken into account the effect that cycling the water would have on its temperature in the discussion on page 3-68 of the draft EIS regarding the project benefiting the annual mean water quality of Lake Elsinore. The friction exerted on the cycled water as it is pumped to the upper reservoir, cycled down and through turbines may increase the water temperature. The Santa Ana Water Board and EPA recommend a 3-D hydrodynamic model for the lake be developed to predict turbulent energy inputs, mixing, and circulation and their effects on the lake. The Santa Ana Water Board requests that in the final EIS an appropriate model is used to recalculate the effects on the temperature and DO levels of the cycled water.

Response: The cycling of water through 1.5 miles of conduit is likely to have a negligible effect on raising the temperature of the water as the conduits would be underground where annual temperatures are consistently cooler (about 60 degrees F) than the summer lake temperatures (time when the demand for the project would be greatest) thereby negating any increase resulting from friction. Concerning the overall effect of cycling water between reservoirs and the potential effects on Lake Elsinore's thermal regime, we have augmented our discussion on the effects of cycling on temperatures in the lake in section 3.3.2.2 of the final EIS. Further, we find that given the uncertainties associated with the success of other water quality related programs such a the Lake Elsinore Stabilization and Enhancement Project and the axial flow pumps designed to disturb the thermal gradient that develops throughout the lake in the summer, the implementation of a 3-D hydrodynamic model prior to making a licensing decision would not make sense.

Comment 93: The city of Lake Elsinore states that Lake Elsinore and San Jacinto Watersheds Authority (Joint Watershed Authority) has invested considerable funds to develop, build, install, and operate a reliable aeration system for the lake to improve water quality and that any alteration to the design or operation of the existing system to accommodate the project should require mitigation through the development of an equally reliable, dedicated, and applicant-funded aeration system.

Response: We do not expect any negative effects from the LEAPS Project operation on the aeration system implemented as part of the Joint Watershed Authority's Lake Elsinore Stabilization and Enhancement Project. We also note that Dr. Alex Horne (Elsinore Valley MWD and Nevada Hydro, 2005) has suggested that design features could be incorporated into the final LEAPS Project that could be beneficial to the efforts of the Joint Watershed Authority programs. Our recommended revised lake management plan is the proper place to recognize the relationships between the proposed project and other lake management programs.

Comment 94: Riverside County states that the addition of imported water to Lake Elsinore should not introduce Total Phosphorus or Total Nitrogen in excess of the respective TMDL Load Allocations assigned to Supplemental Water discharges to Lake Elsinore. Total Phosphorus offsets for supplemental water discharges should not be allowed unless the required 35 percent in-lake Total Phosphorous load reductions have been achieved by in-lake nutrient treatment and removal projects.

Response: Make-up water to maintain Lake Elsinore at elevation of 1,240 feet msl would be acquired by Elsinore Valley MWD, using funds from the co-applicants designated for this specific purpose. Because the water would be delivered by Elsinore Valley MWD, the quality of the water would be subject to its allocated or supplemental load allocations under the TMDL. As such, we expect make-up water as part of the proposed project would meet the TMDL requirements.

Comment 95: The Santa Ana Water Board comments that is unclear from the discussion on page 3-67 of the draft EIS what effect the intake/outlet discharges would have on Lake Elsinore water quality, and therefore recommends that appropriate modeling be used to assess the effects of the project on internal nutrient loading in the lake and results be presented in the final EIS. The State Water Board also states that it is unclear what affect the discharges from the intake/ outlet structure into Lake Elsinore would have on the lake's water quality standards because the reversal of flows during project operation could re-suspend bottom sediments.

Response: We have modified the text in section 3.3.2.2 of the final EIS to clarify the expected effects of discharges from the intake/outlet structure during project operations on suspended sediments and nutrients within Lake Elsinore. As noted in our response to comment 92, given the uncertainties associated with the success of other water quality related programs such a the Lake Elsinore Stabilization and Enhancement Project and the axial flow pumps designed to disturb the thermal gradient that develops throughout the lake in the summer, the implementation of a 3-D hydrodynamic model prior to making a licensing decision would not make sense.

Comment 96: Mr. Pinnow comments that water quality analysis in the draft EIS contains some obvious mistakes such as the statement on page 3-67 that "a greater surface area to volume in the upper reservoir" used in support of the co-applicants' view that the operation of the pumped storage project could improve DO in Lake Elsinore. He points out that the average depth of the upper reservoir would be much greater than the average depth of Lake Elsinore (180 versus 15 feet) so that the surface area to volume ratio in the upper reservoir would be less than the surface area to volume ratio in Lake Elsinore.

Response: We have corrected the text in the final EIS based on Mr. Pinnow's comment. At 1,240 feet msl, Lake Elsinore has a surface area of 3,074 acres and a volume of 38,519 acre-feet (surface area to volume ratio of 0.08). Decker Canyon reservoir would have a surface area of about 76 acres which corresponds to a volume of 5,500 acre-feet, resulting in a ratio of 0.01, smaller than Lake Elsinore. However, we still conclude that over time, project operations should provide a measurable benefit to the annual mean water quality by using temperature and oxygen concentration differences between the two water bodies to promote mixing of the water column and control internal nutrient loading within Lake Elsinore**.** Our view that project operations could increase oxygen concentrations within Lake Elsinore is also supported by Dr. Alex Horne in his memo to David Kates filed in response to AIR-WQ-6 (Elsinore Valley MWD and Nevada Hydro, 2005) and by Dr. Micheal Anderson (Anderson, 2006) in his technical analysis of the potential water quality effects of the LEAPS Project on Lake Elsinore submitted to the Santa Ana Water Board, January 31, 2006, and filed by Nevada Hydro as appendix D of its comments on the draft EIS.

Comment 97: The Center for Biological Diversity questions the conclusion in the draft EIS that lake level stabilization would result in benefits to water quality greater than the effects associated with sediment disturbances from the project. It points out the Santa Ana Water Board studies referenced in draft EIS conclude that both control of nutrients and lake level stabilization are necessary to improve water quality in Lake Elsinore and do not specify that water levels are more important than sediment disturbance.

Response: Based on comments on the draft EIS we have modified the text in the final EIS to clarify the point raised by the Center for Biological Diversity; however, we would also like to note that Lake Elsinore is a terminal lake that has at times completely dried up. The fluctuation in shoreline widths during the historic drying and filling phases of the lake has resulted in sediment disturbances at all reservoir elevations. The cycling of water into and out of Lake Elsinore, and the resulting changes in exposed shoreline would not be substantially different than historical conditions save for the timing between the rising and falling surface elevations. Once water sources and levels are secured, secondary programs and projects have been proposed and implemented to improve the quality of water in the lake. The LEAPS Project is one such project dependent on water levels which could contain design features that could assist the already approved Lake Stabilization and Enhancement Project. The TMDL is the appropriate tool to control nutrient loading into Lake Elsinore and the lake level stabilization has been determined by local agencies as a promising method to improve water quality. We discuss the effects of project operations on water quality in section 3.3.3.2.

Comment 98: The Santa Ana Water Board states that the comments in the draft EIS regarding the positive effects of the project on phytoplankton are speculative and request that the final EIS include more comprehensive documentation of the effects, including specific references supporting the claims. The Santa Ana Water Board also indicates that the draft EIS does not include a discussion of the project's effects on zooplankton in Lake Elsinore, which are important in the reduction of phytoplankton. Dr. Michael Anderson, referenced by the Santa Ana Water Board, states the operation of the project could result in significant zooplankton mortality. As such, the Santa Ana Water Board recommends that the final EIS evaluate the project's effect on zooplankton.

Response: Based on comments on the draft EIS we have modified the final EIS and discuss the anticipated effects of the proposed project on phytoplankton and zooplankton. We conclude that the natural mixing processes resulting from the project operations combined with the increased efficiency of the axial flow pumps, installation of the diffused aeration system and the proposed project should all help to achieve oxic conditions in the subsurface that would help to control algae blooms. Project operations could negatively affect zooplankton populations through entrainment. However, this extent of potential effect would depend on the depth of the intake.

Comment 99: The Santa Ana Water Board and EPA indicate that the effects of operating a pump storage system on a terminal lake are unknown. The Santa Ana Water Board requests a thorough discussion on the possible effects of a pump storage system on a terminal lake, such as Lake Elsinore, be included in the final EIS that takes into consideration the unique nature of this lake.

Response: We conclude that the effects of operating a pumped storage project on a terminal lake like Lake Elsinore would not be substantially different from operating a pumped storage project on a non-terminal lake. The effects of pumping water into and out of Lake Elsinore on a daily basis within the Joint Water Authority's specified target range would be less dramatic over the long term than maintaining lake levels between 1,240 feet msl and 1,247 feet msl on a terminal lake that has dried up completely in the past.

Comment 100: The Santa Ana Water Board requests the following studies be done to better quantify project effects on water quality standards of Lake Elsinore and reduce uncertainty concerning predicted effects: (1) evaluation of the water temperature gain and/or loss that would occur as the project transfers water between the lake and the upper reservoir and back and the effects of the temperature change on water quality; (2) develop and apply a 3-D hydrodynamic model for the lake; and (3) develop an ecological model that can be used to better understand the trophic cascades that may result from the project. EPA requested the previous two models listed be applied, as well.

Response: We conclude that the information in the record of this proceeding is currently sufficient to assess the potential effects and to recommend proposed measures to address the potential effects. Further, as explained in our response to comment 92, we find that given the uncertainties associated with the success of other water quality related programs such a the Lake Elsinore Stabilization and Enhancement Project and the axial flow pumps designed to disturb the thermal gradient that develops throughout the lake in the summer, the implementation of a 3-D hydrodynamic model prior to making a licensing decision would not make sense.

Comment 101: EPA and the Corps recommend the final EIS include a functional assessment of direct, indirect, and cumulative effects to waters at both upper reservoir sites from watershed changes.

Response: In the final EIS, we have provided such an assessment on the Decker Canyon site as we did for the Morrell Canyon site in the draft EIS.

Comment 102: The County of Orange questions where water collected by the proposed seepage collection systems would be discharged and how water from dam seepage would affect the water quality and habitat of the upper San Juan Creek watershed. It also asks under what circumstances water would be released to the San Juan Watershed in the event of dam failure, how much water would be released to the San Juan Watershed, and how would the release affect water quality. The Center for Biological Diversity also raises this concern. Further, the State Water Board questions where emergency releases from the upper reservoir would be discharged to and what would be the effect of releasing Lake Elsinore water into Morrell or Decker Canyons.

Response: The purpose of the seepage collection system is to collect natural seepage from the San Juan Creek within the footprint of the proposed upper reservoir and convey that water beyond the dam to keep it in the watershed. The co-applicants propose a liner system to prevent Lake Elsinore water from leaking into the San Juan Creek watershed. We discussed potential dam failures at the upper reservoir sites on page 3-32 of the draft EIS. We noted that dam failure analyses submitted in the license application were preliminary and that if licensed, a more detailed inflow design flood and dam break analysis would be developed in the final supporting design report prior to construction. The dam break analysis is described in detail on page E.6-43 through E.6-50 of the license application. Failure of any dams or dikes associated with the upper reservoirs would temporarily affect water quality and introduce considerable sediment into the San Juan Creek. However, the probability of dam failure is remote. Emergency overflows associated with the spillway would also discharge into the San Juan Creek watershed and temporarily introduce Lake Elsinore water into the watershed.

Comment 103: The Center for Biological Diversity states that the final EIS must include a more specific comprehensive monitoring plan, particularly with regard to water quality impacts to the San Juan Creek.

Response: The liner system proposed for the upper reservoir would prevent any water from seeping out of the upper reservoir to mix with waters in San Juan Creek under normal operating conditions; however, the EIS does recognize there is some risk of inter-basin transfer regardless of the preventive measures. Failure of any dams or dikes associated with the upper reservoirs would be considered outside normal operations and would temporarily affect water quality and introduce considerable sediment into the San Juan Creek. The co-applicants propose and we recommend the development and implementation of an upper reservoir water conduit monitoring program to assess the effects of the upper reservoir liner and seepage collection systems, shafts, and tunnel on groundwater levels and water quality.

Comment 104: Interior points out that the analysis in section 3.3.2.2 of the potential effects of operations of the proposed project on algae blooms in Lake Elsinore does not take into account the potential effect of algal decomposition on DO levels if the intake structure were designed to draw in water near the surface.

Response: We have augmented the discussion on the potential effects of the proposed operations on algae and the resulting increases on oxygen demand after algae die-off. We conclude that it would be unlikely that the water level and suction of the intake would be sufficient to draw significant amounts of algae into the intakes where pressure gradient could eliminate their ability to float causing them to die and sink to the bottom of the lake as suggested by the co-applicants.

Comment 105: The Santa Ana Water Board states that the draft EIS contains very little discussion of the effects on water quality and beneficial uses from the construction and operation of the high voltage power line that is part of the project. It requests that in the final EIS BMPs, non-point source pollution management measures, and other techniques to be employed to reduce effects on water quality standards from power line construction and operation be discussed.

Response: The effects of the construction of the transmission lines are detailed in section 3.3.1.2, *Environmental Consequences*, in *Geology and Soils* and succinctly stated with respect to water quality in section 3.3.2.2, *Environmental Consequences*, in *Water quality*. The co-applicants proposed and our recommended soil erosion control plan would use BMPs to control the effects of construction on water quality in the project vicinity. We recommend implementation of the soil erosion control plan and hazardous substances spill prevention and control plan over the term of any license issued for project.

Comment 106: EPA and the Corps recommend the final EIS include a description of the functions and values of the streams that could be affected by the construction of crossings for the transmission line access road, a discussion of the significance of the aquatic resources at risk from construction and operation of the transmission line, and an evaluation of less damaging alternatives to culverted crossings.

Response: We identify the drainages that would be crossed by the proposed and staff alternative transmission alignments. The co-applicants indicate that they would place transmission towers to avoid sensitive areas and riparian areas. Further, our recommended measures to conduct site-specific pre-construction surveys for specials plants and wildlife in sensitive areas and implement a vegetation control plan along with the co-applicants proposed soil erosion control plan would avoid effects on aquatic resources during the construction and operation of the transmission line. As tower placement and temporary access roads would have the potential to affect streams, culverted crossings, and sensitive areas, we recommend in the final EIS that the co-applicants prepare and implement a transmission tower placement plan in consultation with the USFS, CDFG and FWS.

Comment 107: Pacific Clay states that the cumulative effects analysis in the draft EIS for water resources is inadequate and only references the Santa Ana Integrated Watershed Plan and lists Congressional appropriations without going beyond general statements or perfunctory analysis.

Response: The cumulative effects analysis not only covers the Santa Ana Integrated Watershed Plan but also mentions the pending TMDL developed for Lake Elsinore and Canyon reservoir as well as the Joint Watershed Authority's Lake Level Stabilization and Enhancement Project. The cumulative effects analysis raises the most pertinent programs that could have additional effect on the water quality of Lake Elsinore and discloses the cumulative effect relative to the proposed project.

AQUATIC RESOURCES

Comment 108: Pacific Clay is critical of the analysis in the draft EIS regarding the effects of construction on fish habitats and populations. It states that transmission tower locations could affect fish populations through stream crossings and ground disturbing activities washing sediment into streams; however, these locations are not yet sited, measures are not specified in the draft EIS to prevent these effects, and affects to major drainages are not discussed. It also notes that the draft EIS does not suggest alternate approaches from rotenone poisoning in Lake Elsinore or discuss the consequences of this poisoning. Further, Pacific Clay questions the speculative conclusions about the effects of the intake/outlet in Lake Elsinore absent specific information on the location, depth, and distance from the shore.

Response: Measures to avoid potential effects to fish populations from ground disturbing activities from transmission tower placement are addressed on page 3-81 of the draft EIS. The co-applicants indicate that they would avoid placing towers in sensitive areas and riparian areas. Although exact tower locations have not yet been sited, implementation of established BMPs are commonly applied during construction activities and are typically effective at protecting stream resources if implemented properly. As noted in our response to Comment 106, tower placement and temporary access roads would have the potential to affect streams and sensitive areas and therefore we recommend in the final EIS that the co-applicants prepare and implement a transmission tower placement plan in consultation with the USFS, CDFG and FWS.

As discussed on page 3-84 of the draft EIS, rotenone poisoning would remove desirable game fish as well as undesirable carp from Lake Elsinore, and this measure is not supported by the Joint Watershed Authority Fisheries Management Plan. Current presence of carp in Lake Elsinore is not the result of the co-applicants' proposal, and therefore we do not recommend the co-applicants be responsible for the extirpation of carp from the lake by rotenone poisoning or any other means.

While we agree with Pacific Clay that the location, depth and distance from shore of the intakes are only conceptual, we respectfully disagree that the analysis for entrainment potential is inadequate for the EIS. In the draft EIS, we examined the likelihood for entrainment if the intakes were located near the shore or far out into the lake, and concluded that the likelihood of fish entrainment in the intakes was low. We also reviewed performance of several physical and behavioral barriers used at other projects or that are under development, and we conclude that implementation of such facilities is very expensive relative to the potential benefit to the fishery. Therefore, our staff recommendation is that the co-applicants monitor the intakes for entrainment losses during the first year and once every 5 years thereafter over the term of any new license. Based on the monitoring results, we recommend the co-applicants develop and implement, with Commission approval, measure to mitigate for any losses. Mitigation activities may include implementing measures such as those identified in the Fisheries Management Plan, including annually stocking desirable game fish that would lead to the establishment of a productive sport fish fishery in Lake Elsinore.

Comment 109: Linda and Martin Ridenour take issue with the statement in section 3.3.3.2 of the draft EIS that the Santa Rosa powerhouse would not be near a stream. They state that a USFS map shows a blue line (stream) in the vicinity of the proposed powerhouse.

Response: We have modified the final EIS to state that small streams are located on the Santa Rosa powerhouse site. The co-applicants proposed and our recommended soil erosion control plan would include measures to avoid impacts to the water quality in these streams.

Comment 110: CDFG states that the final EIS should address project effects on the arroyo chub (*Gila orcutti*), a species of special concern and the tidewater goby (*Eucyclogobius newberryi*), a federally threatened species and state species of concern from the reservoir's effects on water quality and the introduction of non-native species to the watershed. The State Water Board also is concerned about the potential introduction of exotic species (bass and sunfish) in Lake Elsinore being a threat to the upper reservoir's watershed if a spill or overflow releases adults or larvae of these species.

Response: A discussion of project effects on arroyo chub has been included in section 3.3.3.2 of the final EIS. Tidewater goby are not known to occur in the project area or watershed, the only reference to the presence of tidewater goby in the San Juan drainage is from an observation noted in 1939. Habitat for tidewater goby consists of brackish shallow tidal lagoons and lower stream reaches where the water is fairly still but not stagnant. Currently San Juan Creek does not provide habitat suitable for the tidewater goby (FR 65:69693), and San Juan Creek does not contain designated critical habitat for this species. Therefore we did not include a discussion of tidewater goby in the EIS.

See also response to Comment 102. The likelihood for a spill or overflow event is remote, and would be the result of a catastrophic event. Therefore the likelihood for adult fish to be introduced into the upper reaches is remote, and larvae of warmwater fish would not likely survive such an event. As stated on pg. 3-80 of the draft EIS, non-native species including bass and sunfish are already present in lower reaches of San Juan Creek. Surface water quality monitoring below the upper reservoir was proposed by the co-applicants and recommended by the USFS and staff and clarified requirements for a monitoring and remediation plan should fish from Lake Elsinore be introduced into San Juan Creek.

Comment 111: The city of Lake Elsinore recommends that an Aquatic Vegetative Management Plan for Lake Elsinore be developed and implemented to mitigate for the possible negative effects of lake-stabilization and sediment resuspension.

Response: The Final Fisheries Management Plan for Lake Elsinore developed for the Joint Watershed Authority contains measures to address establishment of stands of aquatic vegetation. However, such activities will not be successful until the number of carp, which feed on aquatic plants, in the lake is reduced. Also see our response to comment 112.

Comment 112: The city of Lake Elsinore states that the project may have a substantial negative environmental effect on achieving the goals of the Fisheries Management Plan and the state beneficial use designation. As such it recommends the following mitigation measures be implemented: (1) fund an intensive 2-year carp removal program by the city in the amount of $500,000 in lieu of the proposed "rotenone poisoning"; (2) fund improvements to sport fish spawning habitat in the large cove off the T-peninsula of the levee system based on the plans and specifications prepared by Wildlands Inc. for the Joint Watershed Authority in the amount of $500,000; (3) develop and fund improvements to approximately 60 acres of adjacent fry and fingerling nursery habitat in the southeast bay area in the amount of $1,500,000; (4) develop and conduct fish population surveys every 3 years on Lake Elsinore to assess the fishery and attainment of the goals of the Fisheries Management Plan, with sport fish stocking based on the results of the surveys and consultation with CDFG at a cost no less than $50,000 annually; and (5) immediately clean up any fish kills that occur during project construction, count the loss of sport fish, and replace the lost sport fish before the project is operational.

Response: We respectfully disagree that the operation of the proposed project would have substantial negative effects on achieving the goals of the Fish Management Plan and the state beneficial use designation. Management of fisheries resources in Lake Elsinore is the responsibility of the Joint Watershed Authority that developed the Fisheries Management Plan for Lake Elsinore to address agency priorities for manipulating the current composition of fish species as well as implementation of habitat enhancement measures to restructure and improve the sport fishery in the lake. There are many elements of the Fisheries Management Plan, which is designed to be adaptive in order to respond to changes in the fishery over time that may occur as a direct result of actions described in the plan, or as an indirect result of other activities that affect fish resources in the lake.

The current state of the Lake Elsinore fishery, lack of aquatic vegetation, and presence of undesirable populations of carp in Lake Elsinore is unrelated to the proposed project construction and operations. Carp removal is a key element of the Fisheries Management Plan to restructure the fishery in the lake, and the measure is already being implemented through annual netting operations. Rotenone poisoning is not recommended as it would also remove desirable game fish from the lake. The habitat enhancement measures recommended by the city of Lake Elsinore do not appear to address potential project affects on the fishery, but are enhancement activities that are already planned. Our recommendation is that the co-applicants monitor for entrainment in year 1 and every 5 years thereafter over the term of any license issued for the project. Any contributions to the implementation of the Fisheries Management Plan, would depend on the results of the entrainment monitoring and would be tied to project-related fish mortality and impingement. The monitoring plan would be developed in consultation with the CDFG, FWS, the State Water Board and the Joint Watershed Authority.

Comment 113: Linda and Martin Ridenour request information about the fish stocking program including the frequency of fish stocking, the types of fish to be stocked, and the cost to Elsinore Valley MWD to do the stocking.

Response: The co-applicants propose and we recommend consultation with CDFG and FWS to support a sports fish stocking program in Lake Elsinore consistent with the Fisheries Management Plan for recreational angling. The details of this support would be determined in the event that the Commission issues a license for the project.

Comment 114: The Santa Ana Water Board indicates that the project may potentially affect the lake's fish population, especially larval fish or ichthyoplankton through entrainment and impingement. It states that although the draft EIS briefly discusses methods to reduce mortality to fish from project operations, the final EIS should provide more discussion on methods to be used to reduce fish and ichthyoplankton effects.

Response: Section 3.3.3.2 (pages 3-88 and 3-89) of the draft EIS discusses the known technologies currently available to prevent fish entrainment as well as anticipated effects of project operations on fish of various life-stages. In a report filed by the co-applicants, Anderson (2006) estimated potential entrainment losses of ichthyoplankton, zooplankton, and phytoplankton from operation of the project to be 40 to 100 percent, 7 to 24.8 percent, and 1.1 to 4 percent, respectively, based on specific operating scenarios and generalized modeling assumptions. Anderson (2006) also speculated on the effectiveness of a filter-fabric-curtain to prevent entrainment mortality. The co-applicants suggested but did not propose an aquatic filter barrier system might be employed to prevent entrainment of fish, fish eggs and larvae, however such systems were designed for much smaller flow rates and have not been tested for flows as high as 1967 cfs for each intake, as is proposed for Lake Elsinore and we do not recommend such a system in Lake Elsinore.

Comment 115: The State Water Board states that the proposed 1-year entrainment monitoring program may not be long enough to evaluate the potential effects on the Lake Elsinore fishery.

Response: We agree with the State Water Board and have revised our staff recommendation to include monitoring for entrainment losses once every 5 years over the term of any license issued because of the structure and composition of the fisheries is expected to change as a result of implementation of the Fisheries Management Plan.

Comment 116: The Friends of the Forest comments that the draft EIS does not provide much information about the littoral zone of Lake Elsinore. It points out that this is the area of the lake that would be most affected by the proposed project operation and state that biological studies must be completed. The State Water Board and the Center for Biological Diversity also states that the final EIS needs to address the consequences of lake fluctuation and the exposure of near-shore littoral habitats on game fish spawning habitat and other wildlife habitat.

Response: We have added text to section 3.3.4.2 to provide further information regarding the effects of lake fluctuations on wildlife habitat in the fluctuation zone. Current seasonal and annual lake level fluctuations in Lake Elsinore contribute to the lack of vegetation on the shore and the lack of submerged aquatic vegetation. The Joint Watershed Authority concluded that the lack of floating or submerged aquatic plants results from several factors in addition to the lake level fluctuations, including limited availability of shoreline sediments for rooting, shading by dense algal populations; turbidity caused by several mechanisms, and constant foraging by carp (Joint Watershed Authority, 2005). Limiting lake level fluctuations to 1 foot on a daily basis, and 1.7 feet on a weekly basis as proposed by the co-applicants would provide a more stable regime of constant inundation and may contribute to the establishment of rooted shallow-water vegetation that provides spawning, rearing, foraging, and cover from predators. Anderson (2006) estimated the fluctuations in shoreline exposure would not result in increased turbidity, since natural wave action would likely prevent fine material from accumulating near the active shoreline.

Comment 117: Pacific Clay states that the cumulative effects analysis in the draft EIS for fisheries is inadequate and only provides a project-specific discussion of the effects of project operations on the city of Lake Elsinore's fishery programs. It states that this is a violation of NEPA because it fails to provide a listing of related actions and never addresses project effects in combination with those of other past, present, and reasonably foreseeable future actions within the San Juan River Basin.

Response: We have expanded the cumulative effects section in regards to fisheries to include reconfiguration of the Back Basin Wetlands as part of the Lake Elsinore Stabilization and Enhancement Project and the proposed Special Area Management Plan for the San Juan Creek and Western San Mateo watersheds.

TERRESTRIAL RESOURCES

Comment 118: The Orange County Chapter of the California Native Plant Society states that the EIS should include a large-scale map or overlay that clarifies what percentage of the total southern coast live oak forest and other vegetation types would be removed at the sites. Furthermore, CDFG states that it is not possible to determine the existence of significant adverse effects because the draft EIS did not contain a detailed description or map of existing biological resources and habitat value within the project area, specifically the Lion's Springs and Morrell canyon sites. EPA recommends the final EIS include detailed maps of both the Decker and Morrell canyon reservoir sites showing plant communities, water and wetland boundaries, riparian areas, and acreages for each. Linda and Martin Ridenour also comment that information about vegetation that would be disturbed is insufficient.

Response: As an attachment to their April, 24, 2006, filing, the co-applicants submitted a report discussing a delineation of wetlands and waters at the Morrell and Decker Canyon sites that was conducted by Michael Brandman Associated (MBA) in January, 2006. We have overlaid the reservoir footprint for each alternative on an aerial photo that was included in the delineation report, to provide additional detail about waters of the U.S. and waters of the state that occur on each site, as shown in figure 14 of the final EIS. Survey results are summarized in section 3.3.4.2. We conclude that the level of detail provided in the final EIS is sufficient to serve as the basis for comparing the biological effects of the staff alternative with those that would occur under the co-applicants' proposal. Based on this comparison, we conclude that the staff alternative would be the least environmentally damaging action alternative. Additional information, including all the technical studies filed by the co-applicants, with attached aerial photos, site drawings, topographic maps, cover type maps, jurisdictional wetland delineations, functions and values assessments, field notes, and other exhibits, are available to the public on the Commission's eLibrary or by request from the co-applicants.

Comment 119: SDG&E requests a clarification concerning the type of vegetation cover (disturbed or chaparral) at the southern substation site given that the information in table 15 conflicts with the table note.

Response: We have added headers to table 15 to clarify that the proposed southern substation is currently disturbed, and that the alternative southern substation is characterized by chaparral.

Comment 120: CDFG notes that an accurate statement of the potential for impacts on sensitive species cannot be made because the final alignments of the transmission line and access roads have not been established. CDFG comments that the Department would require biological surveys for all sensitive and endangered species in the development footprint, according to the policies of the Multi-Species Habitat Conservation Plan (Multi-Species HCP). CDFG also notes that the California black walnut is considered locally and regionally sensitive, is covered by the Multi-Species HCP, and would be affected by the project.

Response: As discussed in sections 2.4.3.2, 5.2.6 and 5.2.7, we recommend pre-construction surveys for special status species in any areas that have not yet been covered. We have added the California black walnut to table 13, and modified tables 13 and 14 to indicate species for which focused surveys would be needed, according to the Multi-Species HCP.

Comment 121: Nevada Hydro states that no factual basis exists to impose a compensation requirement for those plant communities not recognized by the California Natural Diversity Database as high priority habitats. Nevada Hydro states that coastal sage scrub has not been identified as communities known or believed to be of high priority. However, although not required, the co-applicants would replace coastal sage scrub at a 1:1 ratio and requests that the proposed measure as described on page 2-14 of the draft EIS be corrected to reflect the 1:1 replacement ratio for coastal sage scrub. Nevada Hydro states that the appropriate replacement ratio for southern coast live oak riparian forest, southern sycamore-alder riparian forest, and southern willow scrub, should these habitats types be present with the area of physical disturbance, is 2:1.

Response: We have corrected the text on page 2-14 to reflect the co-applicants' proposal to replace coastal sage scrub at a 1:1 ratio and we have included this lower ratio in the staff alternative in the final EIS. The staff alternative also includes compensation for the loss of chaparral and non-native grasslands, at a 1:1 mitigation ratio because many special status species use non-native grasslands, including white-tailed kite, burrowing owl, loggerhead shrike, southern California rufous-crowned sparrow, northwestern San Diego pocket mouse and Stephens' kangaroo rat. Chaparral habitat for these species would be reduced as a result of project construction, unless the co-applicants provide compensation.

Comment 122: The Center for Biological Diversity comments that coastal sage scrub is also a rare plant community according to California Natural Diversity Data Base (CNDDB) and should be addressed in the final EIS (on page 3-92). It also comments that the draft EIS did not adequately describe the biological resources of the project area and state that sticky Dudley, Parry's tetracoccus, and Robinson's pepper-grass are additional List 1B species that occur in the San Juan Creek area and should be included in the final EIS.

Response: The Center for Biological Diversity references CNDDB (2005) as the basis for stating that coastal sage scrub is a rare plant community. However, we could not find this reference in the *Literature Cited* section of the Center for Biological Diversity letter. In preparing the draft EIS, we used the *List of Terrestrial Vegetation Natural Communities Recognized by the California Natural Diversity Database, September 2003 Edition*, as posted on the CNDDB web site. The 2003 edition is still posted on the web site, as of August 17, 2006, and we assume this is the most current version. This version does not indicate that CNDDB considers coastal sage scrub to be a rare plant community. Regardless of the "official" status of the community, however, the draft EIS does address its special importance, and we recommend that the co-applicants mitigate for project effects (please see response to Comment 124). We did not conduct an in-depth analysis of any resources in San Juan Creek because we consider the risk of a dam break to be extremely low.

Comment 123: Riverside County states that several species' habitat assessments or focused surveys were not included in the draft EIS, specifically some of the narrow endemic and Criteria Area plant species required by the Western Riverside County Multi-Species HCP. A thorough analysis of effects on riverine and riparian habitats would be needed.

Response: We have modified tables 13 and 14 to identify which species are narrow endemics, and have added Criteria Area species. We anticipate that additional plant surveys, burrowing owl surveys (if needed) and delineations of wetlands and waters that would be conducted prior to project construction would provide the information the County would need to evaluate project consistency with the Multi-Species HCP. We have specified in section 5.2.6 that the co-applicants should consider these species, as well as others previously identified in the document, during planning for additional, focused surveys in areas that have not yet been covered (e.g., the final placement of transmission towers and temporary access roads) and that may be affected by project construction or operation. We have described the amount of temporary and permanent disturbance to habitats that support these species.

Comment 124: CDFG states that the project occurs within the Western Riverside County Multi-Species HCP and CDFG will review the project for compliance with the plan. It states that a future habitat management plan for the project should include an in-depth analysis of the project's effects on the Multi-Species HCP and demonstrate how the project is consistent with the Multi-Species HCP.

Response: We agree that the habitat mitigation plan should address project effects on species covered under the Multi-Species HCP and support CDFG's intention to review the LEAPS Project for compliance with the plan.

Comment 125: The Center for Biological Diversity also cites the lack of analysis of the potential effects of the co-applicants' proposal to not clear vegetation under transmission lines as inadequate. It is concerned that failure to clear out vegetation under the transmission lines would increase the fire hazard in the project area.

Response: The co-applicants do not propose to clear vegetation under the transmission line, but fuel management in the future may require manipulation to reduce the risk of fire. Methods selected for fuel management would be developed in consultation with the USFS and would depend on site-specific factors (e.g., vegetation type, slope, aspect, access), and could include grazing, prescribed fire, or mechanical means to create and maintain firebreaks. Existing firebreaks that intersect the proposed alignment would also be maintained, as needed and as specified by the USFS. The increased risk of fire that would be associated with uncontrolled public access and weed invasion highlights the importance of effective road and weed management. The objective is to eliminate all man caused fires within the project area and to take prompt, aggressive action on all fires in the vicinity. Our recommended hazardous vegetative fuel treatment plan as specified by the USFS would set forth protocols for the treatment of vegetation in the vicinity of the transmission lines.

Comment 126: Pacific Clay and Linda and Martin Ridenour state that the analysis of the construction effects on special status plants is inadequate because several areas were not included in survey efforts, mesa horkelia was not included in surveys, the effects of the transmission line are unknown because it has not been sited, no rare plant surveys have been conducted for the staff alternative, and maps do not provide a sufficient level of detail. They state that because of these reasons the mitigation proposed is not effective. The Ridenours would like to see all the plans that relate to the protection of rare plant species.

Response: As mentioned in section 3.3.4.2, we recognize that site-specific pre-construction surveys would be needed for special status plants in any areas that have not yet been covered or that have not been thoroughly covered during previous surveys. We have added text to section 5.2.6 to clarify that data obtained through additional surveys should be used to avoid, minimize or mitigate adverse effects, first by locating transmission towers, roads and other project features away from any rare plant populations that may be present. We have added text to this section to specify that the co-applicants should consult with the resource management agencies and other stakeholders to develop a survey plan and then to develop mitigation plan, before submitting finalized reports and plans to the Commission.

Comment 127: The Center for Biological Diversity points to a recent declaration by USFS that invasive species of weeds is one of the four greatest threats to National Forest System lands and comments that the EIS needs to include a description of weed communities in the project area as well as identification of higher protective standards for areas without invasive weed problems. It criticizes the co-applicants' proposal to develop a weed control plan pursuant to the new Cleveland National Forest Land Management Plan because that plan only provides general guidance for the development of site specific plans.

Response: The Center for Biological Diversity letter notes that non-native species are widespread in the South Coast Bioregion of California. Although only 12 weeds were documented during the co-applicants' plant surveys, it is very likely that most, if not all, of the 42 non-native invasive species known to occur in the project vicinity are present in areas that would be affected by the project. On one hand, it would be advantageous to design the project to avoid areas that do not currently support weed species, in order to reduce the threat of introduction. On the other hand, it would be beneficial to design the project to avoid sites that support weed species, in order to reduce the threat of spreading them to un-infested areas. Neither scenario is likely possible, given that project features must also be located to avoid or minimize impacts on steep slopes; streams and riparian habitats; special status plants, plant communities, and animals; listed species; high quality recreation sites, sensitive viewsheds, and other important resources. This situation points out the importance of weed management, without any need for additional detail about existing conditions.

We recognize that the Land Management Plan was developed at a general level to address almost 567,000 acres of lands within the Cleveland National Forest, and was not intended to serve as a blueprint for the development of site-specific weed management plans. Many weed management handbooks are readily available that could serve as a blueprint for developing a plan to manage weeds in lands affected by the LEAPS Project. With their site-specific knowledge, we conclude that selection of any particular document as a model for developing a plan is best left to the co-applicants, in consultation with the resource management agencies and other stakeholders. In any case, because some project features would be located on National Forest System lands, we recommend that the co-applicants consult with the USFS to develop a plan that is consistent with the Land Management Plan goals, objectives, and design criteria. We have added text in section 5.2.6 to clarify the elements that should be included in a weed management plan for the project area, including National Forest System and non-National Forest System lands.

Comment 128: Bruce Campbell comments on the lack of information about the potential effects of the use of toxic and hazardous materials during the construction and operation of the project and requests that a supplemental or new draft EIS be issued that addresses these concerns. He comments that non-native plant species would spread in the area because of the construction of the transmission lines, increased use of OHVs, and transmission line maintenance activities. He requests more information in the draft EIS about the maintenance activities including what herbicides would be used, if toxicological profiles would be presented in a supplement or new draft EIS, and whether hazardous Material Safety Data Sheets will be completed and made available to the public. He asks if this information about herbicides would be made available to the public in both English and Spanish.

Response: For the most part, the transmission line would traverse chaparral and grassland vegetation that does not reach a height that would interfere with project operation, and there would be no need to manage any vegetation except weeds. If taller vegetation is present and would interfere with system reliability or safety, it could be removed by periodic cutting or trimming. We anticipate that herbicides could be used for spot treatment of certain weed species. However, there are many alternatives to herbicides, and non-chemical treatments are almost always preferable (in terms of safety and environmental stewardship), unless other attempts at control have failed, and the risk of damage caused by weeds is greater than the risk of damage caused by an herbicide (Tu et al., 2001).

As discussed in our response to comment 127, we have added text to section 5.2.6 to clarify our recommendations for development of a weed management plan. The plan should include an evaluation of all available methods of weed control for target species, a comparison of their costs and benefits, and finally, selection of the most appropriate treatment. If an herbicide is to be applied, the co-applicants would be required to comply with federal, state and local regulations for proper use and application.

Comment 129: The Center for Biological Diversity indicates that the draft EIS fails to consider native willows, tule, and cattails at Lake Elsinore as potentially important riparian habitat and requests that information about stands of these species and wildlife use of these habitats be included in the final EIS. Linda and Martin Ridenour also state that information about wetlands associated with Lake Elsinore is insufficient.

Response: We have added text in section 3.3.4.2 to recognize that even small and scattered patches of native riparian vegetation can provide important habitat for wildlife. We have added some anecdotal information about birds that use Lake Elsinore, reflecting comments supplied by the city of Lake Elsinore. We also note that implementation of the Lake Elsinore Stabilization and Enhancement Project combined with proposed operations, would be expected to result in a stable upper shoreline at 1,241.7 feet msl, with a variable fluctuation zone that covers about 79 acres 5 days a week and an additional 55 acres during the weekend. We would expect that additional shoreline vegetation and possible new wetlands that could support nesting shorebirds would develop above elevation 1,241.7 feet msl. Given this likelihood, we include a monitoring plan for shorebirds in our staff alternative.

Comment 130: Nevada Hydro states that the co-applicants disagree with the statement on page 3-129 of the draft EIS that wetland delineations would be needed to evaluate and quantify effects. Nevada Hydro comments that the proposed LEAPS Project would not alter the operational parameters established under the Lake Elsinore Stabilization and Enhancement Project but would provide a revenue source that would facilitate the implementation of the plan. It indicates that seasonal variations are substantially greater than the limits outlined in the adopted plan, which has gone through environmental review, and it requests that measures in the staff alternative for wetland delineations and habitat mitigation and monitoring for Lake Elsinore be eliminated from the final EIS.

Response: We agree that stabilizing year-to-year and seasonal lake elevations, while allowing daily and weekly fluctuations, may have little effect on existing wetlands around Lake Elsinore, if any are present. Native species that persist around the shoreline, such as willows, tule and cattails, are tolerant of seasonal water level fluctuations that occur in natural systems throughout the semi-arid west and these species would likely tolerate daily fluctuations of 1 foot. Fluctuations limited to 1 foot and occurring within a 24-hour time-frame, as proposed, should allow for soils to remain moist and these species would likely persist. Operational effects on wetlands that may be associated with Lake Elsinore would likely be minor. We do not recommend in the EIS any additional wetland delineations other than those proposed by the co-applicants as needed after the final placement of project facilities.

Comment 131: CDFG recommends that all areas supporting hydrophytic cover be mapped in order to assess the potential effects on wetlands from the proposed project. It also recommends a CDFG-approved wetland restoration/protection plan, including a means of replacing or protecting the hydrologic conditions, which contribute to the existing wetlands. CDFG states that its policy has no net loss of wetlands and that buffers between existing or proposed development and existing wetlands or wetland compensation sites should be included in any mitigation plan. The Corps, the State Water Board, and Pacific Clay also state that wetland delineations need to occur to determine potential project effects.

Response: As an attachment to their April 24, 2006, comments on the draft EIS, the co-applicants filed a delineation of jurisdictional waters and wetlands at the Morrell and Decker Canyon sites and an assessment of functions and values, using the California Rapid Assessment Method (CRAM). We have included exhibit 4 of the delineation report as figure 14 in the final EIS. We have revised and added text in section 3.3.4.2 to reflect information contained in this report. As noted in section 3.3.4.2, delineation of wetlands associated with Lake Elsinore would be needed, as well, to meet federal and state permitting requirements.

Comment 132: The Orange County Chapter of the California Native Plant Society indicates that although the draft EIS properly states that the Lion Spring wetland fulfills important habitat functions that would lost if the project is built, it is not clear if there is an intention to replace the habitat function with a new wetland formed by the upstream and spring water that are proposed to be diverted under the reservoir’s geofabric liner.

Response: A settling pond may be needed to ensure that clean water is returned to the creek downstream of the reservoir if Morrell Canyon is selected as the site of the upper reservoir. Returning flows to the creek would maintain natural processes downstream of the dam. However, we anticipate that replacement of habitat functions associated with Lion Spring itself would not be feasible, because of the complex geology and hydrology that characterize this site. The staff alternative includes an upper reservoir at the Decker Canyon location, which would eliminate the effect on Lion Spring.

Comment 133: The EPA and the Corps state that information regarding the need for section 404 compliance for wetland effects should have been disclosed for consideration in the draft EIS. Additionally, EPA states that it considers this project and the TE/VS 500-kilovolt Interconnect Project to be separate projects in regard to section 404 compliance. SDG&E also questions whether the south substation would require a wetland permit for access or pad construction.

Response: In general, Commission staff is not in a position to speculate about the permit requirements other agencies may impose.

Comment 134: Nevada Hydro provides a report containing the findings of jurisdictional wetland delineations at the Morrell Canyon and Decker Canyon upper reservation sites and requests that the descriptions of wetlands that might be affected by the construction of an upper reservoir be revised to reflect the findings of the wetland delineation report.

Response: We appreciate the additional information and have included it in the document.

Comment 135: EPA states that the draft EIS should have included a conceptual description of what is being considered as compensatory mitigation to offset unavoidable effects to waters of the US, including wetlands at both the Decker and Morrell canyon reservoir sites. It states that compensatory mitigation should include restoration or enhancement of waters along with the acquisition/preservation of other waters. It recommends that the final EIS analyze an alternative that combines the Decker Canyon site with a minimal functional transmission line that avoids waters of the United States to the maximum extent possible. EPA recommends the final EIS indicate how riparian habitat losses would be mitigated for under the staff alternative.

Response: We do not include a conceptual description of compensatory mitigation, because we do not have information about opportunities/resource needs that may exist within the upper San Juan Creek basin. However, we have added text discussing mitigation priorities to sections 3.3.4.2 and 5.2.6.

Comment 136: CDFG states that the draft EIS did not address its comments from the October 21, 2004, letter pertaining to the loss of approximately 100 acres of mature oak woodlands associated with Lion’s springs and a rare perennial spring.

Response: The referenced letter was sent to the co-applicants only and was not filed with the Commission until April 2006; therefore, CDFG comments were not considered in the draft EIS; however, we now acknowledge CDFG's October 21, 2004, letter and note that the draft EIS did consider the potential effects of the project on the mature oak woodlands associated with Lion Spring at the proposed upper reservoir location in Morrell Canyon.

Comment 137: Nevada Hydro points out that the exact acreages for replacement ratios remain subject to further refinement based on site selection and final grading plans. Further, Nevada Hydro states that either the 3:1 or the 5:1 replacement ratio for oak woodlands would appear to be beyond the ability of the co-applicants to achieve. Nevada Hydro requests that the final EIS reference California Senate Bill 1334 which established section 21083.4 of the Public Resource Code and specifies oak woodland mitigation under CEQA and maintains the proposed ratio of 3:1 for replacement of oak woodlands.

Response: As noted in section 3.3.4.3, we considered California Senate Bill 1334 establishing section 21083.4 of the Public Resource Code in making our recommendations regarding an appropriate mitigation ratio. In section 3.3.4.2, we identified the advantages and disadvantages of various approaches to mitigation, including on-site planting, on-site transplanting, contribution to a mitigation banks, and purchase of off-site lands or conservation easements. We concluded that the first two options would not likely be successful, and that the third option might not allow the co-applicants, resource management agencies and other stakeholders to choose site(s) for mitigation that would provide the highest local benefits. For this reason, we recommended purchase and protection of existing oak woodlands at the 1:1 ratio recommended by Interior and specified by USFS.

Comment 138: The Orange County Chapter of the California Native Plant Society states that the proposed 2:1 oak mitigation is inadequate and that oaks should be mitigated at 5:1. SDG&E requests further discussion of why the co-applicants propose a 2:1 ratio rather than the 5:1 ratio recommended by the USFS as well as discussion of CDFG’s permitting requirements under section 1600 of the Fish and

Game Code for riparian and oak woodland impacts. CDFG states that the proposed 5:1 ratio mitigation for the loss of oak woodland is not adequate, and instead should be 10:1, which is the CDFG standard for removal of mature coastal live oak trees. Additionally, CDFG states that the spacing of the replacement trees should be 20 feet minimum and should be monitored, nurtured, and protected within the drip line so they survive a minimum of 5 years. Off-site mitigation alternatives should be included in detail in the EIS and should be agreed upon by CDFG. The Center for Biological Diversity also recommends a higher mitigation ratio as well as information about where and how the mitigation would occur.

Response: The staff alternative now includes a 1:1 habitat mitigation replacement ratio for oak woodlands and an equivalency analysis to ensure that the replacement habitat is of equal value consistent with Interior's recommendations and a priority for replacement with the Cleveland National Forest, consist with measures specified by the USFS, instead of the 5:1 habitat mitigation replacement ratio we recommended in the draft EIS. We consider CDFG's recommended ratio of 10:1 to be excessive, because off-site mitigation will involve mature oak woodlands that currently provide high-quality habitat for wildlife, and there would be no time gap between the impact (project construction) and functional mitigation, as would be the case if oaks were planted on-site. We have not identified off-site options for mitigation, but have added text to section 5.2.6 to outline a general order of priority, and clarify that we recommend the co-applicants consult with the resource management agencies and other stakeholders to identify appropriate sites.

Comment 139: The Orange County Chapter of the California Native Plant Society states that the draft EIS does not indicate the range of dbh above 8" or analyze dbh measurements to indicate age-classes, which would help determine the habitat functions of woodland oak communities that would need to be replaced by mitigation (page 3-130).

Response: Coast live oak woodlands in Morrell Canyon contain a variety of age classes; trees range in size from 2 to at least 24 inches diameter at breast height (dbh), with most individuals in the 8 to 12-inch range. For this reason, we are recommending the co-applicants purchase and protect mature coast live oak woodlands as mitigation for habitat losses at Morrell or Decker Canyon.

Comment 140: CDFG states that mitigation for the loss of biological resources should include both temporary and permanent effects. It believes that the draft EIS understates the habitat values of Morrell Canyon and Lion's Spring oak woodland and that the loss of these resources to wildlife in the Cleveland National Forest and surrounding wilderness area would be a significant effect. As such, CDFG recommends that the co-applicants submit additional environmental analysis of the reservoir location and its effect on wildlife habitat function and value and submit a detailed Mitigation and Monitoring Plan to CDFG for approval. Additionally, CDFG states that any management plans developed as a result of the project should include CDFG input and approval.

Response: The information filed with the Commission to date serves as an adequate basis for our conclusion that project effects on biological resources in Morrell Canyon (including Lion Spring) would be substantial. We have added text to section 5.2.6 to clarify that we are recommending the co-applicants consult with the resource management agencies (including CDFG) to develop a detailed habitat mitigation and monitoring plan.

Comment 141: The Center for Biological Diversity states that the occurrence in the planning area and potential spread of sudden oak death syndrome that affects oak woodlands in coastal California must be addressed in the final EIS.

Response: Our review of maps posted on the California Oak Mortality Task Force website in 2005 indicated that *Phytophthora ramorum* had not been reported south of Monterey. A review of the July, 2006, maps shows the same result (http://kellylab.berkeley.edu/SODmonitoring/maps/PDF/SODCalifornia07-25-06page.pdf). Based on the Task Force's evaluation, we conclude that there is a low risk of infection in western Riverside County and in Orange and San Diego counties (http://kellylab.berkeley.edu/SODmonitoring/maps/PDF/state_risk_05a_avg.pdf).

Comment 142: The Center for Biological Diversity comments that the draft EIS lacks any meaningful information on how habitat loss at Morrell Canyon would affect special-status wildlife populations. It also comments that there is no meaningful or quantitative analysis of edge effects on wildlife from the loss of Morrell Canyon.

Response: Section 3.3.4.2 concludes that project construction and operation would reduce habitat quantity and quality for special status wildlife populations in the area. We agree the draft EIS does not contain a detailed analysis of effects at the population level, but clearly, the analysis is sufficient to compare the effects of the proposed action and the staff alternative, in terms of acres and types of habitat that would be affected. We conclude that special status wildlife species that use those habitats would be adversely affected by the loss of those habitats, in direct relation to the acreage of each habitat type that is lost to construction. Thus, acres and types of habitat that would be affected serve as an adequate indicator of impacts on wildlife. Given similar reservoir configurations under both alternatives, the extent of edge effects would depend primarily on acreage, so again, the analysis is adequate to compare the effects of the proposed action and the staff alternative. Based on these relationships, no additional information is necessary to conclude that loss of Lion Spring (a unique habitat feature) and 20 acres of mature oak woodlands at Morrell Canyon would have a greater impact on wildlife, including special status species, than loss of 5 acres of mature oak woodland at Decker Canyon, and that the no-action alternative would have the least impact.

Comment 143: Pacific Clay is critical of the special status wildlife analysis because survey data is out of date with none more recent than 1998 and mitigation measures are not consistent with the Western Riverside County Multi-Species HCP or the Cleveland National Forest Land Management Plan.

Response: We have added text to section 3.3.4.1 to clarify that the co-applicants conducted general biological surveys in the project area in 2001and noted the presence of any special status species observed during other field efforts. Table 16 shows federally listed special status species for which focused surveys were conducted between 2001 and 2005. We anticipate that mitigation measures would be consistent with the Multi-Species HCP in calling for pre-construction surveys, where needed, and recommending compensation ratios that exceed the Multi-Species HCP minimum of 1:1.

Comment 144: CDFG states that the EIS should address project effects on the southwestern pond turtle (*Emy marmorata pallida*), a state species of special concern from the reservoir's effects on water quality and the introduction of non-native species to the watershed.

Response: Only a dam failure at the upper reservoir could adversely affect the southwestern pond turtle. We have not conducted an in-depth analysis of any aquatic resources in San Juan Creek including the southwestern pond turtle, because the risk of a dam failure is very small.

Comment 145: Scott Werner comments that the draft EIS does not provide specifics on the immediate and cumulative effects to many species, especially several CDFG-listed California Species of Concern including the Coast-horned lizard, and Southern California rufous-crowned sparrow, and Bell's sage sparrow.

Response: We used the lists provided in the license application and the co-applicants' responses to additional information requests as the basis for describing special status species that could occur in the project area. Some special status species, such as Bell's sage sparrow, may have been omitted from the lists. We have added the California Species of Special Concern that you text to section 3.3.4.2 and 3.3.4.3 to indicate that other special status species may also occur, and would also be adversely affected by the loss of habitat types they use and by the increased risk of disturbance, both directly and cumulatively.

Comment 146: The Center for Biological Diversity comments that the draft EIS cannot be used to satisfy the NEPA requirements for the USFS decision on the proposed project because it does not present any population data on Management Indicator Species, assuming that the Cleveland National Forest is currently operating under the 1982 regulations.

Response: We used information taken from the Land Management Plan to provide general population data for the Trabuco Ranger District, Cleveland National Forest or the Santa Ana Mountains, wherever possible (see section 3.3.4.1), supplemented with results of MBA's project-specific surveys for the California spotted owl and arroyo toad. Although no detailed data are available about management indicator species (MIS) populations, we find that the project would adversely affect MIS by removing habitat, and, for this reason, we recommend substantial mitigation if either of the action alternatives is implemented.

Comment 147: Riverside County states that the location description of the project is too vague to accurately determine the potential effects of the project on reserve assembly; however, it is likely to be within cell criteria areas and has the potential to affect reserves and/or corridors including Core Reserve Area 1, the proposed extension of Core Area 2, and proposed Constrained Linkages 1, 2, and 9.

Response: We agree with your assessment that the project has the potential to affect the reserves and corridors mentioned.

Comment 148: Nevada Hydro cites numerous conclusions in the draft EIS that suggest that the project would have little effect on nesting shorebirds and requests that Interior's 10(j) recommendation for a monitoring and remediation plan to eliminate or reduce impacts to nesting shorebirds be deleted from the staff alternative and no conditions or measures be imposed with regard to shorebirds.

Response: We respectfully disagree. The draft EIS concluded that while limited in size, small areas of suitable habitat that provides forage and cover for waterfowl, wading birds, and songbirds could be affected by project operations. We also concluded that the more stable water level would promote the development of emergent herbaceous plants within the 79-acre fluctuation zone and additional riparian vegetation may establish along the shoreline above the fluctuation zone providing additional suitable habitat for a variety of ducks, wading birds, and songbirds. Further, in comments on the draft EIS, the city of Lake Elsinore provided more information on water-associated bird species that currently use undisturbed shorelines of Lake Elsinore. Our recommended nesting shorebird plan would monitor project-related effects on these species.

Comment 149: The city of Lake Elsinore states that the draft EIS seriously underestimates the lake's avian resources and provides additional information of bird use of the lake. It states that to mitigate for the potential negative effects of the project on great blue heron and egrets, the co-applicants should be required to provide educational outreach to the general public by purchasing the nesting sites of these wading birds in both the Four Corners and Rome Hill areas of Lake Elsinore. The Center for Biological Diversity comments that the draft EIS presents no data about the shorebirds, waterfowl, and riparian birds that use Lake Elsinore and relies on speculation to downplay potential impacts to avian species that use the lake. It also comments that the draft EIS does not provide an analysis of potential impacts to migratory birds sufficient to allow the reader to compare the various transmission route corridors relative to which alignment would best avoid such impacts. Linda and Martin Ridenour also comment that information provided by MBA is flawed and inadequate to serve as a basis for analysis of potential effects on birds at Lake Elsinore and within the Pacific flyway.

Response: We have added text to sections 3.3.4 and 3.3.5 reflecting information the city of Lake Elsinore provided about bird species observed at Lake Elsinore. However, we have not included the city's recommendation to include purchase of land in the Rome Hill and Four Corners areas to the staff alternative, because we conclude it is very unlikely that the project would affect nesting habitat for great blue herons or egrets. Great blue herons and egrets nest in trees that are large enough to support their sizable nests, in fairly close proximity to foraging areas. The co-applicants do not propose to remove any mature trees along the shoreline, and lake fluctuations should not affect existing trees. For these reasons, there should be no project effects on nesting habitat for these two species.

Although the level of detail provided in the EIS is adequate to identify major areas of concern, we agree that monitoring will be needed to identify high-risk crossings along the selected alignment. As discussed in section 5.2.6, we are recommending the co-applicants implement measures to minimize the risk of collision. Consistent with Avian Power Line Interaction Committee (APLIC) and FWS guidelines for avian protection plans, the co-applicants would monitor the effectiveness of any measures that are implemented, and use the results to design and implement further protective measures if any are needed.

Comment 150: The city of Lake Elsinore states that the fluctuating water levels caused by the project may have a substantial negative effect on shoreline birds and recommend the co-applicants mitigate for these effects by acquiring substantial shoreline property to restore, enhance, and protect the seasonal shoreline nesting sites.

Response: The city's comment letter indicates that several bird species that do not require emergent or woody riparian vegetation for nesting (including black-necked stilts, avocets, and killdeer) are known to breed along the Lake Elsinore shoreline, and that western snowy plover nested there at one time. This information highlights the importance of implementing a monitoring and remediation plan to determine if additional mitigation measures might be warranted. However, as pointed out in section 3.3.4.2, land use and land management practices (construction, soil disturbance, mowing, fertilizing, herbicide use, domestic pets) are likely to have as much or more influence on shorebird use of Lake Elsinore than project operations.

Comment 151: Pacific Clay states that the final EIS should include analysis of an entirely underground transmission option that would avoid potential bird collisions.

Response: The cost of an entirely underground transmission line option would be an additional $320 million or about $10 million per mile for about 32 miles. While such an option would prevent many of the terrestrial resource impacts discussed in the analysis, costs would be prohibitive.

Comment 152: The Fernandez Parties, the Center for Biological Diversity, and Pacific Clay indicate that the draft EIS was missing information regarding the wetlands, wildlife habitat, and rare animal and plant species located in the areas to be affected by the project, and as such the analysis is not adequate.

Response: The analysis is adequate for determining the relative extent of impacts likely to occur under the proposed action and the staff alternative, and to compare these with the no-action alternative. Further detailed, site-specific analysis would be needed in finalizing the location of project facilities, including access roads, in order to avoid and minimize project effects and design appropriate mitigation where necessary.

Comment 153: Linda and Martin Ridenour comment that the effects of an increase in mosquito production at the 86 acre margin of Lake Elsinore were not addressed in the draft EIS. They question the co-applicants' statements about no effect from mosquito and ask if any Vector Control has commented on the co-applicants' statements.

Response: We have added text to section 3.3.4.2 of the final EIS to clarify why we conclude that project operation would not affect mosquito production in Lake Elsinore. We are not aware of any Vector Control comments.

Comment 154: Pacific Clay states that the cumulative effects analysis in the draft EIS for wetlands and riparian habitat is inadequate because it does not identify habitat locations, related actions, or quantify the project's incremental effect when taken in conjunction with the effects of related actions, it does not analyze effects to each habitat separately, and it does not quantify the cumulative risk if the project were to go forwards.

Response: We have added more specific information about project cumulative effects to wetland and riparian habitat the cumulative effects discussion in section 3.3.4.3.

THREATENED AND ENDANGERED SPECIES

Comment 155: CDFG states that the draft EIS does not address its concerns regarding steelhead trout and the habitat function and value of the lower San Juan Creek, as found in its October 21, 2004 letter.

Response: As noted, the referenced letter was sent to the co-applicants only and was not filed with the Commission until April 2006, therefore it was not considered in the draft EIS. However, we analyzed the potential effects of the proposed project on steelhead in San Mateo Creek in section 3.3.5.2 of the draft EIS and concluded that construction at either upper reservoir location would not affect steelhead or steelhead habitat in San Mateo Creek. We also concluded that measures proposed by the co-applicants including their soil erosion control plan, water quality monitoring program at the upper reservoir, and the placement of transmission line poles outside of sensitive area would limit the potential for sediment discharge into San Mateo Creek. We concluded in section 3.3.4.2 of the draft EIS sediment transport several miles downstream to the perennial segments of San Juan Creek would be unlikely and that implementation of a drainage monitoring and remediation plan as recommended by staff and Interior would minimize the potential for negative effects on native fish in the lower San Juan Creek.

Comment 156: Linda and Martin Ridenour asks if the National Marine Fisheries Service (NMFS) responded to the conclusion in the draft EIS that the California summer steelhead would be not adversely affected and requests more specific data to support this conclusion.

Response: We conclude that the construction of the LEAPS Project may affect, but would not likely adversely affect the southern California summer steelhead or steelhead habitat. Only the lower 6 or 7 miles of San Mateo Creek are accessible to southern steelhead trout and spawning occurs in the downstream reach during periods of significant precipitation. Steelhead trout have not been identified in the tributaries to San Mateo Creek that would be crossed by transmission lines. A combination of BMPs during construction and water quality monitoring during the life of the project would reduce, but not eliminate, the potential risk of adverse impacts from the downstream transport of sediments. We sent a letter to NMFS on February 28, 2006, requesting concurrence with our finding that the project would not likely adversely affect California summer steelhead and NMFS has yet to respond.

Comment 157: CDFG does not concur with the finding that the placement of the reservoir in Morrell Canyon would not have an adverse effect to steelhead trout. It states that the project would introduce non-native fish species to the San Juan Creek watershed and affect the water quality of the lower reaches of San Juan Creek from the storage of low quality Lake Elsinore water, which could adversely affect the ability of steelhead to utilize spawning and rearing habitat in the watershed. The introduction of low-quality water from Lake Elsinore could also affect the sustainability of the San Juan Creek as critical habitat. CDFG recommends the co-applicants conduct surveys for steelhead in the San Juan Creek consistent with CDFG and NMFS protocol, and in coordination with CDFG and NMFS, to identify the project effects to steelhead and the portion of the Creek that has been designated as critical habitat.

Response: Introduction of water from the upper reservoir into San Juan Creek would only occur were there to be a spill event, failure of the proposed liner system, or failure of the dam structure, which are highly unlikely given the design of the reservoir. As stated in the draft, surveys of San Juan Creek from Interstate 5 east to just beyond Hot Springs Canyon did not find steelhead; however, non-native species were found, such as mosquitofish, green sunfish, smallmouth bass (*Micopterus dolornieu*), yellow bullhead (*Ameiurus natalis*), and red shiner (*Cyprinella lutrensis*) (FWS, undated, as cited in the Elsinore Valley MWD and Nevada Hydro, 2004a, exhibit E). In its final listings for steelhead, NMFS stated that it believes that steelhead have been extirpated from San Juan Creek, because viable habitat is extremely limited or no longer exists as a result of habitat degradation and they do not anticipate they will occupy the watershed in the future absent major restoration efforts (71 FR 834). In NMFS' final critical habitat designations, San Juan Creek above the I-5 bridge, was excluded as critical habitat based on information provided by CDFG (70 FR 52488). We do not believe effects of project construction or operation will extend to the designated critical habitat portion of San Juan Creek below the Interstate 5 bridge; therefore, we do not recommend surveys for steelhead in that portion of the creek.

Comment 158: The Center for Biological Diversity points out the Cleveland National Forest S10 states that "the future development at Elsinore Peak will be designed to avoid adverse effects to Munz's onion." It states that the construction of eleven towers would disturb nearly 3 acres of potential habitat for this species as well as the spread of non-native species associated with the disturbance would violate the standards of the Cleveland National Forest Land Management Plan. Linda and Martin Ridenour disagree with the draft EIS and the MBA statement that occurrences of Munz's onion are outside the project boundary. They note that they observed this species during a site visit with FERC and USFS staff in 2004.

Response: Neither the proposed nor alternative alignments would affect known populations of Munz's onion on National Forest System lands at Elsinore Peak that USFS staff pointed out during the September, 2004, site visit. Based on the current proposed and alternative alignments, construction of towers should not affect the USFS's ability to meet its objectives under S10. However, the potential occurrence of this species highlights the importance of conducting site-specific surveys at each tower location, inside or outside the Cleveland National Forest, so that the footprint of each tower can be adjusted to avoid affecting this listed species, if it is present. The high risk of introducing and spreading non-native weed species highlights the importance of preparing and implementing plans to manage and monitor weeds and public access.

Comment 159: CDFG disagrees with the conclusion that the project would have no effects on the Quino checkerspot butterfly (*Euphydrayas editha quino*). It states that because the actual alignment of the transmission line and its associated construction effects are unknown, the draft EIS can not determine if the species or its critical habitat would be affected. It recommends conducting protocol level surveys, in coordination with FWS, for suitable habitat along the transmission line corridor once an exact route is established. The Center for Biological Diversity cites the goals of the recovery plan for this species, which calls for the protection and management of as much as possible of the remaining undeveloped suitable and restorable habitat that is part of the known and historic population distributions and states that the project would impede recovery. Linda and Martin Ridenour ask if the University of California at Riverside, as the leading experts on the Quino checkerspot butterfly, was asked to respond to the data filed by the co-applicants. The Ridenours states that more information is needed on the potential effects of the project on this species.

Response: CDFG misunderstood our conclusions regarding the Quino checkerspot butterfly. As discussed in sections 3.3.5.2, 5.2.7 and 5.6.4, we found that project construction would adversely affect this species as a result of direct and indirect effects on habitat. We did not request expert review of the co-applicants' survey results because we based our conclusions on the project's impact on habitat for this species, rather than its impact on individual butterflies. We anticipate that FWS would determine whether project construction would impede recovery, or whether conservation measures (such as establishing and maintaining preferred plant species in areas where soils are disturbed as a result of construction) would provide adequate mitigation for project impacts.

Comment 160: CDFG does not agree with the finding that "no critical habitat for this species [arroyo toad (*Bufo californicus*)] will be affected." The potential discharge of sediment associated with the construction of the reservoir, permanent reduction in water quality to the creek, as well as the introduction of non-native species that prey on arroyo toad would have an effect on the species and its critical habitat. CDFG states that the EIS needs to address these effects and recommends consultation with FWS. Linda and Martin Ridenour also comment on the inadequate study of the arroyo toad habitat and request that USFS conduct its own study.

Response: To our knowledge, the most current designation of critical habitat (70 FR 70, April 13, 2005) does not include any lands within the San Juan or San Mateo creek watersheds. We did not conduct in-depth analysis of any resources in San Juan Creek, because the risk of a dam failure is very low. However, as indicated in section 3.3.4.2, implementation of a sediment and erosion control plan during construction would be important in maintaining downstream water quality, which would protect essential habitat for the arroyo toad. We have added text to indicate that implementation of Interior's recommended drainage monitoring and remediation plan would also benefit habitat for the arroyo toad in San Juan Creek. To our knowledge, no arroyo toads have been observed at Decker Canyon.

Comment 161: The Center for Biological Diversity and Linda and Martin Ridenour comment that the draft EIS does not address the potentially significant impact to the declining populations of the coastal California gnatcatcher.

Response: Section 3.3.5.2 provides estimates of the amount of suitable habitat that would be removed under either of the project alternatives, and section 5.6.4 concludes the project is likely to adversely affect this species and adversely affect critical habitat. Section 3.3.5.3, though brief, points out that the project would contribute to cumulative adverse effects on this species. In light of the significance of this impact, we are recommending that the co-applicants consult with FWS regarding protection, mitigation and enhancement measures as project designs are being developed. Because the coastal California gnatcatcher is so closely linked to coastal sage scrub habitat at lower elevations, loss of chaparral and oak woodlands at the Decker Canyon site should not affect this species.

Comment 162: Linda and Martin Ridenour comment that MBA did an inadequate job by ignoring areas where the California red-legged frog is located. They ask for information on the dates of the surveys conducted by MBA for the Southwestern willow flycatcher, noting that table 16 in the draft EIS only tells the reader the number of visits but not the dates of the surveys. They also comment that they did not read any information in the draft EIS about potential effects of helicopter use during construction on this species and recommend that helicopters not be allowed during the breeding and nesting seasons.

Response: Red-legged frog surveys were conducted only in areas that might provide habitat for this species; we are not aware that MBA overlooked any areas that should have been surveyed. The completed survey reports for each species for each year of survey are available to the public on eLibrary (www.ferc.gov) using the "eLibrary" link. For assistance, contact FERC Online Support at FERCOnlineSupport@ferc.gov or toll-free at (866) 208-3676, or for TTY, (202) 502-8659. The description given in section 3.3.5.1 regarding the location of critical habitat is meant only to indicate that it is not immediately adjacent to the project, and that no project features would be constructed within it. We anticipate that the need for timing restrictions would be addressed through consultation with USFS, FWS and CDFG on final designs.

Comment 163: Linda and Martin Ridenour ask how many pairs of Least Bell's vireos were found during the surveys and ask that USFS conduct its own study of this species in the project:

Response: As indicated in section 3.3.5.2, MBA did not observe any least Bell's vireos during its surveys.

Comment 164: The Center for Biological Diversity states that the draft EIS does not address the 50 acres of Stephens' kangaroo rat habitat that would be eliminated but not mitigated outside of the Stephens' Kangaroo Rat HCP area. It again states that the draft EIS cannot analyze effects to any species without population or locational data.

Response: We have added text to section 3.3.5.2 to clarify anticipated project effects on the Stephens' kangaroo rat. Based on information in the Multi-Species HCP, there are no reliable data on Stephens' kangaroo rat populations in the vicinity. CDFG's recent report on special status species indicates the Stephens' kangaroo rat's status is unknown.

Comment 165: The Center for Biological Diversity states that the draft EIS is wholly deficient in its analysis of the proposed project's impact on listed species because it fails to provide population and abundance data either on the project site or region.

Response: We have added information, where available, about populations in the region; however, MBA's surveys did not reveal the presence of any federally listed wildlife species in the project area.

Comment 166: The Center for Biological Diversity comments that the draft EIS needs to disclose what actions would be taken if new populations of listed species are identified and what remedial actions would be taken to prevent or minimize loss of fish or wildlife. It also states that Interior's recommendation no. 2 is not properly described in section 5 of the draft EIS.

Response: We have added text in section 5.2.7 to clarify that the staff alternative includes provisions for implementation of protective measures, if monitoring indicates they are needed. This approach is consistent with the USFS revised preliminary 4(e) condition no. 38 (see appendix C for full text). We have included all the information Interior provided about its 10(a) recommendation no. 2 and Interior did not take issue with our characterization of its recommendations in its letter commenting on the draft EIS.

Comment 167: Pacific Clay states that the cumulative effects analysis in the draft EIS for federally listed species is inadequate because it does not define the range in southern California for each relevant species, fails to identify past, present, and reasonably foreseeable future actions that might affect each species in its range, fails to identify the project's incremental effect to each species when evaluated in conjunction with the related actions, and fails to evaluate the risks of adverse cumulative affects to each species.

Response: We respectfully disagree and note that we did address cumulative affects to the listed species in the draft EIS. However, in the final EIS we now provide information on the cumulative effects to listed species on a species-by-species basis.

RECREATIONAL RESOURCES

Comment 168: The city of Lake Elsinore and Peter Dawson state that any construction-related drawdown of Lake Elsinore below 1,240 feet msl would have substantial negative affects on recreational use because the Seaport Boat Launch facility and the inlet channel "event" concession are not functional below that elevation. They state that any drawdown below that elevation should be prohibited or a mitigation plan should be developed to mitigate for the effects. John Pecora is concerned the fluctuating water levels of Lake Elsinore would prohibit the launch of his boat from its present storage location. Empire Pre-Cast is concerned that the shoreline would be useless when water elevations are down. Peter Dawson comments that the PRINCESS, a 94 foot paddlewheeler currently being refurbished, would not be able to operate at an elevation below 1,240 feet msl. The Santa Ana Water Board, the State Water Board, and Pacific Clay state that the draft EIS did not address the effects on recreational boating from the project-caused shoreline fluctuations and requests that the final EIS discuss this issue.

Response: The construction and operation of the proposed project would not draw down Lake Elsinore below the minimum target elevation of 1,240 feet msl. The co-applicants propose to perform all in-lake construction, including the intake/outlet structure, behind a cofferdam and would not drawdown the lake below 1,240 feet msl. The project would operate between 1,240 and 1,247 feet msl consistent with the Lake Level Stabilization and Enhancement Project, and would not be able to operate if water levels fell below 1,240 feet msl. We conclude in section 3.3.6.2 of the EIS that because the project would not operate below 1, 240 feet msl, project-related fluctuation in water elevations would not adversely affect existing recreational boating facilities at Lake Elsinore.

Comment 169: The city of Lake Elsinore states that the estimated 6 acres or 0.5 percent loss of Lake Elsinore's surface acreage from the construction of the tailrace tunnels **is** a mischaracterization of the true negative effect on the boating traffic pattern. The City estimates that approximately 20 percent of the lake would be affected and a detailed assessment and mitigation plan for the loss of recreational use by the proposed navigational restrictions should be performed to determine the affect of boating capacity and traffic pattern.

Response: We respectfully disagree. We calculated 6 acres by multiplying two-thirds of the length of the tailrace tunnel (the length that would be in Lake Elsinore and thus would affect boating) by 200 feet and converting to acres.

Comment 170: To assist the city of Lake Elsinore in carrying out its mandatory police powers on Lake Elsinore, the city recommends the co-applicants develop and fund implementation of a Boating Traffic Plan prior to construction to ensure public safety. The city recommends that it review and approve the plan prior to implementation.

Response: To protect public safety during construction, the co-applicants propose detailed site plans that identify contingencies for restricting public access to certain areas, such as near construction activities in the lower reservoir including boating. Therefore, we do not see the need for a separate boating traffic plan.

Comment 171: The city of Lake Elsinore recommends the co-applicants be required to perform an aquatic safety study to consider the public safety element on Lake Elsinore from operations of the project.

Response: If licensed, the licensee would be required by the Commission's regulations to prepare a public safety plan that would detail the location of safety signage and buoys and any other safety measures designed to protect the public using Lake Elsinore or other project facilities.

Comment 172: The city of Lake Elsinore recommends that the co-applicants provide annual employee orientation on the projects to all city employees, local law enforcement, fire department staff, and commercial boating facilities on the lake.

Response: The co-applicants, as one of their environmental measures, propose to provide tours of the generating facilities. As needed, local public safety agency personnel could tour facilities and ask questions about public safety obligations.

Comment 173: Linda and Martin Ridenour disagree that the fish stocking program would improve angling and state that anglers would have to wade out 95 feet (during drawdowns) to be able cast. As mitigation, they recommend a walkway with a non-slip surface, preferably located at Perret Park, wide enough for 10 anglers and their gear.

Response: The fish stocking program would not only improve angling from the shore but also from the water as angling occurs from both the shore and on the water. Before the implementation of the Lake Level Stabilization and Enhancement Project, changes in lake level elevations resulted in fluctuations of more than 95 feet. The proposed project supports the Lake Level Stabilization and Enhancement Project, would reduce overall effects to fishermen who wade out into Lake Elsinore as lake levels would be higher than, and fluctuate within a narrower range than historical levels. Therefore we do not find that the provision of a walkway for fisherman is warranted.

Comment 174: Riverside County recommends the co-applicants develop and fund the operation and maintenance costs for a 30-acre sports park to meet local recreation needs.

Response: Based on comments received on the draft EIS, the co-applicants now propose to provide a developed turn-key park facility, which could include sports fields, at the proposed powerhouse construction lay down locations to either the city of Lake Elsinore or Riverside County. The co-applicants propose to retain ownership and responsibility for O&M activities subject to a determination whether such ownership and operation would be authorized under the Elsinore Valley MWD's existing special district authority for developments not in public ownership and not located on National Forest System lands.

Comment 175: Riverside County states that the co-applicants should be required to secure, renovate, and fund a lakeside park facility on 10 to 15 acres on Grand Avenue, on the Naval Academy site if available.

Response: We have analyzed the potential effects of the proposed project on recreational opportunities in the project vicinity and conclude that the co-applicants proposed recreational facilities at the Santa Rosa powerhouse construction lay-down area would provide a new recreational experience. There is no evidence that the existing public access to Lake Elsinore is inadequate and therefore we do not include an additional lake side park facility in the staff alternative.

Comment 176: Jay Scott and other individuals protest the finding in the draft EIS that development of a formal landing site at Ortega Oaks would benefit hang gliders as there would still be interference from transmission lines, substations, fencing, and other structures that would cause air disturbance of normal wind conditions.

Response: The revised co-applicants' proposal and staff alternative transmission alignment to place the transmission lines underground in the vicinity of the launch sites and from the north/south transmission line to the Santa Rosa powerhouse and not the Ortega Oaks powerhouse site would be greatly reduce interference with hang gliding activities over the alignments included in the draft EIS. We have revised the text in section 3.3.6 *Recreational Resources* of the EIS relative to the co-applicants' proposal. While we agree that a formal landing site at Ortega Oak would benefit hang gliders, we no longer include this measure in the staff alternative because we now include the Santa Rosa powerhouse location.

Comment 177: Nevada Hydro comments that the co-applicants' initial assessment of impacts on the existing Morgan Trail was based on plotting the trail on USGS topographic maps. USFS subsequently provided the co-applicants with additional information identifying the as-built routing of the trail, which differed considerably from the initial presentation. Based on the updated information, the co-applicants agree that the proposed Morrell Canyon upper reservoir would necessitate both the temporary closure and permanent re-routing of a portion of the trail should the Morrell Canyon site be selected.

Response: We have clarified the text in the final EIS to disclose that the proposed Morrell Canyon reservoir would require the relocation of the Morgan Trail.

Comment 178: The Center for Biological Diversity comments that the draft EIS should not characterize the Morgan trail use as "low" in the absence of any user studies. It also points out that the map showing trail seems to follow an old ridge route rather than the current trail, which rapidly descends into the riparian oak woodland of upper Morrell Canyon. David Voss questions the use of USFS staff observations of the number of vehicles parked at the trailhead as a basis for determining usage of Morgan Trail. He comments that users typically carpool and that just counting vehicles underestimates the usage. Linda and Martin Ridenour also disagree with the use characterization of Morgan Trail in the draft EIS and question the lack of information on the effects of the proposed project on the other three trailheads within the Cleveland National Forest. They disagree with statement in the draft EIS that there are no developed recreational sites in Decker Canyon and ask the USFS to respond that there is a trail system located there.

Response: We agree that in the absence of user studies the exact level of use is unattainable; however, we have based our characterization of use on communications with USFS staff who are responsible for managing the resource. The presence of 2 to 3 vehicles on a peak use weekend, even if full of passengers, would comprise only 15 hikers and represent 20 percent of the parking lots capacity. Non-peak weekends and weekdays would receive even less use, supporting our characterization as "low," especially when the forest received more than 31,000 visits to the wilderness alone. We have modified the map to show the current location of Morgan Trail, which is consistent with the effects analysis. As for Decker Canyon, there are no system trails maintained by the Cleveland National Forest in Decker Canyon.

Comment 179: Pacific Clay and Linda and Martin Ridenour criticize the recreational resource analysis because it understates the effects of the project on trail destruction, public access to the Cleveland National Forest, disturbance of developed recreation sites, inconsistency with the USFS Land Management Plan's designations, and inadequate figures.

Response: We respectfully disagree. The draft EIS discloses the effects of the proposed project on existing trails, recreational use in the Cleveland National Forest, and affects on existing developed recreational facilities in section 3.3.6.2, and disclose inconsistencies with the Cleveland National Forest Land Management Plan in section 3.3.7.2. We have clarified the text in section 3.3.6.2 of the final EIS that construction of the Morrell Canyon Reservoir alternative would require the relocation of portions the Morgan Trail. Also, placing the transmission line underground in the vicinity of the hang gliding launch sites would affect use of the Morgan Trailhead for about a year during the construction of the transmission line. Access to the Cleveland National Forest in the general vicinity of construction would not be precluded; however, the recreational experience along forest access routes near proposed project facilities (reservoir, transmission lines, support towers) would be adversely affected.

Comment 180: Linda and Martin Ridenour comment that if an upper reservoir were built then it should be open to the public as a water resource and should not be enclosed behind a chain link fence. In addition, they state that a day-use recreation facility should be located at the upper reservoir site as mitigation for losing use of Decker Canyon.

Response: We conclude that the co-applicants' proposal to fence the upper reservoir is reasonable given that the surface elevation of the upper reservoir would fluctuate over 50 vertical feet during the day. Instead, the co-applicants propose to develop a recreation facility either at the upper reservoir construction laydown area or at an alternative location as may be approved by the USFS.

Comment 181: The County of Orange requests the co-applicants work with the Cleveland National Forest staff to ensure that the Main Divide Road is kept open during project construction and restored to its original condition, or better, as part of project completion.

Response: Construction of the proposed upper reservoir and buried transmission line would require work to be performed in close proximity to South Main Divide Road and rely on the road network to deliver construction related equipment and materials. Because homeowners who live in the area also rely on the road, it would be open for the duration of project construction. The co-applicants propose to prepare a traffic management plan that would include controls to traffic flow in and around project construction. The co-applicants also propose to maintain or rehabilitate the road to pre-project construction conditions. Furthermore, USFS preliminary 4(e) condition no. 13 specifies that the co-applicants provide a "safety during project construction plan" to identify potential hazards near public roads, trails, and recreational facilities, and measures necessary to protect public safety. Implementation of this measure should address the County of Orange's concerns.

Comment 182: Nevada Hydro states that the draft EIS mischaracterizes the nature of Lion Spring by describing that feature as a "cluster of natural springs" (on page 3-33). Further, Nevada Hydro is unaware of the existence of "Lion Spring Trail." Finally, Nevada Hydro questions the statement "this type of setting is not abundant in the general area" on page 3-202 when there are 35,330 acres of oak woodlands with the Multi-Species HCP study area and three large clusters in the Cleveland National Forest from the Santa Ana Mountains near Glen Ivy south toward San Mateo Canyon (Riverside County, 2003, page IIC-94).

Response: In section 3.3.6.2 of the draft EIS we describe Lion Spring as a location where a complex of seeps rise through subsurface fractures on the east side of Morrell Canyon, consistent with the description in MBA 2006. We revised the description in the water quality section of the final EIS to be consistent. We agree that there is no Lion Spring Trail and have revised the text in section 3.3.6.2 to refer to Morgan Trail. The 35,330 acres of oak woodlands within the Plan Area account for less than 3 percent of the existing vegetative cover, a fact that supports our description of the oak woodlands as "not abundant." More importantly, coast live oak woodlands, such as those that occur at Morrell and Decker canyons, account for only 6,660 acres of the Plan Area, or 0.5 percent of the existing vegetative cover.

Comment 183: Elsinore Hang Gliding Association comments that there are no specific measures for dispersed recreation. The project as proposed by the co-applicants could affect dispersed recreational use at the wilderness area, hang gliding launch sites, Morgan Trail, powerhouse site, and hang gliding flight paths and landing areas.

Response: We analyzed the potential effects of the proposed project on dispersed recreation in section 3.3.6.2 of the EIS and conclude that there would be a temporary disruption to use of the Morgan Trail and hang gliding for about one year during construction of the project. The staff alternative includes reasonable measures to ensure the safe public use of existing the dispersed recreational opportunities in Cleveland National Forest during the construction of the upper reservoir and placement of the transmission towers.

Comment 184: Nevada Hydro comments that none of the studies conducted by the co-applicants have identified or suggested the potential likelihood of any micro-meteorological impacts on air currents or thermals associated with the construction of the upper reservoir and, therefore, disagree with the statement on page 3-202 of the draft EIS that the construction of a reservoir in Morrell Canyon would eliminate a series (over 3) of known house thermals along the ridge to the southwest of Morrell Canyon.

Response: We agree that the construction of a reservoir with a 100 acre surface area would not affect air currents in the project area. However, the footprint of the upper reservoir in Morrell Canyon covers the originating location of several house thermals and therefore would eliminate them as known locations of thermals.

Comment 185: Jay Scott and other individuals state the draft EIS is incorrect in reporting that hang gliders launch from nine various points along South Main Divide Road in the vicinity of the proposed Morrell Canyon upper reservoir site and indicate that they know of only two authorized launch sites (Edwards and E) in the Cleveland National Forest.

Response: We have modified the text in the final EIS accordingly.

Comment 186: Jay Scott and other individuals state that the staff transmission alignment would be hazardous to hang glider pilots because of the close proximity of the switch yard and buildings to the landing area. They state that placing the power lines underground or placing the overhead lines at least one mile from the two authorized launch sites and the landing area would put hang gliders at an acceptable risk that would most likely not result in loss of life. They also comment the current reference to parasailing should be changed to paragliding as parasailing occurs on waterbodies.

Response: We have reconsidered the transmission alignment and now include a staff alternative transmission alignment in the final EIS that places the transmission lines underground in the vicinity of the hang gliding launch. We also now include the Santa Rosa powerhouse location in the staff alternative which eliminates the construction of an above ground substation and transmission lines in the vicinity of the landing area at Ortega Oaks. Under both the co-applicants' proposed and staff alternative transmission alignments, there would no longer be any above ground transmission lines between the launch areas and the landing site at Ortega Oaks. We have deleted references to parasailing in the final EIS.

Comment 187: Francis Hoffman, on behalf of the Elsinore Testing of Experimental Aircraft Mechanism, states that the comment on page 3-184 of the draft EIS that successful launches occur about 75 percent of the time is inaccurate and further suggests that the USFS should be collecting statistics on hang gliding activities in the Cleveland National Forest.

Response: We discussed hang gliding use in general with Mr. Charles Mackin of Infrastructure Solutions, a local business that services the hang gliding industry. He indicated that about 75 percent of the pilots taking off at the launch sites travel east and then west and find thermals that support them. Mr. Mackin indicated on a typical day with 50 pilots launching from the E site 10 may head cross country, 25 would find sufficient thermals and stay above the mountains for a number of hours and land at the landing zone while others, unsuccessful in finding adequate thermals would 'sled' to the landing site. He indicated that these were estimates based on his knowledge of practice in the area.

Comment 188: Bret Daniel, Rancho Capistrano Property Owners Association, and other individuals comment that the hang gliding safety mitigation measures proposed in the draft EIS are "vastly inadequate." In particular they are concerned that adding power lines either in front or behind the South Main Divide Road will create a major hazard for recreational flight in this area. They also comment that this area is a destination for pilots from all over the world and the project will compromise not only his safety but the safety of other local pilots. Francis Hoffman, on behalf of the Elsinore Testing of Experimental Aircraft Mechanism, and Pacific Clay state that the mid-slope alignment will cause an unacceptable risk of death to hang gliders. Jay Scott and other individuals request that the Commission prohibit new overhead power lines within one mile of the two authorized hang glider launches (Edwards and E) located in the Cleveland National Forest or within one mile of the landing zone located on parcel 386120029 in Riverside County. In support of this request, they cite the draft EIS for the Agua Fria National Monument/Bradshaw-Harquahala Planning Areas issued by National Park Service that includes an alternative to prohibit new overhead power lines, phone lines, or communication facilities within one mile of launching and landing zones in the general project area that hang gliding commonly takes place. The city of Lake Elsinore also states its concern for hang-glider safety with the staff alternative transmission alignment and request than an underground transmission line in certain locations be evaluated.

Response: We have reconsidered the transmission alignment and now include a staff alternative transmission alignment in the final EIS that places the transmission lines underground in the vicinity of the hang gliding launch sites. We also now include the Santa Rosa powerhouse location in the staff alternative which eliminates the construction of an above ground substation and transmission lines in the vicinity of the landing area at Ortega Oaks. Under both the co-applicants' proposed and staff alternative transmission alignments, there were no longer be any above ground transmission lines between the launch areas and the landing site at Ortega Oaks.

Comment 189: Riverside County states that the final EIS should describe the types of improvements that would occur at the top or bottom of the hill to meet the needs of hang gliders.

Response: Both the co-applicants proposed and staff alternative transmission alignments would bury the line in the vicinity of the USFS permitted hang gliding launch sites and significantly reduce conflicts with hang gliding activities. The staff alternative no longer includes a powerhouse and substation at the Ortega Oaks sites and eliminates conflicts with the existing informal landing site at Ortega Oaks. The staff alternative does not include any other measures to enhance hang gliding activities.

Comment 190: Lake Elsinore Soaring Club indicates the placement of transmission lines and towers anywhere along the crest or northeast facing slop of the Ortega Mountains between Clinton-Keith Road and Santiago Peak would make gliding (different than hang gliding in that pilots are in an enclosed, lightweight, powerless aircraft) much more dangerous and even deadly. It recommends the relocation of the transmission lines to the southwest side of the Ortega Mountains.

Response: According to the Soaring Club, the sport of gliding uses the lift winds rushing into the east side of the mountains near Lake Elsinore as hang gliders rush up and over the mountains, analogous to pelicans flying along ocean waves, typically flying near the ridgeline. Based on comments received on the draft EIS, we reconsidered the transmission alignment and now include a staff alternative transmission alignment in the final EIS that places the transmission lines further west away from the crest or northeast facing slope of the Ortega Mountains and also includes an underground portion in the vicinity of the hang gliding launch and landing sites.

LAND USE AND AESTHETICS RESOURCES

Comment 191: Riverside County states that the lack of specificity in the draft EIS makes it impossible to determine what effects would result from the daily lowering of the surface level of Lake Elsinore. It states a more detailed study of the lake shore and properties that adjoin it is needed to ensure that property values, land uses, and access points are protected. The city of Lake Elsinore states that the co-applicants should be required to acquire undeveloped shoreline property that lies below 1,263.3 feet msl to reduce effects on private property owners and then should be used for development of public recreation and environmental habitat preservation.

Response: As described on pages 3-50 through 3-56 of the draft EIS, project operations would reduce seasonal lake level fluctuations compared to the natural pattern and would maintain the lake level between 1,240 and 1,249 feet msl (revised in the final EIS to 1,240 to 1,247 feet msl). However, project operations would introduce a daily fluctuation that does not currently occur. This would be similar to beach property where the tide goes in and out over the course of a day resulting in shoreline migration from 8 feet to over 100 feet. Because this daily and weekly shift in shoreline would be less than the shoreline migration experienced during dry years, we do not see the need to do a more detailed study of the potential effects on lake shore properties, nor do we see the need for the co-applicants to acquire this undeveloped shoreline property. The lake is already managed by other parties to the 1,263 elevation.

Comment 192: Riverside County comments that a major portion of the proposed project is located within the Riverside County Flood Control and Water Conservation District's (Flood Control District's) preliminary Lakeland Village Master Drainage Plan (MDP) boundary and the proposed alignment for the powerhouse and the inlet/outlet structure may be in potential conflict with one of its proposed facilities. Although the powerhouse is likely to be constructed underground and therefore, would most likely not affect the facility, the issue of right-of-way and easement for future operation and maintenance of the MDP facility needs to be addressed in the draft EIS. Additionally, it states that the intake/outlet structure may be in potential conflict with one of its proposed drainage facility outlets downstream of the intersection of Grand Avenue and Adelfa Street into Lake Elsinore. Riverside County states that the draft EIS should address potential effects on the proposed MDP facilities in the project area.

Response: We have revised the text of section 3.3.7.2, *Environmental Consequences, Effects of Construction and Operation on Infrastructure*, to include the information about the MDP provided by Riverside County and conclude that consultation with the Flood Control District would address both existing and proposed Flood Control District facilities.

Comment 193: Riverside County states that the project would have a cumulative adverse effect on the Fire Department's ability to provide an acceptable level of service. They recommend the following mitigation measures: (1) participate in the Fire Protection Impact Mitigation Program; (2) prepare a traffic management plan to be reviewed by the County Fire Department; (3) all buildings located in Riverside County would be required to have an approved access and be constructed in accordance with Riverside County Ordinance Nos. 460 and/or 787, subject to review and approval by the Riverside County Fire Department; (4) all water mains and fire hydrants providing fire flows should be constructed in accordance with the appropriate sections of the Riverside County ordinance and be subject to review and approval by the Riverside County Fire Department; (5) any buildings constructed within the "Hazardous Fire Area" of Riverside County should comply with the special construction provisions contained in Riverside County Ordinance 787 and subject to approval by the Riverside County Fire

Department; and, (6) prior to approval of any development plan for lands adjacent to open space areas, a fire protection/vegetation management (fuel modification) plan should be submitted to the Riverside County Fire Department for review and approval.

Response: As discussed on page 5-37 of the draft EIS, the staff recommends that the co-applicants prepare and file a road and traffic management plan for non USFS roads. This plan would be developed in consultation with Riverside County and the city of Lake Elsinore. The co-applicants have indicated that they will comply will all applicable local and county ordinance during the construction and operation of the project.

Comment 194: The Lake Elsinore Unified School District and Pacific Clay indicate that the draft EIS does not discuss the potential effects of project construction on the Butterfield Elementary School on Grand Avenue. According to the Lake Elsinore Unified School District, the school would be inoperable for several years under the co-applicants' proposal because of construction activities and the resulting noise levels directly adjacent to the school. Additionally, Lake Elsinore Unified School District states that the electromagnetic fields (EMFs) resulting from the powerhouse and transmission lines may be too large a risk to the students and teachers, which would require permanently closing the school and building a costly new school in an another location. The Lake Elsinore Unified School District would like to see these effects evaluated in the final EIS along with appropriate mitigation measures.

Response: The effects analysis on page 3-305 of the draft EIS, *Effects of Construction on Noise,* discloses the proximity of the Butterfield School to the proposed Santa Rosa powerhouse site and evaluates the worst case scenario for noise levels, concluding that because the majority of the loudest work would occur underground, noise effects would be less than significant and would be within the Riverside County and city of Lake Elsinore's regulations. The effects of operation on EMF is discussed on page 3-250 of the draft EIS, and concludes that there would be no adverse EMF effects at the school. Furthermore, based on comments received on the draft EIS, we have evaluated the scenario of placing the transmission lines underground, thereby diminishing the EMF concerns raised by the District and by Pacific Clay.

Comment 195: Anna Lee states that construction of a powerhouse at the Evergreen Site would lower the value of her retirement properties on Evergreen Street (primary residence) and Garner Road (income property).

Response: Given that the majority of the powerhouse would be underground and that the property would be landscaped into a park-like setting, we conclude that the powerhouse would not be likely to adversely affect nearby property values except perhaps temporarily, during construction. The co-applicants' proposed acquisition of properties nearest the powerhouse site would help reduce the effects of construction on those living closest to the site. The aboveground substation could adversely affect nearby property values, as described on page 3-269 of the draft EIS.

Comment 196: The Lakeland Village/Wildomar Redevelopment Project Area Committee comments that both the proposed and staff alternatives would place a hydroelectric plant adjacent to the redevelopment project area. It states that the draft EIS does not mention the redevelopment project area or address how construction and operation of the proposed project would affect its mission of redevelopment. It expresses concern about traffic during construction on Grand Avenue, the condition of pavement and shoreline staging areas after construction, fluctuating water levels on the appeal of Perret Park, the effect on property values, and the potential for inundation of its project area should there be a dam break at the upper reservoir. It sees no acceptable mitigation relative to these concerns. Linda and Martin Ridenour also request information on the effects of project-induced fluctuation on the use of Perret Park.

Response: Construction and operation of the project would affect the redevelopment area in the same way that it would affect the land uses and property owners, which we discuss in the draft EIS on pages 3-227 through 3-233 and pages 3-268 through 3-273. We discuss effects on traffic and pavement on pages 3-251 through 3-259 of the draft EIS, and discuss the risks associated with a dam break on pages 3-29 through 3-33. With respect to effects on property values, the fact that the majority of the powerhouse would be underground and that the property would be landscaped into a park-like setting leads us to conclude that the facility would not be likely to adversely affect the redevelopment project area or property values except perhaps temporarily, during construction. The aboveground substation could adversely affect nearby property values, as described on page 3-269 of the draft EIS.

Perret Park is a county-owned park along the southwestern shore of Lake Elsinore in Lakeland Village. Riverside County closed the park in 1999, but has since reopened the park with renovations. We are not aware of any renovations that included the development of beaches at the park. As such, we maintain that the only developed recreational facilities on Lake Elsinore that would potentially be directly affected by project operations would be boat docks, as stated on page 3-198 of the draft EIS.

Comment 197: Linda and Martin Ridenour state that figure 17 in the draft EIS shows their home within the Cleveland National Forest boundary, and they request clarification of this information. They also state that figure 18 is inadequate because it does not show adjacent properties. They state that residents need to know the location of their properties relative to the proposed project facilities including the construction lay-down areas and the water flow pipes.

Response: Figure 18 shows the jurisdictional boundary of the Cleveland National Forest, as shown on official USFS maps (USFS, 1994). However, the USFS does not have jurisdiction over private lands (in-holdings) within the boundary. The Commission issued a public notice describing the revised co-applicants' proposed transmission alignment and the revised staff alternative transmission alignment to all affected property owners (within 0.25 mile) on October 3, 2006. This notice included the identifying numbers of all parcels located within 0.25 mile of both transmission alignments and the proposed Santa Rosa powerhouse location such that property owners could determine if their lands would be affected by the proposed project. The Commission afforded affected property owners an opportunity to submit additional comments at that time, and this final EIS reflects our assessment of the additional comments that were submitted.

Comment 198: Edwin Thorell questions whether the reference to Canadian studies on the effects of transmission lines on property value is relevant to California and suggests that the USFS should engage in land swaps with displaced landowners to provide the landowners with property in the same rural condition of their current land.

Response: The effect of any project on property values is a function of the particular circumstances of the project, the affected properties, and the real estate market at large. However, potential effects can be estimated based on the experiences of similar projects. In that respect, the Canadian studies are just as relevant as other studies, which together suggest that transmission line effects on property values are not as significant as property owners generally expect. Any landowners whose land would be used for project facilities would be compensated by the co-applicants for their land.

Comment 199: Pacific Clay states that the staff alternative transmission alignment would run directly through its multi-million dollar brick making kilns and brick storage facilities, which would affect and likely destroy the entire manufacturing area. Pacific Clay states that it is being asked to bear a disproportionate economic burden because it, along with affiliated companies, has large-scale commercial and residential development plans that would be affected either directly or indirectly by the route of the transmission line. It estimates the potential economic damage to itself would be in excess of

$150,000,000. It further states that the two northerly proposed alignments would result in a more equal distribution of the economic damage, and it would not consent to the use of or voluntarily convey any of its property holdings for the advancement of the proposed project. Nevada Hydro comments that placement of towers on Pacific Clay property could be problematic since mining operations create a changing landscape that would prevent the placement of towers within the actively mined area. Nevada Hydro notes that the resources present at Pacific Clay are designated as a mineral resource zone and are of regional and statewide significance. The city of Lake Elsinore also states that transmission alignment alternative no. 2 presents an unnecessary incursion into a soon to be developed area of Lake Elsinore and would adversely affect this new community while providing few off-setting benefits. It further states that although it generally supports the proposed mid-slope alignment, the northern segment should follow the alignment proposed by the co-applicants to begin at the existing SCE substation to the proposed northern substation and then running along the Cleveland National Forest border.

Response: We have reconsidered the staff alternative transmission alignment and now recommend an alignment that coincides with the co-applicants' proposed alignment in areas outside of the Cleveland National Forest (to the north and to the south of the Forest). Pacific Clay lands and areas in the city of Elsinore targeted for future development would no longer be traversed or be adjacent to the co-applicants' proposed or staff alternative transmission alignment.

Comment 200: Nevada Hydro disagrees with the statement in the draft EIS on page 3-229 that the northern and southern segments of the proposed transmission line are located on undeveloped lands and no homes or buildings would need to be razed or moved to accommodate construction along the proposed transmission alignment. Nevada Hydro states that as proposed the co-applicants' transmission alignment traverses a limited number of forest in-holdings upon which easements or other rights-of-way would be required and that a limited number of existing residences could be displaced. Nevada Hydro also comments that the mid-slope alignment would adversely affect more private property than the co-applicants' proposal.

Response: We have revised the text of section 3.3.7.2, *Environmental Consequences, Effects of Construction on Change of Land Use*, to reflect the fact that some residences could be displaced by the co-applicants' proposal and by the staff alternative transmission alignments, both of which have been modified since the draft EIS was published.

Comment 201: Rancho Capistrano Property Owners Association and Jon R. Johnson note that safety recommendations during fires prohibit people from being within 100 to 500 feet of transmission lines. Because much of the proposed transmission line route would be within 100-500 feet community escape route, it would be safety hazard during brush fires.

Response: Both the proposed and staff alternative transmission alignments now include underground segments that eliminate the conflict between the transmission line routes and the community escape route for Rancho Capistrano residents.

Comment 202: Rancho Capistrano Property Owners Association, Jon R. Johnson, and Andrew and Sandra Mauthe note the proposed and staff alternative transmission lines would interfere with the ability for fire crews to fight fires from the air.

Response: The USFS' number one priority in firefighting is public and firefighter safety. The USFS does not place aircraft, crews, engines or fire fighting equipment in fire areas unless the agency can provide for their utmost safety. Smoke consists of carbon particles, which can conduct electricity. If the concentration of carbon is high enough, an electrical discharge from the line to the ground, similar to lightning, can occur. The discharge hazard increases as line voltage increases, distance to the ground decreases, and the amount of smoke increases. High power transmission lines are just one of several safety considerations that need to be addressed in fire suppression. Based on the history of fire suppression in southern California, the presence of transmission lines would interfere with aerial fire suppression operations. Placing the line underground along South Main Divide Road in the vicinity of the two USFS permitted hang gliding launch sites to a point south of the egress road to Rancho Capistrano and along the connection to the Santa Rosa powerhouse as currently proposed by the co-applicants and recommended by the staff would reduce interference with fire suppression activities in these locations.

Comment 203: The Fernandez Parties, Rancho Capistrano Property Owners Association, La Cresta Property Owners Association, and Lynice Spangler state that the draft EIS does not adequately identify and mitigate for the potential fire hazard created by the transmission lines near their property. La Cresta Property Owners Association recommends if the transmission lines are built, the co-applicants be required to build alternate evacuation routes for residents of the Santa Rosa Plateau communities.

Response: The staff recommended alternative includes several measures that would address your concerns about safe egress from Santa Rosa Plateau communities in areas prone to wildfires. Should the proposed project be licensed, the co-applicants would be required to provide the USFS with a hazardous vegetative fuel treatment plan and the USFS and the city of Lake Elsinore with road and traffic management plans for both USFS and non-USFS roads.

Comment 204: The Fernandez Parties indicate that there is a private airport located on the property directly adjacent and south of their property that would not be usable if the transmission lines were built above ground in that location. They state that the State Aeronautics Act prohibits the building of structures such as transmission lines in the vicinity of an airport and require permits for all other structures that may obstruct air navigation in the vicinity of an airport.

Response: We have revised the text of section 3.3.7.1, *Affected Environment, Land Use Within and Adjacent to the Project Boundary* to correctly describe the airstrip and have revised section 3.3.7.2, *Environmental Consequences, Effects of Construction on Change of Land Use*, to conclude the co-applicants' proposed or staff alternative transmission alignment would be located within 3,000 feet of the private airstrip and could render the private airstrip unusable**.**

Comment 205: Nevada Hydro comments that the draft EIS concludes that the staff alternative transmission alignment, located about 1.5 miles from the Skylark Airport, would not be expected to pose a safety hazard to aircraft operating according to standard flight rules. The draft EIS concludes that the co-applicants have not provided enough detail to assess the effects of their proposed transmission alignment on operations at Skylark Airport. Nevada Hydro states that given that the co-applicants' proposed transmission alignment is located 2 miles from Skylark Airport, it would be reasonable to conclude that the co-applicants' proposed transmission alignment would have less effect than those associated with an alignment that is closer to the airport. It refers Commission staff to the discussion of aircraft safety hazards in section 11 of the final license application. Nevada Hydro also points out that the description of Skylark Airport as a private dirt airstrip on page 3-297 is incorrect.

Response: We have revised the text to clarify that neither the co-applicants' proposal nor the staff alternative transmission alignment would be expected to pose a safety hazard to aircraft operating according to standard flight rules out of Skylark Airport. We have also corrected the text on page 3-297 concerning the airport.

Comment 206: Elsinore Hang Gliding Association (EHGA) comments that the Commission must ensure that the project meets all appropriate comprehensive plans associated with the Land Management Plan Cleveland National Forest Strategy R5-MB-077 September 2005.

Response: As discussed in section 3.3.7.2, *Environmental Consequences,* Consistency with Land Management Plans, in the draft EIS (page 3-235), we state that the staff alternative transmission alignment would not be consistent with the Land Management Plan land use zones and that an amendment would be required before construction of the transmission line could occur.

Comment 207: The Center for Biological Diversity states that the proposed LEAPS Project violates the Cleveland National Forest Land Management Plan by failing to demonstrate why an alternative transmission alignment off the forest would not be entirely reasonable. Further, it states that the draft EIS incorrectly identifies the land use zoning for the proposed Morrell upper reservoir and part of the proposed Decker upper reservoir sites. It points out that these proposed facilities would be located within the Back Country Motorized Use Restricted land use zone and that developed facilities in this zone are suitable only by exception.

Response: We agree that the Morrell Canyon upper reservoir site and portions of the Decker Canyon upper reservoir site are located in the Back Country Motorized Use Restricted land use zone and have revised the text in the final EIS accordingly. The USFS indicates that it could consider utility facilities as a suitable use by exception in this land use zone.

Comment 208: The Center for Biological Diversity comments that the proposed LEAPS Project would not enable the USFS to meet the desired condition for Elsinore Place under the Cleveland National Forest Land Management Plan.

Response: Based on comments on the draft EIS we have included photo simulations to characterize the effects of the proposed project on the aesthetic resources. The EIS does disclose that construction and operation of the proposed project would conflict with the USFS Land Management Plan's Scenic Integrity Objectives, as stated on page 3-242 of the draft EIS. The 2005/2006 revised Cleveland National Forest Land Management may need to be amended to make the project consistent with the plan.

Comment 209: The Natural Resource Defense Council and Pacific Clay state that the project is incompatible with Cleveland National Forest and Lake Elsinore land-use plans and policies, such as the High Scenic Integrity Objectives and the BLM's Visual Resource Management Program. Additionally, the Natural Resource Defense Council states the draft EIS dismisses the possibility that Morrell Canyon could be designated a wilderness area by the USFS and Pacific Clay states that the Visual Resource Management Plan recommended in the draft EIS is inadequate mitigation for the level of effects. Mr. Mosier recommends the final EIS affected environment identify the existing viewsheds pertinent to the LEAPS Project and that the surface of Lake Elsinore should be included as a key observation point due to its panoramic views. Additionally, Mr. Mosier suggests the final EIS include an application of the Scenery Management System to inventory and analyze the scenery values of those lands in the final EIS. Mr. Mosier recommends the Scenery Management System should be applied so as to predict future scenic integrity levels and present photo simulations of the proposed alternatives. Mr. Mosier also claims that a more thorough analysis is needed to support the analysis in the draft EIS related to the mid-slope transmission alignment. Lastly, Mr. Mosier recommends using the title Scenery Conservation Plan to be consistent with USFS policy direction as opposed to Visual Resource Management as proposed by the co-applicants and used in the draft EIS.

Response: In the final EIS, we have included the viewsheds pertinent to the discussion of the aesthetic affected environment and included Lake Elsinore as a key observation point. We have also developed photo simulations of the proposed project alternatives as seen from important viewsheds to enhance the presentation of the existing landscape and the potential effects of the project on the visual resources. The simulations portray the full range of the project's effects on scenery expected within the project area's sensitive public viewsheds. The Scenery Management System (SMS) was used by the USFS to develop the current Scenery Integrity Objective's against which the proposed project is evaluated against. The SMS also provides a nationally consistent method for identifying degrees of scenic integrity effects that may be created by project proposals.

Comment 210: The Center for Biological Diversity comments that the draft EIS is inappropriately silent on the location of Morrell and Decker upper reservoir sites in the Wildhorse Inventoried Roadless Area. It points out that the USFS has agreed not to authorize road construction of the type contemplated by the proposed project until the state's roadless areas' status under the new Roadless Rule (section 1925.04b of the Interim Directive [1920-2006-1]) has been determined.

Response: According to the current Cleveland National Forest Land Management Plan, the areas of the forest where Morrell and Decker reservoirs are proposed is designated as an Inventoried Roadless Area that allows consideration for road construction or reconstruction. However, the USFS is enjoined from implementing the 2005 Roadless Rules. Contrary to the Center for Biological Diversity's comments, the Final Land Management Plan does not specify a Wildhorse Inventoried Roadless Area.

Comment 211: Pacific Clay also states that an amendment would be needed to the Cleveland National Forest Land Management Plan to construct either the co-applicants' proposed or staff's recommended transmission line alignments.

Response: On page 3-239 of the draft EIS, we acknowledge that construction along either the co-applicants' proposed transmission alignment or the staff alternative transmission alignment would require an amendment to the Cleveland National Forest Land Management Plan.

Comment 212: Christopher Willis comments that the proposed project would "destroy the untouched feel and character of the pristine open areas." He is especially concerned about the irreparable damage to the beauty that the current National Forest is mandated to preserve and speaks of the public benefit that extends beyond actual visitors. There is societal benefit to knowing that such unspoiled vistas exist.

Response: The Cleveland National Forest Land Use Plan is the framework designed to provide for a balanced management of forest service resources and values. We recognize the USFS has recently gone through an extensive public planning process to identify and develop policy to be balanced stewards of the forest. The plan recognizes the potential for future development within the forest, designates certain lands as acceptable for various land uses, and sets guidelines for allowable alterations to the landscape. The plan provides for the preservation of certain unspoiled vistas and lands. We believe the EIS discloses the effects of the proposed project on the USFS lands and indicate where it is incompatible with the approved plan. The Cleveland National Forest Land Management Plan may need to be amended to accept the project's inconsistencies while retaining the current plan's desired conditions and outcomes.

Comment 213: EHGA, Jay Scott, and other individuals comment that the EIS should consider the effects on Preservation Visual Quality Objective under the original Visual Management Plan. It states that no above-ground transmission alignments should be placed on the Trabuco Ranger District, Cleveland National Forest.

Response: The EIS evaluates the effects of the proposed project with the most current Cleveland National Forest Land Management Plan, which uses Scenic Integrity Objectives. The "Very High"

Scenic Integrity Objective is essentially the same as, and correlates directly with, the “Preservation” Visual Quality Objective of the original USFS Visual Management System. The Cleveland National Forest Management plan assigns the “Very High” Scenic Integrity Level within the entire San Mateo Wilderness and no other lands near the project area. Since no Project features are proposed within the wilderness, the Very High Scenic Integrity Objective (corresponding to the Preservation Visual Quality Objective) does not apply to this project.

Comment 214: Mr. Mosier suggests that the final EIS be more informative by indicating that the Moderate Scenic Integrity Objective applies to less than 2 to 3 percent of the total length of the proposed transmission line.

Response: The final EIS discloses the approximate length of the proposed transmission lines that would traverse Moderate Scenic Integrity Objective lands.

Comment 215: The Palomar Observatory and the Lakeland Village/Wildomar Redevelopment Project Area Committee state that the draft EIS does not address the issue of outdoor lighting and dark skies and requests that all permanent lighting be fully shielded low-pressure sodium and comply with Riverside County’s lighting ordinance.

Response: The co-applicants state that they would comply with Riverside County's lighting ordinance.

Comment 216: The city of Lake Elsinore and Riverside County state that the visual aids presented in the draft EIS are not adequate to evaluate the visual effects of transmission line placement and a comprehensive simulated visual study should be done. Linda and Martin Ridenour state that visual simulations of the aesthetic effects should be taken from Grand Avenue and should clearly show the locations of the powerhouses so that residents of Lakeland Village can understand the potential effects on their neighborhood.

Response: We have provided visual simulations of the transmission line and the powerhouse in appendix D of the final EIS.

Comment 217: Nevada Hydro comments that in the analysis of effects of project construction of the proposed transmission alignment on aesthetics the draft EIS states that over the term of any license, USFS maintenance crews would maintain a fire break below the lines and these fire breaks also would be apparent as a scar across the native vegetation. Nevada Hydro requests that the USFS identify where fire breaks should be developed and maintained. Alternatively, it requests that if fire breaks are deemed not to be beneficial, the final EIS should state that brush clearance activities should be limited to the extent feasible.

Response: While the co-applicants are not proposing to clear vegetation under the transmission line, the final EIS states that fuel management in the future may require manipulation to reduce the risk of fire. Methods selected for fuel management would depend on site-specific factors (e.g., vegetation type, slope, aspect, access), and could include grazing, prescribed fire, or mechanical means to create and maintain firebreaks. Existing firebreaks that intersect the proposed alignment would also be maintained, as needed. These issues would need to be addressed in the hazardous vegetation fuel treatment plan and the scenery conservation plan as specified by USFS in their revised preliminary 4(e) conditions under any license issued for the project.

Comment 218: The Fernandez Parties, Pacific Clay, Rancho Capistrano Property Owners Association, La Cresta Property Owners Association, and individuals state the draft EIS does not adequately identify the project’s aesthetic and property valuation effects on property owners who purchased land based on the wide open spaces and natural beauty of the region and national forest. The beauty and property values would be diminished with construction of transmission lines and towers. Pacific Clay states that the claim in the draft EIS, on page 3-232, that the effect of the staff alternative transmission line alignment on future development "cannot be determined" is not true because there are standard appraisal methodologies.

Response: In section 3.3.8.2 of the draft EIS, *Environmental Consequences***,** *Effects of Construction and Operation on Property Values and Development* (see pages 3-269 through 3-273), we discuss the potential effects of the project transmission line on property values in great detail, and indicate that various studies have shown transmission line effects on property values ranging from small positive effects to negative effects as high as 53.8 percent. We indicate that most results show a negative impact on property values of 1 to 10 percent. We maintain, however, that despite standard appraisal methods, the precise effect on future development cannot be determined except on a case-by-case basis at this time.

Comment 219: The Fernandez Parties, Pacific Clay, and Lake Elsinore Unified School District state that the draft EIS fails to consider the effects of EMFs associated with the project on residents, rare horses, and students along the transmission route. The Fernandez Parties state that the brief analysis on page 3-248 through 3-251 of the draft EIS is inadequate because the World Health Organization has stated there is "sufficient evidence" to apply a "precautionary principle" to power and electromagnetic fields. The District indicates that state school site selection guidelines limit the placement of schools near high voltage transmission lines. John Pecora is concerned regarding his family's elevated exposure to electromagnetic fields.

Response: We are aware of the World Health Organization's adoption of its precautionary principle, but stand by our analysis of electromagnetic field effects and our conclusion that the project would not have adverse effects on animals or humans in the project area. The transmission line would be far enough away from residences that any potential health effects would be minimized. Additionally, the co-applicants' proposed transmission alignment and staff alternative transmission alignment now contain longer underground segments that would reduce the risk of any potential health effect. We have revised section 3.3.8.2, *Environmental Consequences.*

Comment 220: The city of Lake Elsinore states that it appears that there has been a trade-off of 95 percent of the aquatic mitigation funds proposed by the co-applicants to partially alleviate short-term inconveniences on the Ortega Highway with the recommendation of a measure to excavate an area of Decker Canyon. The city states that this is not a thoughtful use of limited project resources set aside for environmental mitigation and that alternative mitigation measures represent a much more common sense approach to addressing the needs of commuters.

Response: Our determination of the level of funding to address aquatic mitigation has no relationship to the staff recommendation to achieve a balance of excavation to fill at the upper reservoir location. Using fill excavated at the construction would greatly reduce the volume of large truck traffic on portions of Ortega Highway and Grand Avenue during construction.

Comment 221: Rancho Capistrano Property Owners Association and Andrew and Sandra Mauthe comment that they paid for the paving of South Mountain Divide Road, which was designed as a 35 mph road and express concerns about an estimated potential increase of 400,000 cars annually on this road.

Response: We estimated the project related increase in traffic volume on South Main Divide Road to increase to 150 vehicles during the a.m. and p.m. peak travel times, which would still be well below the estimated capacity of 2,100 vehicles and maintain the same level of service. USFS preliminary 4(e) condition no. 26, *Road and Traffic Management Plan*, would address the concerns raised in this comment. We discuss the effects of construction and operations on South Main Divide Road on pages 3-253 through 3-259 of the draft EIS.

Comment 222: Lake Elsinore Unified School District is critical of the traffic analysis in the draft EIS, stating that it did not account for the transportation of imported and excavated soil and arbitrarily divides trip generation numbers among various areas to cover different construction scenarios. It also states that the final EIS should address traffic effects in the event that the 73,750 truck loads of excavated soil cannot be used at the upper reservoir. Robert and Susan Konoske question whether truck trips to import clay have been included, whether truck trips for disposal have been included, and the effects of the construction truck trips on local traffic patterns.

Response: We based our truck trip estimates in the draft EIS on the assumption that traffic volume increases associated with construction activities would increase but not above the threshold that would drop the road's Level of Service. The truck trip estimates are for the number of trips necessary to relocate the excavated soil materials under the co-applicants' proposed construction configuration and the staff alternative. We discuss the assumptions and effects of each, including the import of clay material to line the upper reservoir between pages 3-253 and 3-259 of the draft EIS. We discuss the potential traffic effects associated with the potential transport of excavated material away from the proposed powerhouse site in the first paragraph on page 3-256 of the draft EIS.

Comment 223: Riverside County states that a comprehensive traffic study should be prepared and submitted to the County prior to finalizing the EIS so that the Transportation Department can complete its review of the EIS. Riverside County and Pacific Clay recommend a traffic management plan be developed and approved by the Riverside Country Transportation Department to accommodate truck traffic on county roads such as Grand Avenue. Riverside County also makes numerous recommendations related to road maintenance, traffic flow, light signals, road improvements, and cost sharing responsibilities. These recommendations include road pavement testing be conducted before and after construction and funding should be provided to the Transportation Department to mitigate for project effects that cause pavement deterioration; the co-applicants fund a traffic signal to be located at the adjacent major intersection of Grand Avenue and Ortega Highway; the co-applicants be required to construct truck turnouts, a truck climbing lane, and/or other safety improvements on the affected areas of the Ortega Highway; safety improvements along Grand Avenue, including shoulder widening to accommodate the truck traffic activities; and that the co-applicants contribute on a fair share basis to the Regional Transportation Network by participating in the County's Transportation Uniform Mitigation Fee program. Lake Elsinore Unified School District indicates the traffic hazards from construction traffic would be most severe on Grand Avenue with three schools and no sidewalks, forcing students to travel on the road or dirt shoulder in close proximity to vehicular traffic. Empire Pre-Cast is also concerned about increased truck traffic and safety hazards on Grand Avenue.

Response: The EIS considers the need for traffic control plans which would include among other items schedules for the volume and timing of construction traffic and long term monitoring, reporting, and changes to the plan as necessary. Based on comments received on the draft EIS, the co-applicants road and traffic management plan for non-USFS roads should be developed in consultation with the Riverside County's Transportation Department. Pre-construction monitoring and baseline condition documentation could be developed as part of the plan so as construction related effects could be separated from normal traffic effects. The co-applicants also propose to participate in the development of a traffic signal at the intersection of Grand Avenue and Ortega Highway. Further, the co-applicants also propose several specific measures to improve traffic flow on Grand Avenue and Ortega Highway during construction. The details of involvement, measures, responsibilities, and schedule would be included in the co-applicants' proposed final road and traffic management plan, which would be developed in consultation with local agencies and filed for approval with the Commission. Development of the plan prior to construction would address the concerns of Riverside County and the Lake Elsinore Unified School District.

Comment 224: Pacific Clay, Linda and Martin Ridenour, and Robert and Susan Konoske state that the traffic counts conducted by the co-applicants were deficient since the counts only captured data from 1 day in July.

Response: Our review of California Department of Transportation (Caltran), Traffic Operations Division Traffic and Vehicle Data for Ortega Highway and Grand Avenue indicates that recorded peak hour traffic (2005) data are relatively consistent with the co-applicants' traffic study data validating our use of the study. For example the Caltrans traffic volume estimates the peak hourly traffic on Ortega Highway west of Grand Avenue (between Grand Avenue and the Riverside County line) at 1300 where as the co-applicants peak estimate for Ortega Highway west of Grand Avenue was 1252. In addition, Caltrans peak hourly estimate for Ortega Highway east of Grand Ave (between the intersection with Grand Avenue and Lake Shore Drive) at 1800 vehicles whereas the co-applicants estimated peak hourly traffic volume on Grand Avenue south of Ortega Highway at 1382. Although these two road segments are not the same segment, they do present a reasonable picture of the estimated traffic volumes on Grand Avenue in the vicinity of its intersection with Ortega Highway and in the proposed project area. As such, we feel the Caltrans data supports our use of the co-applicants traffic study. Our review of the co-applicants traffic study also indicated that the 38 trucks per hour (as shown on page 3-254 of the draft EIS) is adequate for the purposes here because this estimate was made for the highest peak hour operation on the most critical street section. Furthermore this construction volume assumes level of service (LOS) "C" is maintained, while LOS "D" would also be generally acceptable. Effects from construction would last 4 years and, with implementation of a road and traffic management plan, traffic scheduling could help alleviate these concerns. In addition we have addressed the scheduling of truck traffic relative to the traffic data on page 3-257 of the draft EIS.

Comment 225: Riverside County comments that the draft EIS states that clay may be imported from the Alberhill area but does not analyze the effects of resulting truck traffic.

Response: Contrary to Riverside County's statement, we analyze the number of truck trips necessary to transport clay for the lining of the upper reservoir on page 3-256 of the draft EIS. We analyze the air and noise pollution generated by such truck traffic in subsequent sections.

Comment 226: Linda and Martin Ridenour state that the 58-acre Ortega Oaks powerhouse would affect park and ride use that currently occurs on that vacant parcel.

Response: According to Riverside County's Transportation Commission, whose Transportation Services department oversees the local park and ride program, the 58-acre parcel at Ortega Oaks is not a formal park and ride facility (website: http://www.rctc.org/transportation/carpool.asp; accessed September 14, 2006). Therefore we do not evaluate the effects of a potential powerhouse at the site on car-pooling.

SOCIOECONOMIC RESOURCES

Comment 227: Francis Hoffman, on behalf of the Elsinore Testing of Experimental Aircraft Mechanism, indicates that the Commission staff is deliberately concealing the appearance, size, noise, and proximity of the facilities from homeowners whose property values might be affected by the proposed project.

Response: The draft EIS provides a detailed description of the proposed project facilities and discloses the potential effects on the aesthetic resources of the project area. In addition, we now have included visual simulations of the appearance of the proposed project facilities in the final EIS.

Comment 228: The city of Lake Elsinore states that the draft EIS only provides a cursory economic analysis of the potential effects of the project and a more detailed analysis is needed.

Response: The city does not indicate in its comments what other economic effects not included in the draft EIS it believes would occur. We stand by our conclusion that the most likely project economic effects would be potential effects on property values, which we discuss in detail.

Comment 229: Riverside County states that the EIS should describe mitigation measures due to effects on displaced persons from the construction of the project. It recommends that the co-applicants work directly with the Department of Public Social Services to develop plans to address this issue, prior to construction.

Response: In the case of the limited properties where residences would be razed, owners would be compensated for their property. With respect to potentially displaced persons who might be in need of social services provided by the county, the co-applicants now propose to provide relocation assistance for persons who might be displaced from rental properties. We have revised the text in section 3.3.7.2, *Environmental Consequences, Change of Land Use,* to address this point.

Comment 230: Riverside County, the Fernandez Parties, and Edwin Thorell inquire as to whether or not eminent domain would be used to acquire properties near the proposed powerhouse. Additionally, they would like to know what other mitigation measures would be proposed to reduce construction-related effects on residents. The Fernandez Parties also state that Elsinore Valley MWD does not have the right of eminent domain, so therefore the draft EIS must identify all project elements and locations that are proposed for private property and discuss alternative locations in instances where use or acquisition of the property is likely.

Response: On pages 3-269 and 3-270 of the draft EIS, we discuss the co-applicants' plans to use eminent domain authority if necessary to acquire needed property.

Comment 231: Linda and Martin Ridenour comment that the section on growth-inducing impacts states that power would be used locally, but Elsinore Valley MWD has stated publicly that the power would not be used locally and that it would go into the grid.

Response: Once power enters the grid, the electricity may be transmitted either locally or elsewhere in the region. However, we have revised the text related to growth-inducing impacts to delete the reference to local power sales.

CULTURAL RESOURCES

Comment 232: Nevada Hydro disagrees that the Area of Potential Effects (APE) includes the shoreline around Lake Elsinore to the upper limit of the zone of daily fluctuations expected from the project as stated on page 3-276 of the draft EIS because the operational range of the project is within the range of natural seasonal variations in the lake.

Response: Inclusion of an area within an APE does not mean that an undertaking would affect any or all cultural resources within that area. An APE is a hypothetical construct intended to establish a geographic framework in which there is reasonable possibility that an undertaking could affect historic properties. We included the Lake Elsinore shoreline in the APE as a starting point for analysis.

Comment 233: Nevada Hydro comments that, contrary to the information on page 3-288 in the draft EIS, no previous study, including the EIR for the Lake Elsinore Stabilization and Enhancement Program and the Corps NEPA documentation for the levee system, did any party, agency, or tribal group identify or assert that Lake Elsinore should be considered eligible for listing in the National Register or that management measures for this property should be developed. It comments that the minimum intrusion into the lake associated with the project and the cycling operation should not predicate the need for a National Register determination. Nevada Hydro agrees with the conclusion in the draft EIS that the proposed project would not likely adversely affect this potential TCP, but disagrees with the statement that there is insufficient information about the TCP to determine whether this aspect of the proposed project (construction of the intake/outlet structure) would alter any characteristics contributing to the importance or cultural value of this resource.

Response: In its March 24, 2005, comments on Nevada Hydro's draft HPMP, the USFS stated (Comment no. 22) that resource 33-11009 (Lake Elsinore) was eligible for inclusion in the National Register and that any measures to mitigate adverse effects to this resource should be developed in consultation with the USFS, Tribes, and the SHPO. The analyses on pages 3-283 and 3-284 have been revised to clarify the discussion regarding effects to Lake Elsinore as a TCP and we continue to conclude that construction of the intake/outlet structure and operation of the project would have no effect on the characteristics contributing to the National Register eligibility of Lake Elsinore as a traditional cultural property**.**

Comment 234: Nevada Hydro disagrees with the statement on page 3-281 that the APEs for the Evergreen powerhouse site, both the proposed and alternative transmission alignments, and the access roads remain to be surveyed. It refers the authors to the performance of cultural resource surveys contained in the draft HPMP.

Response: On page 2-3 of its draft HPMP, Nevada Hydro states that the locations of access roads from existing roads to the transmission line corridors are not yet known, leading us to conclude that no archaeological surveys have been conducted along access roads. The HPMP's description of cultural resources field studies (p. 2-4) does not specify precisely what areas were surveyed either in 1996-97 or in January 2005**.**

Comment 235: John and Soma Stickler raise concerns about the effects of the proposed and alternative transmission line alignments along the Cleveland National Forest in the vicinity of Tenaja would have on archaeological sites. They indicate that transmission line alternative 4 would avoid this area.

Response: The co-applicants' revised and staff alternative alignments now includes alternative 4. For all alignment alternatives, the HPMP, revised and finalized in consultation with the SHPO, Tribes, and the USFS and the Lake Elsinore Historical Society, would provide for processes to determine effects of construction and operation of transmission lines on significant archaeological sites, and to appropriately resolve any adverse effects**.**

Comment 236: Pacific Clay states there is no way to know the potential extent of effects on cultural resources from the staff's recommendations because no cultural resource surveys have been done since project facilities have not been sited.

Response: We recommend that the co-applicants, in consultation with the SHPO, the USFS, Tribes, and the Lake Elsinore Historical Society to conduct any additional surveys necessary to identify cultural resources in proposed locations of project facilities, determine effects of the project on such resources, and to develop and implement measures to resolve any adverse effects prior to any construction activities at those locations**.**

Comment 237: The Pechanga Tribe provides confidential information concerning its history in the project area.

Response: We thank the Tribe for providing this information**.**

Comment 238: The Pechanga Tribe recommends further evaluation, testing and/or avoidance at several archeological sites in the Morrell Canyon area.

Response: The co-applicants' revised and finalized HPMP would contain provisions for consultation with the Tribes regarding measures to resolve any adverse effects to these archaeological sites arising from project construction or operation**.**

Comment 239: The Pechanga Tribe requests applicable agencies consult with the Tribe in person regarding the specific locations and details of the project effects on cultural resources because the Tribe can not disclose specific details in letter.

Response: The co-applicants'' revised and finalized HPMP would contain explicit protocols through which appropriate tribal liaison would coordinate with the co-applicants, the USFS, and Commission staff regarding communication with the Tribes.

Comment 240: The Pechanga Tribe requests assessments be made according to section 106 review process and that the Pechanga Tribe be a consulting party on a government-to-government basis.

Response: The co-applicants' revised and finalized HPMP would contain measures to ensure that evaluation of cultural resources would be accomplished through application of the National Register Criteria for Evaluation and in consultation with the SHPO, the USFS, Tribes, and the Lake Elsinore Historical Society.

Comment 241: The Pechanga Tribe intends to assert its right pursuant to California law with regards to any human remains or items discovered in the course of the project in the Tribe's traditional territory and it requests that all permitting agencies work with the Tribe to draft an agreement that would address this issue. The Pechanga Tribe also requests all Luiseno cultural resources uncovered in the Tribe's traditional territory and not located on federal properties be relinquished to the Tribe for proper treatment

Response: As indicated in its draft HPMP, the co-applicants would follow applicable California law regarding discovery of human remains on state or private land. The co-applicants would also notify USFS of any such discoveries on USFS property; USFS would then be responsible for treatment and disposition under federal law. The draft HPMP also specifies that the co-applicants would consult with the Tribes regarding treatment and disposition of cultural resources of importance to the Tribes that are identified on private or state land**.**

Comment 242: The Pechanga Tribe is concerned no APEs have been set for the project tunnels and believes that the APE for the tunnel portions of the project should be reevaluated in consultation with the Tribe. It further states that wherever the HPMP notes that it would address future decisions regarding APEs or amendments, it should acknowledge that the lead agency would consult with the Tribe as well as the SHPO.

Response: The revised and finalized HPMP would provide for consultation with the Tribes as well as the SHPO and USFS regarding identification or modification of APEs**.**

Comment 243: The Pechanga Tribe states that further archeological surveys will need to be completed to meet the legal requirements for the project. It asks that it be allowed to participate in those surveys and be consulted about field and lab methodologies and how surface collections should proceed. The Pechanga Tribe further requests that culturally appropriate evaluation methods be incorporated into the HPMP and that no public interpretations are created for Native American cultural resources. The Pechanga Tribe also requests that the lead agency or its designated agent allow the Tribe to monitor all grading and ground-disturbing activities in culturally sensitive areas within the Tribe's traditional territories and tribal monitors be present during all archeological testing. It also requests that it be allowed to review and comment on any Native American monitoring plans.
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Response: We recommend that the co-applicants, in consultation with the SHPO, the USFS, Tribes, and the Lake Elsinore Historical Society to conduct any additional surveys necessary to identify cultural resources in proposed locations of project facilities, determine effects of the project on such resources, and to develop and implement measures to resolve any adverse effects prior to any construction activities at those locations**.** In the HPMP, the co-applicants have proposed to appoint a tribal liaison who would consult with the tribes regarding construction monitoring, archaeological survey, and resource protection measures.

Comment 244: The Pechanga Tribe requests the lead agency commit to avoidance and preservation of Native American sacred sites.

Response: NHPA does not require federal agencies to avoid effects to cultural resources; it requires federal agencies to consider a variety of measures to resolve adverse effects, among them avoidance, minimization or mitigation. Nevertheless, whenever possible, avoidance is always the best approach for resolving potential adverse effects to cultural resources.

Comment 245: SDG&E comments that the draft EIS does not include a discussion of an alternative substation site that may avoid impacts to cultural resources and generally does not contain any on-the-ground surveys for cultural resources. SDG&E states that the extent and significance of any cultural resources is unknown, could affect the routing of the transmission line, and should be disclosed in the EIS.

Response: The co-applicants' revised alignment now includes alternative 4 that avoids areas of archaeological sensitivity. However, the co-applicants would need to complete surveys along the final transmission alignment prior to commencing construction.

Comment 246: Ruth Atkins comments that the two most prominent historic properties in close proximity of the proposed project are the Elsinore Naval and Military Academy and the Machado Adobe. The former was never used as a club, as indicated on page 3-281 of the draft EIS, and the later was built in 1858 and, when the Butterfield Stage Line was commissioned, used as a stage coach stop. She also comments that in the area there is a marker of the tanning vats built in 1891 by the Luiseno Indians that is a California Registered Historical Landmark. She and Linda and Martin Ridenour would also like assurances that the historic properties near the Santa Rosa powerhouse site, including the naval academy building, would not be adversely affected by ground vibration during construction.

Response: We have revised the text in the final EIS to indicate that the Elsinore Naval and Military Academy property was not used as a club, although originally intended as such. Nevada Hydro's draft HPMP contains measures to address potential effects of construction-related ground vibration on significant buildings prior to initiation of heavy construction or blasting near such buildings**.**

Comment 247: Linda and Martin Ridenour state that the Lake Elsinore Historical Society and the Riverside County Office of Historic Preservation were not notified by Elsinore Valley MWD of the filing of a revised HPMP. They ask that the Lake Elsinore Historical Society be invited to participate in the HPMP.

Response: We recommend that the Lake Elsinore Historical Society be included as a consulting party to the Programmatic Agreement and will afford this organization opportunity to comment on the revised HPMP.

AIR QUALITY AND NOISE

Comment 248: Nevada Hydro comments that the LEAPS Project's ability to store generated energy, including nuclear energy produced at the San Onofre Nuclear Generating Station, results in the more efficient use of energy resources and diminishes the need construct new and operate existing fossil-fuel burning generating facilities within non-attainment basin.

Response: We agree that hydropower generation produces less air pollutant emissions compared to natural gas or coal-fuel plants. However, we find the statement about storing nuclear energy to be misleading because nuclear power is a baseload generating resource rather than being used on the margin, and is not used for pumping.

Comment 249: Nevada Hydro cites a reference on page 3-294 to the Mojave Desert Air Basin and Salton Sea Air Basin and states that it does not believe that any portion of the proposed project is located within these two air basins and questions why they are included in the draft EIS.

Response: The LEAPS Project area is located principally within the South Coast Air Basin which is in Riverside County; however, the proposed transmission alignments extend to Orange and San Diego Counties. Riverside County is partitioned into three air basins: South Coast Air Basin, Salton Sea Air Basin, and Mojave Desert Air Basin. According to CARB, an air basin generally follows political boundary lines and is defined to include both source areas and receptor areas. However, because air masses can move freely from basin to basin, interbasin transport of pollutants is unavoidable. It is for this reason that the Mojave Desert Basin and Salton Sea Air Basin were included in the EIS.

Comment 250: Nevada Hydro points out that the San Mateo Wilderness Areas should be included in the list on page 3-302 of areas located within 100 kilometers of a federal Class I area.

Response: We have added the San Mateo Wilderness Area to the list of areas located within 100 kilometers of a Federal Class I area in the final EIS.

Comment 251: Nevada Hydro provides updated information about the state of California laws pertaining to air emissions and provides an exhibit (Exhibit 4 in the April 25, 2006 filing) the compares LEAPS to other generation technologies for ancillary services and RMR value. It requests that the final EIS augment the existing air quality analysis to describe the beneficial effects of the LEAPS Project. It requests that the final EIS also include an analysis of the project's compliance with the general conformity rule (40 CFR Part 51, Subpart W, and 40 CFR Part 93, Subpart B).

Response: We have included information on beneficial effects of the LEAPS Project in the final EIS. As described in section 3.3.10.2 of the draft EIS, the general conformity rule applies to federal actions in non-attainment areas. The LEAPS Project is located in Riverside County, but the proposed transmission alignments extend to Orange and San Diego Counties. The air basins in these three counties are classified as attainment for NO_x, SO_2 and CO, and non-attainment for Ozone and PM_{10}/$PM_{2.5}$. Therefore, a conformity determination would only be applicable for Ozone (NO_x/VOCs being the pre-cursors) and PM_{10}/$PM_{2.5}$. An emission estimate including construction worker's commutes, construction equipment and use of delivery, hauling and work trucks in pounds per day per pollutant has been included in the EIS as presented in Tables 36 and Table 37. These values can be converted into tons/year based on the expected amount of project days/year and compared with *de minimus* levels in order to make a conformity determination and comply with the general conformity rule. Based upon the proposed construction schedule, it is anticipated that these values could exceed the *de minimus* levels and be applicable to conformity requirements. However, these values are less than the SCAQMD "significant thresholds" for construction activities. Therefore, none of these activities are anticipated to have a significant effect on the surrounding air quality and additional mitigation would likely not be required. A preliminary conformity analysis will be completed prior to the issuance of any license for the proposed project.

Comment 252: EPA states the draft EIS does not include mitigation measures to minimize air pollutant emissions from project activities. It recommends the following measures to minimize construction emissions at the reservoir site, the powerhouse site, and along the transmission lines: (1) consult with the South Coast Air Quality Management District and prepare a fugitive dust mitigation plan; and, (2) develop and implement a plan complying with best practices for mitigating exhaust emissions from construction equipment and evaluate the feasibility of measures to reduce construction emissions.

Response: We have addressed the need for fugitive dust mitigation in the final EIS. If a license is issued for the proposed project, we recommend that the licensees consult with South Coast AQMD to comply with best practices for mitigating exhaust emissions from construction equipment and evaluate the feasibility of measures to reduce construction emissions.

Comment 253: The Center for Biological Diversity comments that the significance of exceedances of carbon monoxide, particulate matter, and ozone standards in the project area and the potential effects of the construction and operation of the project relative to these standards is not addressed in the draft EIS. It states that the draft EIS must fully discuss the proposed project's production of ozone precursor emissions and particulate matter, and the direct, indirect, and cumulative impact both on human health and on vegetation and wildlife habitat, especially for threatened and endangered species.

Response: We discuss the air emissions and fugitive dust that could be generated by the construction and operation of the proposed project relative to the appropriate standards and thresholds in section 3.3.10.3 of the draft EIS and conclude that air emissions and fugitive dust would not exceed the current significance thresholds.

Comment 254: Lake Elsinore Unified School District indicates that blasting could present a public safety risk and affect the learning environment at schools in the project area. It recommends the final EIS include a detailed disclosure of planned blasting activities, anticipated environmental effects, and appropriate mitigation measures. Lake Elsinore Unified School District also is critical of the fugitive dust discussion in the draft EIS and states that the final EIS should include a greater analysis of local air quality effects created by construction activities in the immediate vicinity of the project. It also states that localized effects should be analyzed and schools viewed as sensitive receptors. John Pecora is also concerned about the effects of dust on his family and home.

Response: We address fugitive dust in section 3.3.10.3 of the draft EIS and have added information about the potential effects of blasting. If licensed, we would require the licensee to comply with local and state laws to control fugitive dust and noise from blasting.

Comment 255: Pacific Clay and Lake Elsinore Unified School District are critical that the draft EIS does not recommend any mitigation for the potential release of smelly gasses into the atmosphere which could affect distant communities and individuals who commute along Ortega Highway daily. Linda and Martin Ridenour request CARB data to support staff's statements that gases released from the lakebed during construction are not expected to be toxic.

Response: We do not expect that large quantities of smelly gases would be emitted from the lakebed during construction. Mitigation recommendations for any of these gases which could potentially affect distant communities and individuals commuting along the Ortega highway would be taken if it is determined that there may be a significant impact on these areas.

Comment 256: Linda and Martin Ridenour state that the discussion of state and national area designations in the draft EIS is hard to read. They request a clear statement in the final EIS about whether the city of Lake Elsinore has air quality problems and whether the project-related emissions are considered significant under NEPA and CEPA.

To control air emissions they recommend compliance with SCAQMD rules governing low sulfur fuels and use of filter traps on truck tailpipes. To control dust they recommend the use of non-potable water to control dust, that all haul truck be covered, 2 feet of freeboard be left between the top of the load and the top of the trail bed, and that construction be halted when wind speeds reach 25 miles per hours in order to reduce the amount of dust released into the air.

Response: As noted in our response to comment 252, we address fugitive dust in section 3.3.10.3 of the draft EIS and have added information about the potential effects of blasting. If licensed, the co-applicants would comply with local and state air emissions rules and regulations including those to control sulfur levels, fugitive dust, and noise from blasting.

Comment 257: Lake Elsinore Unified School District is critical of the noise discussion in the draft EIS and should consider the effects of construction noise and truck traffic on schools including taking the school schedule into account.

Response: The noise analysis presented in the EIS does consider and evaluate project-related impacts from construction and operational activities. As part of the construction impact analysis, noise from truck traffic and mobile/stationary equipment noise were examined. Both morning and afternoon peak traffic conditions were considered. The results of the analysis show that construction traffic would not result in significant noise impacts. Rock drilling activity may generate loud noises during early stages of the construction, but would be substantially attenuated when the excavation goes deep into the ground. Mitigation measures, if required, would be employed to ensure conformance with applicable City or County noise codes.

Comment 258: La Cresta Property Owners Association and John Pecora inquire about how the effect of a constant loud humming noise from the transmission lines on residents would be mitigated.

Response: The nearest residential sensitive land uses are at distances of 100 feet or more from the proposed transmission alignment. However, the effect of a humming noise from the transmission lines on residents would be minimal because the intensity of noise in decibels (dBA) would be attenuated over distance. The “hum”, also referred to as “low frequency sound”, is not clearly defined but is generally considered as noise at frequencies below 150 Hz. Exposure to low frequency noise at low intensity noise levels resulting from distance attenuation loses would not be noticed by most receptors as humans are less sensitive to these tonal sounds. Section 3.3.7.2 of the EIS describes precautionary measures that will be undertaken during construction of the power lines to help protect humans from uncertain risks

Comments 259: Linda and Martin Ridenour request information on the effects of the use of helicopters to install transmission lines on noise quality in the project area. They inquire about the echo effect from living on the mountain. They state that much of the description in the *Affected Environment* is unclear. For instance, is the noise environment of Lake Elsinore describing the noise in the city of Lake Elsinore or on the lake? What does "except at locations affected by transportation, recreation, and industrial sources" mean?

Response: The use of helicopters to install the transmission lines would be temporary in nature. As a result, the impacts on noise quality in the project area are not anticipated to be significant. The Ldn noise descriptor is commonly used to monitor the anticipated increase in the ambient noise levels within the community. Construction activity will be monitored to ensure conformance with applicable local government regulations, including the 60 Ldn recommended in city of Lake Elsinore General Plan. Noise (sound waves) traveling in a direct path to the Santa Ana Mountains may reflect back toward the residential community; however, the sound wave energy intensity would be very much reduced due to transmission loses anticipated as it passes through the mountainous terrain. In addition, any reflected sound wave would be further attenuated over distance and thus would not significantly impact the residential sensitive land uses. The noise environment in city of Lake Elsinore is generally typical of a rural setting (e.g., 47 to 57 dBAs); however, elevated noise levels may be experienced during the daytime at locations influenced by vehicle traffic on Interstate-15 and the arterials roads servicing the community, intermittent power boat and jet ski activities, and aircraft operations from the Skylark Airstrip.

Comment 260: Linda and Martin Ridenour point out that there are more sensitive land uses than described in the draft EIS, including Lakeside High School, a soon to be opened Middle School, and Butterfield School, four churches in Lakeland Village, a ball park, and Perret Park.

Response: The noise impact analysis presented in section 3.3.10, *Air Quality and Noise*, only considers the nearest sensitive land uses that may be impacted by noise-producing activity associated with the proposed and alternative actions. As such, it was considered to be the worst-case scenario. If no significant impacts were anticipated from this worse-case evaluation, it is reasonable to conclude there would be no significant impacts for sensitive land uses located at further distances from the project-related noise sources. A list of the sensitive land uses is provided in figures 16 and 18 in section 3.3.6 under the subtitles Recreational Resources and Land Use and Aesthetic Resources; respectively. There are other sensitive land uses further north, east and west of the proposed powerhouse sites, including Lakeside High School located on Riverside Drive. We have revised the text in section 3.3.10 to recognize these other receptors.

DEVELOPMENTAL ANALYSIS

Comment 261: Nevada Hydro provides a cost estimate of $5 million per mile for 500-kV gas-insulated lines as quoted by Siemens Power Transmission & Distribution Inc., and that the projected cost for placing a 1.5 mile segment of the transmission line underground would be less than $10 million.

Response: We have considered your cost estimate in our developmental analysis.

Comment 262: SDG&E comments that the draft EIS cost estimate is low and does not fully account for the current level of 500-kV construction costs. It cites recent substantial changes in the cost of steel and a shortage of skilled labor in the construction of high-voltage electric transmission. SDG&E questions the economic benefits of operating the project and asks that the final EIS include an explanation of the methodology used to determine the number of hours and time periods during the typical week in which the Proposed Project was assumed to be in a pumping mode. SDG&E also notes that table note "a" in table 48 conflicts with the information in table 47 concerning when pumping hours would occur. Finally, SD&E comments that use of a single typical week is unlikely to be representative of the varied system conditions that occur throughout the year and recommend an hour-by-hour simulation of the facility for a full year using actual hourly market clearing prices for energy in southern California from a recent year, accounting for the storage capacity of the upper reservoir and incorporating the pumping/generation efficiency loss. The final EIS should acknowledge that any simulation would likely overstate the benefits.

Response: We added a significant contingency to the co-applicants' costs in the final EIS reflecting some of this uncertainty. We have corrected footnote a on table 48, *Summary of Projected Annual Costs and Capital Costs under the Co-Applicants' Proposal*, to read "Pumping energy is based on average energy values at SP-15 for August 2004 through July 2005 assuming pumping during all off peak hours (10 p.m. through 6 a.m., Monday through Friday) and assumed additional pumping operations during 16 hours (four hours Monday through Thursday) of regular peak hours in the final EIS.

Comment 263: SDG&E requests that the statement on page 4-30 the TE/VS transmission line would provide "wheeling" benefits to regional utilities, and any other reference to "wheeling," be deleted because under the cost recovery regime proposed by the co-applicants in their March 20, 2006, additional information response, the operational control of the TE/VS transmission would be turned over to the California Independent System Operator Corporation.

Response: We have deleted the reference to wheeling in section 4.6.

Comment 264: SDG&E suggests that table 52 and the associated discussion be deleted from the final EIS, also citing the March 20, 2006, filing by the co-applicants.

Response: We note the March 20, 2006, filing was by Nevada Hydro under a separate proceeding and was later withdrawn from the LEAPS Project proceeding; however, we consider it important to evaluate the incremental cost of key project components such as the pumped storage element and continue to evaluate the economics of the LEAPS Project both as stand-alone project and in combination with the TE/VS Interconnection.

Comment 265: Mr. Pinnow provides an analysis of whether the LEAPS Project makes sense from an economic point of view. He comments that the assumption in table 42 that the return on equity rate for investors of 12 percent would be impossible to achieve without subsidization from California rate payers. He questions whether the $40.00/MWh for off-peak energy value south of path 15 includes the power transportation costs to get power to the LEAPS plant. If not, the final EIS should include this cost. He asks that information about the gross annual profit of the stand-alone pumped storage project be presented in the final EIS. He also concludes that there is insufficient information in the draft EIS to determine if the pumped storage facility in combination with the proposed transmission line would result in a net benefit to rate payers. He asks why the economics for the transmission line have not been included in the draft EIS for public review.

Response: Since the Mead Decision of 1995, the Commission no longer evaluates the internal rate of return for a project and leaves the financials analysis and risk in the hands of the co-applicants. Typically, in order to obtain bonds or other financing, an applicant must have an independent engineer certify the economics and feasibility of the project to move forward and procure financing. We do not typically evaluate profits associated with any project; however, we continue to present the annualized costs, benefits and net benefits for both the stand-alone pumped storage project and the combined transmission line and pumped storage project. Transmission benefits in the final EIS are based on additional information provided by the co-applicants in their comments on the draft EIS.

Comment 266: Mr. Pinnow provides cost estimates for underground cable (cost of cable and installation) through the Cleveland National Forest of about $157 million based on current technologies including the use of tight polymer insulation jackets rather than oil-filled jackets and recommends that underground technology be used for any transmission cable routed through the Cleveland National Forest.

Response: We have reviewed Mr. Pinnow's and other cost estimates for underground transmission cables and have lowered our estimate accordingly.

Comment 267: Mr. Pinnow comments that the configuration of transmitting the power from the LEAPS Project to the TE/VS transmission line must be modified to be brought into conformance with section 71663.5(b) of the California Water Code that requires that any electrical power generated within a water district be used within the district for its own purpose and that only surplus power may be sold over the high voltage transmission line. He asks that the cost of any reconfiguration be included in the final EIS.

Response: The co-applicants are required to comply with state laws and regulations.

Comment 268: Mr. Pinnow comments that neither the LEAPS Project nor the TE/VS transmission line can be considered reliability must run (RMR) resource because this term is limited to power plants that are available to run hours per day for 7 days per week. He comments that the LEAPS Project would not meet this definition and instead should be categorized under the default qualifying capacity criteria under section 40.13.2 of the CAISO tariff language. He questions whether any RMR value is ascribed to the LEAPS Project in the draft EIS.

Response: We did not explicitly consider RMR benefits in conducting our benefits analysis. We noted that pumped storage includes many ancillary benefits and included both a higher energy cost during super peak hours and a dependable capacity benefit in our economic approach. We did review CAISO's RMR units and note that PG&E's Helms Pumped Storage Project units are included as RMR units.

Comment 269: Francis Hoffman, on behalf of the Elsinore Testing of Experimental Aircraft Mechanism, disagrees with Commission staff that sufficient costs for eminent domain are provided in the co-applicants' proposal. Douglas Pinnow, Edith Stafford, and Linda and Martin Ridenour point out that Elsinore Valley MWD does not have the power of eminent domain to acquire property for the LEAPS Project as assumed in the draft EIS. Rather, Elsinore Valley MWD must acquire property by direct negotiation with each affected property owner in accordance with section 71663.5(d) in the California Water Code. Mr. Smith indicate that his parcel in the La Cresta area would need to taken by eminent domain should the project proceed and questions whether costs associated with eminent domain proceeding have been included in the cost estimates in the draft EIS. Pacific Clay states that the construction budget in the draft EIS is not large enough to have included costs for involuntary acquisition of the necessary properties. Edwin Thorell notes that measure 64, the acquisition of property though purchase of fee simple or through lease by voluntary sale, has a 0 cost in the measure table. He states that the failure to address the costs of property acquisition increases the cost of the project beyond the $931 million construction cost indicated.

Response: We have modified the cost associated with property acquisition and reflect those changes in section 4 of the final EIS.

Comment 270: Francis Hoffman, on behalf of the Elsinore Testing of Experimental Aircraft Mechanism, states that there are no costs included to provide an alternative landing zone during construction.

Response: The co-applicants propose to provide funds for an appropriate landing zone if the Commission selected the Ortega Oaks powerhouse site. Both the co-applicants' proposal and the staff recommended alternative would site the powerhouse at the Santa Rosa location. Construction of the underground powerhouse at the Santa Rosa location would not disrupt the continued use of the landing zone at Ortega Oaks.

STAFF CONCLUSIONS

Comment 271: Nevada Hydro comments that the staff conclusions on page 5-5 of the draft EIS that the co-applicants' proposed transmission alignment could interfere with USFS fire suppression activities and that staff alternative mid-slope transmission line would avoid interference with USFS fire fighting suppression activities is a mischaracterization of the of the two alternatives. It points out that both alignments would traverse plant communities with similar fuel loading characteristics and that because the staff alternative mid-slope alignment is 1.2 miles longer, it would produce incrementally more effects. Further, Nevada Hydro requests the presence of beneficial impacts, such as the availability of an upper reservoir as a source of water for fire fighting as well as the additional potable water that the co-applicants would provide to the Rancho Capistrano area.

Response: We have revised the staff alternative transmission alignment to include an underground segment in the vicinity of the launch sites and for the connection to the Santa Rosa powerhouse. The use of underground lines in these two locations reduces interference with fire suppression activities.

Comment 272: Nevada Hydro notes that the draft EIS on page 3-189 states that recreational use during 2001 within the Cleveland National Forest was estimated at 790,000 visits. It comments that in that context, with an estimated 500 users per year that it may not be accurate to state that hang gliding is a very popular activity in Lake Elsinore on page 5-32).

Response: We agree that 500 hang gliding users per year is a small percentage of the overall visitation at Cleveland National Forest. However, we find that Lake Elsinore is a unique and popular destination for hang gliders. We have revised the text in section 5.2.8 to read that Lake Elsinore is a very popular and unique location for hang gliding.

Comment 273: Nevada Hydro requests the factual documentation, other than the suggestion by Mike Hilberath, for the need for a 12-acre landing area. It points out that a 12-acre area would constitute 20 percent of the 58-acre Ortega Oaks powerhouse site and request clarification of why a well-planned 5-acre landing area, as now proposed by the co-applicants, would be inadequate.

Response: We have revised the staff recommended alternative in the final EIS to include a powerhouse at the Santa Rosa location. Since the provision of the co-applicants' 5-acre or the staff's 12-acre landing site was tied to selection of the Ortega Oaks location for the powerhouse, we no longer include this measure in the staff alternative.

Comment 274: Nevada Hydro disagrees with the staff conclusion on page 5-34 that co-applicants should provide O&M funding for developed sites if such funding is not available the intended sources.

Response: Nevada Hydro proposed to provide recreational amenities as part of its proposed environmental measures for the licensing of the LEAPS Project. Therefore, O&M for ongoing maintenance of project-related recreational facilities would be appropriate.

Comment 275: Nevada Hydro disagrees with the staff conclusion on page 5-36 of the draft EIS that long-term monitoring, reporting, and changes are necessary provisions of the road and traffic management plan because there would only be limited number of employees once the construction period had ended.

Response: We concluded in section 3.3.7.2 that operation of the project with its limited number of employees and limited recreational use would have minor effects on local traffic on Grand Avenue. We have revised section 5.6 of the final EIS to make clear our intention that the majority of effects on local roads would result from project construction activities. Therefore, the monitoring, reporting, and changes to the non- USFS road and traffic management plan be confined to the project construction period. We recommend that the co-applicants consult with USFS as part of the road and traffic management plan for USFS roads on responsibilities for post-construction road maintenance resulting any increase in project-related road use to access project-related recreational facilities.

Comment 276: EPA recommends the final EIS describe the monitoring and reporting that would be required of the co-applicants, identify all terms and conditions of the FERC license related to the monitoring requirements, and discuss all implementation and effectiveness monitoring that would be conducted by the appropriate agencies.

Response: We have added text to section 5 of the final EIS to provide more guidance on the monitoring activities.

Comment 277: SDG&E questions the conclusion that the TE/VS transmission line could provide 1,000 MW of import capability into the San Diego area. SDG&E requests that the final EIS either cite studies that support the 1,000-MW increase in import capability or acknowledge the uncertainty surrounding this number and that a lower number would necessarily mean reduced benefits for customers.

Response: We have reviewed the available system studies and acknowledge the uncertainty surrounding a 1000 MW increase in import capability. The final EIS now uses a value of 750 MW (testimony of L.P. Brown, Long-Term Resource Plan of SDG&E July 9, 2004)

CUMULATIVE EFFECTS ANALYSIS

Comment 278: The Center for Biological Diversity comments that the draft EIS does not include an adequate cumulative effects analysis on water, soil, and biological resources in the project planning area.

Response: In response to your comment, we have added information about several other regional activities, including the Special Area Management Plan, to the appropriate *Cumulative Effects* sections.

APPENDIX B

Comment 279: Mr. Pinnow points out that the statement on page B-13 "A new 30-mile-long, 500-kV transmission line with an approximate 1,000 MW rating" is inconsistent with the capacity information shown graphically on page B-10 and with notice of the application that states that the TE/VS transmission line is to transmit and manage grid flow of approximately 1,600 MW of electricity.

Response: We agree that the information on pages B-10 and B-13 is inconsistent. The LEAPS Project transmission line is being proposed as having a maximum thermal rating of 1,600 MW. This is the maximum power that can flow over the line due to the thermal limitations of the substation equipment associated with it and to the possibility of it violating National Electric Code (NEC) minimum ground clearances due to excessive conductor sag. A line's rating is almost always higher than its expected loading. We have revised the text on page B-13 to clarify that the proposed 32-mile 500 kV line has a 1,600 MW rating.

COMMENTS ON THE PUBLIC NOTICE OF OCTOBER 3, 2006 FOR THE REVISED PROPOSES AND STAFF ALTERNATIVE TRANSMISSION ALIGNMENTS

On October 3, 2006, the Commission issued a public notice to landowners of property crossed by or near either the proposed or alternative routes for the transmission line and other interested parties to the proceeding. The maps attached to this notice showed two transmission alignments: (1) the co-applicants' current proposal, modified in response to staff's draft EIS and filed with the Commission on June 12, 2006; and (2) the staff alternative alignment being considered for the final EIS. The notice invited comments within 30 days of the date of the letter. The following entities filed comments in reply to this public notice:

Entity	**Date**
Roy Salameh	October 11, 2006
John and Vera Kalachian	October 12, 2006
Theordore and Katie Miller	October 18, 2006
San Bernardino Valley Audubon Society	October 18, 2006
John Willet	October 23, 2006
Christopher Wills	October 25, 2006
Michael Hilberath	October 31, 2006
Bryan Groth	October 31, 2006
Richard and Victoria Bogard	October 31, 2006
Fieldstone Communities	November 1, 2006
Sycamore Creek Homeowners Association	November 1, 2006
Harvey and Lucy Miles	November 2, 2006
Katy Miles	November 2, 2006
Orba Smith	November 2, 2006
Christopher Oates	November 2, 2006
Lois Nosporic	November 2, 2006
Matthew Miles	November 2, 2006
Sandra Weaver	November 2, 2006
Fernandez Parties	November 2, 2006
Jacqueline Ayer	November 2, 2006
James Diamond	November 2, 2006
Sharon West	November 2, 2006
Pacific Clay Products	November 2, 2006
Cheri Phelps	November 3, 2006
Sycamore Creek Marketplace, LLC	November 3, 2006
Center for Biological Diversity and Sierra Club	November 3, 2006

Entity	Date
City of Lake Elsinore	November 3, 2006
County of Riverside	November 3, 2006
Bridgette Moore	November 6, 2006
Ellen Hazinski	November 7, 2006
John Hazinski	November 7, 2006
Marty Kreisler	November 7, 2006
Edwin Thorell	November 7, 2006
Michelle Randall	November 8, 2006

In additional 47 individuals file a form letter in opposition to the proposed transmission alignment expressing concerns about the proposed and alternative transmission lines will run along the border of the Glen Eden community. They cite the potential effect of the construction and operation of the line on the health and beauty of the Glen Eden Sun Club community. They state that the proposed transmission line will mar the landscape, run directly through a wildlife corridor, and destroy the area's vegetation and wildlife. They also comment that the draft EIS makes no reference to the Glen Eden Sun Club community. Using the same form letter, another 20 individuals and the Sycamore Creek Homeowners Association expressed similar concerns about the effects of the proposed LEAPS Project transmission lines on the health and beauty of the Sycamore Creek community.

We have summarized and responded to any new issues raised in the above letters. We have not summarized issued that have already been addressed in the responses to comments on the draft EIS.

PROCEDURAL

Comment 280: The Center for Biological Diversity comments on the co-applicants' alternative 4(e) condition no. 5, indicating that the suggested new language concerning the co-applicants' right to a hearing and to propose alternative 4(e) conditions is unnecessary as the applicable regulations already provide for this.

Response: The USFS revised preliminary 4(e) condition no. 5 does not include the co-applicants' suggested language. The revised USFS preliminary 4(e) conditions are found in appendix C to this final EIS.

Comment 281: The Center for Biological Diversity and Sierra Club comment that the draft EIS does not include sufficient information to evaluate the environmental effects of placing the transmission line underground in the Cleveland National Forest.

Response: We did not consider placing lines underground in the alternatives presented in the draft EIS. We eliminated the underground alternatives based on cost; therefore, we did not discuss the effects of placing the transmission lines underground construction on environmental resources. However, we disclose the effects of placing segments of the transmission alignments underground on the environmental resources in the final EIS.

Comment 282: The Phillips Development Company reports that it did not receive notification of the modified transmission alignment even though its properties are within 0.25 mile of the proposed alternative alignments. According to Phillips Development Company, parcel number 125-120-38 as shown on the map included with the public notice is incorrect. The map should show two properties—

125-120-38 on the west side and 125-120-37 on the east side—adjacent to parcel number 125-120-004. The new alignments would be in closer to private property owners with El Cariso Village. The Company is also concerned about the possibility of a 3,500-foot-wide Federal Energy Corridor that could allow more than just electrical transmission lines.

Response: We obtained parcel information from the Elsinore Valley MWD and made a good faith effort to notify every property owner within 0.25 mile of the two transmission alignments being considered in the final EIS. The parcel information available to us did not show parcel 125-120-37. This proceeding is not considering the TE/VS Interconnect as a Federal Energy Corridor.

Comment 283: Jacqueline Ayer comments that when transmission alignments are substantially relocated that the lead Federal agency is required to re-evaluate all of the environmental impacts. In the case of the TE/VS Interconnect a new analysis of land use impacts is warranted. She states that existing develop densities in areas such as El Cariso Village are as high as 5 dwelling units per acre, which, is 100 times more than the .05 dwelling units acre cited on page 3-273 of the draft EIS.

Response: The effects of the new transmission alignments on land use and other environmental resources are disclosed in the final EIS. Our characterization of densities ranging from 5- to 20-acre minimum lot size in the rural areas in the draft EIS is correct; however we have added language to section 3.3.7.2 of the final EIS to indicate that some of these areas, such as El Cariso Village, may be rezoned for development at much great densities. Nowhere in the draft EIS do we cite .05 dwellings per acres in rural areas

Comment 284: Ms. Ayer comments that the potential effect of the new transmission alignments would be devastating to property values and that the draft EIS trivializes property value impacts.

Response: We provide considerable discussion in section 3.3.8.2 of the draft and final EIS about the affects of transmission lines on property values, citing numerous studies on the potential effect of transmission lines on property values.

Comment 285: Ms. Ayer states that the NEPA analysis is improperly deferred commenting that the deferral of specific plans to address environmental impacts is inconsistent with NEPA requirements. For instance, she notes that traffic concerns would be addressed in the traffic and management control plan that would be developed after the project is licensed. She also states that the co-applicants are sidestepping any obligation to mitigate impacts to local roads during project construction.

Response: With regard to traffic impacts, the traffic and management control plan would be developed prior to construction and would be implemented before the construction and operation of the project. This plan would be developed in consultation with the appropriate local agencies and would address the co-applicants' obligations for pavement repair during and following construction. Our responses to comments 3 through 13 above address concerns about the statement of purpose and need in the EIS.

Comment 286: Ms. Ayer comments that contrary to the statement in section 2 of the draft EIS the pumped storage project would depend on fossil fuels.

Response: We agree that the pumped storage project would depend on fossil fuels unless the co-applicants are successful in obtaining power sales agreements for geothermal, wind, or other non-fossil based sources of energy and have revised the text in section 2 of the final EIS accordingly.

Comment 287: Ms. Ayer comments that the draft EIS insists that the LEAPS Project and TE/SV Interconnect are stand alone projects and that the draft EIS focuses on the LEAPS Project and does not address the TE/SV Interconnect in any substantial detail.

Response: We consider the LEAPS Project to consist of the co-applicants' proposal for a pumped storage facility and associated transmission lines. The draft and final EIS disclose the effects of the proposed and alternative project configurations including the effects of the proposed 32 miles of transmission lines on environmental resources. We note that a substantial amount of the analysis in the EIS pertains to ground-disturbing activities, land use, and aesthetics associated with the construction and operation of the transmission line. An effect analysis for the co-applicants' and staff alternative transmission alignments is carried through each environmental resource area addressed in the EIS.

Comment 288: Ms. Ayers comments that the draft EIS fails to identify reasonably foreseeable cumulative effects associated with the potential designation of a 3,500-foot-wide TE/SV corridor as a Federal Energy Corridor under the Energy Policy Act of 2005.

Response: The Commission has not taken any action on the designation of the TE/SV line corridor and we have no action against which to evaluate cumulative effects.

Comment 289: Ms. Ayer raises numerous other issues about the scope and adequacy of the draft EIS including her views that the no-project (action) analysis is flawed and the final EIS should consider additional no-action alternatives, that the discussion of FERC's licensing authority is faulty, that Elsinore Valley MWD does not have eminent domain authority, and that the economics of the new alignments are not justified.

Response: As discussed in response to comment 53 above, the draft and final EIS include a sufficient level of detail to assess the potential effects of the proposed project on environmental resources in the project area. We address eminent domain authority in our response to comment 50 above. In appendix B, we address previous studies of proposed transmission systems in southern California and note that these studies do not address some of the strategic benefits (reliability, load diversity, fuel diversity, access to lower cost power plants, firm power purchase, economy energy and surplus hydropower purchases, power exchange, and reserve sharing) which could improve the economics of an interconnection project, especially when combined with pumped storage capacity. We continue to conclude that the power from the LEAPS Project would be useful in meeting part of the regional need for on-peak power and that the TV/SE Interconnect Project would be an appropriate long-term solution to southern California's transmission congestion and transmission-constrained, generation-deficient San Diego area.

LAND USE

Comment 290: The Center for Biological Diversity and the Fernandez Parties comment that the September 2006 decision in the California v. U.S. Department of Agriculture (N.D. Ca. Case No. C05-03508 EDL) reinstated the Roadless Area Conservation Rule (66 FR 3,244 (January 12, 2001). This rule disallows any road construction and reconstruction, subject to certain limited exceptions, in Inventoried Roadless Areas. This would apply to the Wildhorse/Morrell Inventoried Roadless Area and this must be disclosed in the final EIS.

Response: As noted in our response to comment 210, according to the current Cleveland National Forest Land Management Plan, the areas of the forest where Morrell and Decker reservoirs are proposed is designated as an Inventoried Roadless Area that allows consideration for road construction or reconstruction. Contrary to the Center for Biological Diversity's claims, the Final Land Management Plan does not specify a Wildhorse Inventoried Roadless Area. Therefore the cited court decision does not apply.

Comment 291: Mr. and Mrs. Hazinski and Mr. Kreisler, residents of Horsethief Canyon, comment that the proposed transmission line would cross Temescal Valley, west of Horsethief Canyon, over and adjacent to proposed residential projects recreation areas, and a shopping center on the Sycamore Creek property. They had been led to believe that any project transmission lines located within one mile of residential communities would be underground. They specifically recommend that the transmission line be placed underground for about 2 miles between parcel #391210014 extending north under Interstate 15 and the proposed northern substation. Ms. Randall objects to the placement of above ground transmission lines. She recommends placing the line underground between the Glen Eden Sun Club and the planned Sycamore Creek residential community and asks that costs associated with an additional 2-mile underground segment in this area be included in the final EIS. The Sycamore Creek Marketplace, LLC, objects to the location of the co-applicants' proposed and staff alternative transmission alignments due the proximity to a planned residential developments. The owner request the location of the proposed transmission line be a minimum of one mile away from the boundary of the Sycamore Creek development and that the towers be at least one and one half miles away from the Sycamore Creek property. The Fernandez Parties, Orba Smith and numerous other individuals continue to oppose the project and also request consideration of additional underground segments in areas near residential developments.

Response: The co-applicants do not propose to place transmission lines underground within 1 mile of residential communities. The draft EIS considered but eliminated from detailed study installation of underground lines based on costs. In the final EIS, both the co-applicants' proposed transmission alignment and the staff alternative transmission alignment include underground segments in the vicinity of the launch areas along South Main Divide Road and the powerhouse. We include the costs associated with additional underground segments in the final EIS.

Comment 292: Mr. Hazinski reports that the co-applicants' modified transmission alignment ensures that the line would not be built within a mile of the Horsethief Canyon community north of the city. He states that the Elsinore Valley MWD secured a guarantee from Nevada Hydro that if it were to go within a mile of the community, that section would go underground (The Californian, October 5, 2006). He comments that this discriminates against landowners with private wells outside of the water district. He suggests that a more appropriate route would be along Lake Street and Temescal Canyon Road

Response: The license application and subsequent filings by the co-applicants made no reference to a commitment made by either applicant to place transmission lines underground within 1 mile of the Horsethief Canyon community. We have considered the environmental effects of the proposed transmission line relative to all parcels regardless of whether they are located within or outside of the water district's jurisdiction.

Comment 293: The city of Lake Elsinore and Pacific Clay products state that on balance the co-applicants' modified transmission alignment is preferred because it results in lesser visual impacts on the Lake Elsinore community and adjacent residents, but the city would also support the staff alternative transmission alignment as long as the underground segment to the powerhouse is included.

Response: In the final EIS, we include the underground segment from the vicinity of South Main Divide Road to the powerhouse in the staff alternative transmission alignment.

Comment 294: The San Bernardino Valley Audubon Society indicates that while putting the entire transmission line underground would protect raptors it would also foster the growth of non-native plants. It comments that the notice implies that Morrell Canyon has been selected over Decker Canyon.

Response: The maps included with the notice for the two transmission lines being considered for discussion in the final EIS contain legends that show underground segments of several miles. We do not propose to place the entire 32-mile transmission line underground. We note that the staff alternative in the final EIS still includes an upper reservoir at Decker Canyon.

Comment 295: The Fieldstone Company states that it did not comment on the LEAPS Project before because it recognizes the need for growth must be balance with the imperative for safe and environmentally sound energy. Fieldstone recommends that the Commission reconsider the mid-slope alternative as being more environmentally sensitive than the modified staff alternative and having the least impact to existing residential developments. Fieldstone comments that the draft EIS failed to review the contents of the County of Riverside General Plan, which would be greatly impacted by the co-applicants' modified transmission and the two alignments being considering for the final EIS. Fieldstone comments that only the mid-slope alignment avoids the impacts to approved residential communities.

Response: We have reviewed the merits of the mid-slope transmission alignment and concluded that its close proximity to private properties, including two large residential developments in Horsethief Canyon and interference with hang gliding activities created more adverse effects than the revised staff alternative alignment. We did review the County of Riverside General Plan in the draft EIS and reviewed it in relation to the revised staff alternative alignment in the final EIS and conclude that the our revised alternative would have less effect overall on residential communities and would significantly reduce effects on hang gliding activities at Lake Elsinore.

Comment 296: Fieldstone states that the draft EIS omits consideration of the Riverside Multi-Species Habitat Conservation Plan approved by the FWS. It comments that the northern segment of the co-applicants' alignment and the new alignments would adversely impact a significant wildlife corridor.

Response: We addressed, in section 3.3.4.2 of the draft EIS, the potential effects of the proposed project of wildlife corridors identified in the Western Riverside County Multi-Species Habitat Conservation Plan.

Individuals who filed letters in response to the draft EIS and public notice of October 3, 2006:

Christopher A. Wills, M.D.	March 1, 2006
Elsinore Hang Gliding Association	March 20, 2006
Linda Hale	March 27, 2006
James Provenzano	March 28, 2006
J. Capozzelli	April 12, 2006
Alan L. White	April 12, 2006
Susan Frommer	April 12, 2006
Risser C. Estes	April 18, 2006
Gregory Angsten	April 18, 2006
Jim Shaw	April 18, 2006
Frederick T. Pishotta	April 18, 2006
Dora D. Labellarti	April 18, 2006
Devonne L. Fisher	April 18, 2006
Dennis R. Fisher	April 18, 2006
Lynice Spangler	April 18, 2006
Karen Gilbert	April 19, 2006
Doris J. Singleterry	April 19, 2006
Saul L. Frommer	April 19, 2006
Fred Blaskovich	April 19, 2006
Charles & Yolanda Hoelscher	April 19, 2006
Allyn Cooksey	April 19, 2006
Hansen Family	April 19, 2006

Joan H. Adkins	April 19, 2006
Debbie & Raymond Badham	April 19, 2006
Eric Gilbert	April 20, 2006
Tom Hazelleaf	April 20, 2006
United States Hang Gliding Association	April 20, 2006
Bret M. Daniel	April 20, 2006
John W. Kirk	April 20, 2006
Kriss Larson	April 20, 2006
Bernard M. Lipman	April 20, 2006
James Gaar	April 21, 2006
Bud Mathurin	April 24, 2006
James Flack	April 24, 2006
Eric Gilbert	April 24, 2006
Elsinore Hang Gliding Association	April 24, 2006
Lynn Perry	April 24, 2006
Peter J. & Tina M. Cutuli	April 24, 2006
Martin Kreisler	April 24, 2006
Vance Litchfield	April 24, 2006
Jim Appleby, Sr.	April 24, 2006
Harold Burgess	April 24, 2006
Mitch Frisch	April 24, 2006
Gena Osborne	April 24, 2006
Jeff & Irene Johnson	April 24, 2006
Dawn Swett	April 24, 2006
Anna Marx	April 24, 2006
Susan Cash	April 24, 2006
Karen Snyder	April 24, 2006
Jorgen Moller	April 24, 2006
Patricia Barnes	April 24, 2006
Melody Barnett & Family	April 24, 2006
Dia Peters	April 24, 2006
Linda Nielsen	April 24, 2006
Elizabeth L. Bostian	April 25, 2006
Ray Stinnett	April 25, 2006
Mike Harper	April 25, 2006
Sierra Club, San Diego Chapter, Forest & Wilderness Committee	April 25, 2006
C&C Parties	April 25, 2006
Doug Koch	April 25, 2006
Asher Chapman	April 25, 2006
Michael Estrada	April 25, 2006
Wilmer I. Rohr. IV	April 25, 2006
Mark Mallett	April 25, 2006
John Pitt	April 25, 2006
Robert Carmichael	April 25, 2006
James Wood	April 25, 2006
David W. Biddle	April 25, 2006
Marc Johnson	April 25, 2006
John C. Mulyana	April 25, 2006
John Heiney	April 25, 2006
Brian Dahl	April 25, 2006
David Freman	April 25, 2006

Erik Delf	April 25, 2006
LaCresta Development	April 26, 2006
Kelly Smith, Keller Williams Realty	April 26, 2006
Richard Nakai	April 26, 2006
Melanie Parker and 199 Other Individuals	April 26, 2006
Jo Ann McCracken	April 26, 2006
Marianne & Gerald Cline	April 26, 2006
Patrick & Camilla Davenport	April 26, 2006
Patricia Barnes	April 26, 2006
Linda & Scott Pyle	April 26, 2006
Kathleen Dickey	April 26, 2006
Craig A. Sherman, Esq.	April 26, 2006
Michael Gordon	April 26, 2006
Gordon Kane	April 26, 2006
Albert Temmins	April 26, 2006
Dennis Keith	April 26, 2006
Laurra Maddock	April 26, 2006
Janet Maker	April 26, 2006
Paget Reid	April 26, 2006
Dan Abrams	April 26, 2006
Bill Holmes	April 26, 2006
Jerry Hughes	April 26, 2006
Robert Rocco	April 26, 2006
Casey Hudson	April 26, 2006
Christopher & Mary Louise Muller	April 26, 2006
Philip Glaser, D.D.S.	April 26, 2006
Jennifer Cochrane-Schultz	April 26, 2006
Mikko Helenius, M.D.	April 26, 2006
Brook Bryant	April 26, 2006
Scott Quinnell	April 26, 2006
C. Mollie Bigger, Ph.D.	April 26, 2006
Sharon Connor	April 26, 2006
Karen Thordarson	April 26, 2006
Patricia Bleha	April 26, 2006
Mark Gauthier	April 26, 2006
Mark Sorensen	April 26, 2006
Stephanie Adams	April 26, 2006
Ellen L. Trumpler	April 26, 2006
Claire Frogman	April 26, 2006
Nira Trock	April 26, 2006
Tessa Kershnar	April 26, 2006
Don Bremmer	April 26, 2006
Brittany McKee	April 26, 2006
H.E. Kershnar	April 26, 2006
Phyllis Watson	April 26, 2006
Lisa R. Marks	April 26, 2006
Marni Majda	April 26, 2006
Samam Dabin	April 26, 2006
Melissa Weyek	April 26, 2006
Barbara Meyer	April 26, 2006
Eugene St. Laurent	April 26, 2006

Jason Hashimoto	April 26, 2006
Lynn Fleischer	April 26, 2006
Stephen E. Rudolph	April 26, 2006
Melba Simms	April 26, 2006
Theresa Brady	April 26, 2006
Dorothy Boberg	April 26, 2006
Betty Schnaar	April 26, 2006
Willis Simms	April 26, 2006
J. Water	April 26, 2006
Michael Stevenson	April 26, 2006
Barry Katzen	April 26, 2006
Julie R. Szende	April 26, 2006
Randy Steinberg	April 26, 2006
Elizabeth G. McMahon	April 26, 2006
John M. Rountree	April 26, 2006
Linda Kleer	April 26, 2006
Jeff Fromberg	April 26, 2006
Clif Potts	April 26, 2006
Barbara & Jacob Rubin	April 26, 2006
Michael Karp	April 26, 2006
Mark Carrow	April 26, 2006
Barbara Gable	April 26, 2006
Trish Tuley	April 26, 2006
Joan Weaver	April 26, 2006
Sierra Club, San Gorgonio Chapter	April 26, 2006
Irene Dunny	April 26, 2006
Lori Kessler	April 26, 2006
Debby McAllister	April 26, 2006
Jim McKnight	April 26, 2006
Ralph Bocchetti	April 26, 2006
Jane Affonso	April 26, 2006
Martha Hess	April 26, 2006
Kyle Daniels	April 26, 2006
Lori Whalen	April 26, 2006
Angela M. Woodcock	April 26, 2006
Guy L. Kirkpatrick	April 26, 2006
Ned Boyer	April 26, 2006
Lynne Jeffries	April 26, 2006
Stacy Brady	April 26, 2006
Gregg Oelker	April 26, 2006
Cathy Sellitto	April 26, 2006
Shirley Ann Szalkowski	April 26, 2006
Thomas & Beatriz Ferguson	April 26, 2006
Adrienne Kligman	April 26, 2006
Andrew Sutphin	April 26, 2006
Robin & Tony Applegarth	April 26, 2006
Kris Ockershauser	April 26, 2006
Mark Watt	April 26, 2006
Ed Amador	April 26, 2006
Susan Shields	April 26, 2006
Andrew Reich	April 26, 2006

Sharon Wright	April 26, 2006
Johanna E. Howard	April 26, 2006
Andrea & Charles Sims	April 27, 2006
Donna Gould	April 27, 2006
Garry & Cheryl Chaban	April 27, 2006
David Perlman	April 27, 2006
Paul Carlton	April 27, 2006
Tom Randel	April 27, 2006
Donald R. Gates	April 27, 2006
Julie A. Gates	April 27, 2006
J.D. & Shirley Sooter	April 27, 2006
Lake Elsinore Soaring Club	April 27, 2006
Eileen R. Baldwin	April 27, 2006
Shawn Rogers	April 27, 2006
House Family	April 27, 2006
Edward & Gert La Faso	April 27, 2006
Damien Schlitt	April 27, 2006
Peter H. Dawson	April 27, 2006
Jane Rice & over 400 Other Individuals of the Sierra Club	April 27, 2006
Debbie Chaddock	April 28, 2006
Kim F. Floyd	April 28, 2006
Susan B., Kay, M.D.	April 28, 2006
Chris Warren	April 28, 2006
Rev. Michael Agliardo, SJ	April 28, 2006
Nolan Farkas	April 28, 2006
Ed Van den Bossche	April 28, 2006
Karen Horn	April 28, 2006
Angeles Chapter, Sierra Club	April 28, 2006
Gary W. Feemster	April 28, 2006
Gabriele Rau	April 28, 2006
Darryl Mar	April 28, 2006
Gabi Dendinger	April 28, 2006
Charles L. Polep	April 28, 2006
Walid Soussou	April 28, 2006
Albert A. Rossi	April 28, 2006
Len Gardner	April 28, 2006
Carolyn Olney	April 28, 2006
Yvetta Williams	April 28, 2006
Greg Bell	April 28, 2006
Cynthia Tuell	April 28, 2006
Lynda Warren	April 28, 2006
Ann McKibben	April 28, 2006
Ann Cantrell	April 28, 2006
Dorrit Ragosine	April 28, 2006
Theresa Brady	April 28, 2006
Ralph Bocchetti	April 28, 2006
David A. Miller	April 28, 2006
Rev. Sarah I. Gibb	April 28, 2006
Bob Faulkner	April 28, 2006
Dr. Lyle C. Henry	April 28, 2006
Tom Hazelleaf	April 28, 2006

Dr. Jack Paxton	April 28, 2006
Kris Ockershauser	April 28, 2006
Jeanette McKinley	April 28, 2006
Ruth Hall	April 28, 2006
Dr. W.D. Botch	April 28, 2006
Marlene L. Brown	April 28, 2006
Steven C. Huskey, Esquire	April 28, 2006
Valerie Zachary	April 28, 2006
Sue Kuramoto	April 28, 2006
Gary Hoover	April 28, 2006
Richard Sanders	April 28, 2006
Kenneth N. Howard	May 1, 2006
Dawn Swett	May 3, 2006
Elizabeth L. Bostian	May 3, 2006
Craig Perkins	May 3, 2006
David Perlman	May 3, 2006
Katharine Gring	May 3, 2006
Stephanie Remington	May 3, 2006
Jim Cokas	May 3, 2006
Van Collinsworth	May 3, 2006
Charles David Stout, Ph.D.	May 3, 2006
Mary Ann Kiger	May 3, 2006
Merri B. Levy	May 3, 2006
Rick Farber	May 8, 2006
Don Bremner	May 8, 2006
Robert Ives	May 8, 2006
Jose Henriquez	May 8, 2006
Erik Counseller	May 8, 2006
Inland Empire Waterkeeper	May 31, 2006
US Fish and Wildlife Service	June 21, 2006
USDA-FS PSW Region	June 23, 2006
Elsinore Valley Municipal Water District	July 6, 2006
State Senator Dennis Hollingsworth and Ray Haynes, Assemblyman, 66th District	August 2, 2006
John Pecora	September 6, 2006
Chris Hyland, Doug Pinnow, and John Lloyd	September 14, 2006
Jay Scott	October 2, 2006
Elsinore Valley Municipal Water District	October 30, 2006
Roxanne Salazar	October 31, 2006
Edna Vallecillo Garcia & Family	October 31, 2006
C & C Parties	November 2, 2006
Louise Hurt	November 2, 2006
Eleanor Haile	November 2, 2006
Jenny Flack	November 2, 2006
Gary Nazaroff	November 2, 2006
Dr. Lisa White	November 2, 2006
Tom Saldana	November 2, 2006
Anne Clendinning	November 2, 2006
Margaret Buttner	November 2, 2006
Erlene Kuentzler	November 2, 2006
Harvey Ailport	November 2, 2006

Ruth Sizemore	November 2, 2006
Ed Littlewort	November 2, 2006
David Gilmore	November 2, 2006
Sherrie Fabian	November 2, 2006
Robert Lemke	November 2, 2006
Heath Friedman and Family	November 3, 2006
Linda Sulkamer	November 7, 2006
Reginald & Aleta Thompson	November 7, 2006
Ben Gradias	November 7, 2006
Krista Bradias	November 7, 2006
Mila Escano	November 7, 2006
Debra Nisporic	November 7, 2006
Josh Miles	November 7, 2006
Bryan Groth	November 7, 2006
John Sheppard	November 7, 2006
David Clarkson	November 7, 2006
Vicki Rembock	November 7, 2006
Minervia Nisporic	November 7, 2006
Justin Merkys	November 7, 2006
Gloria Carrillo	November 7, 2006
Robert & Jackie Albaugh	November 7, 2006
Donna Parrish	November 7, 2006
Victoria Bobard	November 7, 2006
Jeremy Marsh	November 7, 2006
Clara Bernice Sheppard	November 7, 2006
Pam Harris	November 8, 2006
Anne Rendeiro	November 8, 2006
Mike Mrak	November 8, 2006
David Rendeiro	November 8, 2006
Gregory S. Brintle	November 8, 2006
Marlene L. Brintle	November 8, 2006
Kent Carlsen	November 8, 2006
Alolen W. Brumbaugh	November 8, 2006
Lucy Mikj	November 8, 2006
Richard Bogert	November 8, 2006
Gary Goldberger	November 8, 2006
David Leal	November 9, 2006
Dawn R. Carrozzo	November 9, 2006
Fred L. Carrozzo	November 9, 2006
Lois Perez	November 9, 2006
Patsy & Robert Duchesne	November 9, 2006
Yvonne Valasek	November 9, 2006
Jon Basel	November 9, 2006
Peter & Janice Daniello	November 9, 2006
Dale & Carol Hook	November 9, 2006
Eldon H. Gloor	November 9, 2006
Sherrie Fabian	November 9, 2006
JoAnn Brown	November 9, 2006
David Gross	November 9, 2006
Sharon Seidman	November 9, 2006
Ross Edmonds	November 9, 2006

Peggy M. O'Donnell	November 9, 2006
Michael P. Johns	November 9, 2006
Shirley Gross	November 9, 2006
Linda Farley	November 9, 2006
John Farley	November 9, 2006
Carmen D. Calco	November 9, 2006
Gerry Stevenson	November 9, 2006
James C. Zack	November 9, 2006
Joalene Rollison	November 9, 2006
Larry Barnett	November 9, 2006
Laurie Fitzgerrell	November 9, 2006
Robert Hills	November 9, 2006
Regina Zasadzuvusju	November 9, 2006
Nancy Leefe	November 9, 2006
Heidi Dietschi	November 9, 2006
William B. Crosman	November 9, 2006
Brian G. Cleary	November 9, 2006
Wendy J. Crosman	November 9, 2006
Norman Gundenheim	November 9, 2006
Susan Troxler	November 20, 2006
Kathy A. Pierce	December 14, 2006

COVER SHEET

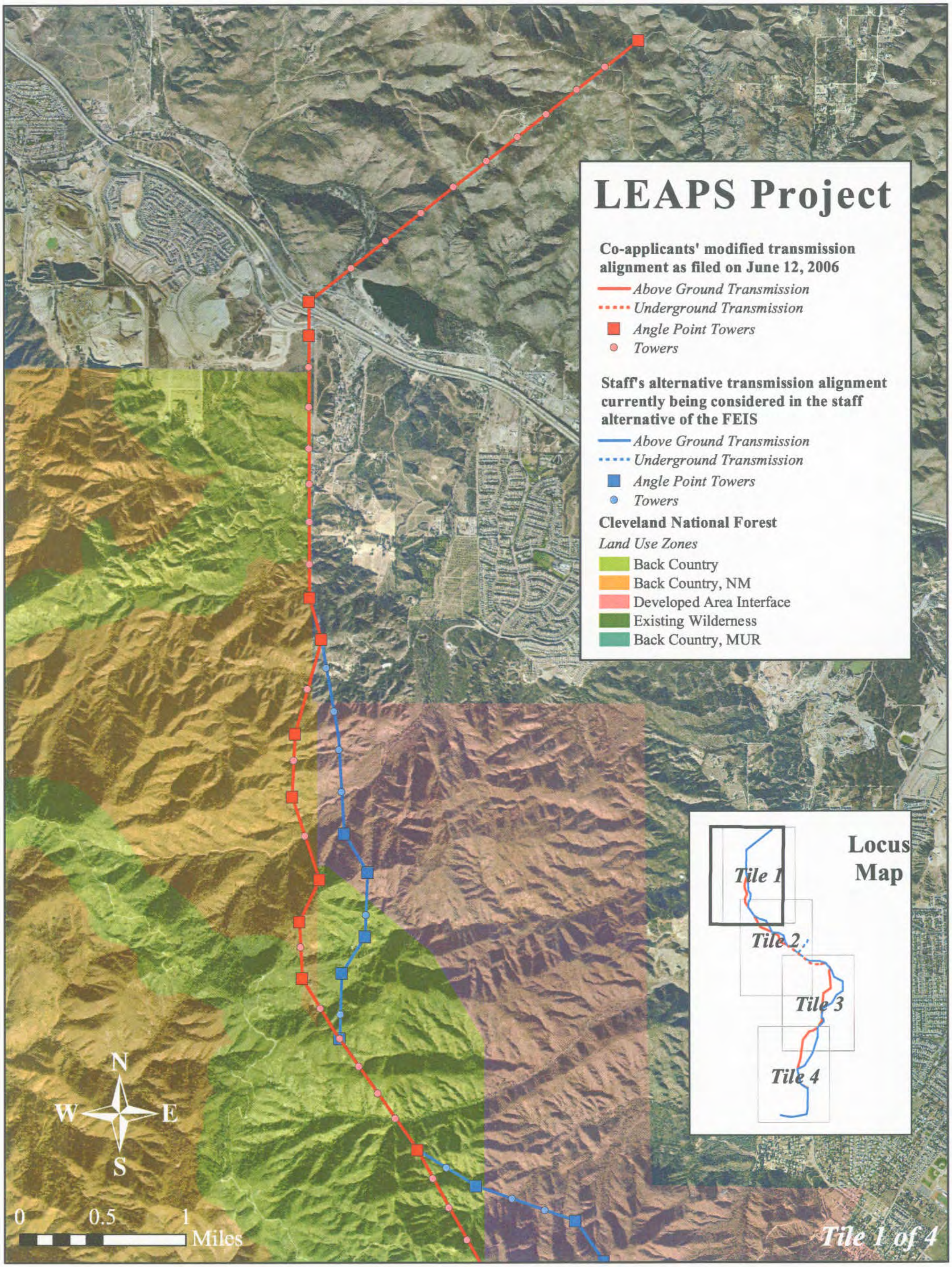
FEDERAL ENERGY REGULATORY COMMISSION

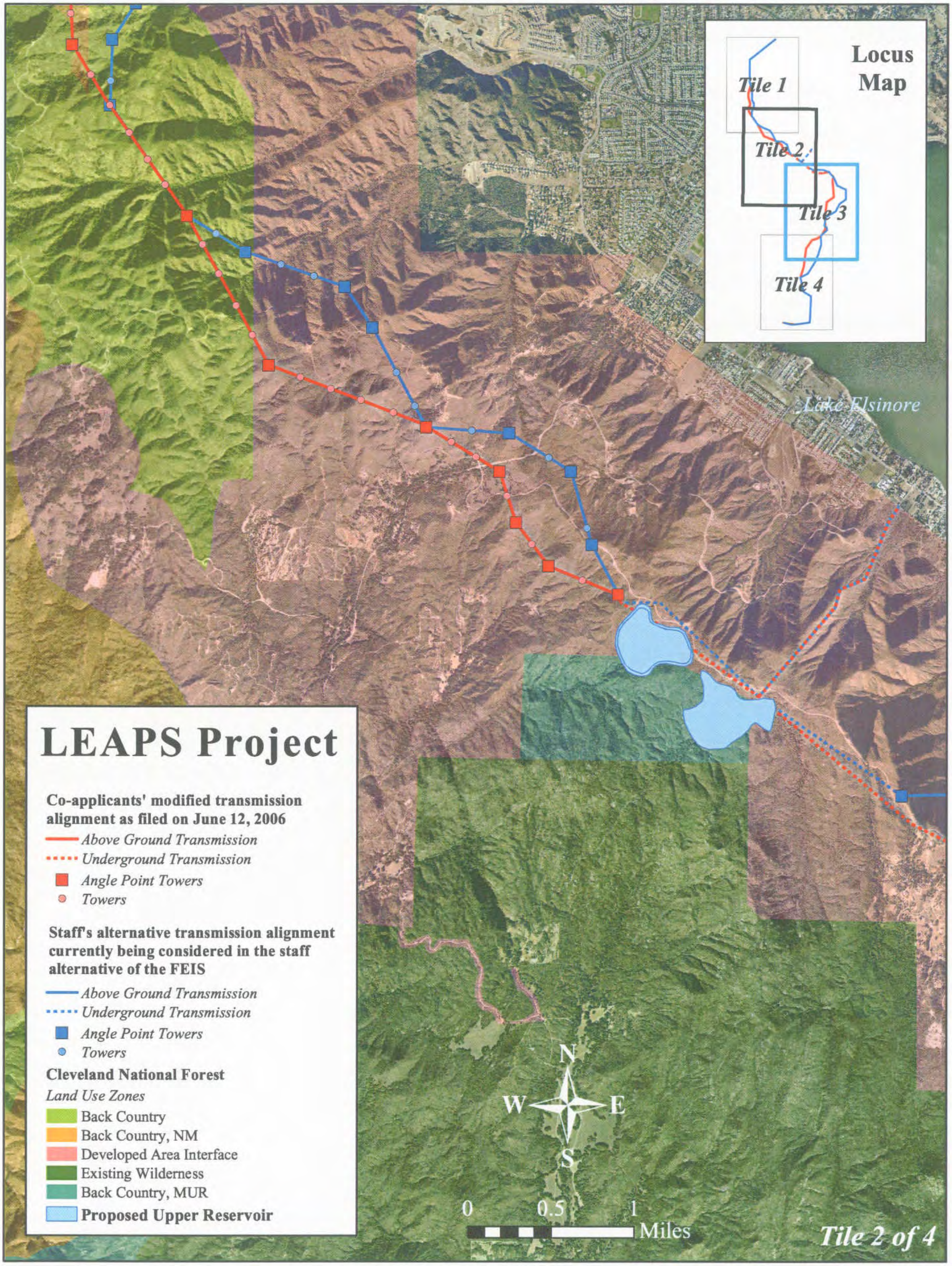
FINAL ENVIRONMENTAL IMPACT STATEMENT
FOR HYDROPOWER LICENSE
Lake Elsinore Advanced Pumped Storage Project
Docket No. P-11858-002

Appendix F
Maps of the Co-applicants' Proposed and Staff Alternative
Transmission Alignment
Tiles 1 through 4
FEIS

APPENDIX F

Maps of the Co-applicants' Proposed and Staff Transmission Alignments


LEAPS Project
Co-applicants' modified transmission alignment as filed on June 12, 2006
Above Ground Transmission
Underground Transmission
Angle Point Towers
Towers
Staff's alternative transmission alignment currently being considered in the staff alternative of the FEIS
Above Ground Transmission
Underground Transmission
Angle Point Towers
Towers
Cleveland National Forest
Land Use Zones
Back Country
Back Country, NM
Developed Area Interface
Existing Wilderness
Back Country, MUR
Locus Map
Tile 1
Tile 2
Tile 3
Tile 4
N
W
E
S
0
0.5
1
Miles
Tile 1 of 4



Locus Map
Tile 1
Tile 2
Tile 3
Tile 4
Lake Elsinore
LEAPS Project
Co-applicants' modified transmission alignment as filed on June 12, 2006
Above Ground Transmission
Underground Transmission
Angle Point Towers
Towers
Staff's alternative transmission alignment currently being considered in the staff alternative of the FEIS
Above Ground Transmission
Underground Transmission
Angle Point Towers
Towers
Cleveland National Forest
Land Use Zones
Back Country
Back Country, NM
Developed Area Interface
Existing Wilderness
Back Country, MUR
Proposed Upper Reservoir
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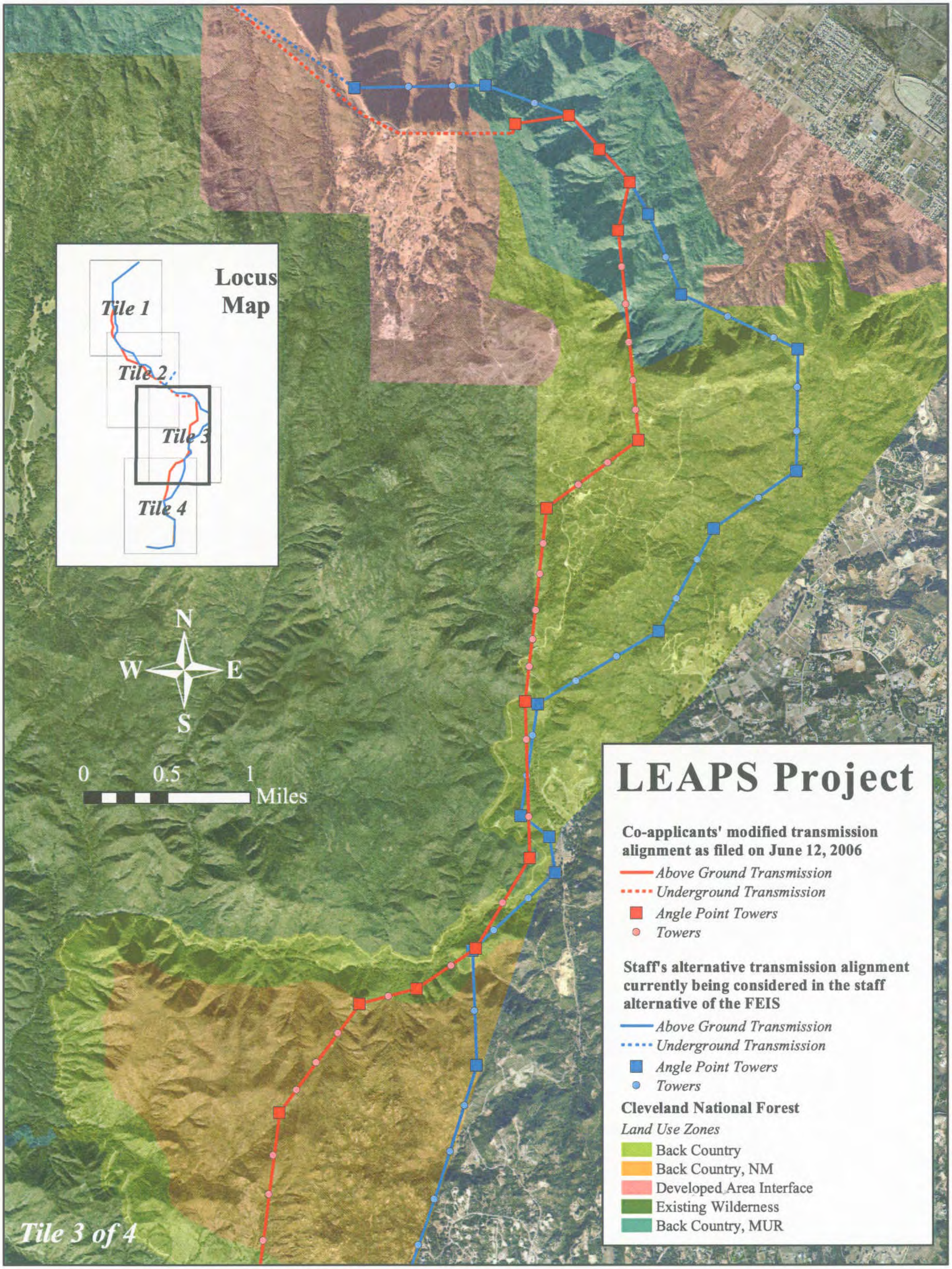
0
0.5
1
Miles
Tile 2 of 4



Locus Map
Tile 1
Tile 2
Tile 3
Tile 4
N
W
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S
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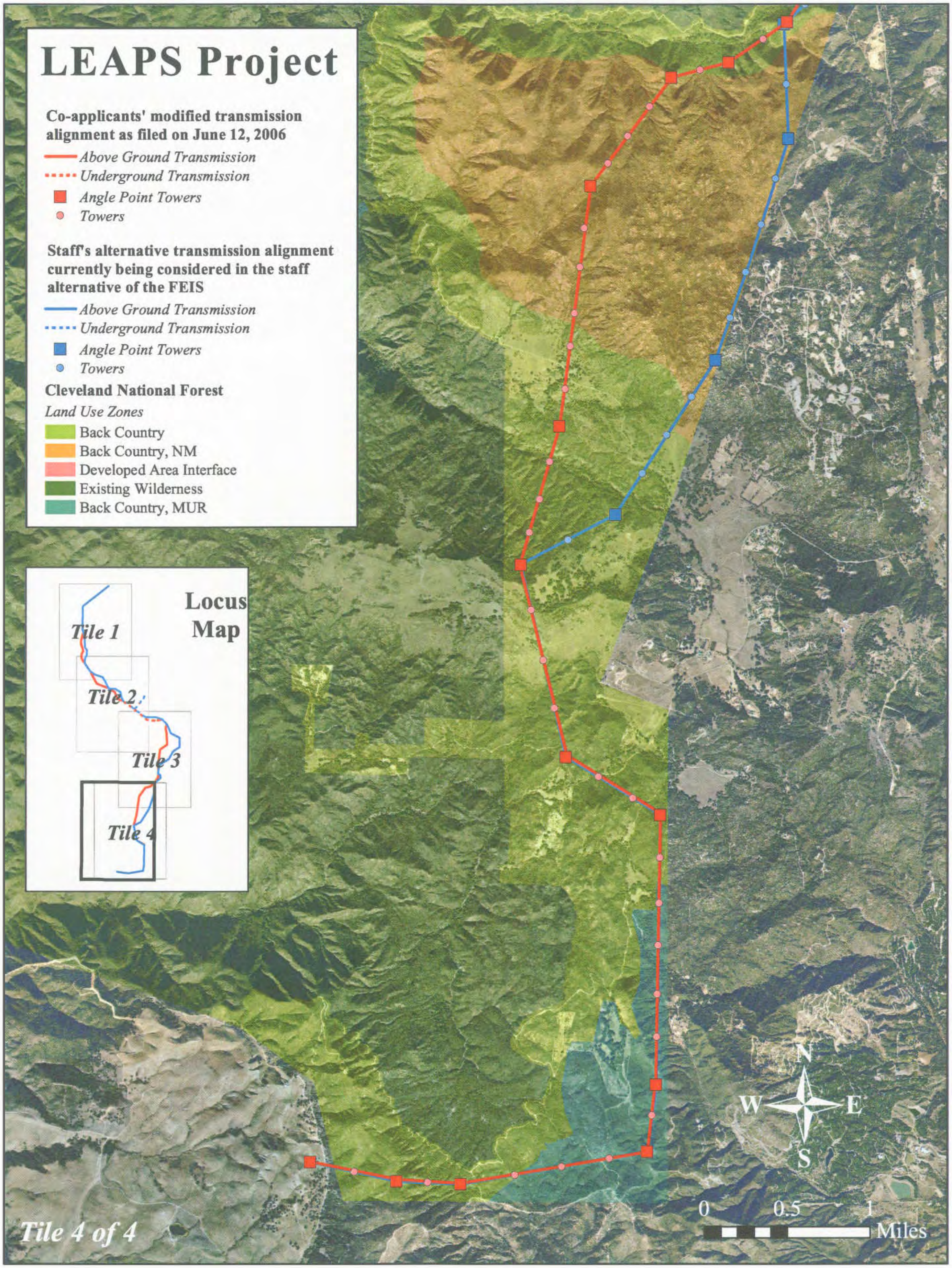
1
Miles
LEAPS Project
Co-applicants' modified transmission alignment as filed on June 12, 2006
Above Ground Transmission
Underground Transmission
Angle Point Towers
Towers
Staff's alternative transmission alignment currently being considered in the staff alternative of the FEIS
Above Ground Transmission
Underground Transmission
Angle Point Towers
Towers
Cleveland National Forest
Land Use Zones
Back Country
Back Country, NM
Developed Area Interface
Existing Wilderness
Back Country, MUR
Tile 3 of 4


LEAPS Project
Co-applicants' modified transmission alignment as filed on June 12, 2006
Above Ground Transmission
Underground Transmission
Angle Point Towers
Towers
Staff's alternative transmission alignment currently being considered in the staff alternative of the FEIS
Above Ground Transmission
Underground Transmission
Angle Point Towers
Towers
Cleveland National Forest
Land Use Zones
Back Country
Back Country, NM
Developed Area Interface
Existing Wilderness
Back Country, MUR
Locus Map
Tile 1
Tile 2
Tile 3
Tile 4
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Miles
Tile 4 of 4

COVER SHEET

FEDERAL ENERGY REGULATORY COMMISSION

FINAL ENVIRONMENTAL IMPACT STATEMENT
FOR HYDROPOWER LICENSE
Lake Elsinore Advanced Pumped Storage Project
Docket No. P-11858-002

Appendix G
Management Indicator Species (MIS) Analysis
Pages G-1 to G-12
FEIS

APPENDIX G

Management Indicator Species Analysis

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APPENDIX G

MANAGEMENT INDICATOR SPECIES ANALYSIS

1. INTRODUCTION

The purpose of this assessment is to evaluate the effects of the Lake Elsinore Advanced Pumped Storage Project (LEAPS Project) on Management Indicator Species (MIS) identified in the Land Management Plan (LMP) for the southern California forests (USFS, 2005a).

2. PROJECT DESCRIPTION

In February, 2004, the Elsinore Valley Municipal Water District (Elsinore Valley MWD) and the Nevada Hydro Company, Inc. (Nevada Hydro), or co-applicants, filed an application for an original license with the Federal Energy Regulatory Commission (Commission or FERC) for the construction and operation of a 500-MW pumped storage project. The project would use Lake Elsinore as a lower reservoir, and would require construction of an upper reservoir within the boundaries of the Cleveland National Forest. The project, including an approximately 30-mile-long transmission line, would occupy about 2,412 acres of federal lands, including National Forest System lands. The co-applicants filed a special use permit application for the TE/VS Interconnect Project with the U.S. Forest Service (USFS) in July 2003. Under the Federal Land Policy and Management Act, the USFS must decide whether to grant an easement for rights of way over, across, and upon National Forest System lands for electrical poles and lines for the transmission and distribution of electrical power.

The proposed action consists of an upper reservoir in Morrell Canyon, a powerhouse at the Santa Rosa location, and a transmission line that crosses the Cleveland National Forest. The staff alternative consists of an upper reservoir at the Decker Canyon site, a powerhouse at the Santa Rosa location, and a transmission line with an alignment similar to the proposed route. For a detailed description of the proposed action and the staff alternative and maps of the project area, refer to the LEAPS Project final environmental impact statement (final EIS).

3. MIS SELECTED FOR THE PROJECT

Table G-1 shows the MIS selected for the four southern California forests, what each is intended to represent, and whether they occur in the LEAPS Project area. As shown in the table, blue oak, Englemann oak, valley oak, bigcone Douglas-fir, Coulter pine, California black oak and white fir do not occur in the project area. The remaining five MIS (mountain lion, mule deer, arroyo toad, song sparrow and California spotted owl) are relevant to the LEAPS Project, and could be affected by construction and operation.

Table G-1. Management Indicator Species selected for the four southern California forests.

Species	Indicators of Management	Relevance to LEAPS Project
Mountain lion	Fragmentation	Known to occur in the project area
Mule deer	Healthy, diverse habitats	Known to occur in the project area
Arroyo toad	Aquatic habitat	Potential habitat in the project area, but not documented to occur
Song sparrow	Riparian habitat	Known to occur in the project area
California spotted owl	Montane conifer forest	Known to occur near the project area
Blue oak	Oak regeneration	Does not occur in the project area

Species	Indicators of Management	Relevance to LEAPS Project
Engelmann oak	Oak regeneration	Does not occur in the project area
Valley oak	Oak regeneration	Does not occur in the project area
Bigcone Douglas-fir	Bigcone Douglas fir forest	Does not occur in the project area
Coulter pine	Coulter pine forest	Does not occur in the project area
California black oak	California black oak forest	Does not occur in the project area
White fir	Montane conifer forest	Does not occur in the project area

In the following sections, we summarize the environmental baseline and potential environmental effects of the LEAPS Project on MIS. Most of the baseline information is taken from species accounts that were developed to provide technical support for the LMP (USFS, 2005b). Detailed information about the environmental baseline for each species (general distribution, distribution in the national forests of southern California, natural history, population and /or habitat status and trends on National Forest System lands, predicted viability outcomes, and threats and conservation considerations) is available on-line in the "reading room" associated with the LMP (USFS, 2006b).

For each species, the discussion of environmental effects focuses on project elements that would be located on National Forest System lands. The FEIS for the LEAPS Project contains additional analysis about potential effects within the broader project area, which also includes non-National Forest System lands. Section 3.3.4.2, *Terrestrial Resources*, of the final EIS discusses effects on mountain lion, mule deer, song sparrow and California spotted owl. Section 3.3.5.2, *Threatened and Endangered Species*, addresses effects on the arroyo toad.

4. MIS ENVIRONMENTAL BASELINE AND ENVIRONMENTAL EFFECTS

4.1 Mountain Lion

The Cleveland National Forest chose the mountain lion as an MIS to evaluate planning and management of habitat fragmentation and habitat linkages (USFS, 2005a). The USFS management goal for this species is to ensure functional landscape linkages and ensure the population is well-distributed.

4.1.1 Environmental Baseline

Mountain lions are habitat generalists, inhabiting a variety of habitat types throughout California. They use any area with predominantly native, woody vegetation; ample prey (especially mule deer); and low density of human inhabitants (Dickson et al., 2005). They are rare at higher elevations in pure stands of conifers and at lower elevations in pure stands of chamise chaparral.

While mountain lions may be thriving in some areas of northern California, they are considered imperiled in some of southern California's highly fragmented wildlands (Stephenson and Calcarone 1999). Beier (1991) estimates a population of about 20 mountain lions in the Santa Ana Mountains of the Cleveland National Forest. This population is isolated as a result of habitat fragmentation, and is likely to be extirpated unless adequate movement corridors are established and protected between the Santa Anas and the Palomar Range to the east.

A 5-year study of mountain lions in the Santa Ana Mountains showed that two animals occupied home ranges that included sites where LEAPS Project features would be constructed (Beier and Barrett, 1993). One of these animals (a young male) was documented several times in upper Morrell Canyon. Radio-tracking of both this individual and one other mountain lion (an adult female) showed frequent movements near the northern segment of the proposed transmission alignment route, parallel with the ridgeline (a northwest-southeast orientation).

4.1.2 Environmental Effects

Effects of the Proposed Action on Mountain Lion Habitat

Construction of an upper reservoir at Morrell Canyon would temporarily disturb about 140 acres of suitable mountain lion habitat and convert about 100 acres, including 20 acres of riparian oak woodland, to project use. The reservoir would be located on top of Lion Spring. Water from the upper drainage area would be collected and conveyed under the reservoir, and returned to the creek downstream of the dam.

Construction would affect about 0.25 acre at each of 85 transmission tower sites, and would convert about 21.25 acres of suitable mountain lion habitat to project use. Some temporary access roads would be constructed, and then obliterated and revegetated, but many of the towers would be installed using helicopters to avoid road construction on steep slopes. Locations of any access roads that may be constructed are not known at this point in the design process.

Construction of the underground transmission line segment would temporarily disturb about 23.2 acres within suitable mountain lion habitat, and convert about 5.8 acres to permanent maintenance road.

Noise disturbance would occur during construction. Maintenance activities during project operation would cause localized disturbance at the reservoir site, but disturbance levels would not be substantially greater than those that occur under existing conditions along the South Main Divide Road and Morgan Trail. The co-applicants would use helicopters to maintain the transmission line, which would cause temporary, localized disturbance.

Effects of the Staff Alternative on Mountain Lion Habitat

Construction of an upper reservoir at Decker Canyon would temporarily disturb about 140 acres of suitable habitat, and convert about 100 acres, including 5 acres of riparian oak woodland, to project use. No springs or seeps would be affected by construction, and no water conveyance system is thought to be necessary.

Construction would affect about 0.25 acre at each of an estimated 85 transmission tower sites and would convert about 21.25 acres to project use. The southern segment of the alternative alignment is located east of the proposed alignment and closer to the edge of the National Forest System boundary over several miles of the route, or follows immediately along the edge of the National Forest System boundary. Any temporary access roads needed for this alignment would presumably also be closer to the edge of the National Forest System boundary. Many of the towers would be installed using helicopters to avoid road construction on steep slopes. Locations of any access roads that may be constructed are not known at this point in the design process.

Construction of the underground transmission line segment would temporarily disturb about 15.1 acres within suitable mountain lion habitat, and convert about 3.4 acres to permanent maintenance road.

Noise disturbance would occur during construction. Maintenance activities during project operation would cause localized disturbance at the reservoir site. Disturbance levels would be slightly greater than those that occur under existing conditions along the South Main Divide Road, because construction would occur at a site that does not support any recreation activity. The co-applicants would use helicopters to maintain the transmission line, which would cause temporary, localized disturbance.

Effects on Mountain Lion Habitat and/or Population Trends

Construction of either project alternative would contribute to the downward trend in habitat availability for mountain lions in southern California, and would likely contribute to downward population trends for this species in the Santa Ana Mountains. Effects associated with Morrell Canyon would be more substantial than those that would occur at Decker Canyon, due to the loss of more oak woodland. Based on radio-tracking studies (Beier and Barrett, 1993), upper Morrell Canyon (and Lion Spring) may provide an important habitat element for mountain lions. Lion Spring may also be important for mule deer, their primary prey.

The transmission line itself would not likely block mountain lion movement or interfere with existing or proposed linkages, because transmission towers typically would be spaced at intervals of 1,000 to over 1,700 feet, and vegetation would not be removed beneath the line, except as needed for fuel management during project operation. The staff alternative alignment is closer to the edge of the National Forest System boundary, and intrudes less into mountain lion habitat. Access roads would also likely intrude less into mountain lion habitat under the staff alternative alignment. For this reason, the staff alternative transmission alignment should have less effect on mountain lion habitat or population trends.

Permanent maintenance or temporary access roads would not likely block mountain lion movement, since mountain lions often travel along lightly used dirt roads, but would increase the risk of disturbance (including illegal harvest) and damage to habitat, if public access is not controlled. Implementation of weed management and road management plans would reduce the potential for adverse effects.

4.2 Mule Deer

The Cleveland National Forest uses mule deer as an indicator of healthy, diverse habitats with low to moderate levels of human disturbance (USFS, 2005a). The USFS management goal for mule deer is to maintain stable or increasing well-distributed populations.

4.2.1 Environmental Baseline

In low-elevation mountain ranges of southern California, such as the Santa Ana Mountains, mule deer reach their highest densities in oak woodlands, riparian areas, and meadow and grassland margins. They also occur in open scrub and young chaparral.

The LMP indicates that the four southern California national forests support most of the deer in the southern part of California (USFS, 2005b). The USFS (2005b) reports that the Santa Ana population is estimated at about 950 deer. Based on analysis of trends between 1990 and 1996, CDFG believes that populations are stable in the South Coast Deer Analysis Unit (DAU 7), which includes the Santa Ana Mountains (CDFG, 1998). More recently, the USFS estimated the population in hunt zones D-15 and D-16 of DAU 7, which are located in the Cleveland National Forest, at 3,360 (USFS, 2005b).

Effects of the Proposed Action on Mule Deer Habitat

Construction of an upper reservoir at Morrell Canyon would temporarily disturb about 140 acres of suitable mule deer habitat and convert about 100 acres, including 20 acres of riparian oak woodland, to project use. The reservoir would be located on top of Lion Spring, which may be important as a water source for mule deer. However, water from the upper drainage area would be collected and conveyed under the reservoir, and returned to the creek downstream of the dam.

Construction would affect about 0.25 acre at each of 85 transmission tower sites, and would convert about 21.25 acres of suitable mule deer habitat to project use. Some temporary access roads would be constructed, and then obliterated and revegetated, but many of the towers would be installed using helicopters to avoid road construction on steep slopes. Locations of any access roads that may be constructed are not known at this point in the design process.

Construction of the underground transmission line segment would temporarily disturb about 23.2 acres within suitable mule deer habitat, and convert about 5.8 acres to permanent maintenance road.

Noise disturbance would occur during construction. Maintenance activities during project operation would cause localized disturbance at the reservoir site, but disturbance levels would not be substantially greater than those that occur under existing conditions along the South Main Divide Road and Morgan Trail. The co-applicants would use helicopters to maintain the transmission line, which would cause temporary, localized disturbance.

Effects of the Staff Alternative on Mule Deer Habitat

Construction of an upper reservoir at Decker Canyon would temporarily disturb about 140 acres of suitable mule deer habitat and convert about 100 acres, including 5 acres of riparian oak woodland, to project use. No springs or seeps would be affected by construction, and no water conveyance system is thought to be necessary.

Construction would affect about 0.25 acre at each of an estimated 85 transmission tower sites and would convert about 21.25 acres to project use. Temporary access roads would likely be constructed to provide access to the transmission line route, but many of the towers would be installed using helicopters to avoid road construction on steep slopes. Locations of any access roads that may be constructed are not known at this point in the design process.

Construction of the underground transmission line segment would temporarily disturb about 15.1 acres within suitable mule deer habitat and convert about 3.4 acres to permanent maintenance road.

Noise disturbance would occur during construction. Maintenance activities during project operation would cause localized disturbance at the reservoir site. Disturbance levels are currently low, because the Decker Canyon site does not provide trail access. For this reason, maintenance activity would represent a small incremental increase in Decker Canyon. The co-applicants would use helicopters to maintain the transmission line, which would cause temporary, localized disturbance.

Effects of the Project on Mule Deer Habitat and/or Population Trends

Construction of either project alternative would contribute to downward trends in habitat for mule deer that have occurred as a result of residential and urban development in southern California. Loss of habitat would eventually also contribute to downward trends in population, although a 1998 CDFG report indicated the population trend in DAU 7 is stable. Riverside County is one of the five counties anticipated to be most affected by loss of habitat for deer between 2000 and 2020 (CDFG, 2004). Loss of a larger area of oak woodland at Morrell Canyon would have a more substantial effect than loss of habitat at Decker Canyon, because mule deer use oak woodlands for thermal and hiding cover, and rely heavily on acorns as a food resource in the fall (Zeiner et al., 1990).

Road densities would slightly increase under either alternative, and increase the risk of disturbance (including illegal harvest) and habitat damage during project operation, if public access is not controlled. Implementation of weed management and road management plans would reduce the potential for adverse effects.

4.3 Arroyo Toad

The arroyo toad is an indicator of aquatic habitat quality. The Cleveland National Forest anticipates that long term trends in arroyo toad abundance, distribution and habitat condition will reflect the effectiveness of protection and improvement measures for arroyo toads and other riparian dependent species on National Forest System lands. The USFS management goal for this species is to maintain properly functioning streams and stable or increasing populations (USFS, 2005a).

4.3.1 Environmental Baseline

The arroyo toad is endemic to the coastal plains, mountains, and desert slopes of central and southern California and northwestern Baja California from near sea level to about 8,000 feet. Within these areas, arroyo toads are found in both perennial and intermittent rivers and streams with shallow, sandy to gravelly pools adjacent to sand or fine gravel terraces.

Arroyo toads occur in most of the major stream systems on the Cleveland National Forest. While populations on the Cleveland National Forest and surrounding lands are more numerous than on the other forests, many appear to be small. Most of the populations occur right along the national forest boundary, with the bulk of prime breeding habitat often lying just off National Forest System lands.

The FWS recovery plan indicates the arroyo toad is present in the headwaters of San Mateo Creek and some of its tributaries, and identifies San Juan Creek from Decker Canyon to the Orange County line as being within Recovery Unit 10 (FWS, 1999). In April 2005, FWS revised the boundaries of designated critical habitat for the arroyo toad (70 FR 70). No critical habitat is now designated within the San Juan Creek or San Mateo Creek drainages in Riverside or Orange County.

Essential habitat for this species is located in the San Juan Creek drainage downstream of the Riverside/Orange County line, about 4 miles south of Morrell and Decker canyons (70 FR 70).

The co-applicants' consultant, MBA, identified potential habitat for the arroyo toad at one location on the northern segment of the proposed transmission alignment (Temescal Wash), outside National Forest System lands, and at two locations along the southern segment (Los Alamos Canyon and Tenaja Creek), where the transmission alignment would cross streams and associated riparian habitat. MBA conducted surveys for the arroyo toad at each of these sites but did not observe any evidence of this species (MBA, 2004).

4.3.2 Environmental Effects

Effects of the Proposed Action on Arroyo Toad Habitat

Construction of an upper reservoir at Morrell Canyon would not affect arroyo toad habitat.

Construction of two transmission towers could affect about 0.5 acre of essential habitat at Los Alamos Canyon and Tenaja Creek crossings, if they are constructed within 1,640 feet of riparian habitat. Construction of two towers at Temescal Wash could affect 0.5 acre of potential habitat. However, towers generally would be constructed at the tops of slopes and along ridgelines, rather than in canyon draws or stream bottoms that would support riparian habitat.

Temporary road construction could affect the suitable toad habitat, including tributaries to the San Mateo Creek watershed. Locations of any access roads that may be constructed are not known at this point in the design process. However, existing roads or helicopters would be used to install most transmission line towers to avoid road construction on steep slopes.

Construction of the underground segment of the transmission line would not affect arroyo toad habitat.

Effects of the Staff Alternative on Arroyo Toad Habitat

Construction of an upper reservoir at Decker Canyon would not affect arroyo toad habitat.

Construction of two transmission towers could affect about 0.5 acre of essential habitat at Los Alamos Canyon and Tenaja Creek crossings, if they are constructed within 1,640 feet of riparian habitat. Construction of two towers at Temescal Wash could affect 0.5 acre of potential habitat. However, towers generally would be constructed at the tops of slopes and along ridgelines, rather than in canyon draws or stream bottoms that would support riparian habitat.

Temporary road construction could affect the suitable toad habitat, including tributaries to the San Mateo Creek watershed. Locations of any access roads that may be constructed are not known at this point in the design process. However, existing roads or helicopters would be used to install most transmission line towers to avoid road construction on steep slopes.

Construction of the underground segment of the transmission line would not affect arroyo toad habitat.

Effects on Arroyo Toad Habitat and/or Population Trends

Construction of an upper reservoir at either Morrell Canyon or Decker Canyon would not affect arroyo toad habitat or population trends. No habitat is present at the site, and the risk of adverse effects occurring downstream in the event of a dam failure is small. High hazard dams (such as would be constructed at either location) must be designed to withstand the probable maximum flood and the maximum credible earthquake, and are subject to regular federal and state inspections.

Construction of transmission towers and access roads is anticipated to avoid riparian habitat, for the most part. Construction of either transmission alignment could cause a small reduction (i.e., 0.5 to 1.0 acre) in potential habitat, but would not likely contribute to downward population trends, since no arroyo toad populations are known in the project area.

If located in riparian habitats, temporary access roads could increase the risk of erosion and sedimentation during construction. Implementation of best management practices to prevent erosion and sedimentation would reduce the potential for adverse effects on streambank stability and water quality.

If located in riparian habitats, temporary access roads could also increase the risk of disturbance and habitat damage during project operation, unless public access is controlled. Implementation of weed management and road management plans reduce the potential for adverse effects.

4.4 Song Sparrow

The Cleveland National Forest selected the song sparrow as an MIS for the health of riparian habitat (USFS, 2005a). The USFS management goal for this species is to maintain stable or increasing populations and healthy riparian habitat.

4.4.1 Environmental Baseline

In California, this species breeds primarily in riparian habitat or wetlands, where it typically nests in herbaceous vegetation or shrubs. The LMP describes song sparrows as being well distributed in southern California forests; surveyors documented song sparrows at 197 out of 206 point count stations during an 8-year period of forest riparian bird count surveys.

The Partners in Flight Species Assessment (Panjabi et al., 2005) indicates population trends are highly variable or unknown within the species' range, and predicts a slight to moderate decline in future suitability of breeding conditions. The LMP describes a significant negative trend in populations on National Forest System lands, and a slight downward (but insignificant) trend on non-National Forest System lands in the California foothills (USFS, 2005b). However, the LMP also emphasizes protection and enhancement of riparian condition, and indicates the trend for this habitat type should be stable or improving.

Effects of the Proposed Action on Song Sparrow Habitat

Construction of an upper reservoir at Morrell Canyon would convert about 20 acres of riparian oak woodland to project use. The reservoir would be located on top of Lion Spring. Water from the upper drainage area would be collected and conveyed under the reservoir, and returned to the creek downstream of the dam.

Tower construction would affect some song sparrow habitat where the alignment crosses streams, but towers generally would be sited along ridgelines and at the tops of slopes, rather than in canyon draws or stream bottoms that might support riparian forest or shrub. Temporary access roads would presumably also avoid steep canyon draws and riparian habitat, and should not affect song sparrow habitat during either construction or operation. Locations of any access roads that may be constructed are not known at this point in the design process. However, existing roads or helicopters would be used to install most transmission line towers to avoid road construction on steep slopes.

Construction of the underground transmission line segment and the permanent maintenance road alongside it would be located primarily in chaparral and would not affect song sparrow habitat.

Noise disturbance would occur during construction. Maintenance activities during project operation would cause localized disturbance at the reservoir site, but disturbance levels would not be substantially greater than those that occur under existing conditions along the South Main Divide Road and Morgan Trail. The co-applicants would use helicopters to maintain the transmission line, which would cause temporary, localized disturbance.

Effects of the Staff Alternative of Song Sparrow Habitat

Construction of an upper reservoir at Decker Canyon would convert about 5 acres of riparian oak woodland to project use. No seeps or springs are present, and no water conveyance system is thought to be needed.

Tower construction would affect some song sparrow habitat, but towers generally would be sited along ridgelines and at the tops of slopes, rather than in canyon draws or stream bottoms that might support riparian forest or shrub. Locations of any access roads that may be constructed are not known at this point in the design process. Temporary access roads would presumably also avoid steep canyon draws and riparian habitat, and should not affect song sparrow habitat during either construction or operation.

Construction of the underground transmission line segment and the permanent maintenance road alongside it would be located primarily in chaparral and would not affect song sparrow habitat.

Noise disturbance would occur during construction. Maintenance activities during project operation would cause localized disturbance at the reservoir site. Disturbance levels are currently low, because the Decker Canyon site does not provide trail access. Maintenance activities could represent a small incremental increase in disturbance. The co-applicants would use helicopters to maintain the transmission line, which could cause temporary, localized disturbance near some riparian areas.

Effects on Song Sparrow Habitat and/or Population Trends

Construction of a reservoir at either Morrell Canyon or Decker Canyon would reduce available habitat for song sparrows. Effects would be greater at Morrell Canyon, which carries more water and supports more hydrophytic vegetation than Decker Canyon. Construction at either site could contribute to downward trends in song sparrow populations, which the LMP describes as significantly negative on National Forest System lands, and slightly downward (but insignificant) on non-National Forest System lands.

Construction of transmission towers and access roads is anticipated to avoid riparian habitat, for the most part. If located in riparian habitats, temporary access roads could increase the risk of erosion during construction. Implementation of best management practices would reduce the potential for adverse effects on streambank stability.

If located in riparian habitats, temporary access roads could increase the risk of disturbance and habitat damage during project operation, unless public access is controlled. Implementation of weed management and road management plans would reduce the potential for adverse effects.

4.5 California Spotted Owl

The California spotted owl is an MIS for montane conifer forest habitat (USFS, 2005a). The Cleveland National Forest anticipates that monitoring for this species would provide information about whether USFS management is maintaining enough mature, large-diameter, high-canopy cover stands with densely shaded understories to provide sufficient habitat for interior forest species. The USFS management goal for this species is to maintain/increase numbers and distribution (USFS, 2005a).

4.5.1 Environmental Baseline

California spotted owls in the Santa Ana Mountains, and in other southern California forests, are clustered in islands of suitable habitat, surrounded by habitat that is not suitable (USFS, 2005b). The LMP indicates that in southern California, owls may use home ranges as small as 98 to 243 acres when they are located in riparian/hardwood forests, because they use narrow stringers of dense forest along steep canyons in areas otherwise dominated by chaparral (USFS, 2005b). Small oak stands may also serve as important stepping stones in dispersal.

As of 1992, surveys confirmed 114 pairs in the San Bernardino Mountains, the largest subpopulation in southern California, and 11 in the Santa Ana Mountains (Beck and Gould, 1992). The results of a 2003 report on range-wide population trends were inconclusive, but USFS (2005b) indicates there is a high risk that the southern California metapopulation will go extinct within the next 30 to 40 years.

Effects of the Proposed Action on California Spotted Owl Habitat

Construction of an upper reservoir at Morrell Canyon would convert about 20 acres of oak woodland to project use.

Tower construction could affect some owl habitat, but towers generally would be sited along ridgelines and at the tops of slopes, rather than in canyon draws that might support riparian forest. Locations of any access roads that may be constructed are not known at this point in the design process. Temporary access roads would presumably also avoid steep canyon draws and riparian habitat, and should not affect owl habitat during either construction or operation.

Construction of the underground transmission line segment and the permanent maintenance road alongside it would be located primarily in chaparral and would not affect owl habitat.

Noise disturbance during construction or operation would be unlikely, because the closest documented owl site is located about 2 miles from the proposed transmission alignment.

Effects of the Staff Alternative on California Spotted Owl Habitat

Construction of an upper reservoir at Decker Canyon would convert about 5 acres of oak woodland to project use.

Tower construction could affect some owl habitat, but towers generally would be sited along ridgelines and at the tops of slopes, rather than in canyon draws that might support riparian forest.

Construction of the underground transmission line segment and the permanent maintenance road alongside it would be located primarily in chaparral and would not affect owl habitat. Locations of any access roads that may be constructed are not known at this point in the design process. Temporary access roads would presumably also avoid steep canyon draws and riparian habitat, and should not affect owl habitat during either construction or operation.

Noise disturbance would be unlikely during project construction or operation, because the closest documented owl site is located about 2 miles from the staff alternative transmission alignment.

Effects on California Spotted Owl Habitat and/or Population Trends

The loss of oak woodland habitat at Morrell Canyon or Decker Canyon would contribute to downward habitat trends for the California spotted owl in southern California. Effects associated with Morrell Canyon would be more substantial than those that would occur at Decker Canyon, due to the loss of more oak woodland that could serve as a stepping stone for owl dispersal. USFS assigns the highest habitat value rating to coast live oak forest with 80 to 100 percent canopy cover (USFS, 2005b).

No California spotted owls are known to be present in any areas that would be affected by project construction, and no direct loss of nest sites, pairs or individuals would be expected. However, loss of habitat at either Morrell or Decker Canyon would likely contribute to downward trends in population and further impede recovery of populations in the Santa Ana Mountains.

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