2.0 PROPOSED ACTION AND ALTERNATIVES

2.1 INTRODUCTION

In this section, we describe the alternatives analyzed in this draft 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, pumped storage does not depend on fossil fuels and is not 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;
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;
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 30 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; and
8. appurtenant facilities.

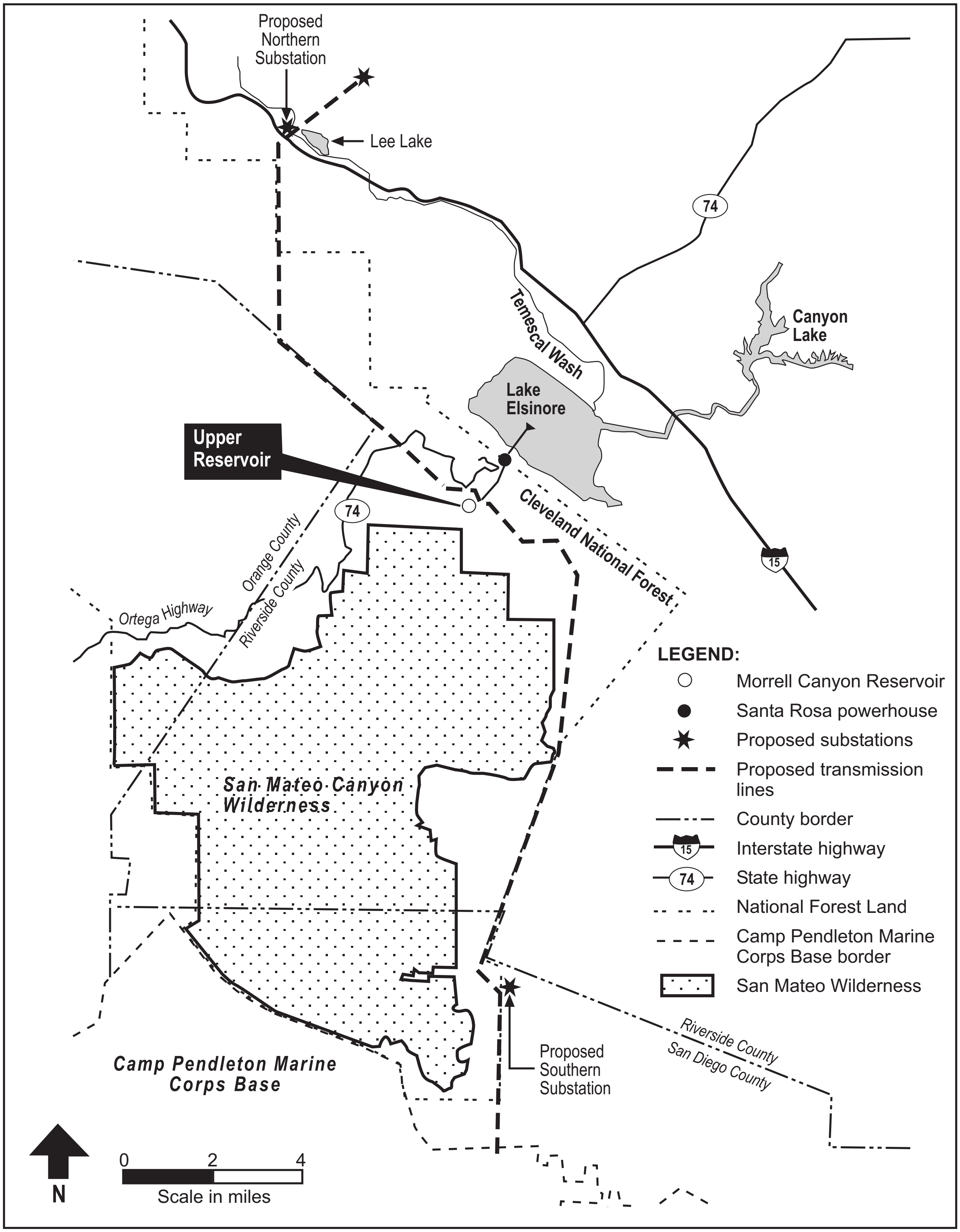

Figure 2. LEAPS Project—Proposed project facility locations. (Source: Elsinore Valley MWD and Nevada Hydro, 2004a, as modified by staff)

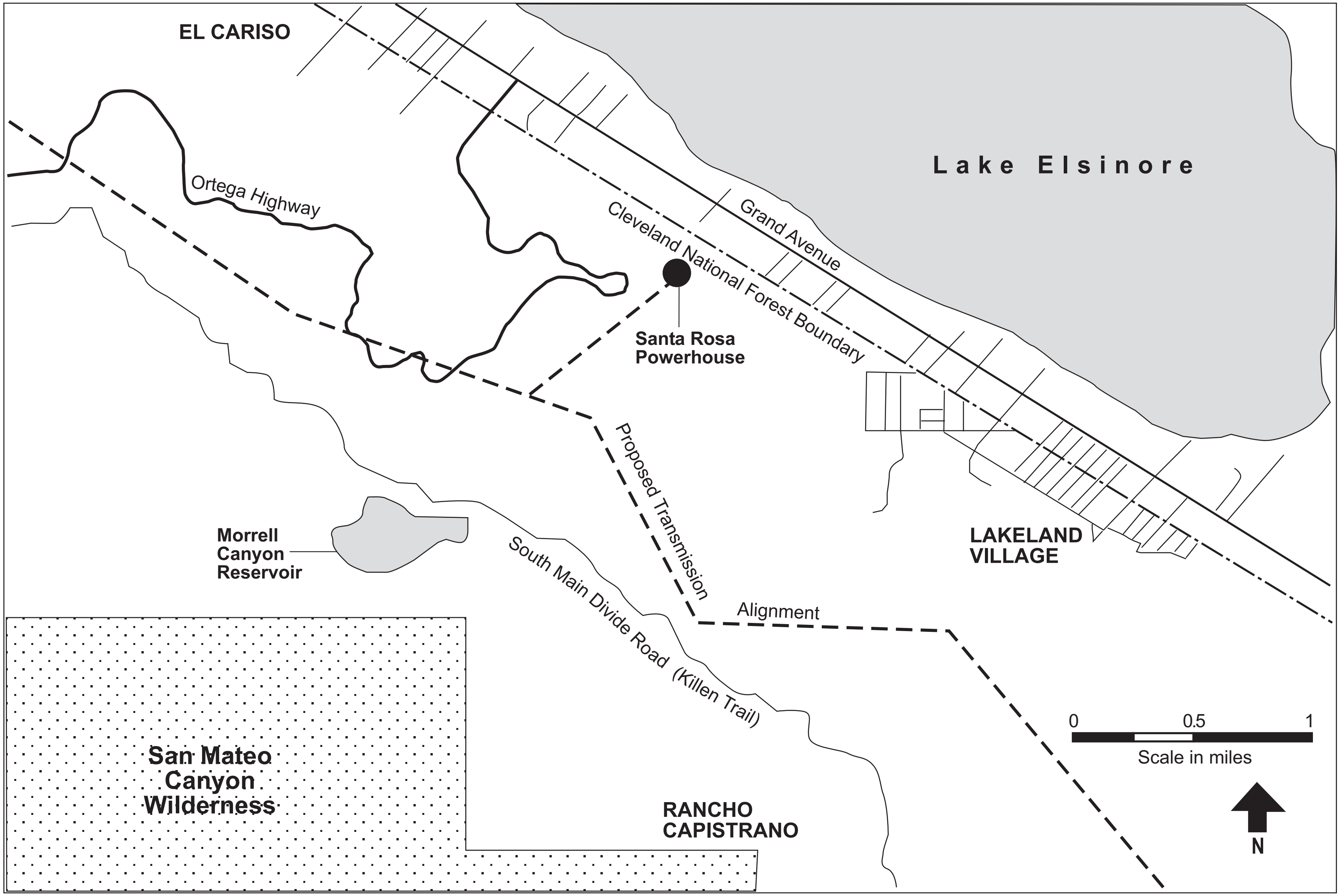

Figure 3. LEAPS Project—Proposed upper reservoir and powerhouse sites. (Source: Elsinore Valley MWD and Nevada Hydro, 2004a, as modified by staff)

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.[10] 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.

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

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[10] 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).

a slope of about 2 percent; and (3) a 250-foot-long, 12-foot-diameter steel penstock.[11] 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 13.8-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 30-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 generally in line with the project's underground high-pressure water conduit. This initial uphill portion would be a double-circuit, overhead line using aluminum conductors with steel reinforced centers suspended from porcelain insulators carried by self-supporting steel-lattice towers about 170 feet tall. Each circuit would consist of three phases with bundles of two to three aluminum conductors with steel reinforced centers per phase. The double-circuit portion of the transmission line would split into two single-circuit lines once it reaches the top of the hill, with each circuit changing direction on a "heavy angle" (60 degree to 90 degree) structure and then heading north or south. The southern segment of the proposed transmission alignment would connect the LEAPS

[11] 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).

Project to the SDG&E system at a new interconnecting substation near the existing 230-kV Talega-Escondido transmission line where the line enters Camp Pendleton in northern San Diego County. The northern 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 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 and Ortega Oaks powerhouse location are described under section 2.4.3, *Staff Alternative*. The Evergreen powerhouse location is 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. 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 cubic yards from the high-head water conduit tunnels including construction adits and power shaft intake; 4,500 cubic yards 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; 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).

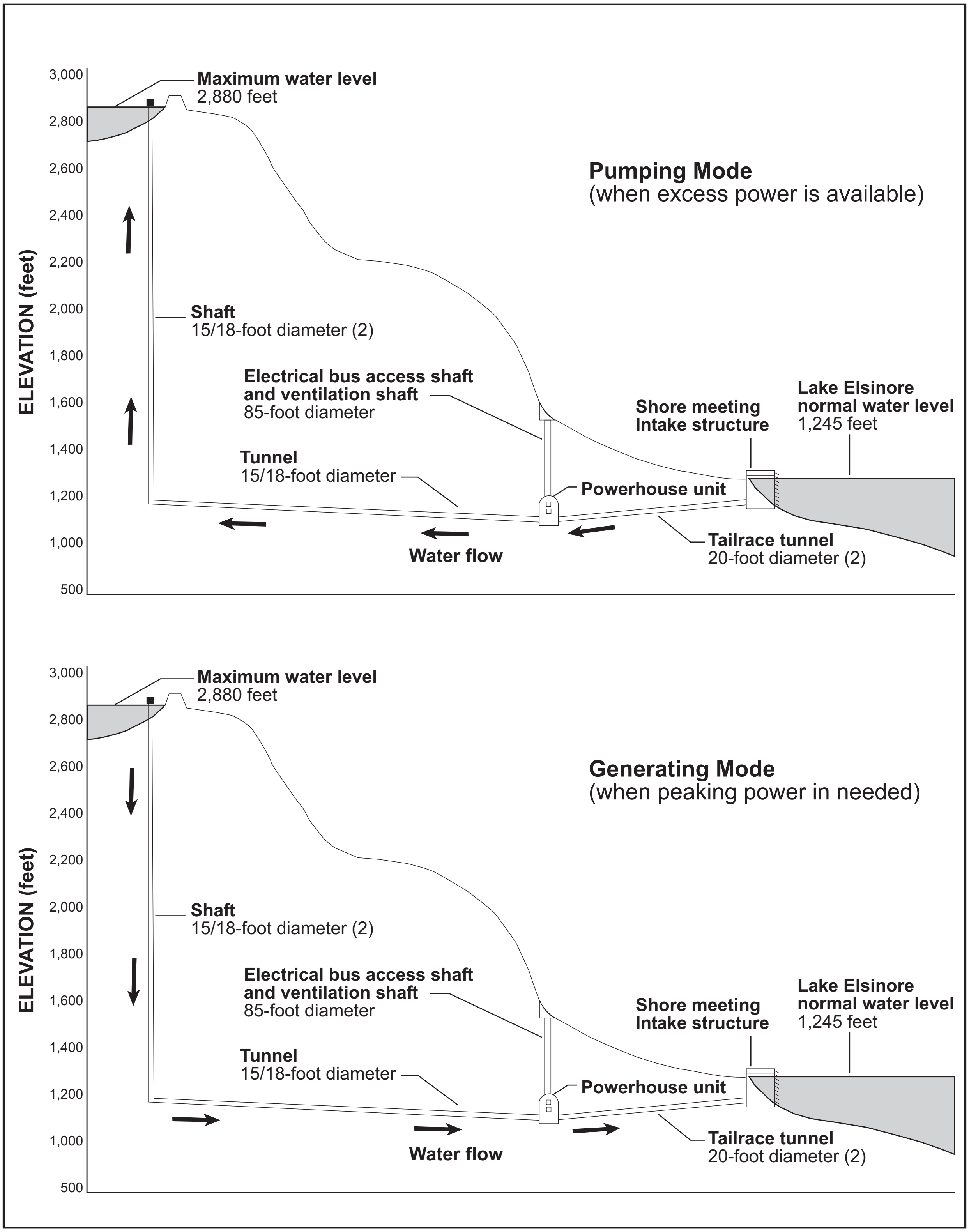

Figure 4. Proposed operation of the LEAPS Project in pumping and generating modes. (Source: Elsinore Valley MWD and Nevada Hydro, 2004a, as modified by staff)

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. 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 during the off-peak 12 hours. 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 proposed 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.[12]
- 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 dam safety monitoring program.[13]
- Prepare an oil and hazardous substances pollution contingencies spill prevention control and countermeasure 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.

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[12] 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.

[13] This co-applicant-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.

- 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.
- 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.

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 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 (LESJWA).

Land Use and Aesthetic Resources

- Acquire and demolish the multi-family residences nearest the proposed powerhouse site 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 FCWCD 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.[14]
- 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.[15]
- 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 archeological surveys in the area of potential effects (APE), (2) determining the need for intensive surveys, (3) monitoring archeological 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 archeological 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.

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[14] 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.

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

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 54 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 draft 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. We summarize the currently applicable 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.

Condition No. 26, *Hazardous Vegetative Fuel Treatment Plan*—Nevada Hydro and Elsinore Valley MWD shall develop and implement a hazardous vegetative fuel treatment plan to reduce the potential for wildfires originating at the project facilities. The plan shall include provisions for: (1) an analysis of fuel loading on National Forest System lands that extend 300 feet 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; (5) the initial fuel treatments; and (6) maintenance of treated areas by performing repeat treatments every 8 years.

Condition No. 27, *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. 28, *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.

Condition No. 29, *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. 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.

Condition No. 30, *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. 31, *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, resurvey areas of suitable habitat within the project boundary every 10 years, and monitor for ongoing effects.

Condition No. 32, *Ground Disturbing Activities*—Nevada Hydro and Elsinore Valley MWD shall consult with the USFS prior to any ground-disturbing activities 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. 33, *Environmental Monitoring*—Nevada Hydro and Elsinore Valley MWD shall develop and implement detailed monitoring plans in consultation with the USFS, SWRCB, California Air Resources Board (CARB), and CDFG for environmental monitoring during construction and operation of the project.

Condition No. 34, *Noxious Weed Management Plan*—Nevada Hydro and Elsinore Valley MWD shall develop and implement a noxious weed management plan for the purpose of controlling and containing the project-related spread of noxious weeds. The plan shall establish which populations of noxious weeds are within the project areas and which are a priority for control; it shall also identify the following: (1) priorities for treatment, (2) control methods, (3) methods to control contiguous populations outside the project boundary, and (4) provide for an inventory of noxious weeds every 5 years.

Condition No. 35, *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.

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.[16] 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 (no. 26), only apply to National Forest System land within the project boundary (nos. 26–29, 31–33, and 35), allow for the option of providing a recreation facility in the vicinity of the upper reservoir (no. 28), and allow for development of the HPMP through the NEPA process (no. 29). The full text of the USFS preliminary 4(e) conditions with the proposed revisions and alternative conditions filed by the co-applicants is found in appendix C. We analyze the project-specific alternative condition no. 28 in section 3.3.6.2, *Recreational Resources*.

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

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[16] 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).

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 California SWRCB for Water Quality Certification for the LEAPS Project, pursuant to Section 401 of the Clean Water Act. The California SWRCB has 1 year to act on the application, unless it is withdrawn and refiled.

2.4.3 Staff Alternative

2.4.3.1 Project Facilities

As we have said, the co-applicants considered several other locations for project facilities, including an upper reservoir located in Decker Canyon and a powerhouse site located at Ortega Oaks. 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 Ortega Oaks site (Ortega Oaks powerhouse), and
3. transmission lines that follow a mid-slope transmission alignment (figures 5 and 6).

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 Ortega Oaks 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).[17] 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).

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[17] 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).

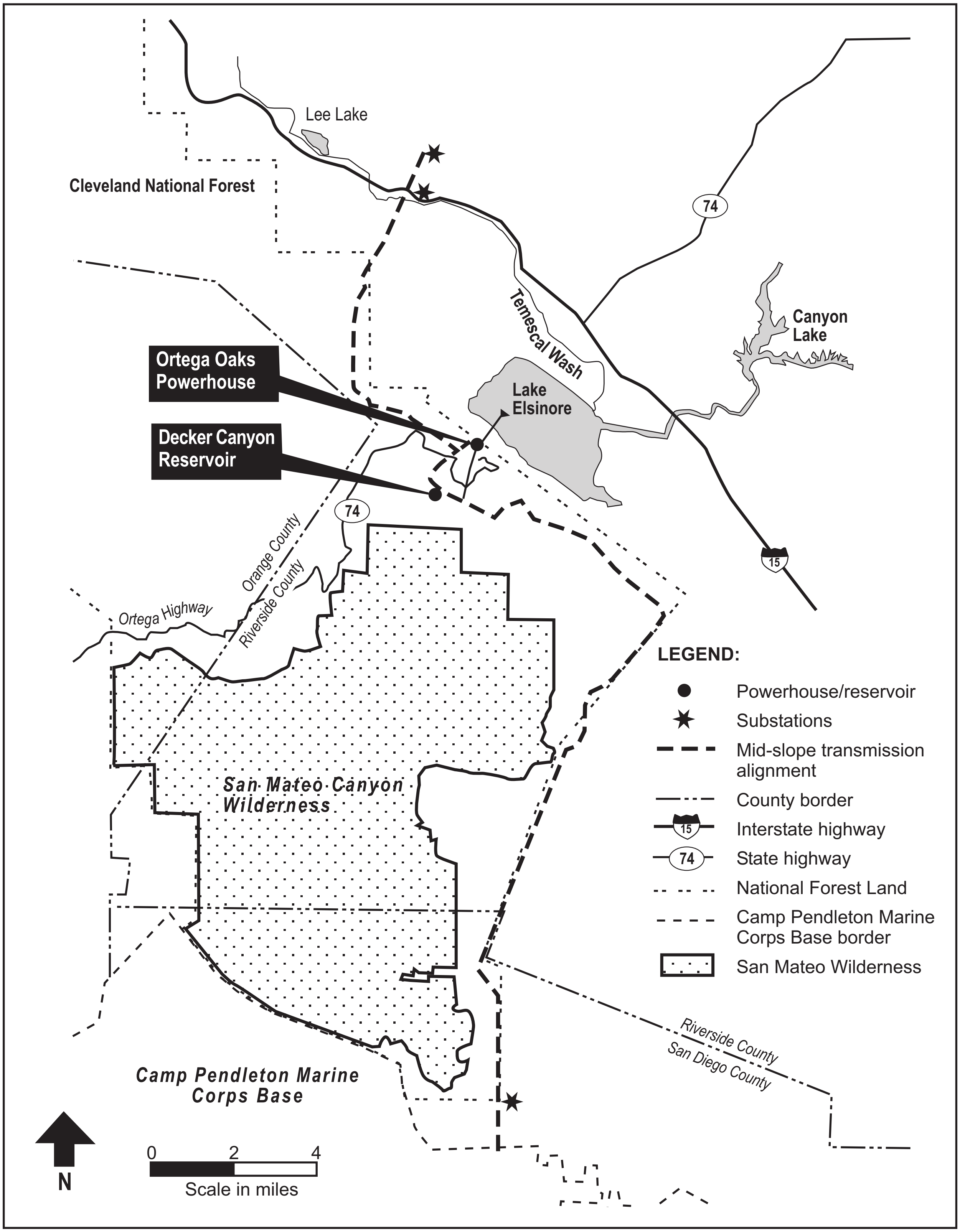

Figure 5. Staff alternative project facility locations. (Source: Elsinore Valley MWD and Nevada Hydro, 2004a, as modified by staff)

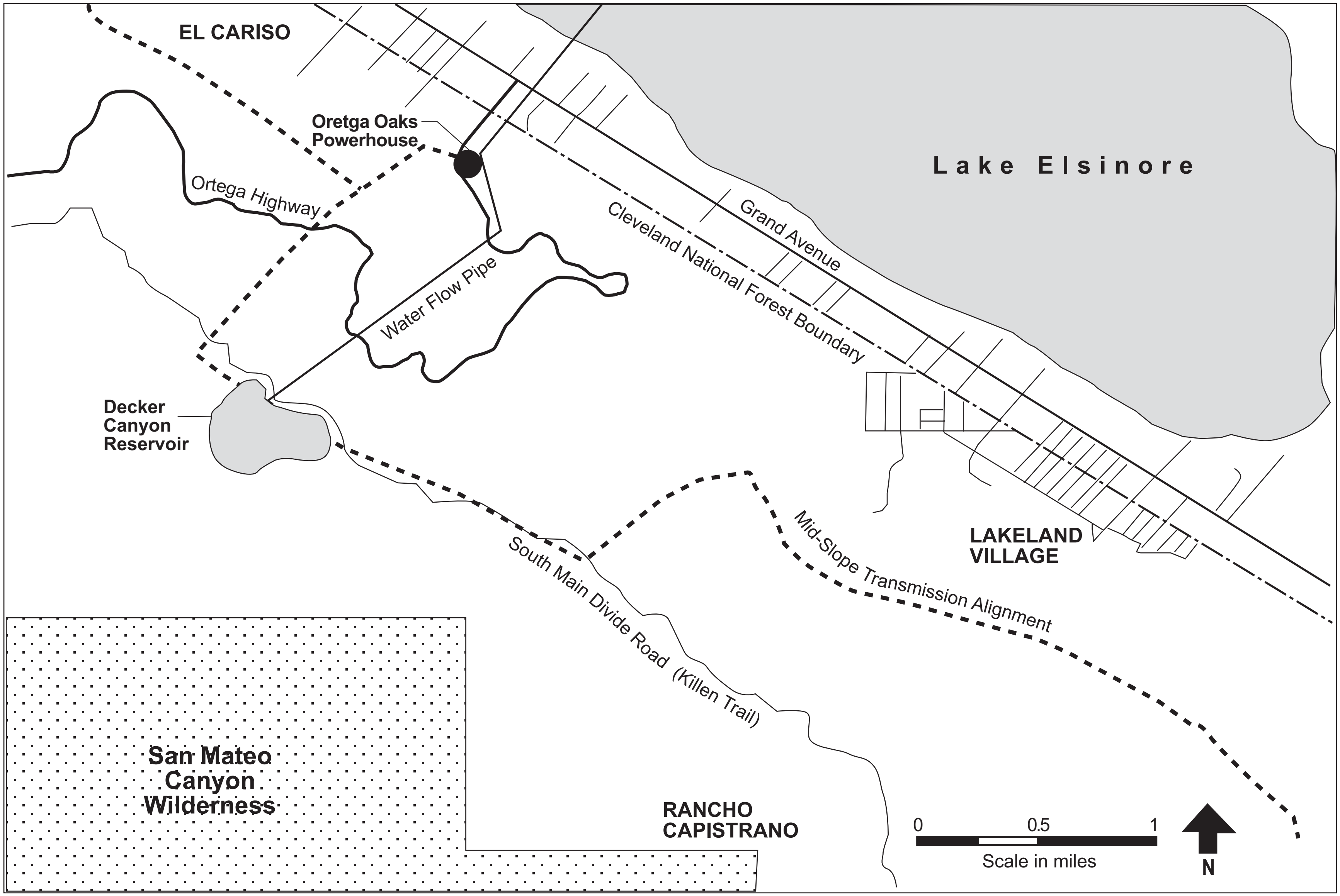

Figure 6. Staff alternative showing the locations of Decker Canyon upper reservoir and Ortega Oaks powerhouse sites. (Source: Elsinore Valley MWD and Nevada Hydro, 2004a, as modified by staff)

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 Ortega Oaks powerhouse would be located on a 58-acre site, and the construction laydown area would be located within the 58 acres. The estimated depth of excavation to construct a powerhouse at the Ortega Oaks site would be 320 feet (compared to 340 feet for the proposed Santa Rosa powerhouse site), resulting in a slightly reduced excavation quantity because of the shorter shafts between the powerhouse and the surface. From the Ortega Oaks powerhouse, the tailrace tunnel would parallel the Ortega Highway (State Route 74), and then cross under Grand Avenue to Lake Elsinore. The length of the tailrace tunnel from the Ortega Oaks site would be 2,600 feet (compared to 1,950 feet for the proposed Santa Rosa powerhouse site) and would require about 33 percent more excavation than for the tailrace tunnel at the proposed Santa Rosa powerhouse site).

As with the co-applicants' proposed transmission alignment, the staff alternative's mid-slope 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. This mid-slope transmission alignment, however, would be located eastward of the co-applicants' proposed alignment and below the ridge line. Figure 6 shows the mid-slope transmission alignment. The entire length of the mid-slope alignment would be above ground.

The northern segment of the mid-slope alignment transmission alignment would be about 10.4 miles long. From the Ortega Oaks powerhouse substation, the alignment would run uphill in a westerly direction. From north of Ortega Highway, the transmission alignment would run parallel to the northern segment of the co-applicants' proposed transmission alignment, but at a distance of 0.2 to 0.4 mile east (and downslope) of the co-applicants' proposed alignment. At this point, the transmission line would generally parallel the Cleveland National Forest boundary, extending north over its northern boundary and then generally heading in a northeasterly direction to connect with the existing 500-kV Valley-Serrano line located north of the Interstate 15 in the Alberhill area.

The southern portion of the mid-slope transmission alignment would be about 20.3 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 mid-slope transmission alignment would continue westward until just crossing the South Main Divide Road. Here it would turn south and run 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 0.4 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 mid-slope 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 alternative mid-slope 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.

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 Santa Rosa powerhouse and Morrell Canyon upper reservoir sites, 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, 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

- 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 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, 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.
- Develop and implement a plan to enhance near shore fish habitat that will 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
- Implement the 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 (MSHCP).
- Consult with the USFS, Interior, CDFG, and Riverside County to identify appropriate mitigation of habitat losses including 5:1 replacement ratio for about 5 acres of oak woodlands; 3:1 replacement ratio for about 6 acres of coastal sage scrub, and 1:1 replacement ratio for about 216 acres of chaparral and grasslands.

- Consult with the USFS annually to review the list of special status species, re-survey areas of known special species occurrence, 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.
- In consultation with the USFS, 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.
- Develop and implement a recreation plan that provides for transfer of cleared land off National Forest System lands to a local entity and development of recreational facilities at the powerhouse location and operation and maintenance (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 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.
- 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 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.

Cultural Resources

- Revise the draft HPMP in consultation with the SHPO, Tribes, BIA, 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 most but not all of the site-specific preliminary 4(e) conditions specified by the USFS as described in section 1.6, *USFS Section 4(e) Conditions.* Commission staff would modify the following measures:

- Ensure all transmission facilities conform to APLIC et al. (1996) guidelines, including power lines to reduce risks of bird strikes. The staff alternative would include conformance with 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 a third location for the powerhouse at the Evergreen site. This 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 Evergreen powerhouse would be 290 feet (compared to 340 feet for the proposed Santa Rosa powerhouse site). The tailrace tunnel length from the alternative 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). It too 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 Evergreen site in section 3, *Environmental Consequence*.

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.

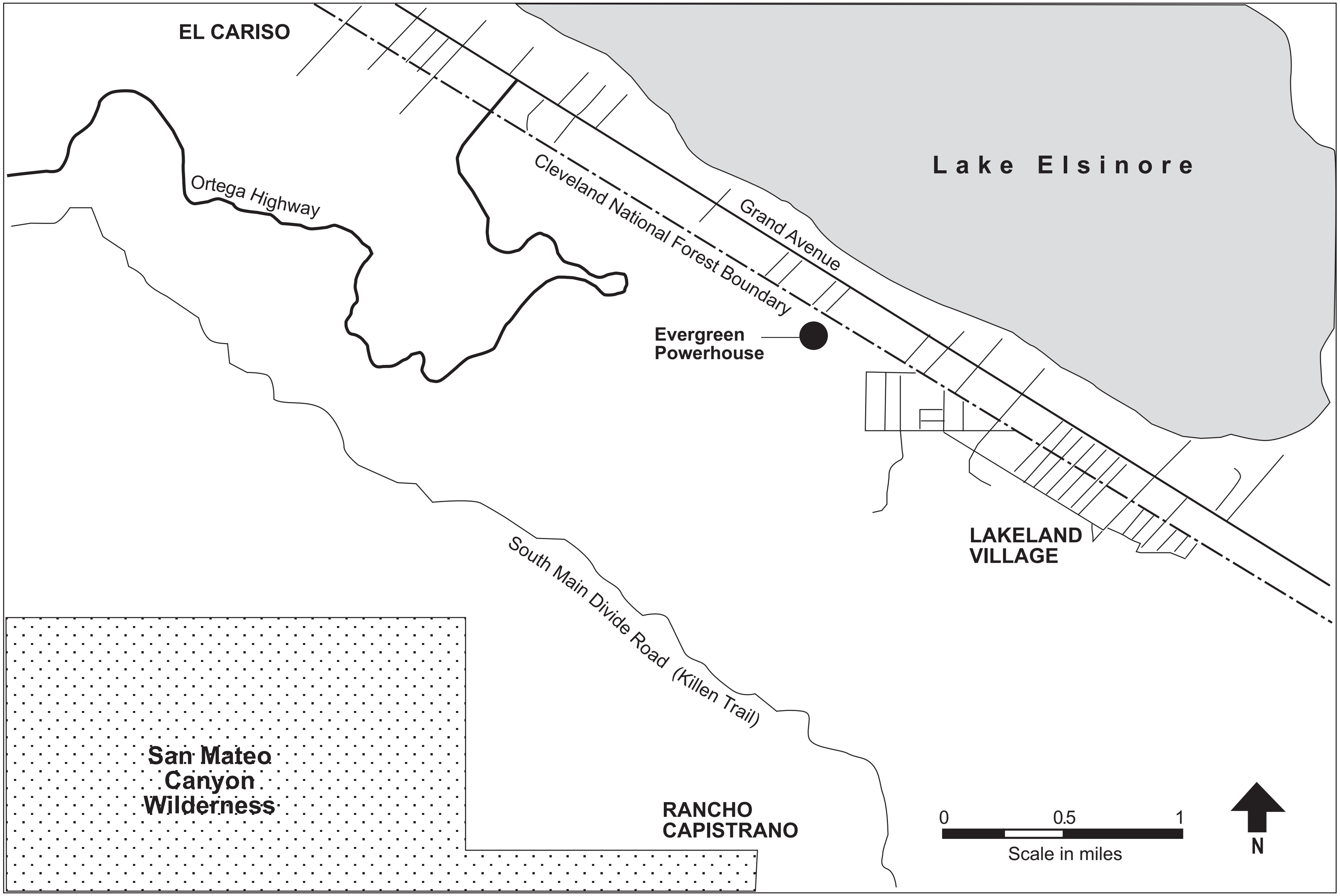

Figure 7. LEAPS Project—Location of optional Evergreen powerhouse site. (Source: Elsinore Valley MWD and Nevada Hydro, 2004a, as modified by staff)

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

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)**
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 draft 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 is included as the northern most portion of the staff's mid-slope transmission alignment. Alignment 3 is similar to the portion of the mid-slope transmission alignment that is routed behind the hang gliding launch sites. Finally, Alignments 4 and 5 have been eliminated from detailed analysis because of their proximity to the San Mateo Wilderness Area. We do not include these variations on the co-applicants' proposed transmission alignment in our detailed analysis.

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. 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 do not include these variations in our detailed analysis.

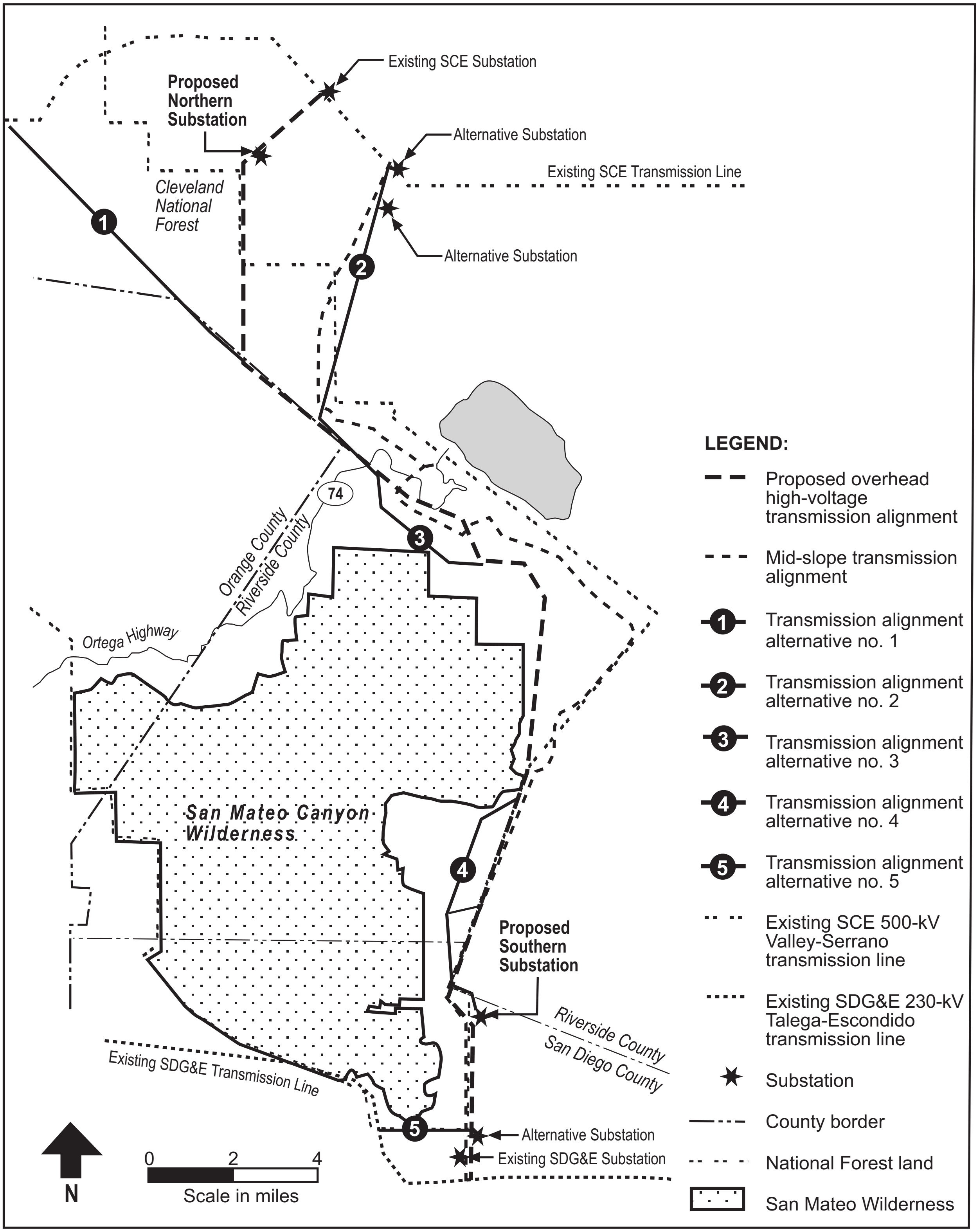

Figure 8. LEAPS Project—Transmission alignments (1–5) considered but eliminated from detailed analyses. (Source: Elsinore Valley MWD and Nevada Hydro, 2004a, as modified by staff)

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