

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 COMPARISON OF ALTERNATIVES

In this section, we compare the development and non-developmental effects of Eagle Crest's proposal, Eagle Crest's proposal as modified by staff, and the no-action alternative.

We estimate the annual generation of the project under the three alternatives identified above. Our analysis shows that the annual generation would be 4,308 GWh for the proposed action; 4,308 GWh for the staff alternative; and 0 GWh for the no-action alternative.

We summarize the environmental effects of the different alternatives below.⁶⁵ We present the effects of the proposed and staff alternative transmission line and substation in table 37 and also discuss it in section 5.2.

Table 37. Comparison of the proposed action and the staff alternative for the Eagle Mountain Pumped Storage Project (Source: staff).

Resource	Proposed Action	Staff Alternative
Project Facilities	Construct the proposed substation location near Desert Center, as shown in figure 2.	Recommend construction of the substation about 6 miles east of Desert Center and south of Interstate 10, as shown in figure 2.
	Construct the proposed transmission line, as shown in figure 2.	Recommend construction of the transmission line along the State Water Board's preferred alternative transmission line route, as shown in figure 2.
Geology and Soils	Implement the Erosion and Sediment Control Plan filed July 7, 2010.	Same as proposed.
Water Resources	To evaluate effects of project operations on groundwater levels and ensure that levels are maintained at historical values, develop a groundwater level monitoring network and monitor during project operations	Same as proposed, but include in the recommended comprehensive groundwater monitoring program that would include development of an annual groundwater hydrologic budget report. Additionally include the quarterly measurement and

⁶⁵ Under the no-action alternative, the project would not be built.

Resource	Proposed Action	Staff Alternative
	<p>(including reservoir filling) initially on a quarterly basis and possibly extending to bi-annual or annual monitoring depending on findings and prepare annual reports.</p>	<p>annual reporting of groundwater pumping production, water quality, and groundwater levels in the project water supply wells. Initial reservoir filling rates should be decreased if drawdown exceeds the Maximum Allowable Changes thresholds in groundwater levels in select wells positioned throughout the groundwater basin, as also suggested by the State Water Board.</p>
	<p>To limit the effects of project groundwater pumping during the initial fill pumping period, monitor existing wells on neighboring properties whose water production may be impaired if project pumping would adversely affect these wells, replace or lower the pumps, deepen the existing well, construct a new well, and/or compensate owner for increased pumping costs.</p>	<p>Include the monitoring aspect in the recommended comprehensive groundwater monitoring program. Regarding the replacement, or alteration of new wells, and compensation for increased pumping costs, we note that the FPA, section 10(c), 16 U.S.C. 803, makes clear that a licensee of a hydropower project “shall be liable for all damages occasioned to the property of others by the construction, maintenance, or operation of the project works....”</p>
	<p>To effectively control seepage from the upper and lower reservoirs, install an array of seepage recovery wells outside the downgradient end of each of these two reservoirs. A testing program would be initially employed during final engineering (prior to project operations) to confirm the assumed hydrogeologic conditions (e.g., aquifer characteristics and bedrock fracture interconnectedness) and seepage recovery well pumping rates.</p>	<p>Include the monitoring aspect in the recommended comprehensive groundwater monitoring program. Additionally, conduct a performance pumping test of the final seepage recovery system prior to reservoir filling to ensure that hydraulic control of the local groundwater can be achieved; document and submit results to the Commission and the State Water Board.</p>

Resource	Proposed Action	Staff Alternative
	<p>To ensure that seepage recovery via pumping wells would be effective at managing groundwater levels beneath the Metropolitan Water District's Colorado River Aqueduct and in the Eagle Creek Canyon portion of the proposed landfill, develop a groundwater level monitoring network (including existing and new monitoring wells) and record groundwater levels, water quality, and production at the project seepage recovery wells.</p>	<p>Same as proposed, but include as part of the recommended comprehensive groundwater monitoring program.</p>
	<p>To limit the effects of seepage from the reservoirs, maintain seepage from the upper reservoir below the bottom of the elevation of the landfill liner and maintain seepage from the lower reservoir to prevent a significant rise in water levels beneath the Colorado River Aqueduct.</p>	<p>Same as proposed, but include as part of the recommended comprehensive groundwater monitoring program. Additionally prevent artificially raised groundwater levels from encroaching within 5 feet of the bottom of the proposed landfill liners.</p>
	<p>Monitor groundwater levels by using the network of proposed groundwater monitoring wells on a quarterly basis for the first 4 years of project pumping; possibly extend monitoring from quarterly to bi-annually or annually, depending on findings. This measure would focus on assessing seepage conditions in the project vicinity, rather than drawdown conditions as a result of project pumping in the Desert Center area.</p>	<p>Same as proposed, but include as part of the recommended comprehensive groundwater monitoring program.</p>
	<p>To remove salts and metals from the reservoir water and maintain</p>	<p>Same as proposed.</p>

Resource	Proposed Action	Staff Alternative
	total dissolved solids concentration at the level of the source water, install a reverse osmosis desalination facility and brine disposal lagoons.	
	Assess effects on groundwater quality by sampling reservoirs, seepage recovery wells, and wells upgradient and downgradient of the reservoirs and brine disposal lagoons, and implement a monitoring program for groundwater quality on a quarterly basis for the first 4 years.	Implement a reservoir and brine pond-level monitoring plan and a more comprehensive monitoring program of monitoring wells for the proposed brine and solidification ponds.
	Replace the four existing wells located within the proposed reservoir area with wells located outside of reservoirs.	Same as proposed.
	Release excess water from the reservoirs to Eagle Creek during large rainfall events, such as the 100-year event and up to and including the PMF.	Same as proposed, but also recommend modifications and other measures to Eagle Creek, if necessary, to contain the flow within Eagle Creek and direct the flow to the proposed lower reservoir.
	To ensure that potential subsidence would not affect the Colorado River Aqueduct, construct two extensometers.	Same as proposed, but also specify that subsidence is not to exceed 0.125 foot.
Terrestrial Resources	Consult with a Biological Technical Advisory Team (including Eagle Crest, BLM, FWS, and California DFG) to develop a comprehensive site-specific mitigation and monitoring plan.	Same as proposed, and file for Commission approval.

Resource	Proposed Action	Staff Alternative
	Implement the Worker Environmental Awareness Program, filed October 27, 2009, to provide oversight of construction activities by designated staff and train construction crews to recognize biologically sensitive resources.	Same as proposed but include information about Coachella Valley milkvetch.
	Prepare status reports for resource agencies during construction period.	File quarterly reports with BLM, FWS, California DFG, and the Commission.
	Limit construction activities in native habitats and preserve existing desert wash topography and flow patterns.	File pre-construction plans that delineate the limits of disturbance and limits of existing washes or impoundments.
	Conduct pre-construction surveys for state special-status plants and establish avoidance areas where possible. When avoidance is not possible, implement transplant or salvage measures.	Include results of surveys, designated avoidance areas, and transplant locations in pre-construction plans filed with BLM, FWS, California DFG, and the Commission.
	Implement the Revegetation Plan filed October 27, 2009.	Include 2 years of monthly irrigation for transplants and stipulate use of certified weed-free straw.
	Implement the Invasive Species Monitoring and Control Plan filed October 27, 2009.	Revise plan to incorporate success criteria and adaptive management that would be implemented if success criteria are not achieved, including extended treatment periods or increased treatment frequency. Extend the plan's scope to include project reservoirs and water seepage areas. These areas should be monitored on an annual basis following vegetation establishment.

Resource	Proposed Action	Staff Alternative
	Implement measures to avoid disturbance or restrict flow to impoundments that could support Couch's spadefoot toad.	Conduct pre-construction surveys for such impoundments in any areas of construction activity not already surveyed.
	Prior to any construction activities occurring in vegetated areas between February 15 and July 30, conduct surveys for active migratory bird nests and provide a 15-foot no-activity buffer around active nests.	Modify survey period to extend from January 15 to July 30. Consult with FWS, BLM, the Park Service, and California DFG to identify appropriate buffer distances and file with the Commission for approval as part of a quarterly report.
	Develop and implement an evaporation pond management plan to limit effects on birds.	Revise plan to include proposed hazing and habitat techniques, success criteria, and thresholds for implementing exclusionary pond covering.
	Conduct Phase III or pre-construction surveys for burrowing owls.	Conduct pre-construction surveys, but no Phase III surveys. Incorporate results of pre-construction surveys into development of site-specific comprehensive mitigation plan.
	If needed (based on survey results), limit construction from September 1 through February 1 in areas with burrowing owls and provide protection buffer for active nests.	Same as proposed.
	Based on pre-construction surveys, determine need for and implement 0.25-mile construction buffers around active golden eagle or prairie falcon nests.	Extend protection buffer to 1 mile.
	Conduct pre-construction surveys for all burrows that could host badger or kit fox and implement	Same as proposed.

Resource	Proposed Action	Staff Alternative
	measures to avoid causing injury to animals.	
	Conduct pre-construction surveys for bat roosts and foraging areas. Develop and implement avoidance and mitigation measures based on survey results.	Include: (1) baseline surveys during summer and winter; (2) measures to protect onsite bat roosting habitat; (3) measures for onsite replacement of roosting habitat and hibernacula removed by project development; (4) annual summer and winter bat surveys in years 1–5, 7, and 10 following initiation of reservoir filling; (5) criteria for success, and (6) an adaptive management plan that includes additional construction and/or protection of bat habitat to be implemented if success criteria are not met.
	Construct security fencing around project reservoirs, collection substation, and evaporation ponds to exclude large mammals, such as badger, fox, deer, coyote, and bighorn sheep. Design fence to provide access to drinking water in the lower reservoir.	Include solid barrier along the bottom of the fence to exclude terrestrial species, including small mammals and reptiles. Monitor fences for digging activity. Monitor drinking areas to see if they are used by desert big horn sheep. If such monitoring indicates desert bighorn sheep are not accessing these locations, Eagle Crest should consult with FWS, BLM, the Park Service, and California DFG to identify alternative measures that provide more benefit to this species.
	In construction areas without wildlife exclusion fencing or those areas that have not been cleared of tortoises, conduct construction activities only during daylight hours.	Same as proposed.
	Implement measures to ensure	Same as proposed.

Resource	Proposed Action	Staff Alternative
	animals are not trapped in pipeline trenches during construction.	
	Design lighting to prevent casting light into adjacent native habitat.	Same as proposed.
	Develop and implement a transmission line design plan to reduce potential for avian electrocutions and design lines in accordance with industry guidelines.	Include measures in plan to reduce risk of avian collisions, protocols for monitoring and reporting avian/power line interactions, and worker education measures.
Threatened and Endangered Species	Implement the Desert Tortoise Clearance and Relocation/Translocation Plan filed October 27, 2009.	Implement the final Desert Tortoise Clearance and Relocation/Translocation Plan that includes: (1) maintenance of permanent fences for the term of the FERC license; (2) a description of potential relocation recipient sites; and (3) a provision that all injured tortoises would be taken to a qualified veterinarian.
	Purchase and manage for conservation about 160 acres of desert tortoise habitat to compensate for effects on desert tortoise.	Upon completion of final project design and construction plans, calculate acres of project-related disturbance to Category I and Category III desert tortoise habitat and determine appropriate compensation acreage based on NECO Plan compensation ratios.
	Implement the Predator Monitoring and Control Plan filed March 11, 2011.	Modify the plan to include baseline surveys and post-construction monitoring methods for coyotes, wild dogs, and gulls. Include mitigation measures to be implemented if increases in population levels are detected following construction. Include a monitoring schedule that would

Resource	Proposed Action	Staff Alternative
Recreation Resources	Coordinate construction schedules with BLM and provide posted notices of construction activity and any temporary road/access closure.	begin the second year and include annual surveys in years 1 through 5, 7, and 10. Same as proposed.
Land Use	Provide construction access to and from the substation site from the Eagle Mountain Road exit and follow the Frontage Road east to the site. Two weeks prior to beginning construction, locally post notices stating hours of operation for construction near the Desert Center community and along State Route 177.	Same as proposed for access to the site, but consult with agencies and file for Commission approval truck trip plans and traffic controls related to the transportation of salts from the proposed desalination facilities. Same as proposed. Additionally, develop and implement a construction plan for construction activities next to or across private properties and an environmental complaint resolution procedure that includes clear and simple directions for identifying and resolving environmental mitigation problems/concerns during construction of the project and restoration of the ROW. Lastly, file a monthly report with the Commission summarizing resident complaints and solutions related to pipeline construction.
Aesthetics	Incorporate lighting measures in the central project area to minimize the effect on surrounding areas outside of the project; also conduct night sky modeling and monitoring after consultation with the Park Service to determine effectiveness of the	Same as proposed. Additionally, file the results of the modeling and monitoring and any changes to the project lighting design, including consultation with the Park Service.

Resource	Proposed Action	Staff Alternative
	design in minimizing effects on night skies and guide modifications to project lighting.	
	Combine and organize staging areas and areas needed for equipment operation and material storage and assembly within construction lands to the extent feasible to minimize the total footprint needed.	Same as proposed.
	For construction of the water pipeline, reduce color contrast with the surrounding landscape and revegetate with native vegetation.	Same as proposed.
	Employ visual mitigation in the design of the transmission line to minimize visual effects.	Same as proposed.
	Use existing access roads and construction laydown areas to the extent feasible and revegetate with native vegetation.	Same as proposed.
Cultural Resources	Implement the project's HPMP, filed March 4, 2011.	Same as proposed.
Air Quality	Prevent project-related trackout onto paved surfaces by using a variety of construction management strategies.	Same as proposed, and include in the Erosion and Sediment Control Plan.
	Provide measures and standards to stabilize graded site surfaces upon completion of grading.	Same as proposed, and include in the Erosion and Sediment Control Plan.
	Limit areas of active surface disturbance (such as grading) to no more than 15 acres per day.	Same as proposed.

Resource	Proposed Action	Staff Alternative
	Reduce non-essential earth-moving activities during windy conditions.	Same as proposed.
	Develop and implement a transportation management plan for employees.	Same as proposed.
	Use electrical drops in place of temporary electrical generators, and substitute low- and zero emitting construction equipment and/or alternative fueled or catalyst-equipped diesel construction equipment wherever economically feasible.	Same as proposed.
	Properly tune and maintain heavy-duty diesel trucks in accordance with manufacturers' specifications to ensure minimum emissions under normal operations.	Same as proposed.
	Use 2002 model or newer construction equipment.	Same as proposed.
	Retrofit older off-road construction equipment with appropriate emission control devices prior to onsite use.	Same as proposed.
	Implement a 2-year air monitoring study after consultation with the Park Service.	Same as proposed.
Noise	Equip construction machinery with properly operating and maintained noise mufflers and intake silencers.	Same as proposed.

5.2 COMPREHENSIVE DEVELOPMENT AND RECOMMENDED ALTERNATIVE

Sections 4(e) and 10(a)(1) of the FPA require the Commission to give equal consideration to the power development purposes and 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. Any license issued shall be such as in the Commission's judgment will be best adapted to a comprehensive plan for improving or developing a waterway or waterways for all beneficial public uses. This section contains the basis for, and a summary of, our recommendations for licensing the Eagle Mountain Project. We weigh the costs and benefits of our recommended alternative against other proposed measures.

Based on our independent review of agency and public comments filed on this project and review of the environmental and economic effects of the proposed project and its alternatives, we selected the staff alternative, as the preferred option. We recommend this option because: (1) issuance of an original hydropower license by the Commission would allow Eagle Crest to operate the project as an economically beneficial and dependable source of electrical energy during high demand hours; (2) the 1,300 MW of electric energy capacity would come from a renewable resource that does not contribute to atmospheric pollution; (3) the majority of the power used to pump water to the upper reservoir during low demand hours is expected to come from renewable sources or available base-load sources; (4) the public benefits of this alternative would exceed those of the no-action alternative; and (5) the recommended measures would help protect water, wildlife, recreation, land use, aesthetics, cultural, air quality and noise resources during construction and operation.

In the following section, we make recommendations as to which environmental measures proposed by Eagle Crest or recommended by agencies and other entities should be included in any license issued for the project. In addition to Eagle Crest's proposed environmental and mitigation measures, we recommend additional environmental measures to be included in any license issued for the project. We also discuss which measures we do not recommend including in the license.

Measures Proposed by Eagle Crest

Based on our environmental analysis of Eagle Crest's proposal discussed in section 3.0 and the costs discussed in section 4.0, we recommend including the following environmental measures proposed by Eagle Crest in any license issued for the project. Our recommended modifications to Eagle Crest's proposed measure are shown in *italics*.

Geology and Soils

- Implement the Erosion and Sediment Control Plan filed July 7, 2010, that describes the erosion and sediment control practices to minimize soil erosion in

construction areas and prevent sediment transport into stormwater discharges away from the construction site (Measure GEO-1).

Water Quality/Water Quantity

Measures for Drawdown Monitoring and Control

- Develop a groundwater level monitoring network (including existing and new monitoring wells [see figure 8]) to confirm that project pumping throughout the project operations would be maintained at levels that are in the range of historical pumping in the Chuckwalla Aquifer (Measure WS-1). Possibly extend monitoring from quarterly to bi-annually or annually, depending on findings and prepare annual reports for submittal to the Commission and State Water Board, confirming actual drawdown conditions (Measure WS-4). *Include the adaptive management plan to reduce initial reservoir filling rates should it be found that drawdown exceeds the Maximum Allowable Changes thresholds in groundwater levels in select monitoring wells located throughout the groundwater basin. Additionally, as part of a comprehensive groundwater monitoring program, these measures should include the coordinated quarterly measurement and annual reporting of groundwater pumping production, water quality, and groundwater levels in the project water supply wells.*
- During the initial fill pumping period, monitor existing water supply wells on neighboring properties whose water production may be impaired by project groundwater pumping; if project pumping would adversely affect these wells, replace or lower the pumps, deepen the existing well, construct a new well, and/or compensate owner for increased pumping costs (Measure WS-3). *Continue monitoring beyond the initial fill period (4 to 7 years, as estimated by Eagle Crest); the length of additional monitoring should be determined through consultation with the State Water Board and filed for Commission approval.*

Measures for Seepage Monitoring and Control

- To confirm aquifer characteristics and adequate pumping rates in the reservoir seepage recovery wells, perform aquifer tests during final engineering design (prior to project operations) (Measure SR-1). *Include a performance pumping test of the final seepage recovery system (both lower and upper reservoir seepage recovery wells) prior to reservoir filling to ensure that hydraulic control of the local groundwater can be achieved. Submit the results of this test to the Commission and the State Water Board.*
- To effectively control seepage from the upper reservoir, use a separate set of seepage recovery wells, employ a testing program for these seepage recovery wells and make drawdown observations in nearby observation wells to support final engineering design (Measure SR-2).

- Use the groundwater level monitoring network to confirm that seepage recovery well pumping would be effective at managing groundwater levels beneath the Colorado River Aqueduct and in the Eagle Creek Canyon portion of the proposed landfill and record groundwater levels, water quality, and production at the project seepage recovery wells (Measure SR-3). *Manage artificially raised water levels to ensure that they are at least 5 feet below the bottom of the landfill liners.*
- Maintain seepage from the upper reservoir at a groundwater level below the bottom of the elevation of the landfill liner and maintain seepage from the lower reservoir to prevent a significant rise in water levels beneath the Colorado River Aqueduct (Measure SR-4). *Manage artificially raised water levels to ensure that they are at least 5 feet below the bottom of the landfill liners.*
- Use the network of groundwater monitoring wells proposed under Measure WS-1 to monitor groundwater levels on a quarterly basis for the first 4 years of project pumping; extend monitoring from quarterly to bi-annually or annually, depending on findings (Measure SR-5). Unlike measure WS-4, this measure would focus on assessing seepage conditions in the vicinity of the proposed reservoirs, rather than drawdown conditions as a result of project pumping in the Desert Center area.
- Minimize drawdown in the vicinity of the Colorado River Aqueduct through management of reservoir seepage, pending the initial findings of measures SR-1 and SR-5, and as determined through consultation with the State Water Board (Measure SR-1A).

Measures for Water Quality Monitoring and Control

- Install and operate a reverse osmosis desalination facility and brine disposal ponds to remove salts and metals from reservoir water and maintain total dissolved solids concentrations at the level of the source water (Measure GQ-1). *Implement as part of a comprehensive water level and water quality monitoring plan for the reservoirs, seepage wells, monitoring wells, brine ponds, and water supply wells and include steps to be taken in the event of water quality degradation.*
- Monitor groundwater quality to assess and maintain groundwater effects at levels less than significant by sampling reservoirs, seepage recovery wells, and wells upgradient and downgradient of the reservoirs and brine disposal lagoon on a quarterly basis for the first 4 years (Measure GQ-2). *Implement as part of a comprehensive water level and water quality monitoring plan for the reservoirs, seepage wells, monitoring wells, brine ponds, and water supply wells and include steps to be taken in the event of water quality degradation.*

Other Water Resources Measures

- Replace four existing wells located within the site of the proposed reservoirs with wells located outside of the proposed reservoirs (Measure LF-1).
- Release excess water from the reservoirs during large rainfall events, such as the 100-year event and up to and including the PMF.
- Construct *and operate* two extensometers—one in the upper Chuckwalla Valley near Observation Well 3 (OW-3) and the other in the Orocopia Valley near OW-15—to measure potential subsidence that could affect the operation of the Colorado River Aqueduct (Measure WS-2). *File a plan for Commission approval to reduce initial reservoir filling rates should it be found that subsidence exceeds the Maximum Allowable Changes threshold of 0.125 foot as measured by the extensometers.*

Terrestrial Resources

- Develop a comprehensive site-specific mitigation and monitoring program after consultation with BLM, FWS, California DFG (Measure BIO-1) *to protect state sensitive, BLM sensitive, and federally listed plant and wildlife species and file for Commission approval.*
- Implement the WEAP filed October 27, 2009, to ensure that project construction and operation would be conducted within a framework of safeguarding environmentally sensitive resources (Measure BIO-3). *Include information on Coachella Valley milkvetch in the training program.*
- File *quarterly* reports with *BLM, FWS, California DFG, and the Commission*, documenting project activities, mitigation implemented, and mitigation effectiveness, and providing recommendations, as needed (Measure BIO-4).
- *Prior to construction in native habitats, conduct surveys for spadefoot toads in any areas of construction not previously surveyed. After consultation with BLM, FWS, and California DFG, prepare and file for Commission approval, a plan that details construction plans and limits of disturbance such that surface disturbance is restricted to the smallest area necessary to complete the construction, ensures new spur roads and improvements to existing roads are designed in a way that would preserve existing desert wash topography and flow patterns, and avoids disturbing or restricting flow to impoundments that could support Couch's spadefoot toad. If avoidance is not possible, construct a new pool as close as is feasible to replicate and replace each lost pool. If new pools are created, move all larvae from the disturbed pool to the new pool (Measures BIO-5 and BIO-10).*
- Use pre-construction surveys to identify state special-status *and federally listed* plant populations and species and establish avoidance areas in construction

- zones for special plant resources. Where avoidance is not feasible, salvage and transplant any species that can be reasonably transplanted in an approved area (Measure BIO-6). *Include location of sensitive plant resources, construction avoidance areas, and transplant locations on any construction plans filed with the Commission. Submit the plans to BLM, FWS, and California DFG for review and comment and file the plans with the Commission for approval.*
- For construction activities scheduled to occur between about *January 15* and *July 30* in vegetated habitat, survey all potential nesting sites for active bird nests. Active nests would be flagged and provided a buffer from construction activities (Measure BIO-11). *After consultation with FWS and California DFG identify appropriate buffer distances for nesting migratory birds in the project area. Include evidence of consultation and final determination of buffer distances in a quarterly report submitted for Commission approval prior to any ground-disturbing activities.*
 - Develop a plan to manage evaporation ponds to minimize their attractiveness and access to migratory birds and establish a monitoring program to identify bird usage of the evaporation ponds, effectiveness of bird deterrents, and water quality (Measure BIO-12). *Include in the plan provisions to: (1) minimize attractiveness and access to migratory birds; (2) establish a monitoring program to identify bird usage of the evaporation ponds, effectiveness of bird deterrents, and water quality; (3) develop measures for more intensive hazing measures and ultimately exclusionary pond covers, if warranted; (4) develop proposed hazing and habitat modification techniques; (5) develop methods for measuring success, and thresholds for implementing exclusionary pond covering, if needed; and (6) develop an emergency response plan to address a potential breach in the pond berms or liners. Prepare the plan in consultation with FWS, BLM, and California DFG and file for Commission approval.*
 - Conduct a pre-construction survey to further assess burrowing owl use of the project area and potential effects. *Incorporate survey results and mitigation measures into the comprehensive mitigation and monitoring program* (Measure BIO-13). If burrowing owls are present, limit the construction to September 1 through February 1, to avoid disruption of breeding activities; avoid disruption of burrowing owl nesting activities; use a minimum of a 250-foot buffer to avoid active nests until fledging has occurred (Measure BIO-14). *Additionally, if burrowing owls are present, after consultation with FWS and California DFG, develop a burrowing owl relocation plan that includes construction of replacement burrows for any active burrows requiring collapse and file the plan for Commission approval.*
 - Determine through pre-construction surveys if construction activities would occur within *1 mile* of active prairie falcon or golden eagle nests. *Provide survey results to FWS, BLM, and California DFG. Following consultation*

with the agencies, identify any necessary protection buffers, file them for Commission approval, and avoid construction activities in these areas during the nesting season (Measure BIO-15).

- Conduct pre-construction surveys for all burrows that might host badger or kit fox, avoiding active burrows where possible, and mark the perimeters of all avoidance areas with 3-foot-high and no more than 10-foot-apart wooden stakes. Where avoidance is infeasible, encourage occupants to leave their burrows (Measure BIO-16).
- Conduct pre-construction surveys to determine the existence, location, and condition of bat roosts and identify foraging habitat. Based on results of surveys, develop a mitigation plan to avoid roosting and foraging effects on resident bats, minimize disturbance, or, as an inescapable measure, evict bats (Measure BIO-17). *Prepare the bat mitigation plan after consultation with FWS and California DFG and file for Commission approval. The plan should include: (1) baseline surveys during summer and winter; (2) measures to protect onsite bat roosting habitat; (3) measures for onsite replacement of roosting habitat removed by project development; (4) annual summer and winter bat surveys in years 1–5, 7, and 10 following initiation of reservoir filling; (5) criteria for success; and (6) measures for additional construction and/or protection of bat habitat to be implemented if success criteria are not met.*
- Construct security fencing around project reservoirs, collection substation, and evaporation ponds to exclude larger terrestrial wildlife, including bighorn sheep, deer, coyotes, foxes, and badger, from entering project areas that pose hazards. *In addition, install a smooth metal, or similar barrier, along the bottom of the fence to prevent access to all terrestrial species. Monitor fences for digging activity and repair damaged fences sections within 24 hours. Monitor drinking areas to ensure desert bighorn sheep are using these areas. If such monitoring indicates desert bighorn sheep are not accessing these locations, Eagle Crest should consult with FWS, BLM, the Park Service, and California DFG to identify alternative measures that provide similar benefit to this species (Measure BIO-18).*
- In areas without wildlife exclusion fencing or those areas that have not been cleared of tortoises, conduct construction activities only during daylight hours (Measure BIO-20).
- Close, temporarily fence, or cover pipeline trenches each day. Conduct inspections of any open trenches at first light, midday, and at the end of each day to ensure animal safety (Measure BIO-21).
- Design, install, and maintain facility lighting to prevent casting of light into adjacent native habitat (Measure BIO-22).

- Develop, after consultation with FWS *and file for Commission approval*, a transmission line design plan that considers adequate separation of energized conductors, ground wires, and other metal hardware; adequate insulation; *a 1-mile buffer from golden eagle nests*; and any other measures necessary to protect raptors from electrocution hazards and design and construct raptor-friendly transmission lines in strict accordance with the industry standard guidelines set forth in *Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 2006*, by Avian Power Line Interaction Committee, Edison Electric Institute, and Raptor Research Foundation. *The plan should also include measures for reducing potential for avian collision injuries, methods for surveying and reporting project-related avian mortality, provisions for a worker education plan pertaining to avian–power line interactions, and procedures for managing nesting on power line structures.*

Threatened and Endangered Species

- Implement the Desert Tortoise Clearance and Relocation/Translocation Plan, as filed on October 27, 2009, *and modified by the Commission’s Biological Assessment issued on April 21, 2011*, to protect desert tortoise from potential effects related to construction activities.
- Following completion of final project design and interconnection plans, calculate projected-related effects on Category I and Category III desert tortoise habitat. Prepare and file for Commission approval a desert tortoise habitat compensation plan that identifies acres of disturbance and acreage and location of proposed compensation lands.
- Implement the Predator Monitoring and Control Plan filed on March 11, 2011, *and as modified by the Commission’s Biological Assessment issued on April 21, 2011*, to monitor for and control effects of increased predator activity on desert tortoise. *The modified plan includes: (1) surveys for canine activity in the project area; (2) surveys for canine predation on desert tortoise; (3) a survey schedule that includes two annual pre-construction baseline surveys, two annual surveys during construction; and surveys in years 1–5, 7, and 10 to be commenced following the initiation of reservoir filling (4) agency consultation following surveys; (5) development of mitigation measures to be implemented if surveys indicate increases in desert tortoise predator activity and increases in desert tortoise predation; and (6) development of a survey schedule for the remainder of the license term if surveys indicate a need for mitigation measures.*

Recreation Resources

- Coordinate construction schedules with BLM and provide posted notices of construction activity and any temporary road/access closure (Measure REC-1).

Land Use

- Provide construction access to and from the substation site from the Eagle Mountain Road exit and follow the Frontage Road east to the site (Measure LU-1).
- Two weeks prior to beginning construction, locally post notices stating hours of operation for construction near the Desert Center community and along State Route 177 (Measure LU-2).

Aesthetic Resources

- Incorporate directional lighting, light hoods, low pressure sodium bulbs or LED lighting, and operational devices in final design to allow surface night-lighting in the central project area to be turned on as needed for safety. Also, *develop, after consultation with the Park Service, a night sky monitoring plan during the post-licensing design period (to represent baseline conditions) and during construction and a trial operational period (Measure AES-1). File the plan for Commission approval.*
- Combine and organize staging areas and areas needed for equipment operation and material storage and assembly within construction lands to the extent feasible to minimize the total footprint needed (Measure AES-2).
- For construction of the water pipeline, reduce, to the extent possible, side-cast soils to reduce color contrast with the surrounding landscape. Backfill the pipeline disturbed zone and revegetate with native vegetation immediately following completion of pipeline construction (Measure AES-3).
- Employ visual mitigation in the design of the transmission line to minimize visual effects, such as specifying materials with a dull finish and background appropriate colors (Measure AES-4).
- Use existing access roads and construction laydown areas to the extent feasible and revegetate with native vegetation *within 3 months following completion of construction of the respective component* (Measure AES-5).

Cultural Resources

- Implement the HPMP, *filed March 4, 2011.*

Air Quality

- Periodically water or apply suitable surfactant for short-term stabilization of disturbed surface areas and rock and soil storage piles (Measure AQ-1).
- Prevent project-related trackout onto paved surfaces by using a variety of construction management strategies (Measure AQ-2).

- Stabilize graded site surfaces upon completion of grading when subsequent development is delayed or expected to be delayed by more than 30 days, except when precipitation dampens the disturbed surface (Measure AQ-3).
- Limit areas of active surface disturbance (such as grading) to no more than 15 acres per day (Measure AQ-4).
- Reduce non-essential earth-moving activities during windy conditions and cease clearing, grading, earth-moving, or excavation activities if winds exceed 25 mph averaged over a 1-hour duration (Measure AQ-5).
- Promote ride sharing, shuttle transit, and other measures for employees to reduce vehicle trips (Measure AQ-6).
- Use electrical drops in place of temporary electrical generators and substitute low- and zero-emitting construction equipment and/or alternative fueled or catalyst-equipped diesel construction equipment wherever economically feasible *or if necessary to meet CARB or other applicable air quality standards* (Measure AQ-8).
- Properly tune and maintain heavy-duty diesel trucks in accordance with manufacturers' specifications to ensure minimum emissions under normal operations (Measure AQ-10).
- Use 2002 model or newer construction equipment, where feasible *or if necessary to meet CARB or other applicable air quality standards* (Measure AQ-11).
- Retrofit older off-road construction equipment with appropriate emission control devices prior to onsite use, where feasible *or if necessary to meet CARB or other applicable air quality standards* (Measure AQ-12).
- After consultation with the Park Service, implement air quality monitoring for 2 years after initiation of project construction *to ensure project meets CARB or other applicable or other applicable air quality standards*.

Noise

- Equip construction machinery with properly operating and maintained noise mufflers and intake silencers (Measure NOI-2).

Additional Measures Recommended by Staff

In addition to Eagle Crest's proposed measures listed above, we also recommend including the following measures in any license issued for the Eagle Mountain Project:

Project Facilities

- Construct the project transmission line along the State Water Board's preferred alternative transmission line route. This route would diverge from the applicant's proposed route after crossing the Colorado River Aqueduct and would then parallel the existing 160-kV SCE transmission line for about 10.5 miles going southeast to a point just north of the proposed substation, then it would travel south about 2 miles to the State Water Board's preferred substation location, SCE's Red Bluff substation.

Water Resources

- During project construction, perform channel modifications and other measures, such as rip rap protection, to contain flows associated with the PMF to the Eagle Creek channel and direct these flows into the proposed lower reservoir and file a report with the Commission when measures are completed.
- Develop a reservoir-level monitoring plan to ensure that the water levels are managed properly within operational restraints to ensure protection of terrestrial resources and file for Commission approval.
- Develop a brine pond-level monitoring plan to ensure that the ponds are managed properly and help limit leakage through the lining of the ponds and file for Commission approval.
- Develop a comprehensive monitoring well placement plan including partially horizontal monitoring wells and monitoring program around the proposed brine and solidification ponds to allow for the earlier detection of leaks in the lining of the ponds and file for Commission approval.
- The applicant proposes groundwater monitoring under seven different measures—WS-1, WS-3, WS-4, GQ1, GQ-2, SR-3, and SR-5—that each have specific purposes. Coordinate the implementation of these separate measures as part of a comprehensive groundwater monitoring program to ensure that information collected as part of each measure is reported simultaneously for the purpose of better evaluating the project effects on the groundwater quality and levels in the Chuckwalla Aquifer. Use the comprehensive groundwater monitoring program results to develop a groundwater hydrologic budget and annually file the associated reports for review by the Commission along with any comments from the State Water Board.

Terrestrial Resources and Threatened and Endangered Species

- After consultation with BLM, FWS, and California DFG, submit a revised final version of the Revegetation Plan, filed October 27, 2009, to the Commission for approval prior to any ground-disturbing activities in native vegetation. The final plan would include total acres of proposed disturbance,

as identified in the final construction plan; the stipulation that any hay, straw, or topsoil brought to the site be certified weed-free; and success criteria. The plan should also include provisions for monthly irrigation of transplants for a 2-year period.

- Modify the proposed Invasive Species Monitoring and Control Plan, filed October 27, 2009, and file for Commission approval, to include criteria for success and the development of environmental measures to be implemented if initial efforts do not prove successful. Include measures to mitigate for disturbance to soils that occur during project operation and maintenance, any seepage areas, and any areas adjacent to project-related surfaces. Extend the monitoring period to 5 years for areas where disturbance or water additions are temporary, and annually in areas where disturbance or water additions occur during normal project operations.
- Remove woody riparian vegetation from around project reservoirs annually.
- Conduct pre-construction surveys for the spadefoot toad in all areas of proposed construction activity not previously surveyed in 2009 or 2010, and implement the same protection measures proposed for the proposed project reservoir areas.

Recreation, Land Use, and Aesthetics

- Consult with agencies and file for Commission approval truck trip plans and traffic controls related to the removal of salts from the proposed desalination facilities.
- Consult with resource agencies and file for Commission approval a construction plan for construction activities on or next to private properties. The plan should include measures to:
 - limit the hours during which noisier construction activities (such as drilling or boring) would occur within 250 feet of residences;
 - notify landowners prior to construction on their properties;
 - maintain access to the properties;
 - secure open ditches when there are no active construction activities taking place;
 - wait until the pipe is ready for installation before excavating the trench where residences would be within 25 feet of the construction ROW;
 - install safety fencing along the edge of the construction ROW that would extend at least 100 feet on either side of any residence;
 - preserve mature trees and landscaping where possible where they would not interfere with safe operation of equipment;

- complete final grading and installation of permanent erosion controls;
 - restore all areas and landscaping within 10 days of backfilling the trench; and
 - discuss with landowners to locate the pipeline in the most desirable location for the landowner, to the extent possible.
- Develop and implement an environmental complaint resolution procedure for residents whose property would be affected by transmission line and water pipeline construction. The procedure would include simple, clear directions for identifying and resolving environmental mitigation problems/concerns during construction of the project and restoration of the ROW. Prior to construction, Eagle Crest would mail the complaint procedures to each landowner whose property would be crossed by the project. In its letter to affected landowners, Eagle Crest would:
 - provide a local contact that the landowners should call first with their concerns; the letter should indicate how soon a landowner should expect a response;
 - instruct the landowners that if they are not satisfied with the response, they should call Eagle Crest's Hotlines; the letter should indicate how soon to expect a response;
 - instruct the landowners that if they are still not satisfied with the response from Eagle Crest's Hotlines, they should contact the Commission's Enforcement Hotline at (888) 889-8030, or at hotline@ferc.gov; and
 - prepare and file with the Commission a monthly status report that includes a table with the following information for each problem/concern: (i) the date of the call; (ii) the identification number from the certificated alignment sheets of the affected property and approximate location; (iii) the description of the problem/concern; and (iv) an explanation of how and when the problem was resolved will be resolved, or why it has not been resolved.

Cultural Resources

- Implement the measures contained in section 3.3 of the HPMP, filed March 4, 2011, if Interior's preferred alternative transmission line route is selected for construction.

Discussion of Key Issues

Following is a discussion of the key issues and basis for our additional recommended measures.

Transmission Line Route

Eagle Crest's proposed 13.5-mile transmission line route (see figure 2) would generally follow existing access roads and Eagle Mountain Road from the central project area to an intersection with the Colorado River Aqueduct. Along this segment, the line would parallel existing transmission lines. After crossing the Colorado River Aqueduct, the proposed line would continue to follow Eagle Mountain Road to a point about 2 miles north of Interstate 10. There are no existing utility structures such as towers or power lines along this segment. At this location, the line would turn to the southeast toward the Desert Center substation. This 2.5-mile section of the line would require a new ROW and would not follow existing landscape features. Of the total 13.5 miles, about 4.5 miles would be within BLM's designated utility corridor.

The staff alternative transmission line route is consistent with the State Water Board's preferred alternative transmission line route. It would diverge from the applicant's proposed route along Eagle Mountain Road and follow the existing SCE transmission line ROW and proposed water pipeline southeast to a point directly north of the proposed eastern substation southeast of the Desert Center airstrip, where it would turn south to connect to the substation. Unlike the applicant's proposed route, the staff alternative transmission line route would result in the construction of new structures closer to existing transmission line structures, thus reducing incremental effects on biological, visual, and land use resources.

As summarized in table 38, our analysis shows that the staff alternative for the transmission line route would have lower environmental effects than the applicant's proposed route or Interior's preferred alternative route. The majority of the applicant's proposed measures to reduce effects associated with the construction of the transmission line are applicable to both routes. However, because the staff alternative: (1) would be located outside of the desert tortoise critical habitat area, (2) would not bisect and would be outside the DWMA, and (3) would parallel an existing transmission line, it is our recommended alternative transmission line route.

Table 38. Summary of key differences in the potential effects of Eagle Crest’s proposal and the staff alternative for the route of the proposed transmission line (Source: staff).

Resource	Applicant’s Proposed Transmission Line	Interior’s Preferred Transmission Line	Staff-Recommended Transmission Route (State Water Board’s Preferred Alternative Route)
Vegetation	A Revegetation Plan for disturbed areas would be implemented. For the transmission line, this plan would cover about 38 acres.	Due to a longer route (additional 5.1 miles) revegetation measures would be needed on about 52 acres	Due to a longer route (additional 2.9 miles) but use of existing ROW access roads (which would reduce length), revegetation measures would need to cover about 32 acres.
Desert tortoise	Desert tortoise protection measures would be conducted, including surveys, relocation, and exclusion fencing for areas under construction. About 2.4 miles would be within designated critical habitat.	The same protection measures would be implemented. Interior’s preferred alternative route assumes the Desert Sunlight Solar transmission line would be built along Kaiser Road. If that is the case, co-locating the line within another line would result in less disturbance to sensitive tortoise habitat and lower predation risks associated with perching and nesting habitat. About 1.5 miles would be within designated critical habitat.	The same protection measures would be conducted, but co-locating the line within an existing transmission corridor, consistent with Interior’s preferred alternative route, would result in less disturbance to sensitive tortoise habitat and lower predation risks associated with perching and nesting habitat. Not within designated critical habitat.

Resource	Applicant's Proposed Transmission Line	Interior's Preferred Transmission Line	Staff-Recommended Transmission Route (State Water Board's Preferred Alternative Route)
Raptors	The transmission line would be constructed according to APLIC guidelines and an avian protection plan would be prepared.	The same protection measures would be implemented, but it is assumed that new structure locations would be less attractive to raptors due to proximity to planned structures.	The same protection measures would be implemented, but new structure locations would be less attractive to raptors due to proximity to existing structures.
Couch's spadefoot toad	The proposed corridor was surveyed and no suitable habitat was identified.	Additional surveys would be needed for areas not previously surveyed.	Additional surveys would be needed for areas not previously surveyed.
Recreation	The transmission line would be about 2 miles from the JTNP boundary.	The transmission line would be farther from the National Park boundary.	The transmission line would be farther from the National Park boundary.
Aesthetics	The transmission line would follow Eagle Mountain Road and then cut across the Chuckwalla Valley directly to Desert Center. The transmission line would not cross Interstate 10.	The transmission line could be co-located with existing lines, depending on final location of the Desert Sunlight Solar transmission line. The transmission line would cross Interstate 10.	The transmission line would be co-located with existing lines. The transmission line would cross Interstate 10.

Resource	Applicant's Proposed Transmission Line	Interior's Preferred Transmission Line	Staff-Recommended Transmission Route (State Water Board's Preferred Alternative Route)
Land use	The transmission line would be located outside the BLM CDCA utility corridor and would cross 0.4 mile of private land.	The transmission line would cross 1.2 miles of private land.	The transmission line would cross 4.9 miles of private land.
Cultural resources	The transmission line would avoid most potential project effects.	The transmission line would avoid most potential project effects.	The transmission line would avoid most potential project effects.

Water Resources

Project effects on groundwater and water resources are key issues associated with the proposed project. Major proposed project facilities and measures, which would limit the environmental effects on the surrounding environment from groundwater withdrawal, seepage of groundwater from the reservoirs, degradation of water quality in the reservoirs due to evaporation, and potential water releases from the reservoirs, include the following:

- Groundwater monitoring, aquifer testing, and seepage control measures,
- Construction of the reverse osmosis facility, and
- Development of a water release system for the reservoirs.

Aquifer tests and groundwater level monitoring, along with adjustment of pumping rates as needed, would help ensure that the effects of the proposed water withdrawal for project facilities do not exceed the historical drawdown levels of about 130 feet near Desert Center. This amount of drawdown occurred in the 1980s during a period of much more intensive irrigation for agricultural fields near Desert Center, which are now mostly abandoned. Nearer to the proposed reservoirs, the aquifer tests and seepage control measures would help ensure that the seepage amounts do not raise groundwater levels and affect nearby users and infrastructure, such as the Colorado River Aqueduct and landfill. The reverse osmosis system, which also includes evaporation ponds and other facilities, would address water quality degradation, such as increased salt content from high evaporation rates, by removing salts and other particles. The water release procedures to emergency overflow structures on the reservoirs would ensure that following a rare high inflow event, excess water would be released in a manner that ensures that the nearby infrastructure and the Colorado River Aqueduct facility, located down gradient of the lower reservoir, would not be affected.

Construction and operation of the proposed Eagle Mountain Project without adequate surface and especially groundwater quality and quantity protection measures could adversely affect the dry desert environment where water is a limited and valuable resource. Onsite investigations, once access is possible, should help determine if acid production is likely to result from filling the existing mining pits with water for the proposed pumped storage project, which could affect water quality degradation in the reservoirs. The likelihood of acid production when the mineral deposits of the existing mining pits are exposed to water is very dependent on the characteristics of the ore deposits, and reliable information is currently not available due to the lack of site access.

While we find Eagle Crest's proposed measures to be largely adequate, we recommend additional monitoring and associated measures to limit the extent of effects of the proposed project. We recommend a comprehensive groundwater monitoring program to ensure that information collected as part of each groundwater level and quality measure is incorporated together for the purpose of better evaluating the project effects on the groundwater quality and levels in the project area within the Chuckwalla

Aquifer. The results from the comprehensive groundwater monitoring program would also be used to develop a groundwater hydrologic budget. Under the staff alternative, reservoir level monitoring would be implemented not only for operational compliance and safety issues, which would largely be covered under Part 12 of the Commission's regulations for safety of water power projects and project works, but also to provide information on the extent of, availability of, and access to water in the lower reservoir for terrestrial resources. In addition, we recommend a possible reduction in the initial reservoir filling rates if the drawdown in the water supply wells exceed the Maximum Allowable Changes thresholds (see table 12) in select monitoring wells in the Chuckwalla groundwater basin. Similarly, we also recommend performance of a pumping test of the final seepage recovery system prior to reservoir filling to ensure that the proposed seepage system can control the likely seepage from the reservoirs. We also recommend that the seepage recovery system prevent groundwater levels from encroaching within 5 feet of the landfill liner, if the landfill project is constructed and that subsidence does not exceed 0.125 foot in the area of the Colorado River Aqueduct. We recommend reducing these filling rates if these thresholds become exceeded. Similarly, we recommend modifying the Eagle Creek channel to ensure that it is capable of conveying water from large storm events without affecting existing or proposed infrastructure. However, it is possible that once future access to the site is allowed and more detailed investigations and hydraulic calculations are possible, this measure may not be needed depending on the filing of the investigative report with the Commission.

As noted above, Eagle Crest proposes to install a reverse osmosis system to maintain the water quality of the reservoirs in the high evaporation desert environment to be similar to the quality of the groundwater used to fill and operate the project. Eagle Crest proposes to direct brine from the reverse osmosis system to evaporation and drying ponds where it would be removed, likely in 10-year intervals. While maintenance and monitoring of these ponds, including the installation of monitoring wells to help identify leaks, was proposed by Eagle Crest, additional monitoring should occur to allow for corrective action to occur sooner than under Eagle Crest's proposal. Eagle Crest should file a brine pond-level monitoring plan to ensure that the ponds are not overfilled and that the water level fluctuations are representative of the evaporation rate. If water levels in a brine pond decrease faster than expected, it could be an indication that the pond liner has failed and a leak has developed. In the area of the proposed brine ponds, the groundwater level is several hundreds of feet below the surface, and the Eagle Crest-proposed monitoring wells would be placed in the groundwater to monitor for possible leakage of the brine ponds. Our analysis indicates that brine leakage could take months or years to reach the groundwater table before it could be detected in the monitoring wells. Therefore, we recommend that in addition to the planned conventional monitoring wells, Eagle Crest should investigate whether partially horizontal monitoring wells extending beneath the evaporation ponds could detect a change in water vapor (an indication of a likely leak in the brine ponds) much more rapidly than normal groundwater monitoring. Due to a depth to groundwater of several hundred feet below the surface, it could take

many years for leakage from the brine ponds to be detectable in conventional groundwater monitoring wells.

We estimate that implementation of the water resources measures proposed by Eagle Crest would have an annualized cost of \$5,042,910. The majority of this cost is due to the cost and operation of the reverse osmosis system, which is a key component to maintaining water quality in a closed system (i.e., it would not have a surface water hydrological connection) located in a very high evaporation environment. We estimate that the additional measures described above would increase the annualized cost of measures by \$300,300. Considering the extent of limited water resources in the area and the possible project effects on water resources, we consider the benefits and protection of water resources to be worth the cost.

Terrestrial Resources and Threatened and Endangered Species

Construction, operation, and maintenance of the proposed Eagle Mountain Project without adequate protection measures could adversely affect terrestrial resources. Eagle Crest, as part of its license application, filed numerous monitoring and mitigation measures to protect the existing terrestrial resources. These proposals include measures to protect desert tortoises, including a Predator Monitoring and Control Plan and the purchase of 160 acres of land to compensate for desert tortoise habitat that would be disturbed during construction of the proposed project. We find that Eagle Crest's proposed measures are largely suitable for the proposed project; however, we recommend several additions.

Control of Riparian Vegetation—Establishment of riparian vegetation around the project reservoirs, especially woody species, has potential to damage the reservoir liners, and attract wildlife to the area. Vegetation could also increase water loss from the reservoirs through evapotranspiration. Several entities in comments on the draft EIS expressed concern about attracting wildlife to the reservoirs. Concerns were related to safety for wildlife species, potential for increased predation on desert tortoise, and potential for wildlife to be attracted to low quality nesting habitat. To address these concerns, we recommend that Eagle Crest prevent the establishment of riparian shrublands or woodlands around the reservoirs by annually controlling woody riparian species that may establish in these areas.

Invasive Species—The proposed pumped storage project would introduce water to the dry desert environment, potentially increasing suitable habitat for invasive plants. The applicant's Invasive Species Monitoring and Control Plan includes monitoring and treatment of areas disturbed during project construction to reduce potential encroachment of invasive species. However, operation of the project would increase soil moisture surrounding the project reservoirs and any water seepage areas, which could create suitable conditions for invasive weed establishment. To avoid potential increases in invasive weeds in these areas, we recommend modifying the proposed Invasive Species Monitoring and Control Plan to include the reservoir shorelines and areas near the

proposed water supply wells. Consistent with FWS recommendations, we recommend that Eagle Crest implement monitoring and control measures for invasive species for the following durations: annually for 5 years following disturbance in areas disturbed by construction or maintenance activities; annually, for the term of the license, along project reservoirs, seepage areas, or other areas at which normal project operations create recurring disturbance that could benefit invasive species; and project wide once every 5 years.

Burrowing Owls—Construction of the project transmission lines and water supply pipeline would occur in potential burrowing owl habitat. Eagle Crest would conduct pre-construction surveys to determine if owls are present in areas disturbed during construction activities. If owls are present, Eagle Crest proposes to avoid construction activities during the breeding season and avoid active burrows. In addition, if owls are present, Interior recommends that Eagle Crest consult with FWS to develop and implement a burrowing owl relocation program. Implementation of such a plan would include proper removal methods and construction of replacement burrows for any active burrows requiring collapse. We conclude Eagle Crest should implement these measures to avoid take of burrowing owls and associated violations of the Migratory Bird Treaty Act.

Avian Protection Plan—Construction of the project transmission lines would create potential electrocution and collision hazards for raptors and other avian species in the Chuckwalla Valley. Although Eagle Crest's proposed transmission line design plan would address potential effects of electrocution, the proposed plan does not include measures to reduce potential for avian collisions with power lines, provide monitoring and reporting protocol to track avian and power line interactions, or include a worker education program. Therefore, Eagle Crest should modify, in consultation with FWS, its proposed transmission line design plan to include avian protection. This plan should (1) meet the APLIC/FWS guidelines for an avian protection plan; (2) present designs to reduce the potential for avian electrocution and collisions; (3) provide methods for surveying and reporting project-related raptor mortality and managing nesting on the proposed transmission lines; and (4) include a workers education program.

Bats—Eagle Crest was not able to access the project site to conduct surveys for bats. However, prior surveys indicate that the mine adit provides winter hibernacula for a large number of local bats. Additional roosting habitat is likely to occur in rocks surrounding the mine pits. Construction of the project could affect these species. Eagle Crest proposes to conduct pre-construction surveys to identify bat habitat, and based on the survey results, it would prepare a bat mitigation plan. To ensure all bat habitat is identified and to minimize project effects on bats, we recommend that Eagle Crest develop and implement a plan that includes: (1) baseline surveys during summer and winter; (2) measures to protect onsite bat roosting habitat; (3) measures for onsite replacement of roosting habitat removed by project development; (4) annual summer and winter bat surveys in years 1–5, 7, and 10 following initiation of reservoir filling; (5) criteria for success, and (6) an adaptive management plan that includes additional

construction and/or protection of bat habitat to be implemented if success criteria are not met.

Spadefoot Toads—Eagle Crest conducted surveys for the spadefoot toad in many areas near the project in 2009. However, as a result of site access limitation and modifications to the proposed project's footprint (including our recommended transmission line route), not all areas were surveyed for the spadefoot toad. As a result, we recommend pre-construction surveys for spadefoot toad in areas not previously surveyed and where project construction, operation, and maintenance activities would occur. We also recommend the same protection measures for the spadefoot toad as those proposed for the central project area, including avoidance of potential habitat or if avoidance is not possible, construction of a new pool as close as is feasible to replicate and replace each lost pool. If new pools are created, all larvae should be moved to the new pool from the disturbed pool.

Predator Monitoring and Control Plan—Ravens are a known predator of the threatened desert tortoise. However, the proposed Predator Monitoring and Control Plan does not address other desert tortoise predators that may increase in numbers as a result of the construction and operation of the project. Therefore, we recommend that Eagle Crest develop a desert tortoise predator control plan in addition to the proposed Predator Monitoring and Control Plan. This plan should include: (1) surveys for canine activity in the project area; (2) surveys for canine predation on desert tortoise; (3) a survey schedule that includes two annual pre-construction baseline surveys, two annual surveys during construction; and surveys in years 1–5, 7, and 10 to be commenced following the initiation of reservoir filling (4) agency consultation following surveys; (5) development of mitigation measures to be implemented if surveys indicate increases in desert tortoise predator activity and increases in desert tortoise predation; and (6) development of a survey schedule for the remainder of the license term if surveys indicate a need for mitigation measures.

Eagle Crest should implement surveys for ravens, raven nests, and raven predation on desert tortoise as proposed in its Predator Monitoring and Control Plan filed March 11, 2011. Eagle Crest should include incidental sightings of gulls and gull predation on desert tortoise, as proposed in its plan.

To monitor canine activity in the project area, Eagle Crest should implement surveys consisting of baited or scented track plates and motion-sensing cameras. To monitor for project-related canine predation on desert tortoise, Eagle Crest should conduct surveys for evidence of burrow excavation and desert tortoise carcasses exhibiting evidence of canine predation.

Purchase of Desert Tortoise Compensation Lands—Eagle Crest proposes to purchase and conserve about 160 acres of desert tortoise habitat to compensate for project-related disturbance in Category I habitat (within the DWMA) and Category III (suitable habitat outside the DWMA) desert tortoise habitat. Development of this measure was based on the design of the proposed project and the NECO Plan guidelines

for 1:1 compensation in Category III habitat and 5:1 compensation within DWMA. Based on Eagle Crest's field surveys and our interpretation of 2010 aerial photography in the central project area, where surveys were not permitted, we estimate that under the staff alternative, 0.5 acre of Category I habitat and 87.8 acres of Category III habitat would be disturbed. Therefore, by following the NECO Plan compensation ratios, Eagle Crest should purchase and conserve 90.3 acres of desert tortoise habitat. However, specific compensation related to the staff alternative would depend on final project design and results of surveys for desert tortoise habitat in the central project area. As such, to ensure the purchase of compensation lands is appropriately based on project effects, we recommend Eagle Crest prepare a desert tortoise compensation plan following completion of the final project design. The plan should identify acreage of project disturbance within Category I and Category III desert tortoise habitat and identify the proposed acreage and location of compensation lands. The plan should be prepared in consultation with FWS and BLM and filed with the Commission for approval.

We estimate that implementation of the terrestrial and threatened and endangered resources measures proposed by Eagle Crest would have an annualized cost of \$204,190. We estimate that these additional measures would increase the annualized cost of measures by \$17,820. Considering the possible project effects on these resources, we consider the benefits to and protection of terrestrial and threatened and endangered resources to be worth the cost.

Recreation, Land Use, and Aesthetics

Construction, operation, and maintenance of the proposed Eagle Mountain Project could adversely affect recreation, land use, and aesthetics in the project area. Likely effects include increased nighttime sky lighting, limits to some access routes, and inundation of some of the remaining but currently non-economical ore reserves. Most of the effects, other than those from the proposed transmission lines and substation, would be similar to or lesser than effects that occurred during the historical operation of the Eagle Mountain mine. Construction and operation of the proposed project would be designed to occur within historical mining pits also proposed for landfill development. Eagle Crest's proposal would be designed to co-exist with the proposed landfill if the two developments are constructed. In addition to designing the project to limit effects on the proposed landfill, Eagle Crest proposes measures to limit the effects of construction on recreation, land use and aesthetics by coordinating planned road closures and other schedules with the public. Other measures proposed by Eagle Crest would address lighting of the proposed central project area and construction activities throughout the proposed project to limit the effects on dark sky conditions. Other measures include design features and route selection that would avoid causing visual degradation during the construction of the water pipeline, transmission line, and substation.

The staff alternative would include plans related to the transportation of salts from the proposed desalination facilities and construction of the transmission line and water pipeline on or next to privately owned properties. Eagle Crest estimates that about 2,500

tons of salt would be removed from the reservoirs each year and that these solids produced from the evaporation and solidifying ponds would need to be removed once every 10 years. The analysis in section 3.3.5.2, *Environmental Effects*, concluded that the removal of 1 year's accumulation of salt would require about 125 truck trips, whereas the removal in 10-year intervals, as proposed, would require about 1,250 truck trips. Substantially fewer train trips could be called upon if the privately owned Eagle Mountain Railroad were used to move the salt. Because the fate of these solids is unknown, a transportation plan developed in consultation with resource agencies and filed for Commission approval would ensure the transport of this quantity of material does not negatively affect other resources (e.g., noise levels and air quality) on a recurring basis.

Development of a construction mitigation plan for construction on or next to private properties would further minimize disturbance to residents and protect public safety. Including measures, such as limiting the hours during which noisier construction activities would occur close to residences, notifying landowners prior to construction, maintaining access to the properties, securing open ditches when there is no active construction activities occurring, preserving mature vegetation and landscaping, providing for safety fencing near residences, completing final grading, implementing permanent erosion control measures, and revegetating within 10 days of backfilling the trench, would help protect the private residences and public safety during the construction process.

A process that considers private property owner recommendations to the extent practicable regarding the siting of the pipelines across their property would retain the owners' preferred areas for their future interests. Development and implementation of an environmental complaint resolution procedure would provide residents with a structured way to comment on routing concerns specific to their properties. Eagle Crest could provide landowners with simple, clear directions for identifying and resolving their environmental mitigation problems/concerns during siting of the pipeline, construction of the project, and restoration of the ROW. By implementing this process, Eagle Crest would provide landowners with information about the proposed construction schedule and contact information, as well as a process for accommodating private landowner recommendations to the exact location of the pipeline. An environmental complaint resolution procedure would also provide a means of tracking and resolving landowner complaints. Regular monthly reporting to the Commission during the pipeline construction period about the nature of each complaint and how Eagle Crest addressed it would ensure that the private residents' recommendations regarding where to locate the pipelines on their properties and complaints that may arise are considered and addressed to the extent practical.

These plans would be used to develop measures including adjustments to the extent practicable to the route of the water pipeline developed in consultation with each affected landowner. Such adjustments could include routing the pipeline along property lines so the majority of the construction and disturbance would occur within property line

setbacks to limit the effects on current and future uses of the properties. Property owners would retain discretion as to the preferred location of the pipelines within their property to the extent practical for pipeline efficiency.

We estimate that implementation of the recreation, land use, and aesthetics resources measures proposed by Eagle Crest would have an annualized cost of \$17,140. We estimate that these additional measures would increase the annualized cost of measures by \$610,780. This cost difference is largely the result of the incremental cost increase of our recommended transmission line route and substation, as compared with the applicant's proposed route. Our recommended route would protect a wide range of resources, including terrestrial and threatened and endangered species, aesthetics, and cultural resources. Considering the possible project effects on these resources, we consider the protection of these resources to be worth the cost.

Cultural Resources

Construction, operation, and maintenance of the proposed Eagle Mountain Project without adequate protection measures could adversely affect properties that are eligible for listing on the National Register. Eagle Crest filed an HPMP in September 2009 for the purpose of protecting and interpreting historic properties. The HPMP was revised in December 2009 and again in February 2011 (filed March 4, 2011).

We find that the HPMP adequately identifies the APE, describes the cultural resources inventories that were conducted within the APE, identifies potential disturbances to historic properties, and provides for the appropriate treatment of the Colorado River Aqueduct, Eagle Mountain mine and town site, and potentially eligible archaeological sites and TCPs that may be identified in the future. The HPMP also provides procedures for annual reporting and consultation with agencies and tribes, cultural resources monitoring, curation, handling of unanticipated discoveries, and the proper treatment of human remains and sacred objects, if they are encountered. Further, the HPMP provides measures for the treatment of paleontological resources if they are identified on federal lands.

Implementation of the HPMP would ensure that potential adverse effects on historic properties as a result of project operation and maintenance or other project-related activities would be addressed over the term of a license. Additionally, if Interior's preferred alternative transmission line route were selected for construction, implementation of the measures contained in section 3.3 of the HPMP would ensure that the 23 cultural resources located within that corridor's APE would be addressed appropriately under section 106. We anticipate that any license issued for the project would include a condition to implement the PA executed among the Commission, the California SHPO, and the Advisory Council, if the Council chooses to participate. Eagle Crest, BLM, and others have been invited to sign the PA as concurring parties. The PA includes a measure to implement the HPMP, filed March 4, 2011, with our additional measures.

We estimate that implementation of the protective measures proposed in Eagle Crest's HPMP would have an annualized cost of \$24,840. Considering the extent of cultural heritage that is present in the project area, we consider the benefits to cultural resources to be worth the cost.

Socioeconomics

Under Eagle Crest's proposal, project construction would provide about 100 jobs during the peak construction period and would provide revenues to county and local government through property, sales, and use taxes. Project operation would provide about 30 jobs, as well as substantial property tax payments. During both construction and operation, we anticipate tax payments would more than compensate for any increase in the need for government services. No residences or businesses would be displaced due to construction and operation of the project.

Air Quality and Noise

The vehicles and machinery used for the project construction would result in substantial amounts of emissions. However, most emissions are expected to remain below the state air quality levels except for nitrogen oxide. Eagle Crest proposes to consult with the Park Service to develop and implement a 2-year air monitoring study. Monitoring results would be used to adjust the construction workload if any air quality exceedances are observed during the later portions of the construction. During operation of the project, the annual offset of emissions by the proposed project is estimated at about 1,443,260 tons of carbon dioxide as compared to a conventional fossil fueled peaking generation facility of the same size.

Compliance with the applicable county noise ordinance codes during construction would minimize the effects of noise levels during construction. Eagle Crest's proposed measures would lower the noise level during construction by equipping all construction equipment with properly operating and maintained noise mufflers and intake silencers, consistent with manufacturers' standards.

5.3 UNAVOIDABLE ADVERSE EFFECTS

Unavoidable adverse effects are those that cannot be reversed except in the extreme long term. Unavoidable adverse effects within the project area are the following:

- Reclamation of existing rock and ore materials from both recoverable and bedrock sources present within the central project area would not be possible once the project is constructed and is in operation.
- Project pumping to initially fill the reservoirs would exceed natural recharge rates in the groundwater basin by about 4,600 acre-feet for each of those four years causing temporary overdraft of the aquifer and drawdown of groundwater levels.

- About 1,700 acre-feet per year of the groundwater used to fill and maintain the reservoirs would evaporate.
- Visual impacts of the project structures, especially the transmission line and substation, would be irreversible but would be limited by mitigation measures and the recommended route and location.
- Construction of the project would eliminate between 142.4 acres (under Eagle Crest-proposed conditions and 109.5 acres (under our recommended conditions) of currently undisturbed desert habitat.
- The proposed use of private lands for portions of the project could limit the feasibility of that land for other uses.

5.4 CONSISTENCY WITH COMPREHENSIVE PLANS

Section 10(a)(2)(A) of the FPA, 16 U.S.C. §803(a)(2)(A), requires the Commission to consider the extent to which a project is consistent with the federal or state comprehensive plans for improving, developing, or conserving a waterway or waterways affected by the project. We reviewed 13 comprehensive plans that are applicable to the Eagle Mountain Project, located in California. No inconsistencies were found.

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