Eagle Mountain Pumped Storage Project
Draft Environmental Impact Report
Volume III
Technical Memorandum, Appendix C

State Clearinghouse No. 2009011010
FERC Project No. 13123

State Water Resources Control Board
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Eagle Mountain Pumped Storage
FERC Project No. 13123

Executive Summary of Biological Mitigation and Monitoring Plans:

Worker Environmental Awareness Program,

Revegetation Plan,

Weed Control Program,

Tortoise Translocation or Removal Plan, and the

Raven Monitoring and Control Program.

Submitted to: Federal Energy Regulatory Commission

Submitted by: Eagle Crest Energy Company

October 27, 2009

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INTRODUCTION

The Eagle Crest Energy Company (ECE) proposes to develop the Eagle Mountain Pumped Storage Hydroelectric Project (Project). The proposed Project will use two existing mining pits, pumping water from a lower pit/reservoir to an upper pit/reservoir during periods of low demand to generate peak energy during periods of high demand. Project details, including Project design, ancillary facilities, the environmental setting, anticipated project impacts, and proposed mitigation measures, can be found in the Final License Application (FLA) and Applicant Prepared Environmental Impact Statement submitted to the Federal Energy Regulatory Commission (FERC) in June 2009 (Eagle Crest Energy Company, 2009).

The purpose of this executive summary is to highlight the key features of five terrestrial mitigation and monitoring programs to be developed for the Project.

PROJECT DESCRIPTION

The Eagle Crest Energy Company ("ECE" or Owner/Operator) proposes to develop the Eagle Mountain Pumped Storage Hydroelectric Project in the Southern California Desert at an inactive iron mine site in Riverside County, located about halfway between Palm Springs and Blythe, California, near the town of Desert Center.

The proposed project is a hydroelectric pumped storage project that will provide system peaking capacity and system regulating benefits to southwestern electric utilities. The proposed project will utilize two existing mining pits as water reservoirs. The project will use off-peak energy to pump water from a lower reservoir to an upper reservoir [formed from the existing mining pits] during periods of low electrical demand and generate valuable peak energy by passing the water from the upper to the lower reservoir through the generating units during periods of higher electrical demand. The low demand periods are expected to be during weekday nights and throughout the weekend, and the high demand periods are expected to be in the daytime during week days, especially during the summer months.

The project will provide an economical supply of peaking capacity, as well as load following, electrical system regulation through spinning reserve, and immediately available standby generating capacity. These latter benefits, referred to as ancillary services, are considered essential for integration of renewable wind and solar power resources to meet State renewable portfolio standards of 33 percent by year 2020, and to offset fossil-fueled peak power generation to help meet State greenhouse gas emissions reductions goals. Ancillary services are employed as a means to increase stability of the electrical system and provide improved transmission reliability.

Parts of the project (1,059 acres) are located on Federal lands managed by the Bureau of Land Management, through the Palm Springs South Coast Field Office. The remainder of the project is on privately owned lands.

MITIGATION AND MONITORING FOR BIOLOGICAL RESOURCES

MITIGATION MEASURES FOR BIOLOGICAL RESOURCES

For terrestrial biological resources, the FLA included a suite of 23 mitigation measures to address potential resource impacts to terrestrial resources, and an additional six mitigation measures specifically targeted to threatened and endangered species. These measures are summarized in Table 1.

Resource Area	Measure number	Summary of Mitigation Measure	Timing of Compliance	Responsibility/ Implementation
Terrestrial Resources	BIO-1	**Mitigation and Monitoring Program.** Concurrent with final engineering design a comprehensive site-specific mitigation and monitoring program will be developed in consultation with the Biological Technical Advisory Team. The Technical Advisory Team is composed of the Owner's staff and consultants and staff from the resource managing agencies.	Pre-construction	Applicant in coordination with the Biological Technical Advisory Team
Terrestrial Resources	BIO-2	**Designation of an Approved Project Biologist.** A Project Biologist must be designated who will be responsible for implementing and overseeing the biological compliance program	Construction and operation	Applicant
Terrestrial Resources	BIO-3	**Worker Environmental Awareness Program (WEAP).** A WEAP will be developed to ensure that project construction and operation occur within a framework of safeguarding environmentally sensitive resources	Pre-construction	Applicant and contractor
Terrestrial Resources	BIO-4	**Reporting.** As part of implementing protection measures, regular reports will be submitted to the relevant resource agencies to document the Project activities, mitigation implemented, and mitigation effectiveness, and provide recommendations.	Construction and operation	Applicant and contractor
Terrestrial Resources	BIO-5	**Minimize Surface Disturbance.** During construction in native habitats, all surface disturbances will be restricted to the smallest area necessary to complete the construction.	Construction	Contractor
Terrestrial Resources	BIO-6	**Pre-construction Surveys: Plants.** Preconstruction surveys will identify special-status plant populations and also species protected by the CDNPA.	Pre-construction	Applicant
Terrestrial Resources	BIO-7	**CDNPA.** In compliance with the CDNPA, the County Agricultural Commissioner will be consulted for direction regarding disposal of plants protected by the CDNPA.	Pre-construction	Contractor
Terrestrial Resources	BIO-8	**Revegetation.** A revegetation plan will be developed for areas that are temporarily disturbed during construction which accommodates the specific features of the desert that make revegetation difficult.	Pre-construction and post- construction	Contractor
Terrestrial Resources	BIO-9	**Invasive Species Monitoring and Control.** A weed control program will be developed prior to construction.	Pre-construction, construction, operations	Contractor
Terrestrial Resources	BIO-10	**Couch's Spadefoot.** Surveys for couch's spadefoot habitat will be conducted, and habitats avoided if possible.	Pre-construction and construction	Applicant (pre-construction) and Contractor (during construction)
Terrestrial Resources	BIO-11	**Breeding Bird Surveys and Avoidance.** Surveys will be completed in all potential nesting sites for active bird nests, for	Pre-construction and construction	Applicant (pre-construction) and

		construction activities scheduled between February 15 and July 30. Nest sites will be flagged and the flagged zone not disturbed.		Contractor (during construction)
Terrestrial Resources	BIO-12	**Evaporation Ponds.** Evaporation ponds will be managed to minimize their attractiveness and access to migratory birds, and a monitoring program implemented.	Design, construction and operation	Applicant (design and operation) and Contractor (during construction)
Terrestrial Resources	BIO-13	**Burrowing Owls**. A Phase III survey will be completed to further assess bird use of the Project area and potential impacts	Pre-construction	Applicant
Terrestrial Resources	BIO-14	**Burrowing Owls**. The construction period is limited to September 1 through February 1 if burrowing owls are present. Disruption of burrowing owl nesting activities or nesting activities should be avoided.	Construction	Contractor
Terrestrial Resources	BIO-15	**Raptors.** Pre-construction surveys will determine if construction buffers will be required during the nesting season.	Pre-construction	Applicant
Terrestrial Resources	BIO-16	**Pre-construction Surveys: Mammals.** Prior to construction, surveys will be conducted for burrows for badger or kit fox. Active burrows and all fox natal dens will be avoided, where possible. Where avoidance is infeasible, occupancy of burrows will be determined and occupants will be encouraged to leave their burrows. All burrows from which badgers or foxes have been removed will be fully excavated and collapsed after animals have left.	Pre-construction	Applicant (pre-construction) and Contractor (during construction)
Terrestrial Resources	BIO-17	**Bats.** Bat surveys will be completed in the Central Project Area. Based on the results of these surveys, a mitigation plan will be developed to avoid roosting and foraging impacts to resident bats, minimize that disturbance or, as an inescapable measure, evict bats.	Pre-construction	Applicant (pre-construction) and Contractor (during construction)
Terrestrial Resources	BIO-18	**Fencing.** A security fence will be constructed around portions of the Central Project Area to exclude larger terrestrial wildlife from entering Project areas that could pose a hazard to these species.	Pre-construction	Applicant (operation) and Contractor (during construction)
Terrestrial Resources	BIO-19	**Construction and Operations**. Construction and maintenance activities will be restricted to minimize Project impacts.	Construction and operation	Applicant (operation) and Contractor (during construction)
Terrestrial Resources	BIO-20	**Construction.** In areas without wildlife exclusion fencing or those areas that have not been cleared of tortoises, construction activities will only take place during daylight hours.	Construction	Contractor
Terrestrial Resources	BIO-21	**Construction.** Pipeline trenches will be closed, temporarily fenced, or covered each day. Any open trenches will be inspected	Construction	Contractor

		by an approved biological monitor at first light, midday, and at the end of each day to ensure animal safety.		
Terrestrial Resources	BIO-22	**Minimize Lighting Impacts**. Facility lighting will be designed, installed, and maintained to prevent casting of light into adjacent native habitat.	Construction and operation	Applicant (operation) and Contractor (during construction)
Terrestrial Resources	BIO-23	**Jurisdictional Waters.** A Streambed Alteration Agreement will be obtained, which will identify the condition and location of all state jurisdictional waters, impacts, and mitigation measures. Mitigation will include the acreage assessment of washes that may be affected, construction requirements associated with working on or near the washes, and compensation for lost or damaged acreage.	Pre-construction	Applicant (Pre-construction) and Contractor (during construction)
Threatened and Endangered Species	DT-1	**Pre-construction Surveys and Clearance Surveys.** All tortoises will be removed from harm's way prior to Project construction.	Pre-construction	Applicant (Pre-construction) and Contractor (during construction)
Threatened and Endangered Species	DT-2	**Construction Monitoring**. No construction or maintenance that requires surface disturbance, in unfenced areas on the linear facilities, will occur without biological monitors.	Construction and operation	Applicant (operation) and Contractor (during construction)
Threatened and Endangered Species	DT-3	**Exclusion Fencing –** The substation and other hazardous areas will be enclosed with a permanent tortoise exclusion fence to keep adjacent tortoises from entering the site.	Construction and operation	Applicant (operation) and Contractor (during construction)
Threatened and Endangered Species	DT-4	**Tortoise Translocation or Removal Plan. T**ortoises removed will be transported to another part of their home range. Any tortoise found in the Central Project Site will be moved to a location immediately adjacent to its capture site outside the fenced construction area.	Construction and operation	Applicant (operation) and Contractor (during construction)
Threatened and Endangered Species	DT-5	**Raven Monitoring and Control Program.** Mitigation to reduce or eliminate the opportunity for raven proliferation will include payment of an "in-lieu" fee to the USFWS for a raven monitoring and control program.	Construction and operation	Applicant (operation) and Contractor (during construction)
Threatened and Endangered Species	DT-6	**Habitat Compensation.** Total compensation will be approximately 160 acres.	Pre-construction or bond posted prior to construction, with all compensation lands purchased prior to Project operation.	Applicant

Threatened and Endangered Species	DT-7	**Operations and Maintenance.** Tortoises observed during routine maintenance activities will be allowed to voluntarily move out of harm's way.	Operation	Applicant

MITIGATION AND MONITORING PLANS

In July 2009, FERC requested ECE provide additional information on five monitoring and mitigation plans that are proposed in the FLA. These five plans are the Worker Environmental Awareness Program, Revegetation Plan, Weed Control Program, Tortoise Translocation or Removal Plan, and the Raven Monitoring and Control Program for the Eagle Mountain Pumped Storage Project. ECE's rationale and approach to these plans is summarized below. Fully elaborated details will be discussed in these plans, based on input from the Technical Advisory Team.

The five plans are described in FLA as follows:

BIO–3 **Worker Environmental Awareness Program (WEAP).** A WEAP will be developed to ensure that project construction and operation occur within a framework of safeguarding environmentally sensitive resources. Although facility construction has the greatest potential to harm environmental resources, the WEAP will also address those environmental issues that pertain to Project operations, such as general conduct, repairs and maintenance.

The WEAP will include information on biological resources that may occur on the site, with emphasis on listed and special-status species. Education will include, but not be limited to ecology, natural history, endangerment factors, legal protection, site mitigation measures, and hierarchy of command. Site rules of conduct will be identified, including but not limited to: speed limits, work areas that must be accompanied by a biological monitor, parking areas, looking under parked vehicles prior to moving them, trash deposition, off-site conduct in the area of the Project, and other employee response protocols. Teamwork will be emphasized, but it will be clear that willful non-compliance may result in sufficiently severe penalties to the contractor that the contractor may dismiss the offending employee.

The educational format will be a video, shown initially by the Project Biologist and ultimately by a limited staff of trained and approved personnel. The Project Biologist also may be videotaped giving the first program, for assistance to further instructors.

All workers completing the education program will be given a wallet card with site "rules" and contact cell phone numbers, and a sticker to affix to their hard hat. Each will sign a sheet attesting to completing the training program.

BIO-8 **Revegetation.** A revegetation plan will be developed for areas that are temporarily disturbed during construction. In order to accommodate the specific features of the desert that make revegetation difficult – namely lack of predictable rainfall, lack of an "A" soil horizon, and the difficulty of re-establishing a soil community of micro-organisms – a detailed and realistic vegetation program will address the following:

- Quantitative identification of the baseline community, both annual, herbaceous perennial and woody perennial species

- Soil salvage and replacement on areas to be revegetated
- Final site preparation and grading to include features that will enhance germination and growth of native species. This will include surface pitting for the accumulation of sediments, water and seed and the construction of small swales for such species as California ditaxis and desert unicorn plant, which are commonly found in road swales and shoulders. All disturbed washes should be recontoured to eliminate erosion and encourage the reestablishment of the drainage to its pre-construction condition.
- Vertical mulching and other techniques to promote a hospitable environment for germination and growth
- Seeding and/or planting of seedlings of colonizing species
- Development of a soil micro-community by inoculation of mycorrhizal fungi and planting species that develop a mycorrhizal net
- Weed control
- Initial irrigation, if necessary
- A realistic schedule of regrowth of native species, and remedial measures, if needed
- Monitoring and reporting

BIO-9 **Invasive Species Monitoring and Control.** To minimize the spread of invasive non-native vegetation a weed control program will be implemented during construction. This program will include:

- Baseline surveys for weed species that are present and/or are most likely to invade the Project site and surrounding area
- Methods to quantify weed invasion
- Methods to minimize weed introduction and/or spread
- Triggers that will prompt weed control
- Methods and a schedule for weed control and eradication
- Success standards

DT –4 **Tortoise Translocation or Removal Plan.** For both the Central Project Area and the linear facilities, it is anticipated that any tortoises removed would not be "translocated" or "relocated" in the biological sense of putting an animal in a location outside its home range. Instead, any tortoise would simply be removed to another part of its home range. Because construction on the Central Project Area will occur on highly disturbed previously mined areas, any tortoise found there during clearance would likely be a transient or in a peripheral part of its home range, certainly outside its core use areas or parts of its home range that could support its survival. By moving such a tortoise to a location immediately adjacent to its capture site outside the fenced construction area, the Project would be maintaining the tortoise within its home range, not translocating it. The tortoise merely would be excluded from undesirable areas. For utility corridors and fence construction, tortoises would be removed a short distance from the construction zone. Hence, this plan describes tortoise removal, not translocation.
Plan requirements include the following:

- Tortoise handling and temperature requirements
- Specifications on data gathered on removed tortoises
- Translocation site preparation (if any) and choice
- Monitoring – All tortoises removed will be monitored sufficiently to ensure their safety.

DT –5 **Raven Monitoring and Control Program.** Proposed projects on federal lands that may result in increased raven populations must incorporate mitigation to reduce or eliminate the opportunity for raven proliferation. The USFWS has developed a program to monitor and manage raven populations in the California desert in an effort to enhance desert tortoise recovery. In order to integrate monitoring and management, the USFWS has agreed to an "in-lieu" fee to replace quantitative raven monitoring on new projects in the range of the desert tortoise. The Project owner will pay in-lieu fees to USFWS that will be directed toward a future quantitative regional monitoring program aimed at understanding the relationship between ongoing development in the desert region, raven population growth and expansion and raven impacts on DT populations. The vehicle for this program is a Memorandum of Understanding between the Project owner, CDFG and USFWS.

The Project Raven Monitoring and Control Program may include this in-lieu fee if it is determined that ravens may increase over current levels due to the Project. In addition to this in-lieu fee, the program includes, at a minimum:

- A suite of construction and operations measures to reduce food scavenging and drinking by ravens (e.g., trash containment, minimization of pooling water

- Roadkill removal
- Qualitative monitoring of raven use of the site during operations, conducted on a pre-determined schedule by the onsite Project environmental compliance officer
- Breeding season nest surveys

PROGRAM STAFFING

An Environmental Coordinator will be hired by ECE to implement FERC license compliance with required environmental measures. This person will oversee the biological program, as well as other measures to protect other environmental resources such as air and water quality, aesthetics, cultural resources, etc.

In addition, as specified in mitigation measure BIO-2, a Project Biologist will be designated who will be responsible for implementing and overseeing the biological compliance program. This person must be sufficiently qualified to ensure approval by USFWS and CDFG for all biological protection measures that may be implemented by the Project. USFWS describes a single designation for biologists who can be approved to handle tortoises - "Authorized Biologist." Such biologists have demonstrated to USFWS that they possess sufficient desert tortoise knowledge and experience to handle and move tortoises appropriately. Authorized Biologists are permitted to then approve specific monitors to handle tortoises, at their discretion. The California Department of Fish and Game (CDFG) must also approve such biologists, potentially including individual approvals for monitors approved by the Authorized Biologist.

A Biological Technical Advisory Team will be established, composed of the ECE's staff and consultants and staff from the resource managing agencies. The resource managing agencies are assumed to include California Fish and Game (CDFG), U. S. Fish and Wildlife Service (USFWS), Bureau of Land Management (BLM), and the National Park Service (NPS). This team will use an adaptive management approach to direct the implementation of monitoring and mitigation programs.

PLAN DEVELOPMENT AND IMPLEMENTATION SCHEDULE

As described in mitigation measure BIO-1, a comprehensive site-specific mitigation and monitoring program will be finalized by ECE in consultation with the Biological Technical Advisory Team, concurrent with final engineering design. Final engineering design work will commence with the issuance of the FERC license. Design work is anticipated to require two years. Thus, there will be a two-year window for the Technical Advisory Team to reach concurrence on the site specific mitigation and monitoring program.

Consultation with the resource management agencies is currently underway for the other five plans covered by this executive summary. Consultation will continue during preparation of the Draft Environmental Impact Statement (EIS) and Draft Environmental Impact Report (EIR) and development of the Final EIS and Final EIR. The salient features for all measures and plans are summarized here to verify that they are a part of Project environmental measures.

FERC licenses are issued for between 30 and 50 years. Therefore, the plans will, of necessity, include provisions for adaptive management. That is, there will be flexibility for the Biological Technical Advisory Team to modify monitoring and mitigation programs to respond to the current conditions on site.

Preconstruction surveys will be undertaken for special status plants, invasive plants, desert tortoise, ravens, and bats. Reports on the results of the pre-construction surveys will be prepared by ECE staff and consultants, and submitted to the Biological Technical Advisory Team for review and comment.

The Worker Environmental Awareness Program will be prepared prior to the start of construction so that it can be implemented at the start of construction.

Based on the results of the pre-construction plant and animal surveys, the mitigation plans can be implemented. This includes translocation/relocation of desert tortoise, revegetation of areas disturbed during construction, raven control, and weed control.

REPORTING

A monitoring schedule will be described in each program to assess the success of the program. Monitoring schedules may vary as appropriate, depending on the resource being monitored.

As described in mitigation measure BIO-4, as part of implementing protection measures, regular reports will be submitted to the Biological Technical Advisory Team. These reports will document the Project activities, mitigation implemented and mitigation effectiveness, and provide recommendations as needed. Reporting will include monthly reports during construction, annual comprehensive reports, and special-incident reports. The Project Biologist will be responsible for reviewing and signing reports prior to submittal to the agencies.

A report to FERC will be prepared by ECE's staff and consultants every six years, on a schedule to be concurrent with the submission of the FERC Form 80, describing the status of the implementation of the mitigation plans and recommending future actions.

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Eagle Mountain Pumped Storage
FERC Project No. 13123

REVEGETATION PLAN

Submitted to: Federal Energy Regulatory Commission

Submitted by: Eagle Crest Energy Company

October 27, 2009

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BACKGROUND AND NEED

The Eagle Crest Energy Company (ECE) has prepared this draft Revegetation Plan for the Eagle Mountain Pumped Storage Project (Project) mitigation measure BIO-8 of the Final License Application (ECE 2009). The plan has been developed for on-site Project areas that are temporarily disturbed during construction. While avoidance of biological resources is the preferred method to minimize Project impacts (BIO-5), it may not always be possible, so revegetation will assist in repairing affected habitats and minimizing long-term Project effects. The Revegetation Plan discusses revegetation techniques, defines success criteria, establishes an implementation and monitoring schedule, and outlines reporting requirements.

Two basic native plant communities (after Holland 1986) will be affected by Project construction: Sonoran Creosote Bush Scrub (California Native Plant Society [CNPS] Element Code 33100) and Desert Dry Wash Woodland (CNPS Element Code 62200) (Figure 1[referred to as Figure 3.3.5.1 in the Final License Application {ECE 2009}]). The variations of Sonoran Creosote Bush Scrub that occur in the Project vicinity are dominated by two species: creosote bush (*Larrea tridentata*) and burro bush (*Ambrosia dumosa*). However, common elements variously include brittlebush (*Encelia farinosa*), white rhatany (*Krameria grayi*), chollas (*Cylindropuntia echinocarpa*, *C. ramosissima*, and occasionally *C. bigelovii*), indigo bush (*Psorothamnus schottii*), and ocotillo (*Fouquieria splendens*). Desert Dry Wash Woodland in the Project area is characterized by broad plains of contiguous runnels (i.e., sheet flow) with intermittent, well-defined washes. For the latter, the wash banks and islands are densely vegetated with aphyllous or microphyllous trees, primarily ironwood (*Olneya tesota*) and blue palo verde (*Cercidium floridum*), with occasional to common smoke tree (*Psorothamnus spinosus*) and catclaw (*Acacia greggii*). In the sheeting areas, the tree species typically found in arboreal drainages are, instead, aspect-dominant elements of the landscape and appear to be homogeneous across the landscape, forming a desert "woodland." Other common wash associates – cheesebush (*Ambrosia [=Hymenoclea] salsola*), galleta grass (*Pleuraphis rigida*), desert lavendar (*Hyptis emoryi*), desert peach (*Prunus fasciculatum*), chuparosa (*Justicia californica*), and jojoba (*Simmondsia chinensis*) grow in both the arboreal drainages as well as the less distinct runnels.

Native habitats occur on the transmission line right-of-way (ROW), proposed substation site, and portions of the water pipeline. The Central Project Area (i.e., the hydropower plant site) probably has few remnant patches of native vegetation, if any, because of the extensive and long-term surface mining. Small patches of Sonoran Creosote Bush Scrub still may be present in the reservoir area based on earlier permitting documents for the Eagle Mountain Landfill and Recycling Center (RECON 1992, County of Riverside and BLM 1996). Based on the inspection of current aerial photos[1], there do not appear to be any changes in the amount or quality of habitat in these disturbed areas since the earlier documents were written.

[1] Access to the site has been denied and environmental assessments have been made based upon current aerial photographs and documents related to the Eagle Mountain Landfill and Recycling Project.

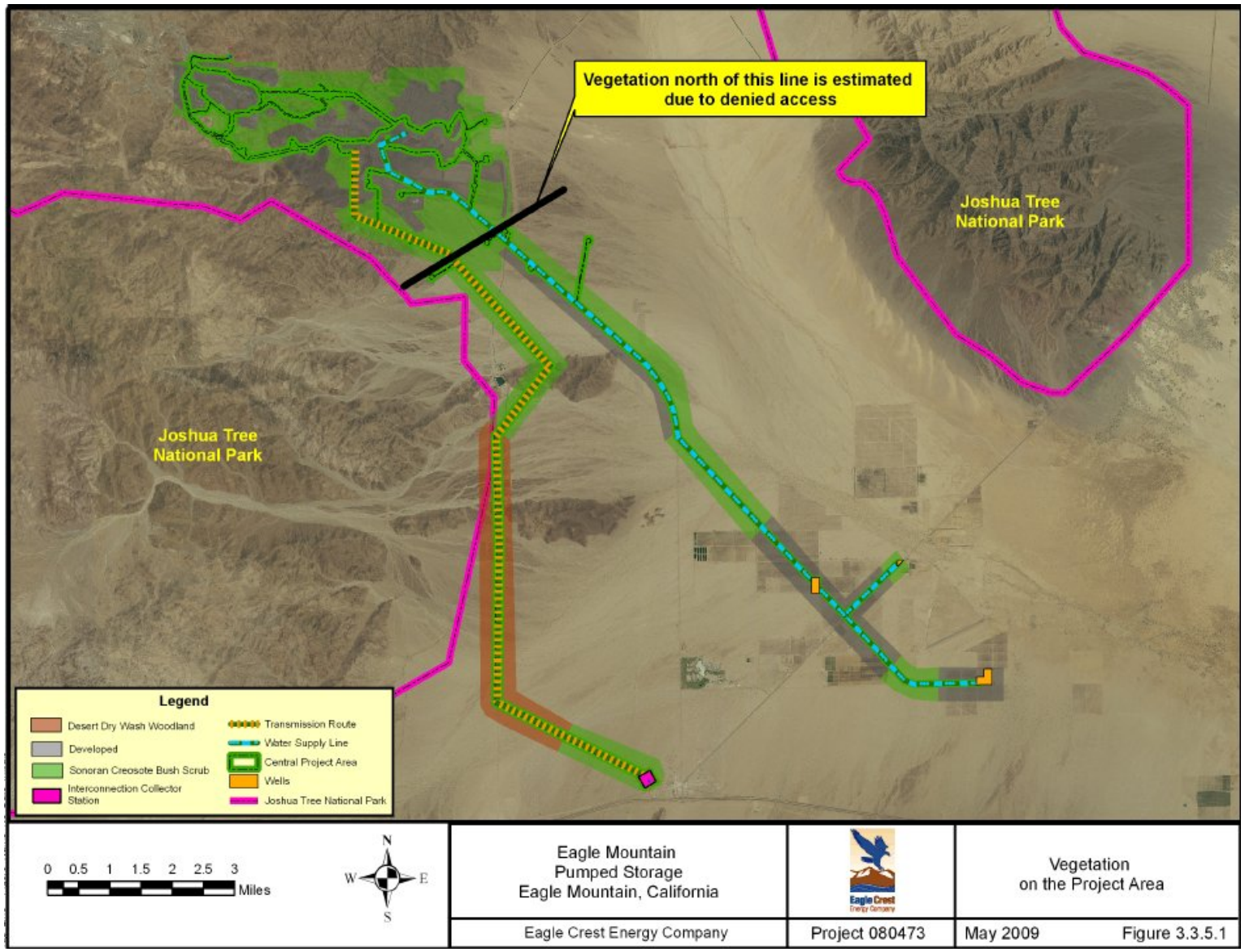

Figure 1: Vegetation of the Project Area

Table 1 (also referred to Table 3-17 of the Final License Application [ECE 2009]) summarizes native habitats on each Project element. The transmission line ROW intersects approximately one mile of developed land (disturbed by mining), 6.9 miles of Sonoran Creosote Bush Scrub and 5.6 miles of Desert Dry Wash Woodland. The water pipeline travels through native Sonoran Creosote Bush Scrub and abandoned jojoba (*Simmondsia chinensis*) fields. The combined acreage of native Sonoran Creosote Bush Scrub intersected by the water pipeline ROW is 20.9 acres. In total, all Project elements are anticipated to disturb a minimum of 81acres of native habitats.

While the loss of native habitat for the sole purpose of construction (as opposed to maintenance) is temporary, it should be considered semi-permanent for the Colorado Desert. Natural re-growth is constrained by limited and unpredictable precipitation and can require several decades to approach pre-disturbance conditions.

Table 1
Acreage Of Native Habitats And Developed Areas On The Eagle Mountain Pumped Storage Project[2,3]

Project Element	Total Acreage (acres)	Sonoran Creosote Bush Scrub (acres)	Desert Dry Wash Woodland (acres)	Developed (acres)
Central Project Area (reservoirs and constructed project features)	1101.5	0	0	1101.5
Transmission Line ROW	327 (13.5 miles)	167 (6.9 miles)	136 (5.6 miles)	24 (1 mile)
Tower Footprint plus Construction Area	*4.6 – 5.7 (54-68 towers)*	*2.1 - 3.3 (26-40 towers)*	*1.8 (22 towers)*	*0.4 (4 towers)*
Access Road	*32.7*	*17.7*	*13.6*	*2.4*
Pulling/Tensioning Sites	*Currently Unknown (intended to fall within the T-Line ROW and substation site)*	*Currently Unknown*	*Currently Unknown*	*Currently Unknown*
Equipment Laydown Sites	*Currently Unknown*	*Assume 0*	*Assume 0*	*Assume 100%*
Proposed Interconnection Collector Substation	25	25	0	0
Water Pipeline	55.6 (15.3 miles)	20.9[3] (8.1miles)	0 (0 miles)	34.7[4] (7.2 miles)

[2] Acreage is calculated based on the following assumptions:

- Transmission Line
  - 13.5 mi long, 200-foot ROW
  - Approximately four towers per linear mile, with more in mountainous terrain (54 to 68 total)
  - Estimated access road width is 20 feet; towers will be immediately adjacent to the access road with no stub road. (Note: This assumption may change when specific towers are engineered. In the two, small mountainous areas, stub roads are more likely to be present to accommodate both the access road and the necessary tower location.)
  - Total tower footprint (40 by 40 feet) plus construction area is 3600 ft^2 (60 by 60 feet)
  - Tensioning and pulling sites are unknown at this time, but are intended to be located within the transmission line ROW and substation site.
  - Equipment laydown areas will be on previously disturbed lands and/or overlapping with other project acreage.

- Water Pipeline and Wells
  - 15.3 mi long, 30-foot ROW, with access road included in the ROW
  - Along Kaiser Road, half of the ROW is in the disturbed (bladed) road shoulder
  - Three groundwater wells; total estimated disturbance footprint for each is 2500 ft^2 (50 by 50 feet)

[3] All calculations of acreage on the Central Project Area are estimates based upon AutoCAD mapping.

[4] Part of the mileage was adjacent to Kaiser Road, where only half the width of the ROW was in native habitat. The other half was in the road shoulder.

Project Element	Total Acreage (acres)	Sonoran Creosote Bush Scrub (acres)	Desert Dry Wash Woodland (acres)	Developed (acres)
TOTAL PROJECT ACREAGE	≥1219.8	≥65.7	≥15.4	≥1139

This Revegetation Plan is being developed by the Project Biological Technical Advisory Team (BTAT), which comprises ECE's biological consultant(s) and staff from the managing resource agencies (expected to include U.S. Fish and Wildlife Service [USFWS], California Department of Fish and Game [CDFG], the U.S. Bureau of Land Management [BLM], and Joshua Tree National Park [JTNP]). The plan is considered a living document and may be subject to revision based upon on-going environmental assessments and consultation with the BTAT. ECE shall submit the final Revegetation Plan to FERC by December 31 of the second year after the license is issued (prior to the start of construction), along with documentation of consultation with the BTAT. The plan will be implemented by the contractor, under supervision of the Project Environmental Coordinator and Project Biologist.

The economic cost analyses to develop and implement the Plan are included in the *Cost of Developing the License Application* (Exhibit A.4) and *Cost of Environmental Measures* (Exhibit E, Section 4.3).

REVEGETATION PLAN COMPONENTS

ECE shall restore all currently undeveloped areas that are disturbed by project construction, including temporary disturbance areas around tower construction sites, laydown/staging areas, temporary access and spur roads, and pipeline construction areas. Areas of the Central Project Site that have been disturbed by surface mining and mine waste disposal, such that they currently do not support native vegetation, will not be included in the Revegetation Plan. Re-vegetation will occur immediately following construction, to minimize unnecessary exposure of scarified soil to wind and water.

In order to accommodate the specific features of the desert that make revegetation difficult – namely lack of predictable rainfall, lack of an "A" soil horizon, and the difficulty of re-establishing a soil community of micro-organisms – components of the Revegetation Plan include the following:

- Quantitative identification of the baseline herbaceous perennial and woody perennial species community.
- Soil salvage and replacement on areas to be revegetated.
- Final site preparation and grading to include features that will enhance germination and growth of native species. Vertical mulching and other techniques to promote a hospitable environment for germination and growth.
- Seeding and/or planting of seedlings of colonizing species.
- Development of a soil micro-community by inoculation of mycorrhizal fungi and planting species that develop a mycorrhizal net.
- Weed control.
- Initial irrigation, if necessary.
- A realistic schedule of regrowth of native species, and remedial measures, if needed.

The Revegetation Plan also shall incorporate the measures identified in the June 2006 Memorandum of Understanding (Appendix A) regarding vegetation management along rights-of-way for electrical transmission and distribution facilities on Federal lands.

Baseline Surveys

Prior to construction, quantitative baseline surveys will be conducted adjacent to but outside of disturbance zones along the ROWs and other areas where surface disturbance during construction will remove native vegetation. These surveys will provide quantitative information on perennial species that will be affected, including density, size and relative health. The quantitative transects used in these surveys will also provide comparative information against which to compare the success of the future revegetation efforts. In combination with streambed delineations for the Streambed Alteration Agreement, these baseline data will also assist the BTAT in the development of the final re-vegetation plan.

Species to be Used in the Revegetation

Species to be used for revegetation will include perennial species that occur in the existing mature native communities on the Project, colonizing species, and species that encourage soil building (e.g., mycorrhizal nets, faunal communities). Annual species in the adjacent native community will naturally revegetate the area due to the typical mechanisms of seed transport (e.g., wind, water, rodents, attachment to fur and/or feathers). As such, they will not be included in the seed mix.

In addition, species will include those that are targeted as special-status or are otherwise protected. For instance, five special-status plants – California ditaxis, crucifixion thorn, desert unicorn plant, foxtail cactus, and Wiggins' cholla – were observed on the ROWs and will experience losses due to construction. These species will be salvaged and transplanted, as feasible, and/or site preparation will restore surface conditions to those that will promote the growth of these species (e.g., swales for California ditaxis and desert unicorn plant). A number of species that are not special-status, but are protected by the California Desert Native Plants Act (CDNPA) also occur in the Project area including:

- Catclaw acacia
- Smoke tree
- Ironwood
- Ocotillo
- Mojave yucca (Y*ucca schidigera*)
- Desert Unicorn Plant
- Blue palo verde
- All cacti

Where avoidance is not feasible for any species, those species and individuals that can be reasonably transplanted will be salvaged and transplanted as part of the Revegetation Plan. Salvaging seed may also be an option considered for certain species (e.g., smoke tree, ironwood).

Seed used for revegetation will come from local sources to maintain local genetic structure and enhance survival potential.

Measures During Construction

During construction, topsoil will be salvaged and stored on the ROW in small piles (≤ 4 ft tall) that will promote the continued functioning of the soil community. Individual plants that will be used for transplantation will be salvaged and appropriately stored.

Site Preparation

Final site preparation and grading will include features that enhance the germination and growth of native species. This will include, but will not be limited to (1) surface pitting for the

accumulation of sediments, water and seed; and (2) the construction of small swales for such species as California ditaxis and desert unicorn plant, which are commonly found in road swales and shoulders. All disturbed washes will be recontoured to eliminate erosion and encourage the reestablishment of the drainage to its pre-construction condition.

Planting

State-of-the-art techniques will be used to plant seedlings, transplants, and seed. Most revegetating will occur during fall, prior to winter rains and also when plant growth is heightened because of mild temperatures. Vertical mulching will be used to encourage the deposition of sediment, provide shade (i.e., nurse plant function), and promote the influx of native fauna, which will, in turn, promote healthy soil and community functioning. As determined to be necessary, wire cages or other growth tubes will be used to prevent herbivory of transplants.

Irrigation

In general, the use of irrigation will be minimized to replicate natural conditions. However, it is recognized that transplants will be physiologically stressed by the transplanting process and will no longer be in a location where successful growth initially occurred. All transplants will be irrigated at least once after planting. As appropriate some species may be manually irrigated at subsequent intervals, for no more than two years. For most plants, soil surface contouring and the construction of natural water catchments for individual plants will provide sufficient water for growth and maintenance.

Invasive Species Control

Invasive, non-native plant species are already present in the area but may try to infest areas that will be restored. An Invasive Weed Monitoring and Control Plan has been developed to address the control of non-native invasive plant species.

Monitoring

Revegetated areas shall be monitored by the Project Biologist to assess progress and identify potential problems. Monitoring will occur for five years after revegetation has been implemented, or until established success criteria are met, Remedial activities (e.g., additional planting, weeding, or erosion control) shall be taken during the monitoring period if necessary to ensure the success of the restoration effort. If the mitigation fails to meet the established performance criteria after the five-year maintenance and monitoring period, monitoring shall extend beyond the five-year period until the criteria are met.

Success Criteria

Successful revegetation in the desert is difficult because of low and unpredictable rainfall. Success standards used in more mesic environments cannot be used in the desert. Success criteria will be developed in consultation with the TAT, and will include, at a minimum, the establishment of native shrubs and the minimization of exotic weed populations.

Reporting

The TAT will review annual findings and restoration success submitted by the approved Habitat Restoration Specialist. A report on the status of the re-vegetation efforts will be submitted to FERC by December 31 following the fifth year of monitoring. If monitoring indicates that additional re-vegetation work is needed after five years, an additional report will be prepared for filing with FERC at the end of the monitoring project.

PLAN PREPARATION AND ACKNOWLEDGEMENTS

This plan was prepared by Alice E. Karl, Ph.D. (Alice E. Karl and Associates), Jeffrey G. Harvey Ph.D., Elizabeth Meyerhoff (HCG, LLC) and Ginger Gillin (GEI Consultants, Inc.).

DOCUMENTATION OF CONSULTATION

On August 3, 2009, ECE sent letters to the resource agencies notifying them of FERC's request for additional information with regard to these biological plans, with a copy of the July 29, 2009 FERC notice attached. On August 20, 2009 ECE sent letters to the BLM, USFWS, NPS, and CDFG requesting their assistance in reviewing and developing draft monitoring and control plans for the following terrestrial resource areas:

1) Revegetation Plan;
2) Weed Control Plan;
3) Desert Tortoise (*Gopherus agassizii*) Translocation or Removal Plan;
4) Raven Monitoring and Control Plan; and
5) Worker Environmental Awareness Program

On September 8, 2009 a conference call was held to discuss biological issues related to the Eagle Mountain Pumped Storage Project, and development of these five plans as a part of on-going consultation. Representatives of the NPS and the CDFG attended the meeting. The BLM and USFWS notified ECE that they would be unable to participate in the initial consultation. However, all agencies did receive the consultation meeting agenda and an executive summary of the mitigation plans that laid out the structure of the intended programs, including implementation schedule and components for the five biological and mitigation plans that would subsequently be developed for agency review. As follow-up to the meeting, meeting notes were distributed to all of the agencies, with an opportunity to comment on the notes. Finalized notes, revised in response to comments received by ECE, were distributed to all agencies on October 16, 2009. In addition, the biological resources section of the Final License Application was sent to the resource agencies, at their request, following the meeting.

On September 14, 2009, another conference call between ECE and the NPS was held to discuss the additional study request filed by the NPS with the FERC. One of the NPS study request's concerned raven monitoring and control and this topic was discussed during the conference call. ECE filed the response to the additional study requests with the FERC on September 17, 2009.

On September 17, 2009 the five draft plans for the 1) Revegetation Plan; 2) Weed Control Plan; 3) Desert Tortoise (*Gopherus agassizii*) Translocation or Removal Plan; 4) Raven Monitoring and Control Plan; and 5) Worker Environmental Awareness Program, were sent to each of the resource agencies (CDFG, USFWS, BLM, and NPS), with a formal request for their review and comment on the plans. As follow-up and in an effort to obtain feedback, a reminder email was sent to each of the four agencies on October 15, 2009 regarding the draft plans and our interest in receiving comments on those plans.

No comments on the revegetation plan were received. Appendix D of the response to the FERC additional information request includes a contact register and copies of correspondence with the land managing agencies.

LITERATURE CITED

County of Riverside Planning Department and U.S. Bureau of Land Management. 1996. Draft Environmental Impact Statement/ Environmental Impact Report for the Eagle Mountain Landfill and Recycling Center Project. Prepared by CH2MHill. State Clearinghouse No. 95052023.

Eagle Crest Energy Company. 2009. Final License Application (FLA) and Applicant Prepared Environmental Impact Statement. Submitted to the Federal Energy Regulatory Commission (FERC) in June 2009.

Holland, R.F. 1986. Preliminary descriptions of the terrestrial natural communities of California. California Department of Fish and Game, Nongame-Heritage Program. 155 pp.

RECON. 1992. Biological Assessment for the Eagle Mountain Landfill Project. Prepared for the Bureau of Land Management, Palm Springs, CA. 102 pp.

APPENDIX A

FS MOU-06-SU-11132426-158
BLM MOU-WO-220-2006-09

Memorandum of Understanding

Among

The Edison Electric Institute

and the

U.S. Department of Agriculture
Forest Service

and the

U.S. Department of the Interior
Bureau of Land Management
Fish and Wildlife Service
National Park Service

and the

U.S. Environmental Protection Agency

This Memorandum of Understanding (MOU) is hereby entered into among the U.S. Department of Agriculture's Forest Service, hereinafter referred to as the Forest Service, the U.S. Department of the Interior's Bureau of Land Management, Fish and Wildlife Service, and National Park Service, hereinafter referred to as Department of the Interior Agencies, collectively referred to as the Federal land management agencies, the U.S. Environmental Protection Agency, hereinafter referred to as EPA, and the Edison Electric Institute, hereinafter referred to as EEI.

Issue Statement

Electric utilities provide an essential service that is closely tied to our Nation's safety, economy, and welfare. In order to provide a dependable supply of electricity, utilities must manage vegetation near their transmission and distribution lines and other facilities to prevent blackouts and wildfires, which can harm people, wildlife, habitat, and property.

To meet both ecological and reliability standards, it is essential for Federal agencies and utilities to work cooperatively to streamline and expedite the management of vegetation near utility facilities, including facilities on Federal lands, in a timely and efficient manner.

Purpose

The purpose of this MOU is to establish a framework for developing cooperative rights-of-way integrated vegetation management (IVM) practices among EEI, an association of U.S. shareholder-owned electric companies, Department of the Interior Agencies, Forest Service, and EPA.

This MOU is intended to provide a working framework among EEI, international affiliates, and industry associates worldwide. The EEI works closely with its members, representing their interests, and works with the Department of the Interior Agencies, the Forest Service, and the EPA to develop practical, sustainable, and cost-effective policies, procedures, and practices that will reduce risks to the environment and the public while ensuring uninterrupted electrical service to customers. These practices are intended to protect human health and the environment and may reduce fires. The Federal land management agencies, through coordination with the EPA and other Government agencies, industry representatives, and local landowners, can promote IVM and other best management practices (BMP) as part of their review of rights-of-way vegetation management plans.

This MOU is intended to facilitate the following mutually accepted goals. These goals are not listed in priority order:

1. Maintain reliable electric service to reduce damage to facilities and structures and the environment by facilitating compliance, as appropriate, with the reliability and safety standards referenced in Appendix A, including the North American Electric Reliability Council standards, which will become mandatory under the Energy Policy Act of 2005 and the Institute of Electrical and Electronics Engineers' clearance standards.

2. Improve power line safety and electric utility worker safety in accordance with the National Electric Safety Code and Occupational Safety and Health Administration standards referenced in Appendix A, which specify separation between electric lines and other objects and relevant worker safety practices;

3. Reduce the likelihood of wildfires and fire-induced interference with electric facilities by promoting compliance with the Uniform Fire Code, Urban Wildland Interface Code, and other applicable standards referenced in Appendix A;

4. Reduce soil erosion and water quality impacts within the electric utility rights-of-way and on adjacent lands by using BMPs; implementation of appropriate BMPs should be focused on erosion control during vegetation management activities and erosion control on transmission corridor maintenance roads.

5. Reduce the risk to human health, natural resources, and the environment by promoting the use of IVM BMPs for maintaining vegetation near transmission and distribution lines, such as the wire zone/border zone method, taking into consideration the American National Standards Institute A300 and Z133.1 standards and other standards and agency practices referenced in Appendices A and B, where appropriate;

6. Streamline administrative processes for approving right-of-way maintenance practices; recognizing that maintenance is implicit in the original approval and that failure to maintain adequate management of the rights-of-way creates adverse natural resource impacts (wildfire and erosion), as well as jeopardizing electric reliability;

7. Promote local ecotypes in re-vegetation projects; enhance site planting with native plant species in management projects; protect native rare species populations affected by rights-of-way establishment, construction, or maintenance; manage rights-of-way areas to maintain wildlife habitat and protect threatened and endangered species habitat; reduce the introduction and control the spread of non-native invasive species or noxious weeds in the rights-of-way and adjacent lands; and develop mutually acceptable corridor vegetative management plans;

8. Encourage public outreach to educate the public in general about the use and acceptance of IVM on rights-of-way;

9. Facilitate prompt evaluation and suppression of dangerous rights-of-way conditions by the rights-of-way holder and Federal land management agencies;

10. Facilitate prompt stabilization of damaged resources within the rights-of-way and ensure that local land management plans, agency procedures, and rights-of-way specific terms and conditions fully reflect and address the use of IVM to manage vegetation near electric transmission and distribution lines and other facilities; and

11. Incorporate IVM and BMPs, where appropriate, into the terms and conditions of the authorization, grant, or permits to ensure sound management of natural ecosystems and the protection of natural resources.

Cooperation among Federal agencies, utility companies, landowners, public interest groups, and other stakeholders can promote sound management of natural ecosystems, protect natural resources, and facilitate IVM to minimize catastrophic blackouts caused by vegetation within the rights-of-way. Nothing in this MOU obligates any of the signatories to engage in any activities inconsistent with their respective missions, roles, and responsibilities.

Background

Thousands of miles of distribution and transmission lines and other electric utility facilities occupy lands managed by Federal land management agencies. Vegetation must be managed around these distribution and transmission facilities to provide safe corridors for the generation and delivery of power.

Recognizing the importance of reliable electric service in the Energy Policy Act of 2005 (P.L. 109-58, enacted August 8, 2005, section 1211), Congress made provisions for electric system reliability standards, including vegetation management. Furthermore, Congress specified that Federal land management agencies responsible for approving rights-of-way for electric transmission or distribution facilities located on Federal lands within the U.S. must expedite any approvals necessary to allow the owners or operators of such facilities to comply with reliability standards that pertain to vegetation management, electric service restoration, or resolution of situations that imminently endanger the reliability or safety of the facilities.

The Utility Vegetation Management and Bulk Electric Reliability Report from the Federal Energy Regulatory Commission, September 7, 2004, recognized the importance of vegetative management for the safety and reliability of electric transmission. Executive Order 13212, 66 F.R. 28357 (May 18, 2001), directs executive departments and agencies to take appropriate actions, to the extent consistent with applicable laws, to expedite projects or review of permits in order to improve the production, transmission, and conservation of energy while maintaining safety, public health, and environmental protection.

Federal agencies develop their own vegetation management activities consistent with their authorizing statutes. Vegetation interference with transmission and distribution power lines is one of the most common causes of electrical outages throughout the United States. Electric power outages may occur when trees or tree limbs grow, fall, or make contact with electric overhead power lines. Outages also occur when overhead lines stretch or sag onto trees due to increased load or changes in ambient conditions, e.g., high air temperature or high wind speed. Since 1996, the presence of vegetation within electrical rights-of-ways has been implicated in initiating three large-scale electric grid failures in the United States and Canada, including the massive August 14, 2003, blackout that affected 50,000,000 people.

Vegetation in contact with power lines can start fires. Arcing can occur when any part of a bare high-voltage line gets too close to a tree or limb. Properly maintained vegetation on rights-of-way can act as effective firebreaks for the control and suppression of wildfire. Maintenance of rights-of-way vegetation reduces risk to the wildland-urban interface and fulfills key point #3 of the National Fire Plan

Roles and Responsibilities

The parties to this MOU mutually agree to promote the following roles and responsibilities to the extent consistent with the respective missions, roles, and responsibilities of each party.

Training: Encourage opportunities for training and technical assistance to Federal agencies, states, tribes, local governments, maintenance crews, utility staff, and landowners seeking to improve vegetation management, including IVM, in rights-of-way occupied by power lines. Promote development of maintenance training and emergency procedures to facilitate the recognition of and rectify unsafe vegetation/power line conditions.

Public Outreach: Encourage efforts to educate the public, organizations, and rights-of-way holders of the importance and value of utilizing IVM in managing vegetation on or adjacent to rights-of-way for power lines located on Federal lands.

Administrative Procedures: Identify mutual management concerns and needs of each Federal agency and rights-of-way holders. Review and analyze vegetation management plans, select BMPs/IVM, and prepare administrative procedures to facilitate implementation of accepted BMPs/IVM.

Application Processing: Identify, reinforce, and implement procedural steps in the planning and rights-of-way authorization process that will expedite normal maintenance of rights-of-way, to the extent permitted by law and regulations. The Federal land management agencies may modify their procedures to require all rights-of-way applications to include generally accepted IVM practices. The Federal land management agencies may identify the desired future condition of rights-of-way resources in coordination with rights-of-way authorization holders.

Integrated Vegetation Management - Best Management Practices: Promote IVM practices and incorporate BMPs into the rights-of-way authorizations used by the utilities managing vegetation on rights-of-way. Parties to this MOU consult resources in Appendices A and B in determining appropriate IVM practices and BMPs. Integrated vegetation management is a system of controlling undesirable vegetation in which (1) undesirable vegetation within an ecosystem is identified and action thresholds are considered, and (2) all possible control options are evaluated and selected control(s) are implemented. Control options, which include biological, chemical, cultural, manual, and mechanical methods, are used to prevent or remedy unacceptable, unreliable, or unsafe conditions. Choice of control option(s) is based on effectiveness, environmental impact, site characteristics, worker/public health and safety, security, and economics. The goal of an IVM system is to manage vegetation and the environment to balance benefits of control, costs, public health, environmental quality, and regulatory compliance.

Consistency: Work with Federal land management agencies to adopt consistent application processing and rights-of-way management practices in concert with agencies' missions.

Maintenance Planning: Establish a mutually agreeable decision date when an agency does not have a customer service standard. Recognizing a need for a timely response to the permit holder, the Federal land management agencies may modify their procedures to require rights-of-way holders to work with the agencies to plan, schedule, and implement rights-of-way maintenance activities that include IVM activities. The Federal land management agencies may modify their procedures to require rights-of-way holders who want to change approved rights-of-way operation and maintenance plans to submit the request for change and the appropriate supporting documentation far enough in advance of the anticipated vegetative maintenance activities to allow the agencies to analyze the information and render decisions in conformance with agency policy and terms and conditions of the permit or authorization. Appropriate documentation could include National Environmental Policy Act analysis, Pesticide Use Proposals, and other data required by the agencies for analysis of the proposal and for rendering any required decisions.

Agency Notification of Maintenance Activities: Encourage cooperation and facilitate successful IVM programs by timely information and communication about maintenance plans and activities, both routine and emergency. When required in rights-of-way authorization's terms, conditions, or stipulations or an approved maintenance plan, a rights-of-way holder is obligated to notify the relevant Federal land management agency of proposed or emergency maintenance activities in accordance with such authorization or plan. When not specified in either a rights-of-way authorization or plan, the parties to this MOU encourage rights-of-way holders to notify the relevant Federal land management agency of any maintenance activities as soon as possible since earlier notification helps to facilitate timely review and approval.

Cooperation: Coordinate utility vegetation management plans with the appropriate Federal agencies and incorporate information on invasive species, threatened and endangered species, and other agency concerns.

Communication: Encourage the rights-of-way holders to frequently communicate with Federal land management agencies regarding the management of their authorized rights-of-way.
Frequent communication is an important component to facilitate the effective implementation of IVM practices among the Federal, State, and local governments, industry, landowners, and rights-of-way holders and to prevent last-minute crises.

Agency Contacts: Provide to all signatories relevant contact information of the person with the principal responsibility for implementing this MOU.

Authorities

The Bureau of Land Management is authorized to enter into this MOU under section 307 of the Federal Land Policy and Management Act, as amended (43 U.S.C. 1737), and the Public Rangeland Improvement Act (43 U.S.C. 1901).

The EPA is authorized to enter into this MOU under section 6604(b) of the Pollution Prevention Act (42 U.S.C. § 13103(b)).

The Forest Service is authorized to enter into this MOU under cooperative agreements between the Secretary of Agriculture and public or private agencies, organizations, institutions, and persons covering Forest Service programs; authority; funding (16 U.S.C. 565a-1).

The Fish and Wildlife Service is authorized to enter into this MOU under the National Wildlife Refuge System Administration Act of 1966, as amended (16 U.S.C. 668dd-ee), and 50 CFR 29.21-4 and 29.21-8 for rights-of-way.

The National Park Service is directed to manage all park lands to protect and preserve natural and cultural resources, pursuant to the National Park Service Organic Act, found at 16 U.S.C. § 1, and subsequent amendments.

Implementation, Amendments, and Termination

This MOU will be reviewed on an annual basis by all signatories and may be amended by the mutual consent of all parties. Changes require written modification, signed and dated by all parties, prior to the effective date.

This MOU will become effective upon the signature of the last approving official of the respective agencies. This MOU will remain in effect for a period of 5 years from the date of the last signature or until terminated by a 30-day advance written notice by any party. The termination by one agency does not automatically void the agreement among the remaining agencies. Other utilities and Federal land management agencies may join in this MOU by signature if they so choose without amending this agreement.

Non-Fund Obligating Document

Each Party will directly fund its own participation under the agreement. All commitments made in this MOU are subject to the availability of appropriated funds and each agency's budget priorities. Nothing in this agreement may be construed to obligate any agency or the United States to any current or future expenditure of resources. This MOU does not authorize or obligate the parties to spend funds or enter into any contract, assistance agreement, interagency agreement, or other financial obligation, even though the funds may be available. This instrument is neither a fiscal nor a funds obligation document. Reimbursement or contribution of funds among the parties will be handled in accordance with applicable laws and regulations.

This MOU does not alter or supplement the agencies' cost recovery procedures. Cost recovery should occur, as appropriate, using existing laws, regulations, and procedures. The agencies agree to coordinate informally on cost recovery and to consider implementation of an interagency collection agreement should formal coordination be requested by an agency.

Endorsement

Federal agencies do not endorse the purchase or sale of any products or services provided by private organizations. The MOU signatories should not make any statements, on the basis of this MOU, that imply that a Federal agency endorses the purchase or use of their products or services. This includes any BMPs or IVM practices mentioned above in the paragraph entitled "Integrated Vegetation Management" and below in Appendices A and B.

Limitations

This MOU is not intended to and does not create any right or benefit, substantive or procedural, enforceable by law or equity against the Federal land management agencies or EPA, their officers, or employees, or any other person. This MOU does not impose any binding obligations on any person.

This MOU is intended only to improve the working relationships of the agencies in connection with expeditious decisions with regard to linear rights-of-way authorizations for energy transmission projects and is neither intended to nor does it create any right, benefit, or trust responsibility, substantive or procedural, enforceable by law or equity by ~~a~~ any person or party

against the United States, its agencies, its officers, or any other person.

This MOU is to be construed in a manner consistent with all applicable laws and regulations.

This MOU neither expands nor is in derogation of those powers and authorities vested in the agencies by applicable law, statutes, or regulations.

The agencies intend to implement the terms of this MOU subject to the above limitations. All provisions in this MOU are not intended to foreclose options or restrict agency authorization; however, the provisions are subject to available resources.

The agencies will comply with the Federal Advisory Committee Act to the extent it applies. Any information furnished to the agencies under this instrument is subject to the Freedom of Information Act (5 U.S.C. 552) unless deemed confidential or exempt by agency policy. This instrument in no way restricts the agencies from participating in similar activities with other public or private agencies, organizations, and individuals.

Authorized Representatives

The parties to this MOU acknowledge that each of the signatories is authorized to act on behalf of their respective organizations regarding matters related to this MOU.

IN WITNESS WHEREOF, the parties hereto have executed this MOU as of the last written date below.

/s/ Thomas R. Kuhn 5/25/06
Thomas Kuhn, President Date
The Edison Electric Institute

/s/ Dale N. Bosworth 3/30/06
Dale Bosworth, Chief Date
USDA Forest Service

/s/ Kathleen Clark 5/1/06
Kathleen Clarke, Director Date
Bureau of Land Management

/s/ Kenneth Stansell (for) 5/17/06
H. Dale Hall, Director Date
U.S. Fish and Wildlife Service

/s/ Steve Martin (for) 4/14/06
Fran P. Mainella, Director Date
National Park Service

/s/ Susan B. Hazen 5/1/06
Susan B. Hazen Date
Principal Deputy Acting Assistant Administrator
EPA, Office of Prevention, Pesticides,
and Toxic Substances

Appendix A
Key Standards Relating to Electric System Reliability and Safety

American National Standards Institute (ANSI) Standards A300 and Z133.1. American National Standards Institute, ANSI A300 – 2001, Tree Care Operations – Tree, Shrub and Other Woody Plant Maintenance – Standard Practices (revision and redesignation of ANSI A300-1995) (Includes Supplements). American National Standards Institute, 1819 L Street, NW, 6th floor, Washington, DC 20036. Tel: 202.293.8020 http://www.ansi.com

American National Standards Institute, Inc., ANSI Z133.1-1994. American National Standard for Tree Care Operations--Pruning, Trimming, Repairing, Maintaining, and Removing Trees, and Cutting Brush-Safety Requirements.

Institute of Electrical and Electronics Engineers (IEEE) Standard 516-2003. Guide for Maintenance Methods on Energized Power Lines, Institute of Electrical and Electronics Engineers, New York, NY, 20003. ISBN: 0-7381-3569-0.

- Provides minimum vegetation-to-conductor clearances to maintain electrical integrity, as specified in Section 4.2.4, Minimum Air Insulation Distances Without Tools in the Air Gap, or its successor:

Line Nominal Voltage	Minimum Vegetation-to-Conductor Clearance to Maintain Electrical Integrity *	
(kV)	(ft)	(m)
765	**20.4**	**6.2**
500	**14.7**	**4.5**
345	**9.4**	**2.9**
230	**5.1**	**1.6**
161	**3.4**	**1.1**
138	**2.9**	**0.9**
88-115	**2.5**	**0.8**
69	**1.3**	**0.4**

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These distances shall be used unless the transmission owner can demonstrate it knows the transient over voltage factors for its system, in which case the values from Table 7 may be used. Correction factors must be applied for altitudes above 900 m.

North American Electric Reliability Council (NERC) Reliability Standards

- NERC is a nonprofit New Jersey corporation whose members are ten regional reliability councils. The members of these councils come from all segments of the electric industry: investor-owned utilities; Federal power agencies; rural electric cooperatives; state, municipal, and provincial utilities; independent power producers; power marketers; and end-use customers. These entities account for virtually all the electricity supplied and used in the United States, Canada, and a portion of Baja California Norte, Mexico.

- NERC's function is to maintain and improve the reliability of the North American integrated electric transmission system. This includes preventing outages from vegetation located on transmission rights-of-way (ROW), minimizing outages from vegetation located adjacent to ROWs, maintaining clearances between transmission lines and vegetation on and along transmission ROWs, and reporting vegetation-related outages of the transmission systems to the respective Regional Reliability Organizations and NERC.

- Under section 1211 of the Energy Policy Act of 2005, NERC reliability standards will become binding and enforceable on the Nation's utilities, with oversight by the Federal Energy Regulatory Commission.

National Electric Safety Code (NESC) 1977®

- Clapp, Allen L. NESC handbook: development and application of the American national standard, National Electrical Safety Code Grounding Rules, General Rules, and parts 1, 2, and 3 by Allen L. Clapp. 1984 ed. Institute of Electrical and Electronics Engineers, c1984, New York, NY (345 E. 47th St., New York 10017) 430 p.: ill.; 20 cm. ISBN: 0471807834.

- The NESC is the national code covering basic provisions for safeguarding persons from hazards resulting from installation, operation, and maintenance of conductors and equipment in electric supply stations, overhead, and underground electric supply and communication lines.

- It also contains work rules for construction, maintenance, and operations of electric supply and communication lines and equipment.

Occupational Safety and Health Administration (OSHA) Standard 29 C.F.R. 1910.269

- OSHA's section 1910.269 standard applies to line-clearance, tree-trimming operations performed by qualified employees (those who are knowledgeable in the construction and operation of electric power generation, transmission, or distribution equipment involved, along with the associated hazards). These employees typically perform tree-trimming duties as an incidental part of their normal work activities.

Uniform Fire Code (UFC) ™, 2003 Edition

- **NFPA 1, Uniform Fire Code (UFC) ™, 2003 Edition.** National Fire Protection Association**,** 1 Batterymarch park, Quincy, MA 02269.

- This code covers hazards from outside fires in vegetation, trash, building debris, and other materials.

Urban-Wildland Interface Code (UIC), 2003 International Edition. 5203 Leesburg Pike, Suite 600; Falls Church, VA 22041 [P] 1-888-ICC-SAFE (422-7233); [F] (703) 379-1546.

- The UIC establishes methods and timetables for controlling, changing, and modifying areas on property, in particular at the interface between developed and undeveloped areas.
- Plan elements include removal of slash, snags, and vegetation that come in contact with electrical lines. Additionally, ground or ladder fuels and dead trees may be removed or thinned.

Appendix B

References

Bureau of Land Management – http://www.blm.gov/weeds

Edison Electric Institute – http://www.eei.org *website contains a compendium of references on Vegetation Management for Right of Ways and Transmission Lines*

Environmental Protection Agency: - http://epa.gov/pesticides

National Pesticide Information Center (NPIC): http://npic.orst.edu/

Pesticide Environmental Stewardship Program (PESP) - http://www.epa.gov/oppbppd1/PESP/index.htm

Fish and Wildlife Service - http://www.fws.gov

Forest Service "Guide to Noxious Weed Prevention Practices" http://www.fs.fed.us/rangelands/ecology/invasives

National Park Service - NPS Management Policies, Chapter 4: http://data2.itc.nps.gov/npspolicy/index.cfm

NPS 77-7 Natural Resource Guidelines (1981): Chapter 2 page 238. "Roles and Responsibilities" the "Superintendent should ensure that the park IPM coordinator participates in all management decisions that may directly or indirectly influence pest management. Superintendents must ensure that park IPM Coordinators review and obtain required reviews and approvals for all pesticide projects performed within the park, including projects performed by non-NPS employees such as lessees and contractors . . . ."

Appendix C
Glossary and Acronyms

ANSI	American National Standards Institute
BMP	Best Management Practices: Procedures that have been determined by subject matter experts to be the most effective, low risk, economical and environmentally appropriate procedures for a specific situation. For example, EPA's water regulations define BMP's as "Methods, measures, or practices selected by an agency [business, or other entity] to meet its non-point source control needs. BMPs include but are not limited to structural and nonstructural controls, operation, and maintenance procedures. BMP's can be applied before, during and after pollution producing activities to reduce or eliminate the introduction of pollutants into receiving waters." (40 CFR - 130.2 [m]).
CFR	Code of Federal Regulations
EEI	Edison Electric Institute: A national association of U.S. shareholder-owned electric utilities and industry affiliates and associates worldwide
EPA	Environmental Protection Agency
FERC	Federal Energy Regulatory Commission
Fed. Reg. or F.R.	Federal Register
IEEE	Institute of Electrical and Electronics Engineers
IPM	Integrated Pest Management
IVM	Integrated Vegetation Management: an ecosystem-based strategy for controlling unwanted vegetation using the most appropriate, environmentally sound, and cost effective combination of biological, chemical, cultural, manual, or mechanical methods. (Section Mutually Agreed Roles and Responsibilities provide a definition of IVM.)
Invasive weeds	(or alien species, aquatic nuisance species, exotic species, foreign species, introduced species, non-native species): a species that enters an ecosystem beyond its natural range and causes economic or environmental harm.
MOU	Memorandum of Understanding
NERC	North American Electric Reliability Organization
NESC	National Electric Safety Code®
Noxious weeds	Designated by Federal or State law as generally possessing one or more of the following characteristics: aggressive and difficult to manage; parasitic; a carrier or host of serious insects or disease; or non-native, new or not common to the U.S.
NPS	National Park Service
OSHA	Occupational Safety and Health Administration
ROW	Rights-of-way: the strip of land designated by an authorization or permit for use by a specific purpose.
ROW authorization/ permit	The legal document allowing a utility permission to pass over, under or through Federal land without conveying any interest in the land.
UFC	Uniform Fire Code
UIC	Urban-Wildland Interface Code™

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Eagle Mountain Pumped Storage
FERC Project No. 13123

Invasive Species Monitoring and Control Plan

Submitted to: Federal Energy Regulatory Commission

Submitted by: Eagle Crest Energy Company

October 27, 2009

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BACKGROUND AND NEED

Several species of exotic plants have been introduced to the southwestern deserts. Tamarisk (*Tamarix* spp.), a medium-sized tree, was introduced to the United States as an ornamental and windbreak. Brought to the United States in the early 1800s (Allen 2002), old hedges of tamarisk are still common along farms and railroads in many areas of the desert. It has especially invaded riparian areas, including springs, rivers, and canals, outcompeting native vegetation for available resources. On the Eagle Mountain Pumped Storage Project (Project), a tamarisk grove was identified in the East Pit in the early 1990s, although the presence of that plant has not been detected on recent aerial photography. It has not been found, nor is it likely to occur, on other Project elements.

Highly successful, exotic ephemeral (also known as "annual") species in the Project area include three grasses - red brome (*Bromus madritensis rubens*), cheatgrass (*B. tectorum*), and split grass (*Schismus* spp) – and two dicots – Tournefort's mustard (*Brassica tournefortii*) and filaree (*Erodium cicutarium*) (Eagle Crest Energy Company [ECE] 2009). Most were established in the desert in the mid-twentieth century, primarily via grazing and agriculture (Allen 2002) but also by road-building and other anthropogenic activities that disturb soil surfaces and/or use equipment capable of transporting exotic seed from sources elsewhere. Brooks (2007) also cited nitrogen deposition from vehicle exhaust as potentially promoting plant invasions.

Exotic species use available resources, thereby competing with native plant species and altering species composition and evenness (i.e., disproportional abundance of some species). This, in turn, alters the availability of resources (e.g., cover, forage) to wildlife, which may alter faunal species diversity in the affected wildlife community. Lack of native vegetation may also be implicated in the inability of species that are periodically stressed by drought – a normal and relatively frequent phenomenon in the desert - to withstand that stress. Furthermore, exotic annuals are responsible for promoting wildfires in the desert (Brown and Minnich 1986; Brooks 1998; and Allen 2002).

Invasive, non-native annual plant species are already present throughout the Project area[1] but may be spread or increase as a result of construction and/or maintenance activities. This Invasive Species Monitoring and Control Plan (ISMCP) will serve as the comprehensive framework to avoid the spread of exotic weeds, monitor any spread, and implement control measures following documentation of any spread as a result of Project activities. The ISMCP will be implemented to minimize emigration of exotic species to adjacent undisturbed sites, reduce the potential for immigration of new infestations, and control and eradicate infestations resulting from Project activities.

[1] Although entry has not been permitted for the hydropower plant site, exotic weeds are assumed to be present there as a result of long-term, intensive mining activities and human habitation.

AVOIDANCE OF EXOTIC WEED PROLIFERATION

To avoid any initial increase and/or spread of invasive non-native vegetation, all equipment brought to the site would be power-washed prior to arrival to minimize the transfer of exotic weed seed. No equipment would travel through a weed-infested area en route to the Project.

MONITORING TO DETECT EXOTIC WEED PROLIFERATION

Pre-Disturbance Surveys

In order to identify baseline weed populations on and adjacent to the Project, quantitative belt transects will be established both within the Project ROWs and also along identical transects outside the Project impact zones. Transects along ROWs also will be sited adjacent to, and especially downwind and downslope, from expected surface disturbance (e.g., along roads and where seeds could be dispersed due to water flow). Baseline surveys will be conducted during one or two years prior to construction. (Because exotic annuals proliferate during high rainfall years and exhibit low abundance during low rainfall years, pre-construction surveys will take place during at least one average to above-average rainfall year.) Species presence and frequency will be quantified; density may be quantified, if practical. Populations of exotic weeds will be mapped and their extent estimated and recorded. A comprehensive weed species list will be recorded and utilized to track changes on and associated with the Project.

Construction and Operations Phases

Transects will be re-surveyed annually during construction and for two years (at least one year with average to above-average precipitation), prior to seed set, to identify new invasions of exotic species and to determine the overall effectiveness and success of control treatments. Control transects (i.e., comparative transects outside Project impact zones) will be simultaneously surveyed.

Success standards for control will be assumed to equal no statistically significant increases in weed frequency and presence over control (comparative) conditions. Should prescribed control methods fail to effectively control or eradicate particular infestations, additional control methods or applications will be implemented until overall success has been achieved.

CONTROLLING EXOTIC WEEK PROLIFERATION

Triggers for Control

Weed control following Project surface disturbance will be implemented if weed species presence and/or frequency statistically significantly increase over baseline and control conditions.

Methods of Eradication

The Project Biologist will propose a method or combination of methods to control noxious plants, by species and location, to the Technical Advisory Team for their approval. If a known or suspected special status species' habitat or sensitive resource might be impacted, qualified personnel would conduct a site-specific assessment of the presence or distribution of the species and recommend the use of control techniques that would not adversely affect the species. In no instance would a noxious plant control operation be undertaken where there is a reasonable likelihood of a threatened or endangered species being adversely affected. In all cases, herbicides will be used only when evaluation of the situation concludes herbicide use is appropriate and the most effective treatment. Chemical labels would be followed and all restrictions heeded.

Control methods will vary by species and the type of habitat where populations occur. With an integrated approach, many species can be easily and effectively controlled. It must be recognized, though, that control of annual weeds is difficult when there is a continual external weed supply from other sources, as currently occurs on the Project hydropower plant site and linear facilities. However, spread and increased abundance due solely to the Project can be controlled. No efforts will be made to eradicate split grass, a highly invasive annual grass species from the Mediterranean region that has become the pre-dominant annual throughout most of the southwestern deserts.

The ISMCP will employ the most effective aspects of the following control methods:

1) Manual Removal - Manual control methods range from hand pulling and grubbing with hand tools to clipping or cutting the plants with scythes or other cutters. If sufficient root mass is removed, the individual plant can be destroyed. Cutting the plants would reduce reproduction of perennial plants and weaken their competitive advantage by depleting carbohydrate reserves in the root systems. This methodology can be very effective, depending on the growth habits and phenology (i.e., reproductive cycle) of the individual species.

2) Mechanical Control - Mechanical controls generally involve manipulating a site to increase the competitive advantage of desirable species and decrease the competitive advantage of noxious plants. Manipulations may include transplanting native plants to shade out undesirable plants, temporarily covering soil contaminated with noxious plant

seeds with plastic, mowing, disking, fire, and plowing. In native desert scrub, these methods generally have limited usefulness.

3) Chemical Application - A wide range of herbicides are available on the market for use in controlling and managing noxious plants. This methodology utilizes the application of herbicidal chemicals applied directly to identified noxious plants via ground-based equipment like tractors, ATVs, backpacks, and hand sprayers. Only registered herbicides will be used and only if their effects on wildlife appear to be safe. A registered herbicide is a chemical or chemical mixture that has met a battery of test requirements conducted by the producers of the chemical and the Environmental Protection Agency (EPA). The specific tests were designed to identify effects to humans, wildlife, and the environment. Upon satisfactory completion of the tests by the EPA, a registration number is given to that product by the EPA. This registration number is presented on the product label along with the specific conditions and parameters that meet the required standards. These products would be used only within the parameters presented on the label.

Although many herbicides are available on the market, two are suggested for potential weed control at the Project: 2,4-D and glyphosate. A general description of their chemical properties follows.

2,4-D- This herbicide has very little persistence in the environment. It has low toxicity to aquatic species and several formulations are approved for use in and near water. In areas near or immediately adjacent to water, 2,4-D would be used if effective on the target plant.

Glyphosate- Glyphosate is marketed as Roundup7©, Rodeo7©, and Accord7© (among others). It is labeled for a wide variety of uses, including home use. It is readily absorbed by leaves and disrupts the photosynthetic process. It affects a wide variety of plants, including grasses and other non-broad-leaved plants. It binds readily to organic matter in soil and is readily degraded by microorganisms. Soil movement is very slight. Rodeo7 and Accord7 can be used near or in water.

Other herbicides, especially species-specific herbicides for mustards and monocots (grasses) will be employed as appropriate and practical.

PLAN PREPARATION AND ACKNOWLEDGEMENTS

This plan was prepared by Alice E. Karl, Ph.D. (Alice E. Karl and Associates). It was reviewed and edited by Jeffrey G. Harvey Ph.D. (HCG, LLC) and Ginger Gillin, (GEI Consultants, Inc.).

DOCUMENTATION OF CONSULTATION

On August 3, 2009, ECE sent letters to the resource agencies notifying them of FERC's request for additional information with regard to these biological plans, with a copy of the July 29, 2009 FERC notice attached. On August 20, 2009 ECE sent letters to the BLM, USFWS, NPS, and CDFG requesting their assistance in reviewing and developing draft monitoring and control plans for the following terrestrial resource areas:

1) Revegetation Plan;
2) Weed Control Plan;
3) Desert Tortoise (*Gopherus agassizii*) Translocation or Removal Plan;
4) Raven Monitoring and Control Plan; and
5) Worker Environmental Awareness Program

On September 8, 2009 a conference call was held to discuss biological issues related to the Eagle Mountain Pumped Storage Project, and development of these five plans as a part of on-going consultation. Representatives of the NPS and the CDFG attended the meeting. The BLM and USFWS notified ECE that they would be unable to participate in the initial consultation. However, all agencies did receive the consultation meeting agenda and an executive summary of the mitigation plans that laid out the structure of the intended programs, including implementation schedule and components for the five biological and mitigation plans that would subsequently be developed for agency review. As follow-up to the meeting, meeting notes were distributed to all of the agencies, with an opportunity to comment on the notes. Finalized notes, revised in response to comments received by ECE, were distributed to all agencies on October 16, 2009. In addition, the biological resources section of the Final License Application was sent to the resource agencies, at their request, following the meeting.

On September 14, 2009, another conference call between ECE and the NPS was held to discuss the additional study request filed by the NPS with the FERC. One of the NPS study request's concerned raven monitoring and control and this topic was discussed during the conference call. ECE filed the response to the additional study requests with the FERC on September 17, 2009.

On September 17, 2009 the five draft plans for the 1) Revegetation Plan; 2) Weed Control Plan; 3) Desert Tortoise (*Gopherus agassizii*) Translocation or Removal Plan; 4) Raven Monitoring and Control Plan; and 5) Worker Environmental Awareness Program, were sent to each of the resource agencies (CDFG, USFWS, BLM, and NPS), with a formal request for their review and comment on the plans. As follow-up and in an effort to obtain feedback, a reminder email was sent to each of the four agencies on October 15, 2009 regarding the draft plans and our interest in receiving comments on those plans.

No comments on the invasive species plan were received. Appendix D of the response to the FERC additional information request includes a contact register and copies of correspondence with the land managing agencies.

LITERATURE CITED

Allen, E.B. 2002. Invasive weeds in the Northern and Eastern Colorado Desert Planning Area. White paper to Richard Crowe, Bureau of Land Management. 3pp.

Brooks, M.L. 1998. Ecology of a biological invasion: alien annual plants in the Mojave Desert. Ph.D. Diss., Univ. of California, Riverside. 186 pp.

---. 2007. Effects of land management practices on plant invasions in wildland areas. Chapter 9 *in* W. Nentwig (ed.) Biological Invasions. Ecological Studies Vol. 93. Springer Verlag Berlin Heidelberg.

Brown, D.E. and R.A. Minnich. 1986. Fire and creosote bush scrub of the western Sonoran Desert, California. Am. Midl. Nat. 116(2):411-422.

Eagle Crest Energy Company. 2009. Final License Application (FLA) and Applicant Prepared Environmental Impact Statement. Submitted to the Federal Energy Regulatory Commission (FERC) in June 2009.

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Eagle Mountain Pumped Storage
FERC Project No. 13123

DESERT TORTOISE REMOVAL AND TRANSLOCATION PLAN

Submitted to: Federal Energy Regulatory Commission

Submitted by: Eagle Crest Energy Company

October 27, 2009

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INTRODUCTION

The Eagle Crest Energy Company (ECE) has prepared this Desert Tortoise Translocation Plan for the Eagle Mountain Pumped Storage Project mitigation measures DT-4, DT-7, DT-1, BIO-20, and in accordance with the Federal Energy Regulatory Commission (FERC) request for additional information[1].

This draft Desert Tortoise Translocation Plan (DTTP) has been developed to minimize potential disturbance, stress, and injury to translocated desert tortoise during project construction and operation. The DTTP provides measures for handling tortoises and temperature requirements required for safe tortoise relocation, including inventory of specific data to be gathered on removed tortoises, preparation activities for the translocation site(s), and monitoring of handled tortoises. Further, the DTTP includes provides an implementation schedule, documentation of consultation with resource management agencies regarding the formation of such plan, and mitigation control measures for any such potential effects.

The economic cost analyses to develop and implement the Desert Tortoise Translocation Plan are included in the *Cost of Developing the License Application* (Exhibit A.4) and *Cost of Environmental Measures* (Exhibit E, Section 4.3).

The Desert Tortoise Translocation Plan is considered a living document and may be subject to revision based upon on-going environmental assessment with resource management agencies. The Plan will be implemented by the contractor, under supervision of the Project Environmental Coordinator and Project Biologist, and in consultation with the Biological Technical Advisory Team. The Technical Advisory Team is composed of the owner's biological consultant(s), and staff from the managing resource agencies (expected to include USFWS, CDFG, NPS, and BLM).

[1] The FERC Deficiency of License Applicant and Additional Information Request letter [dated July 29, 2009] under the Additional Information section for Exhibit E, #23 requests: *specific descriptions of how all of the agency comments and recommendations are accommodated by the plan and, if you do not adopt a recommendation, an explanation, based on project-specific information, of why you do not adopt the recommendation.* It should be noted, resource management consultation is an on-going process to be finalized with the Mitigation and Monitoring Plan.

DESERT TORTOISE REMOVAL AND TRANSLOCATION PLAN

Background and Need

Based on the results of surveys for the Eagle Mountain Pumped Storage Project (Project), desert tortoises occur along the transmission line right-of-way (ROW) and in the vicinity of the proposed substation near Desert Center (Eagle Crest Energy Company [ECE] 2009). While tortoises occur outside the hydropower plant site in native habitat, it is likely that no tortoise habitat remains on the plant site due to extensive and long-term mining. (This conclusion is necessarily based on aerial photographs and information from permitting documents for the Eagle Mountain Landfill Project because entry to the site has not been granted to permit a final assessment of vegetation and potential habitat patches remaining onsite.) As such, it is anticipated that no tortoises are likely to occur on the plant site. Based on surveys, it is also anticipated that no or very few desert tortoises reside along most of the water pipeline ROW; there is a possibility of tortoises along the western portion of the ROW, near the plant site.

Project activities that may encounter tortoises would include:

During Construction

- Fencing of the hydropower plant site and subsequent desert tortoise clearance from the fenced site
- Transmission line construction, including access and stub road grading, actual pad and tower construction, and activities involving equipment laydown areas and pulling and tensioning sites
- Water pipeline construction, including pipeline ROW grading and trenching, pipeline construction, and activities involving equipment laydown areas
- Fencing of the substation and subsequent desert tortoise clearance from the fenced site
- Construction personnel travel on access roads

During Operations

- Potentially, a tortoise that entered the fenced plant site or substation site
- Transmission line maintenance
- Personnel travel on the main access road to the Project

For the hydropower plant site, pipeline and transmission line, it is anticipated that any tortoises removed would not be "translocated" or "relocated" in the biological sense of putting an animal in a location outside its home range. Instead, any tortoise would simply be removed to another

part of its home range. For instance, along utility corridors tortoises would be removed a short distance from the construction zone. By moving such a tortoise to a location immediately adjacent to its capture site, the Project would be maintaining the tortoise within its home range, not translocating it. The tortoise merely would be excluded from a potentially harmful area. Any tortoises found on the hydropower plant site probably would be near the site's border abutting native vegetation. A tortoise found there could be assumed to be a transient (i.e., traveling between segments of its home range) or in a peripheral part of its home range, certainly outside its core use areas or parts of its home range that could support its survival. The 25-acre substation is approximately half the size of an adult female tortoise's home range and one-quarter of an adult male's average home range (Connor et al. 1994, Duda et al 1999, TRW 1999). So, any adult tortoise found on the substation site during clearance would likely have a substantial portion of its home range outside the substation site. Hence, this plan largely describes tortoise removal, not translocation.

This plan first addresses specific techniques of desert tortoise removal during Project construction and operations activities (fence construction, plant site and substation clearance, utility construction, Project operations) and then describes general procedures applicable to all tortoise removals (data collected on all tortoises, temperature considerations, tortoise transportation, authorized handlers, monitoring). This plan does not discuss the actions that engender tortoise removal (clearance activities, fence construction monitoring, fence monitoring, nest removal, reporting), which are discussed as part of the Final License Application (ECE 2009).

Removal During Specific Project Activities

Construction Activities

Tortoise removal that is necessary during the Project construction phase may occur during fence construction on the plant site and substation, utilities construction, plant site clearance, and substation site clearance. For any fence construction or construction of the transmission line and pipeline, tortoises that need to be removed from construction zones would be placed outside the construction zone but on public land or the Project ROW[2]. In all instances, tortoises would be placed in the deep shade of a large shrub or a known burrow for that tortoise, and monitored sufficiently to ensure their safety (as instructed under Post-Release Monitoring).

It is possible that a tortoise might attempt to re-enter an unfenced construction zone (for example, during fence construction), in which case a temporary fence could be erected to exclude the tortoise and increase its safety.

For the plant site and substation tortoise clearance or during other construction activities on the plant site and substation, any tortoise found would be placed on Project land immediately outside

[2] Unless permission can be obtained to put tortoises on private or public land, they must be placed on the Project ROW. It is generally appropriate that any tortoise removed from utility ROWs or fence construction areas be placed 100-200 feet away, preferably outside a known or suspected burrow for that tortoise. (It is anticipated that the Biological Monitors would have found and mapped most burrows close to the ROWs). This distance would be within the home range of any tortoise found on the ROW but sufficiently far from construction activity for minimal disturbance to the tortoise from construction activities. It would also be close enough that if the tortoise had been placed on the wrong side of the ROW, it would not be too far for the tortoise to travel to reach its normal activity areas.

the Project's exclusion fence from the capture location, where it is anticipated that the tortoise would seek a familiar burrow. All tortoises would be placed in the deep shade of a large shrub, and monitored to ensure their safety (as instructed under Post-Release Monitoring).

Tortoises observed by construction staff or other Project personnel on access roads would be allowed to continue their travel, unimpeded, across the road. Vehicles will be moved and remain at least 150 feet from the tortoise until the tortoise moves. If the tortoise does not continue across the road, a Biological Monitor can be contacted to remove the tortoise to native habitat along the road shoulder, in the deep shade of a large shrub, and monitored.

Tortoises Found During Operations

On the plant site, it is unlikely that even a small tortoise would not be highly visible following initial site grubbing and grading. Any tortoise found during Project operations therefore is most likely to have entered the site through a gate or breach in the fence. It is likely that any tortoise found within fenced areas during Project operations would have only recently entered the site. Any such tortoise would be removed to the nearest native habitat outside the fence (on Project land) and monitored as identified in Section 2.1, above.

Tortoises observed on the utility corridors during maintenance activities would not be disturbed or handled and would be allowed to move away of their own accord. Any maintenance that required surface disturbance or heavy equipment would require the same protection measures as for construction.

Tortoises observed by Project staff on access roads would be allowed to continue their travel, unimpeded, across the road. Vehicles will be moved and remain at least 150 feet from the tortoise until the tortoise moves. If the tortoise does not continue across the road, the Project Environmental Compliance Officer can be contacted to remove the tortoise to native habitat along the road shoulder, in the deep shade of a large shrub, and monitored as described in Section 3.6, below.

Procedures Applicable to All Removals

Data Gathered on Removed Tortoises

Except for tortoises crossing access roads and permitted to move along of their own accord, each captured tortoise will be processed prior to removal. The gender, carapace length, distinguishing morphology, clinical signs of disease, capture site location and description, release site location and description, and the amount of void, if any, will be recorded and the tortoise photographed and drawn. All tortoise handling will be accomplished by approved techniques (e.g., Desert Tortoise Council, 1994), incorporating newer research for minimization of disease transmission (e.g., Brown 2003). Each tortoise will be assigned an individual number. Marking techniques will be approved by USFWS, but temporary marks using very small epoxy numbers with a project-specific identifier are suggested. Such numbers will last for several years, long enough to be able to identify specific tortoises if observed during Project construction activities.

Temperature Considerations

In general, it is unwise to translocate tortoises in seasons when daily ground temperatures exceed 43ºC (mid-April through early October) because tortoises must find new refuges in unfamiliar areas, with the added pressure of lethal daily temperatures. (Karl [1992] and Zimmerman *et al.* [1994] observed that 43°C was the approximate surface temperature at which tortoises must go underground to escape heat.) However, for the Project, tortoises will be moved to familiar areas within their home ranges, where burrows are well-known, so tortoises could be moved during periods when lethal temperatures are reached during the day, under certain conditions:

- If a tortoise is found under a shrub in a construction zone or during a clearance survey and the ground temperature is ≥43°C, the tortoise will be avoided until temperatures subside in the late afternoon/early evening, at which time the tortoise can be moved or will move of its own accord. As necessary, to increase safety for this tortoise or to hold it during the plant site tortoise clearance, a temporary pen can be erected around the tortoise and shrub. The pen would be removed later in the day when the tortoise can be safely moved. All penned or avoided tortoises must be monitored to ensure their safety.

- If a tortoise is captured in a burrow at ground temperatures ≥43°C or if it is either impractical to pen it or it cannot be avoided by construction activities, then it should be held in a climate-controlled location (e.g., Project office) and released in the early evening after temperatures fall below 43°C.

- During fence construction, re-routed wash construction, along the utility corridor or on the plant site next to the exclusion fence, if a tortoise is found under a shrub at temperatures ≥43° C, at the Authorized Biologist's discretion it may be moved to another shrub or known burrow for that tortoise. During any such releases, monitoring would proceed as discussed in Section 3.5, below, to ensure tortoise safety. (Note: Moving a tortoise at this temperature must be approved by USFWS as their protocols state that tortoises shall not be handled when air temperatures at 5 cm above the ground surface exceed 35°C (http://www.fws.gov/ventura/speciesinfo/protocols_guidelines/docs/dt).

Adult tortoises held temporarily due to ambient temperatures will be released in the evening, but juvenile tortoises, which are highly subject to depredation by canids, badgers, and ravens, will be released in the early morning to minimize depredation.)

Tortoise Transportation

Most tortoises will be sufficiently near the fence or release site to be hand-carried to the release site. Each tortoise that is hand-carried will be kept upright and the handler, wearing disposable gloves (one pair per tortoise), will move the tortoise as quickly and smoothly as possible. Tortoises kept in a holding area due to temperature considerations or captured further from the release site will be transported to their release sites in individual, sterilized tubs with taped, sterilized lids. If transported by vehicle, the tortoise tub will be kept shaded during transport and

the tub will be placed on a well-padded surface, not over a heated portion of the vehicle floor.

Authorized Handlers

USFWS (http://www.fws.gov/ventura/speciesinfo/protocols_guidelines/docs/dt) describes a single designation for biologists who can be approved to handle tortoises - "Authorized Biologist." Such biologists have demonstrated to USFWS that they possess sufficient desert tortoise knowledge and experience to handle and move tortoises appropriately. Authorized Biologists are permitted to then approve specific monitors to handle tortoises, at their discretion. The California Department of Fish and Game (CDFG) must also approve such biologists, potentially including individual approvals for monitors approved by the Authorized Biologist. Only those biologists authorized by USFWS and CDFG, presumably including the Designated Biologist and certain Biological Monitors, can handle desert tortoises.

Post-Release Monitoring

All tortoises moved, whether during initial fence construction, from the Plant Site, during construction for linear facilities, or later, will be monitored sufficiently to ensure their safety. This is especially critical for juvenile tortoises, which are highly subject to depredation. Any tortoise moved will be watched for at least two hours to determine if it is behaving safely or if it is likely to try and re-enter the construction area (during fence construction or for utility corridors). Should a removed tortoise continually re-enter an unfenced construction area, then a temporary exclusion fence may need to be installed to assist with keeping the tortoise safe. In addition to the initial monitoring at release, in any instance where a tortoise is removed outside a tortoise exclusion fence, that release location will be visited for at least the next two days during tortoise activity temperatures (i.e., <43ºC ground surface temperature [Karl 1992, Zimmerman *et al.* 1994]) to ensure that the tortoise is not fence-walking. The latter would suggest that the release site had been incorrectly chosen and that release outside a different fence should be attempted (outside the opposite side of the fenced utility corridor, for example).

Tortoises released in the evening due to temperature considerations will be monitored until dark with a resumption of monitoring at dawn. Such tortoises will be watched until they found and entered an adequate burrow, ensuring that the tortoise was seeking thermal relief appropriately.

DOCUMENTATION OF CONSULTATION

On August 3, 2009, ECE sent letters to the resource agencies notifying them of FERC's request for additional information with regard to these biological plans, with a copy of the July 29, 2009 FERC notice attached. On August 20, 2009 ECE sent letters to the BLM, USFWS, NPS, and CDFG requesting their assistance in reviewing and developing draft monitoring and control plans for the following terrestrial resource areas:

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On October 16, 2009 ECE received comments from the National Park Service on the Desert Tortoise Translocation and Removal Plan. These comments were editorial in nature have been addressed in the revised plan. No comments on the draft DTTP plan were received from the

other agencies. Appendix D of the response to the FERC additional information request includes a contact register and copies of correspondence with the land managing agencies.

SOURCES

Brown, M.B., 2003. Disinfection protocol. Unpub. document from the University of Florida Mycoplasma research laboratory. 1 pp.

Desert Tortoise Council, 1994 (rev. 1999). Guidelines for handling desert tortoises during construction projects. E.L. LaRue, Jr. (ed.) Wrightwood, CA.

Duda, J.J., A.J. Krzysik, and J.E. Freilich. 1999. Effects of drought on desert tortoise movement and activity. Jour. Wildlife Mgmt. 63(4):1181-1192

Eagle Crest Energy Company. 2009. Final License Application (FLA) and Applicant Prepared Environmental Impact Statement. Submitted to the Federal Energy Regulatory Commission (FERC) in June 2009.

Karl, A.E. 1992. Annual report to the U.S. Fish and Wildlife Service for Permit No. PRT-746058. 12 pp.

O'Connor, M. P., L. C. Zimmerman, D. E. Ruby, S. J. Bulova, and J. R. Spotila. 1994. Home range size and movements by desert tortoises, *Gopherus agassizii*, in the eastern Mojave Desert. Herp. Monogr. 8:60-71.

TRW Environmental Safety Systems, Inc. 1999. Movement patterns of desert tortoises at Yucca Mountain. Unpubl. rept. to U.S. Department of Energy, Yucca Mountain Site Characterization Office, North Las Vegas, NV. Document No. B00000000-01717-5705-00049.

Zimmerman, L.C., M.P. O'Connor, S.J. Bulova, J.R. Spotila, S. J. Kemp, and C.J. Salice. 1994. Thermal ecology of desert tortoises in the eastern Mojave Desert: seasonal patterns of operative and body temperatures, and microhabitat utilization. Herp. Monogr. 8:45-59.

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Eagle Mountain Pumped Storage
FERC Project No. 13123

Raven Monitoring and Control Plan

Submitted to: Federal Energy Regulatory Commission

Submitted by: Eagle Crest Energy Company

October 27, 2009

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INTRODUCTION

The Eagle Crest Energy Company (ECE) has prepared this Raven Monitoring and Control Plan for the Eagle Mountain Pumped Storage Project mitigation measure DT-5[1] and in accordance with the Federal Energy Regulatory Commission (FERC) request for additional information[2].

The Raven Monitoring and Control Plan (RMCP) has been developed to reduce the opportunity for raven proliferation and describes the monitoring and control of the raven population in the project area. Additional components of the RMCP are to reduce project resource subsidies for ravens and to evaluate the effects of common ravens (*Corvus corax*) in the project area on the federally and State threatened desert tortoise (*Gopherus agassizii*). The Final RMCP will include an implementation schedule, documentation of consultation with resource management agencies regarding the formation of the plan, and mitigation control measures for any potential effects. In addition, the Project will provide funding to the United States Fish and Wildlife Service (USFWS) as a contribution to its regional raven monitoring and control program.

The economic cost analyses to develop and implement the Raven Monitoring and Control Plan is included in the *Cost of Developing the License Application* (Exhibit A.4) and *Cost of Environmental Measures* (Exhibit E, Section 4.3).

This Raven Monitoring and Control Plan is considered a living document and may be subject to revision based upon on-going environmental assessment with resource management agencies. The Plan will be implemented by the Project Environmental Coordinator and Project Biologist in consultation with the Biological Technical Advisory Team. The Technical Advisory Team is composed of the owner's biological consultant(s), and staff from the managing resource agencies (expected to include USFWS, CDFG, NPS, and BLM).

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[1] The text of Mitigation Measure DT –5 reads: Proposed projects on federal lands that may result in increased raven populations must incorporate mitigation to reduce or eliminate the opportunity for raven proliferation. The USFWS has developed a program to monitor and manage raven populations in the California desert in an effort to enhance desert tortoise recovery. In order to integrate monitoring and management, the USFWS has agreed to an "in-lieu" fee to replace quantitative raven monitoring on new projects in the range of the desert tortoise. The Project owner will pay in-lieu fees to USFWS that will be directed toward a future quantitative regional monitoring program aimed at understanding the relationship between ongoing development in the desert region, raven population growth and expansion and raven impacts on DT populations. The vehicle for this program is a Memorandum of Understanding between the Project owner, CDFG and USFWS. The Project Raven Monitoring and Control Program may include this in-lieu fee if it is determined that ravens may increase over current levels due to the Project.

[2] The FERC Deficiency of License Applicant and Additional Information Request letter [dated July 29, 2009] under the Additional Information section for Exhibit E, #23 requests: *specific descriptions of how all of the agency comments and recommendations are accommodated by the plan and, if you do not adopt a recommendation, an explanation, based on project-specific information, of why you do not adopt the recommendation.* It should be noted, resource management consultation is an on-going process to be finalized with the Mitigation and Monitoring Plan.

RAVEN MONITORING AND CONTROL PLAN

Background

The raven is a known predator to juvenile [and sometimes adult] desert tortoises, and while it appears that there is no desert tortoise habitat in the central project area, tortoises may enter roadways or work areas from unfenced adjacent native habitat. Human activities, including dumping of garbage, landfills, roads, increased nesting opportunities, irrigation, and increased vehicle use have lead to increased numbers of common ravens in California deserts.

The draft EIS/EIR for the Eagle Mountain Landfill (County of Riverside and BLM 1996) identified several common species that inhabit the disturbed Kaiser Eagle Mountain Mine and surrounding mine shafts as a result of that disturbance, including common raven (*Corvus corax*). Existing attractants for ravens on the project site include open water sources and human occupation of the town. Ravens were also detected during field surveys of the project area in 2008 and 2009 (Final License Application Exhibit E, Appendix B).

The water sources present in the project area including a water treatment pond, the open water portions of the Colorado River Aqueduct (CRA), and the Eagle Mountain Pumping Station (which is part of the CRA system). In addition, there has been human occupation of the Town of Eagle Mountain for many years. At present, the school at the town is operational, and there are several offices in use. Perching, roosting and nesting sites for ravens are plentiful under the existing condition of the project area as well.

The proposed Eagle Mountain Pumped Storage Project will increase human presence and open water sources in the project area. In addition, the minimal waste generated by project-related activities may attract common ravens to the area, as well. Ultimately, the increased predation on young [and possibly adult] tortoises by common ravens may reduce recruitment into breeding populations.

However, because of the baseline condition of continuous subsidies, it is likely that ravens already exist at the Central Project Area. A simple increase in the quantity of water when it is already fully available does not change the availability to opportunistic predators. As such, it is not likely that there would be a measurable change in the density of predators, or, as a result, a significant change in impacts to local fauna. This raven monitoring and control plan will be implemented as part of the Project's environmental measures to ensure that raven increases due to the project, if any, will not cause a biologically significant impact to the local fauna.

Purpose and Objective

The purpose of this RMCP is to identify the conditions of concern specific to the EMPS project area that may attract the common raven (*Corvus corax* [raven]) and to define a monitoring and control plan that will: 1) monitor raven activity and identify potential impacts to the desert tortoises *(Gopherus agassizii*) using a scientifically defensible approach, and 2) specify control measures.

Specific objectives for the Raven Monitoring and Control Plan include:

1. Document the potential impact of the EMPS on raven activity.
2. Document desert tortoise predation by ravens at nesting sites in the immediate EMPS area.
3. Document if there is a relationship between the EMPS conditions of concern and raven activity.
4. Document the effectiveness of raven management and control measures.
5. Define conditions for implementation of management and control measures using adaptive management principles.

Conditions of Concern

There are four basic conditions of concern that have the potential into increase raven proliferation in the project area and that have been identified for the EMPS project. These conditions of concern are considered in development of the Raven Monitoring and Control Plan:

Water from reservoirs and evaporation ponds

The project includes two water reservoirs sites (central and eastern mine pits). Brine ponds will be constructed for the reverse osmosis water treatment system. The reservoirs and brine ponds will provide a consistent water source. Ravens have been known to forage up to 30 miles from their roosts (B. Boarman pers. comm. to A. Karl), although this is unusual. Mean distances from a roost to a point resource have been reported as 3.9 miles (Kristan and Boarman 2003) and 16.8 miles (Mahringer 1970). In two studies observing distances to roosts from landfills, 68 percent of 142 birds remained within 0[3] miles (Mahringer 1970 [in Boarman and Heinrich 1999], with 94 percent within 4 miles of a landfill. Nesting ravens generally remain within a quarter-mile (Kristan and Boarman 2003) to 0.35 miles of the nest. (B. Boarman, Pers. Comm. to A. Karl). Overall, raven densities tend to decline with increasing distance from point subsidies (Kristan and Boarman 2003).

Potential creation of new perching/roosting/nesting sites;

Project components, such as tower structures, transmission poles and lines and support structures may provide new elevated perching and roost sites that have the potential to increase raven use of the area. Nesting ravens generally remain within 400 meters (m) to 560 m of the nest.

Water ponding potential from dust suppression

During construction, water will be applied to the graded areas, construction right-of-way, dirt roads, trenches, spoil piles, and other areas of ground disturbance to minimize dust emissions and topsoil erosion. Ponding water resulting from these dust suppression activities has the potential to attract ravens; although not expected, potentially resulting in increased predation by raven on the desert tortoise.

[3] The reported distance of zero miles indicates that ravens were nesting directly around the periphery of the landfill.

Construction/operation waste management.

Both construction and operation of the EMPS project will result in increased waste generation in the area. Improper waste management can result in the attraction of ravens to the project area.

Monitoring Design, Implementation and Schedule

Pre-construction monitoring nesting surveys will be conducted at the end of the typical breeding season (mid-June) to identify nests or evidence of predation at nests. Nesting surveys will also be conducted during the construction phase monitored post-construction every five years. Each survey will consist of systematically searching the immediate project area and within 1 km of the project boundary. Surveys will be conducted by vehicle when possible and by foot when necessary. All Joshua trees, landscape trees, utility poles, transmission towers, and manmade structures within the survey area will be searched. The location of any nests detected during the survey, if found, will be noted and Universal Transverse Mercator (UTM) coordinates recorded immediately following the conclusion of the primary session at a point. Additional data collected will be time at start and end of survey, weather (including temperature, average wind speed, and percent cloud cover), and other bird species identified. Known nests will be revisited during systematic searches for each successive survey and status recorded. The Project Biologist will search a 30 m radius surrounding each nest for evidence of desert tortoise predation. All desert tortoises depredated will be photographed, and the length measured (or estimated). If desert tortoises are located on-site, each will be marked to avoid duplication of data recording on subsequent surveys.

Raven monitoring summary reports will be prepared after each survey year to document survey results and data analyses. A comprehensive RMCP report will be prepared after completion of all three survey years. Each report will include recommendations for mitigation in accordance with identified triggers and the conditions identified below. The RMCP report will then be repeated once every five years for the duration of the license. This periodic review (once every five years) of the inventory and treated areas is necessary to evaluate the effectiveness of the RMCP over the long-term.

If management objectives of the RMCP are not being met, actions may need to be modified. The Project Biologist and Technical Advisory Team will meet within one year of completion of each RMCP report to discuss progress and submit a report of the findings to the FERC.

Control Measures

Control measures may include removal of raven nests as supported by the Environmental Assessment to Implement a Desert Tortoise Recovery Plan Task: Reduce Common Raven Predation on the Desert Tortoise (USFWS, 2008). In addition, the project will provide funding to the USFWS as a contribution to its regional raven monitoring and control program for a 50 year life of the project. Common raven nest removal measures recommended for desert tortoise conservation purposes would be conducted with appropriate agency approvals. Such removals would be conducted outside the nesting season.

Additional control measures include:

- Any common raven nesting incidence encountered during construction, operation or maintenance of the Project would be reported to the appropriate authorities. The integrity of this resource would be maintained pending subsequent investigation and direction by these authorities. Common raven nest removal from proposed facilities, when determined necessary in consultation with the USFWS, would occur during the inactive nesting season.

- A trash and food waste management program would be initiated during pre-construction phases of the project, and would continue through the duration of the Project. Trash and food items would be contained in closed (common raven-proof) containers and removed regularly (at least once a week).

- Hazing at reservoirs and evaporation pond.

Adaptive Management

Implementation of the RMCP is expected to last the duration of project operations. A key component of the integrated predator management is to monitor the effectiveness of the management action in meeting the stated objectives. The short-term and long-term indictors used to determine effectiveness of raven monitoring and control management include:

❖ Short-term indicator: decreasing number of ravens, shell counts near nests, extent/range of killed desert tortoises.

❖ Long-term indicator: increased numbers of juvenile/adolescent desert tortoises detected during monitoring.

If the control measures have proven to be effective, then they would continue. If such control measures are not found to be effective, then the action(s) would be modified or adapted. The adaptive management plan may include modifying the monitoring and control procedures; where necessary, the projected changes to the monitoring design may include modifying the monitoring time period and spatial design. If changes are deemed necessary to the maintain the effective of the RMCP, the Project Biologist and Technical Advisory Team will consult with applicable resource agencies to determine the best course of action.

DOCUMENTATION OF CONSULTATION

On August 3, 2009, ECE sent letters to the resource agencies notifying them of FERC's request for additional information with regard to these biological plans, with a copy of the July 29, 2009 FERC notice attached. On August 20, 2009 ECE sent letters to the BLM, USFWS, NPS, and CDFG requesting their assistance in reviewing and developing draft monitoring and control plans for the following terrestrial resource areas:

1) Revegetation Plan;
2) Weed Control Plan;
3) Desert Tortoise (*Gopherus agassizii*) Translocation or Removal Plan;
4) Raven Monitoring and Control Plan; and
5) Worker Environmental Awareness Program

On September 8, 2009 a conference call was held to discuss biological issues related to the Eagle Mountain Pumped Storage Project, and development of these five plans as a part of on-going consultation. Representatives of the NPS and the CDFG attended the meeting. The BLM and USFWS notified ECE that they would be unable to participate in the initial consultation. However, all agencies did receive the consultation meeting agenda and an executive summary of the mitigation plans that laid out the structure of the intended programs, including implementation schedule and components for the five biological and mitigation plans that would subsequently be developed for agency review. As follow-up to the meeting, meeting notes were distributed to all of the agencies, with an opportunity to comment on the notes. Finalized notes, revised in response to comments received by ECE, were distributed to all agencies on October 16, 2009. In addition, the biological resources section of the Final License Application was sent to the resource agencies, at their request, following the meeting.

On September 14, 2009, another conference call between ECE and the NPS was held to discuss the additional study request filed by the NPS with the FERC. One of the NPS study request's concerned raven monitoring and control and this topic was discussed during the conference call. ECE filed the response to the additional study requests with the FERC on September 17, 2009.

On September 17, 2009 the five draft plans for the 1) Revegetation Plan; 2) Weed Control Plan; 3) Desert Tortoise (*Gopherus agassizii*) Translocation or Removal Plan; 4) Raven Monitoring and Control Plan; and 5) Worker Environmental Awareness Program, were sent to each of the resource agencies (CDFG, USFWS, BLM, and NPS), with a formal request for their review and comment on the plans. As follow-up and in an effort to obtain feedback, a reminder email was sent to each of the four agencies on October 15, 2009 regarding the draft plans and our interest in receiving comments on those plans.

On October 16, 2009 ECE received comments from the National Park Service on the Raven Monitoring and Control Plan. One substantive comment was included, wondering about accuracy of a literature citation (Mahringer 1970). Some explanatory text has been added to this plan, which accurately cites the author. No comments on the draft raven monitoring and control plan were received from the other agencies.

Appendix D of the response to the FERC additional information request includes a contact register and copies of correspondence with the land managing agencies.

SOURCES:

Beacon Solar Energy Project. Raven Monitoring, Management, and Control Plan. Retrieved August 16, 2009 from the California Energy Commission website at http://www.energy.ca.gov/sitingcases/beacon/documents/applicant/2008-10-21_RAVEN_MONITORING_MANAGEMENT_CONTROL_PLAN_TN%2048718.PDF

Victorville 2 Hybrid Power Project. Draft Biological Resources Technical Report. Retrieved September 11, 2009 from the California Energy Commission website at http://www.energy.ca.gov/sitingcases/victorville2/documents/applicant/afc/Appendix%20H%20Biological%20Resources/Appendix%20H%20Bio%20Technical%20Report.pdf.

Environmental Assessment to Implement a Desert Tortoise Recovery Plan Task: Reduce Common Raven Predation on the Desert Tortoise. Retrieved September 11, 2009 from the Desert Managers Group website at http://www.dmg.gov/documents/EA_Raven_Final_USFWS_033108.pdf

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Eagle Mountain Pumped Storage
FERC Project No. 13123

Worker Environmental Awareness Program

Submitted to: Federal Energy Regulatory Commission

Submitted by: Eagle Crest Energy Company

October 27, 2009

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INTRODUCTION

The Eagle Crest Energy Company (ECE) has prepared this Worker Environmental Awareness Plan (WEAP) for the Eagle Mountain Pumped Storage Project (Project) mitigation measure BIO-3.

The WEAP has been developed to ensure that project construction and operation occur within a framework of safeguarding environmentally sensitive resources. The WEAP provides an implementation schedule; documentation of consultation with regulatory resource agency's regarding the formation of such plan, in addition to measures for training project employees, construction crews, and construction supervisors to reduce adverse effects on biological resources.

The economic cost analyses to develop and implement the Worker Environmental Awareness Plan are included in the *Cost of Developing the License Application* (Exhibit A.4) and *Cost of Environmental Measures* (Exhibit E, Section 4.3).

The Worker Environmental Awareness Plan is considered a living document and may be subject to revision based on on-going environmental assessment with resource agencies. The Plan will be implemented by the contractor, under supervision of the Project Environmental Coordinator and Project Biologist, and in consultation with the Biological Technical Advisory Team. The Technical Advisory Team is composed of the owner's biological consultant(s), and staff from the managing resource agencies (expected to include USFWS, CDFG, NPS, and BLM).

Compliance Strategy

The WEAP will provide guidance for on-site Project employees, construction crews, and construction supervisors regarding compliance with environmental issues at the Project site through ongoing mitigation planning and implementation process. All persons working onsite will undergo environmental awareness and compliance through the WEAP program.

The WEAP will be developed by the Project Biologist in consultation with the Biological Technical Advisory Team[1]. Although facility construction has the greatest potential to harm environmental resources, the WEAP training will benefit all phases of project site monitoring, construction, and operations over the life of the project.

The training format will include a video, as well as handouts and a wallet card with site "rules" and contact names and phone numbers. Signs, magnetic truck door reminders, and other techniques will be used to reinforce training and mitigation measures. A Certification of Completion of the WEAP form will be signed by each worker indicating that they have received WEAP training. A log of signed WEAP forms will be kept on-site with the Project Environmental Coordinator and will serve as an indication that all participants understand the WEAP and will abide by the guidelines set forth in the program materials.

Purpose of Biological Monitors and Project Biologist

Biological Monitors are approved by the Project Biologist to conduct monitoring activities. The Project Biologist will be the "Authorized Biologist" approved by the U.S. Fish and Wildlife Service (USFWS) to handle tortoises and lead the implementation of mitigation measures for a project (http://www.fws.gov/ventura/speciesinfo/protocols_guidelines/docs/dt). The Project Biologist will have demonstrated to USFWS that they possess sufficient desert tortoise knowledge and experience to handle and move tortoises appropriately. Authorized Biologists are permitted to then approve Biological Monitors for specific monitoring tasks, including tortoise handling, at their discretion. The California Department of Fish and Game (CDFG) must also approve such biologists.

Biological Monitors are on-site to ensure that construction of the Project can proceed within compliance guidelines for terrestrial resources and to ensure that mitigation measures are met. One or more Biological Monitors will be on-site during all fencing and surface disturbance activities. The Biological Monitors have the authority to stop work if an activity is likely to cause injury to a listed species. Responsibilities of the Biological Monitors include:

- Direct communication, protocol assessment and WEAP management with the Project Biologist.

[1] United States Fish and Wildlife Service, National Parks Service – Joshua Tree National Park, Bureau of Land Management, and California Department of Fish and Game.

- Monitor all surface disturbance and other construction activities (e.g., fencing) in unfenced habitat to ensure that listed species are not harmed.

- Advise ECE, site employees and contractors on how best to avoid adverse impacts to terrestrial resources.

- Assist the construction engineer in preparing construction zone limits in sensitive habitats.

- Monitor compliance with mitigation measures. Notify the Project Biologist and Project Environmental Coordinator of non-compliance and the corrective actions taken

- The Project Biologist will discuss any changes in the WEAP plan with the Project Environmental Coordinator.

- The Project Biologist will submit brief monthly and annual summary reports to the Biological Technical Team during construction that document implementation of the Conditions of Certification.

Site Specific Factors Covered in Worker Environmental Awareness Program Training

The WEAP training program includes information on the endangered species and other high-profile species and habitats that may occur on the site, and measures to limit impacts to those species. Education will include, but not be limited to ecology, natural history, endangerment factors, legal protection, site mitigation measures, and hierarchy of command.

The video and other educational materials will incorporate all relevant environmental laws as they pertain to Federal and State protection, including the Federal Endangered Species Act, Migratory Bird Act, Clean Water Act, the California Endangered Species Act, CDFG Code, and California Native Desert Plants Act. Site-specific mitigation measures, as set forth in the Final License Application (2009), Environmental Impact Statement (anticipated in 2010), and Environmental Impact Report (anticipated in 2010), will be explained (see below). Responsibilities and site rules of conduct will be identified. Teamwork will be emphasized, but it will be clear that willful non-compliance may result in sufficiently severe penalties to the contractor and/or employee[2].

Relevant mitigation measures and activities pertaining to Project personnel will include, but not be limited to the following:

- Construction personnel will be advised to comply with Biological Monitors who are there to help construction workers remain within compliance guidelines. Biological monitors need to complete certain tasks during the construction activities and, while they will attempt not to slow construction, some activities may

[2] All mitigation measures for the Project are described in the Final License Application (Exhibit E) (ECE 2009)

necessitate construction slowing for biological monitors to complete their responsibilities.

- Biological monitors have the authority to temporarily halt construction activities that could harm sensitive biological resources.
- Employees, construction crews, and construction supervisors are instructed to only work in areas designated by the Biological Monitor. Equipment, supply storage, and parking will only be permitted in specific areas. Under no circumstance is cross-country travel, equipment, or earth moving permitted in unfenced areas without the approval of a Biological Monitor.
- Special, sensitive areas to be avoided will be flagged.
- In unfenced areas, all vehicles or equipment must be looked under prior to moving.
- Site boundary fencing is designed to keep desert tortoises out of the site. Any damage to fences caused by construction or found by site workers must be reported immediately through the "chain of command" so that repairs can be implemented promptly.
- All vehicles or equipment are required to maintain specific speed limits (to be set) on all dirt roads and on paved access roads. Trash must be deposited in appropriate receptacles, not on the ground or in trenches. Examples of trash include, but are not limited to, fruit pits, fruit and vegetable peels, any other garbage, paper or plastic, and cigarette butts and filters.
- Off-site conduct in the area of the Project will be consistent with environmental laws.
- Pets and firearms are not allowed on the Project.

Contact Personnel

Eagle Mountain Pumped Storage Project (names and cell phone numbers and email addresses to be inserted here prior to the implementation of this plan)

Project Manager –

Project Biologist –

Project Environmental Coordinator –

Biological Monitor(s) –

Implementation Schedule

Consultation with the resource management agencies will continue during preparation of the Draft Environmental Impact Statement (EIS) and Draft Environmental Impact Report (EIR) and development of the Final EIS and Final EIR.

A comprehensive site-specific mitigation and monitoring program, which includes the WEAP, will be finalized by ECE in consultation with the Biological Technical Advisory Team, concurrent with final engineering design. Final engineering design work will commence with the issuance of the FERC license. Design work is anticipated to require two years. Thus, there will be a two-year window for the Technical Advisory Team to reach concurrence on the overall site specific mitigation and monitoring program. Training materials for the Worker Environmental Awareness Program will be prepared prior to the start of construction so that training can be implemented at the start of construction.

DOCUMENTATION OF CONSULTATION

On August 3, 2009, ECE sent letters to the resource agencies notifying them of FERC's request for additional information with regard to these biological plans, with a copy of the July 29, 2009 FERC notice attached. On August 20, 2009 ECE sent letters to the BLM, USFWS, NPS, and CDFG requesting their assistance in reviewing and developing draft monitoring and control plans for the following terrestrial resource areas:

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No comments on the Worker Environmental Awareness Program were received. Appendix D of the response to the FERC additional information request includes a contact register and copies of correspondence with the land managing agencies.

SOURCES

Blythe Energy Project. *Environmental Compliance Program, wallet card*.

Cosumnes Power Plant Project. *Appendix B, Draft Worker Environmental Awareness Training Program.* Retrieved September 10, 2009 from the California Energy Commission website (http://www.energy.ca.gov/sitingcases/smud/documents/applicants_files/Data_Response_Set-1Q/APPENDIX_B_DRAFT_CPP_WEAT.PDF).

El Segundo Power Development Project. *Worker Environmental Awareness Program*. Retrieved September 10, 2009 from the California Energy Commission website (http://www.energy.ca.gov/sitingcases/elsegundo_amendment/documents/2007-08-14_DRY_COOLING_DATA_REQUESTS.PDF).

San Joaquin Valley Energy Center. *Worker Environmental Awareness Program*. Retrieved September 10, 2009 from the California Energy Commission website (http://www.energy.ca.gov/sitingcases/sanjoaquin/documents/2003-02-13_STFF_RESP_ALL.PDF).

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Eagle Mountain Pumped Storage
FERC Project No. 13123

Report on Bighorn Sheep

Submitted to: Federal Energy Regulatory Commission

Submitted by: Eagle Crest Energy Company

October 27, 2009

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INTRODUCTION

The Eagle Crest Energy Company (ECE) proposes to develop the Eagle Mountain Pumped Storage Hydroelectric Project (Project). The proposed Project will use two existing mining pits, pumping water from a lower pit/reservoir to an upper pit/reservoir during periods of low demand to generate peak energy during periods of high demand. Project details, including Project design, ancillary facilities, the environmental setting, anticipated project impacts, and proposed mitigation measures, can be found in the Final License Application (FLA) and Applicant Prepared Environmental Impact Statement submitted to the Federal Energy Regulatory Commission (FERC) in June 2009 (Eagle Crest Energy Company, 2009).

PROJECT DESCRIPTION

The Eagle Crest Energy Company ("ECE" or Owner/Operator) proposes to develop the Eagle Mountain Pumped Storage Hydroelectric Project in the Southern California Desert at an inactive iron mine site in Riverside County, located about halfway between Palm Springs and Blythe, California, near the town of Desert Center.

The proposed project is a hydroelectric pumped storage project that will provide system peaking capacity and system regulating benefits to southwestern electric utilities. The proposed project will utilize two existing mining pits as water reservoirs. The project will use off-peak energy to pump water from a lower reservoir to an upper reservoir [formed from the existing mining pits] during periods of low electrical demand and generate valuable peak energy by passing the water from the upper to the lower reservoir through the generating units during periods of higher electrical demand. The low demand periods are expected to be during weekday nights and throughout the weekend, and the high demand periods are expected to be in the daytime during week days, especially during the summer months.

The project will provide an economical supply of peaking capacity, as well as load following, electrical system regulation through spinning reserve, and immediately available standby generating capacity. These latter benefits, referred to as ancillary services, are considered essential for integration of renewable wind and solar power resources to meet State renewable portfolio standards of 33 percent by year 2020, and to offset fossil-fueled peak power generation to help meet State greenhouse gas emissions reductions goals. Ancillary services are employed as a means to increase stability of the electrical system and provide improved transmission reliability.

Parts of the project (1,059 acres) are located on Federal lands managed by the Bureau of Land Management, through the Palm Springs South Coast Field Office. The remainder of the project is on privately owned lands.

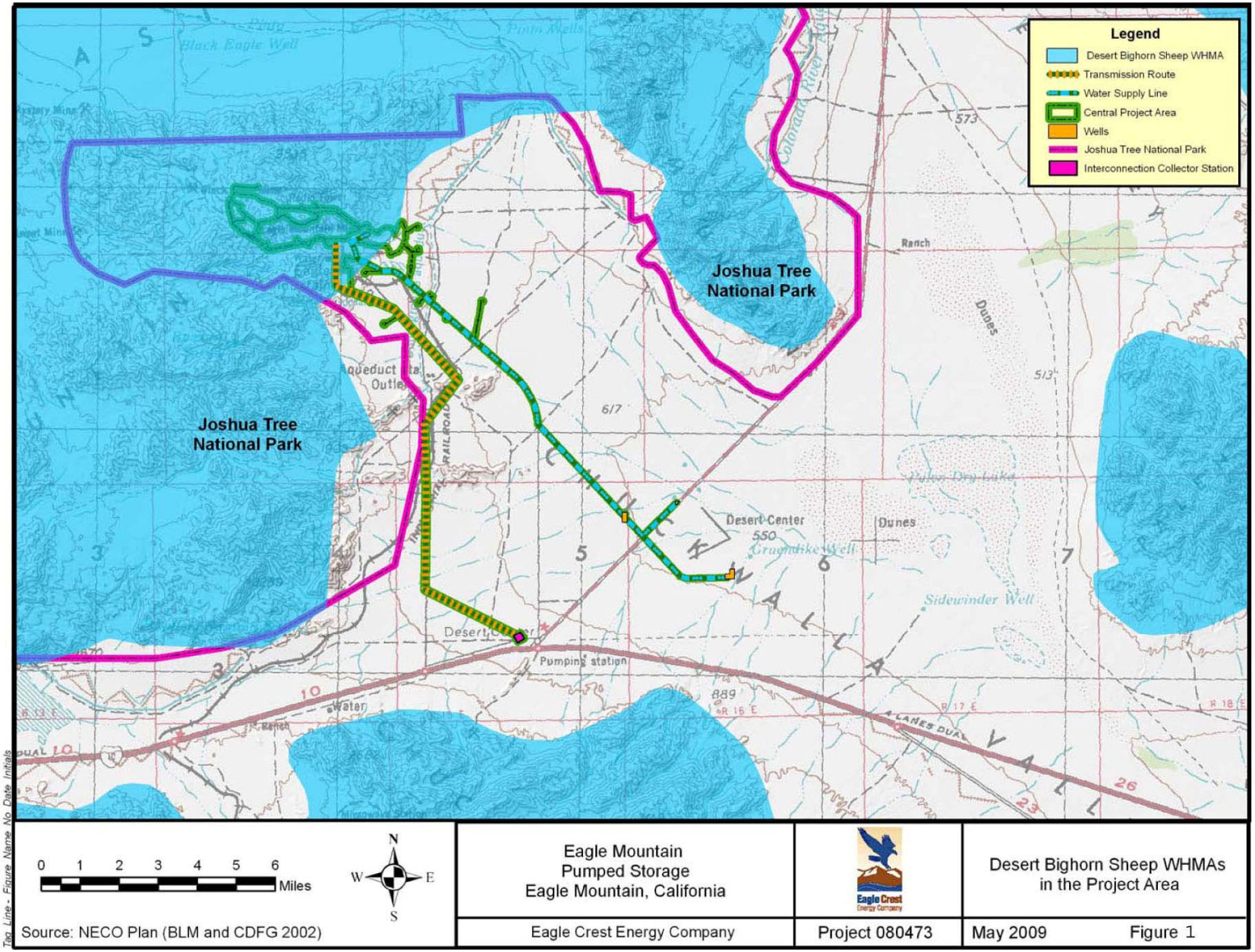
BASELINE CONDITIONS BIGHORN SHEEP

Nelson's Bighorn Sheep are listed as by the *BLM Sensitive species.* Nelson's or desert bighorn are widely distributed from the White Mountains in Mono County to the Chocolate Mountains in Imperial County (CNDDB 2001). They live most of the year close to the desert floor in canyons and rocky areas (Ingles 1965). In summer, they move to better forage sites and cooler conditions in the mountains. Migration routes can occur across valleys between mountain ranges.

BLM management of desert bighorn sheep is guided by the *Mountain Sheep Ecosystem Management Strategy (EMS) in the 11 Western States and Alaska* (BLM 1995). The EMS goal was to "ensure sufficient habitat quality and quantity to maintain and enhance viable big game populations, and to sustain identifiable economic and social contributions to the American people" (BLM and CDFG 2002). This management plan identified eight metapopulations, two of which are included in the NECO Planning Area: the Southern Mojave and Sonoran metapopulations. These metapopulations were further divided into demes, or populations. The Project is located in the Southern Mojave Metapopulation, adjacent to the Eagle Mountain deme and near the Coxcomb deme (Figure 1).

NECO further provides for enhancing the viability of these populations through maintenance of genetic variability, providing connectivity between demes, enhancing and restoring habitat, augmenting depleted demes, and re-establishing demes. To this end, a Bighorn Sheep Wildlife Habitat Management Area (WHMA) has been established that encompasses and connects the Eagle Mountain and Coxcomb demes (BLM and CDFG 2002) (Figure 1).

Bighorn scat were observed at the main project site during 1989-90 and 1995 surveys for the Eagle Mountain Landfill and Recycling Center and during related project surveys (County of Riverside and BLM 1996).


Legend
Desert Bighorn Sheep WHMA
Transmission Route
Water Supply Line
Central Project Area
Wells
Joshua Tree National Park
Interconnection Collector Station
Joshua Tree National Park
Joshua Tree National Park
Desert Center
Dunes
Sidewinder Well
Pumping station
Water
Ranch
Dunes
0 1 2 3 4 5 6 Miles
N
W E
S
Source: NECO Plan (BLM and CDFG 2002)
Eagle Mountain
Pumped Storage
Eagle Mountain, California
Eagle Crest Energy Company
Project 080473
Desert Bighorn Sheep WHMAs
in the Project Area
May 2009
Figure 1

Effects of Additional Water Source

NECO recommends constructing new water developments to expand usable habitat for bighorn sheep. Based on observations of sheep use, Divine and Douglas (1996) suggested that Eagle Spring be enhanced and an artificial water source be installed as mitigation for the proposed landfill. As described in Exhibit E of the Final License Application (FLA) for the Eagle Mountain Pumped Storage Project (Project), the proposed Project will not affect the springs in the mountains surrounding the proposed Project. The landfill's proposed enhancement of Eagle Spring can be carried out as planned.

The proposed Project includes constructing two new reservoirs in the existing mining pits. These proposed new reservoirs will actually provide a consistent water source in a relatively safe environment. Water emptying from the upper reservoir will do so at a slow rate and will always contain some water. Therefore, the project is in compliance with the recommendations of the NECO Plan, as it will result in new water developments in an area which is accessible to bighorn sheep.

Project Fencing

As described below, the proposed Project will include fencing to exclude bighorn sheep from areas that are potentially hazardous to wildlife. These areas will include both reservoirs, the switchyard, and brine ponds. A map showing the location of fencing follows.

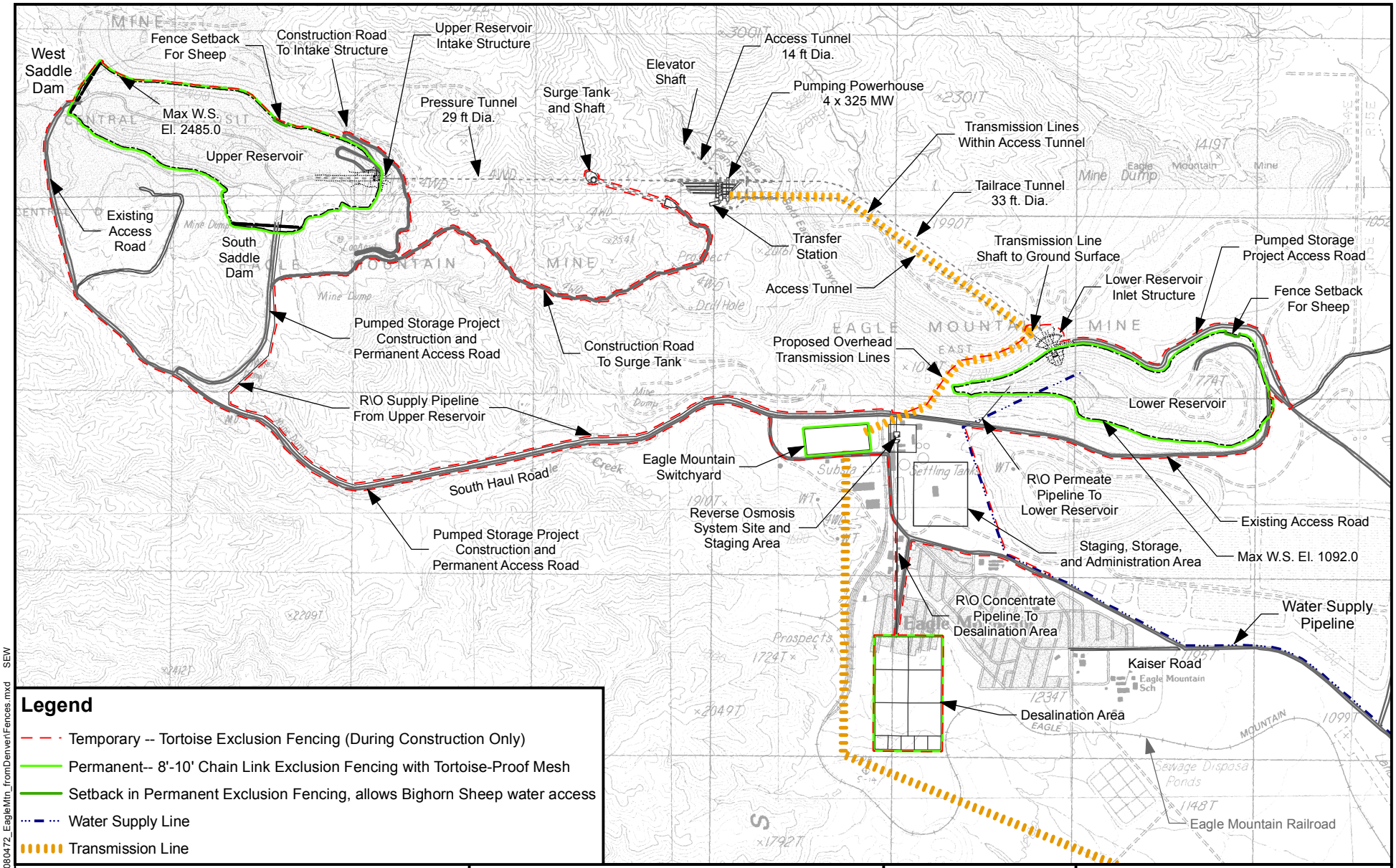
Other Project Facilities

While the current use of the Central Project Area by bighorn sheep is unknown, the site has been mined for decades and it is difficult to conclude that development of a hydroelectric project will increase negative impacts.

Construction and Operations Activities

During Project construction, noise and human activity will discourage sheep use of the Central Project area. However, this area has been mined for decades, so Project construction activity will not be an increase above what has been typically the case in the past.

During Project operation, normal operating traffic will be limited to approximately one vehicle run per day.



Eagle Mountain Pumped Storage
Eagle Mountain, California

Eagle Crest Energy Company

WILDLIFE
EXCLUSION FENCING

Eagle Crest Energy Company | Project 080475 | October 2009 | Figure 3.3.6-4

26-Oct-2009 Z:\GIS\Projects\080472_EagleMtn_fromDenver\Fences.mxd SEW

MITIGATION MEASURES FOR BIGHORN SHEEP

BIO-18 **Fencing.** The NECO Plan recommends fencing potential hazards to bighorn sheep. A security fence will be constructed around portions of the Central Project Area to exclude larger terrestrial wildlife - bighorn sheep, deer, coyotes, foxes, badgers – from entering Project areas that could pose a hazard to these species. Such areas will include the transmission switchyard and other structures that may be dangerous to wildlife. Where exclusion fencing is required, security gates will be remain closed except during specific vehicle entry and may be electronically activated to open and close immediately after vehicle(s) have entered or exited.

All required exclusion fencing will be maintained for the life of the Project. All fences will be inspected monthly and during/following all major rainfall events. Any damage to the fencing shall be temporarily repaired immediately, followed by permanent repair within one week.

DOCUMENTATION OF CONSULTATION

On August 3, 2009, ECE sent letters to the resource agencies notifying them of FERC's request for additional information with regard to these biological plans, with a copy of the July 29, 2009 FERC notice attached. On August 21, 2009 ECE sent a letter to the CDFG requesting their assistance in reviewing and developing draft monitoring and control plans for the following terrestrial resource areas:

1) Revegetation Plan;
2) Weed Control Plan;
3) Desert Tortoise (*Gopherus agassizii*) Translocation or Removal Plan;
4) Raven Monitoring and Control Plan; and
5) Worker Environmental Awareness Program

The letter also requesting consultation regarding bighorn sheep and Streambed Alteration Agreements.

On September 8, 2009 a conference call was held to discuss biological issues related to the Eagle Mountain Pumped Storage Project, and development of these five plans as a part of on-going consultation. Representatives of the NPS and the CDFG attended the meeting. The BLM and USFWS notified ECE that they would be unable to participate in the initial consultation. However, all agencies did receive the consultation meeting agenda and an executive summary of the mitigation plans that laid out the structure of the intended programs, including implementation schedule and components for the five biological and mitigation plans that would subsequently be developed for agency review. As follow-up to the meeting, meeting notes were distributed to all of the agencies, with an opportunity to comment on the notes. Finalized notes, revised in response to comments received by ECE, were distributed to all agencies on October 16, 2009. In addition, the biological resources section of the Final License Application, including information on bighorn sheep in the project area, was sent to the resource agencies, at their request, following the meeting.

On September 23, 2009 the bighorn sheep report was sent to the CDFG with a formal request for their review and comment. As follow-up and in an effort to obtain feedback, a reminder email was sent to the CDFG on October 15, 2009 expressing ECE's interest in receiving comments on the report.

No comments on the Bighorn Sheep Report were received. Appendix D of the response to the FERC additional information request includes a contact register and copies of correspondence with the land managing agencies.

LITERATURE CITED

Bureau of Land Management. 1995. *Mountain Sheep Ecosystem Management Strategy (EMS) in the 11 Western States and Alaska*.

California Department of Fish and Game (CNDDB). 2001. California Natural Diversity Data Base data records for Project area.

County of Riverside Planning Department and U.S. Bureau of Land Management. 1996. Draft Environmental Impact Statement/ Environmental Impact Report for the Eagle Mountain Landfill and Recycling Center Project. Prepared by CH2MHill. State Clearinghouse No. 95052023.

Divine, D.D. and C. L. Douglas. 1996. Bighorn sheep monitoring program for the Eagle Mountain Landfill Project. Submitted to Mine Reclamation Corporation. Prepared by Cooperative Studies Unit, National Biological Service, University of Nevada, Las Vegas.

Eagle Crest Energy Company. 2009. Final License Application. Submitted to the Federal Energy Regulatory Commission.

Ingles, L.G. 1965. Mammals of the Pacific States. Stanford Univ. Press, Stanford, California. 506 pp.

United States Department of the Interior, Bureau of Land Management Desert District and California Department of Fish and Game 2002. Proposed Northern & Eastern Colorado Desert Coordinated Management Plan. FEIS.

PUBLIC

Eagle Mountain Pumped Storage Project
FERC Project No. 13123

Palm Desert, CA

BIOLOGICAL ASSESSMENT
Revised

Submitted to:
Federal Energy Regulatory Commission

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July 2, 2010
GEI Project 080474

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Abbreviations and Acronyms

BA	Biological Assessment
BLM	United States Bureau of Land Management
CAISO	California Independent System Operator
CDFG	California Department of Fish and Game
CEC	California Energy Commission
cfs	cubic feet per second
CHU	critical habitat unit
CNPS	California Native Plant Society
DAF	dissolved air flotation
DWMA	Desert Wildlife Management Areas
ECE	Eagle Crest Energy Company
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
FERC	Federal Energy Regulatory Commission
ft	feet
gpm	gallons per minute
GHG	greenhouse gas
GPS	global positioning system
GWh	gigawatt hour
I/O	Inlet/Outlet
ISO	Independent System Operator
JTNM	Joshua Tree National Monument

JTNP	Joshua Tree National Park
MF	microfiltration
MW	megawatt
MWD	Metropolitan Water District of Southern California
MWh	megawatt hour
NECO	Northern and Eastern Colorado Desert Coordinated Management
NEPA	National Environmental Policy Act
NGA	next generation attenuation
PMF	probable maximum flood
Project	Eagle Mountain Pumped Storage Project
RCC	roller-compacted concrete
RO	reverse osmosis
ROW	right-of-way
RPS	Renewable Portfolio Standards
SCE	Southern California Edison
TBM	tunnel boring machine
USFWS	United States Fish and Wildlife Service
WHMA	Wildlife Habitat Management Area
ZOI	zone-of-influence

Executive Summary

Eagle Crest Energy Company (ECE) proposes to develop the Eagle Mountain Pumped Storage Hydroelectric Project (Project) at the inactive Kaiser Mine site near the town of Desert Center, Riverside County, California. The proposed Project will use two existing mining pits, pumping water from a lower pit/reservoir to an upper pit/reservoir during periods of low demand to generate peak energy during periods of high demand. The low demand periods are expected to be during weekday nights and throughout the weekend, and the high demand periods are expected to be in the daytime during week days, especially during the summer months.

The Project will provide an economical supply of peaking capacity, as well as load following, electrical system regulation through spinning reserve, and immediately available standby generating capacity. These latter benefits, referred to as ancillary services, are considered essential for integration of renewable wind and solar power resources to meet State renewable portfolio standards of 33 percent by year 2020, and to offset fossil-fueled peak power generation to help meet State greenhouse gas emissions reductions goals. Ancillary services are employed as a means to increase stability of the electrical system and provide improved transmission reliability.

Federally-listed Threatened or Endangered Species Addressed in this Biological Assessment

Two species with potential to be impacted by the Project were considered for inclusion in this Biological Assessment: desert tortoise (*Gopherus agassizii*) and Coachella Valley milkvetch (*Astragalus lentiginosus* var. *coachellae*):

Desert Tortoise - Desert tortoise may be affected by Project construction, particularly along the proposed transmission corridor. The Project may adversely affect desert tortoise.

Coachella Valley Milkvetch - This species will not be found on the Project or in areas that will be affected by the Project. As such, the Project will have no effect on Coachella Valley milkvetch.

1 Introduction

1.1 Proposed Project

Eagle Crest Energy Company (ECE) proposes to develop the Eagle Mountain Pumped Storage Hydroelectric Project (Project) at the inactive Kaiser Mine site near the town of Desert Center, Riverside County, California. The proposed Project will use two existing mining pits, pumping water from a lower pit/reservoir to an upper pit/reservoir during periods of low demand to generate peak energy during periods of high demand. The low demand periods are expected to be during weekday nights and throughout the weekend, and the high demand periods are expected to be in the daytime during week days, especially during the summer months.

The Federal Energy Regulatory Commission (FERC or Commission) must decide whether to approve a license to ECE for the project and what conditions of approval should be placed in any license issued. Issuing a new license for the Eagle Mountain Project would allow ECE to generate electricity at the project for the term of a new license (proposed for 50 years), making electric power from a renewable resource.

1.1.1 Need for Power

According to the California Energy Commission (CEC) 2007 Integrated Energy Policy Report, annual peak demand in the Southern California Edison (SCE) planning area is projected to grow, on average, 1.58 percent per year from 2008 – 2018, reaching 26,382 MW by 2018. This is an increase of over 3,100 MW from the 2008 projected peak energy use. Overall energy consumption in the SCE planning area is projected to increase 1.52 percent annually from 2008 to 2018, from 105,054 MW to 118,497 MW (CEC, 2007).

Power from the Eagle Mountain Pumped Storage Hydroelectric Project would help meet the need for power, and particularly peak power, in the southern California region in both the short and long-term. The project will have an installed capacity of 1,300 megawatts (MW) and generate a maximum of 4,308 GWh per year.

1.1.2 Energy Storage for Renewable Energy Sources

According to the CEC, the California Independent System Operator (CAISO), and the major electric utilities in the State, large scale energy storage is essential for successful integration of wind and solar renewable power generation and maintaining reliable transmission grid operations (CEC Workshop on Energy Storage Technologies, April 2, 2009). The CEC's recognition of the need for storage as an essential element in

attaining the State's Renewable Portfolio Standard (RPS) goals of 2020 is very important, as is the recognition that storage is not generation, transmission, or distribution, but rather a special and distinct function required for reliable grid operations and power flow management. Specific transmission operations – known collectively as "ancillary services" – include spinning reserves, voltage regulation, load following, black start, and possibly protection against over-generation. This recognition is consistent with the unanimous consensus among the transmission system operator and the major utilities that adding significant storage capacity is the only means to successfully integrate wind and solar power to meet the State's 33 percent renewable power generation goals and maintain reliable grid operations. As a related consequence, large scale energy storage will also be essential to meeting the State's goals for reductions in greenhouse gases (GHG) by displacing existing natural gas peak power generation.[1]

Pumped storage hydroelectric generation is recognized as one of only two feasible "bulk storage" technologies (Compressed Air Energy Storage – CAES – being the other), and the only one to have been proven on large scales. Other emerging technologies (mainly batteries and flywheels) are much smaller in scale and have significant R&D timelines, but are expected to play a role in small scale applications and management of electricity distribution systems.

The Eagle Mountain Pumped Storage project's location in the southern California transmission grid is complimentary to support existing wind power generation in the San Gorgonio Pass, Tehachapi, and the Salton Sea area, and thousands of megawatts of proposed wind and solar power generation in the Mohave Desert, Chuckwalla Basin and Palo Verde Valley.[2] Recognizing that storage is essential to integrating a high level of wind and solar renewable energy sources and to reliable operation of the transmission grid, and that this storage project will be operated to integrate these renewable energy sources, the storage pump-back power is accounted for as being derived 100 percent from off-peak wind and solar power generation.

One additional energy system function that the project will provide critical support for is development of the "Smart Grid," which entails operational improvements in the electrical grid to substantially improve transmission efficiency, reliability, and affordability, while fully incorporating renewable and traditional energy sources and potentially reducing carbon emissions; (U.S. Department of Energy, *The Smart Grid: An*

[1] Workshop participants and CEC staff indicated that California will need an estimated minimum of 4,000 MW of energy storage by 2020.

[2] Several thousand megawatts of solar power are proposed for development in the nearby Chuckwalla Basin and Palo Verde Valley that may offer opportunities for complimentary transmission operations.

Introduction; How a smarter grid Works as an enabling engine for our economy, our environment, and our future. 2004.)

Utility scale energy storage (as proposed with the Eagle Mountain pumped storage project) provides the means for flexible grid operations to improve overall system efficiency.[3] Operational flexibility provided by pumped storage hydro systems comes from the ability to integrate renewable resources that generate during off-peak demand periods (by storing that energy for peak period use), and that naturally fluctuate in generation output as variable wind speed and cloud cover affect wind and solar energy production (by generating for voltage regulation, ramping and load following). These functions improve system reliability as well, by maintaining a constantly charged electrical grid, providing emissions-free generation to meet peak demands, and providing "black start" capabilities in the event of a system failure (regional outages and massive blackout) in which energy is needed to recharge the grid and provide power needed to restart other traditional generation sources.

Each of these storage functions in operating a smarter grid also reduces waste (reducing GHG emissions), allows full integration of renewable energy generation sources that do not produce GHG emissions, and provides GHG-free peak power generation that displaces traditional fossil-fueled GHG-producing peak power generation. Energy storage, and particularly at the utility scale proposed with this project, is an essential enabling technology for these future smart grid operations and related attainment of State, national, and international environmental goals for addressing GHG emissions.

1.2 Federally-listed Threatened or Endangered Species Addressed in this Biological Assessment

This Biological Assessment (BA) addresses the effects associated with construction and operation of the Project on federally-listed endangered and threatened species. Two species were considered for inclusion in this BA:

Desert Tortoise (*Gopherus agassizii*) – (U.S. Fish and Wildlife Service [USFWS]:*Threatened;* California Department of Fish and Game [*CDFG*]*: Threatened*) Desert tortoise occurs on the Project and is requested for consultation in this BA.

Coachella Valley Milkvetch (*Astragalus lentiginosus* var. *coachellae*) – (*USFWS: Endangered;* U.S. Bureau of Land Management [*BLM*]*: Sensitive; CDFG: None; California Native Plant Society (CNPS): List 1B*) This variety is known primarily from the Coachella Valley, east to approximately Desert Center (Karl and Uptain 1985, U.S.

[3] The DOE estimates that a 5% improvement in efficiency nationwide would be equivalent to eliminating greenhouse gas emissions from 53 million cars. (DOE, The Smart Grid, 2004.)

Bureau of Land Management [BLM] and CDFG 2002; CNPS 2009). A population was also allegedly found in the aeolian areas of Chuckwalla Valley, along SR 177 (BLM and CDFG 2002, CNPS 2009). However, it is likely that this record was mistakenly identified and is actually a population of *Astragalus lentiginosus* var. *variabilis* instead. During Spring 2008 surveys for the EMPS Project, all of the plants found in the aforementioned population keyed to *A. l.* var. *variabilis*. In 2009, Karl and USFWS conducted thorough investigations of this taxonomic issue that included discussions with species experts, reviews of relevant unpublished literature, and re-keying of herbarium specimens in three herbaria where samples from Desert Center were filed. As a result, it was determined that the populations of *A. lentiginosus* at Desert Center were var. *variabilis*, not var. *coachellae*; USFWS concurred (Englehardt 2009a). Therefore, Coachella Valley milkvetch is not expected to be found on the Project due to lack of habitat and lack of nearby verified populations. It also was not seen on the Spring 2009 or 2010 Project surveys nor on several previous surveys in the area (BLM and Imperial Irrigation District [IID] 2003; Karl 2002, 2004a, 2005, and 2007 field notes; Environmental Planning Group [EPG] 2004; Blythe Energy 2004). Based on these factors, Coachella Valley milkvetch is not included for consultation in this BA.

2 Project Description

2.1 Project Location and Features

The Project is sited near the town of Desert Center, Riverside County, California (Figure 2-1). The hydropower plant ("Central Project Area") is located on the former Kaiser Mine site, in adjacent sections of Townships 3 and 4 South, Range 14 and 15 East. A 500 kV double circuit transmission line, travelling south out of the Central Project Area, will convey power to and from the Project through an interconnection collector substation located west of Desert Center. Water to initially fill the reservoirs and annual make-up water will be pumped from groundwater within the adjacent Chuckwalla Valley. Three new wells will be installed and water will be conveyed to the hydropower plant via 12-24-inch pipelines.

2.1.1 Central Project Area

Construction of the Central Project Area (hydropower plant) will require 1101.5 acres (Table 3-1). It will consist of the following facilities: (1) two roller-compacted dams at the upper reservoir at heights of 60-feet and 120-feet; (2) an upper reservoir with capacity of 20,000 acre-feet; (3) a lower reservoir with capacity of 21,900 acre-feet; (4) inlet/outlet structures; (5) water conveyance tunnels consisting of 4,000-foot-long by 29-foot-diameter upper tunnel, 1,390-foot-long by 29-foot-diameter shaft, 1,560-foot-long by 29-foot-diameter lower tunnel, four 500-foot-long by 15-foot-diameter penstocks leading to the powerhouse, 6,835-foot-long by 33-foot-diameter tailrace tunnel to the lower reservoir; (6) surge control facilities; (7) a 72-foot-wide, 150-foot-high, and 360-foot-long underground powerhouse with 4 Francis-type turbine units; (8) a 13.5-miles, 500-kilovolt transmission line; (9) water supply facilities including a reverse osmosis system; (10) access roads; and (11) appurtenant facilities.

The Project reservoirs will be formed by filling existing mining pits with water (Figure 2-1). The mining pits are empty and have not been actively mined for decades. There is an elevation difference between the reservoirs that will provide an average net head of 1,410 ft. The proposed energy storage volume will permit operation of the Project at full capacity for 10 hours each weekday, with 12 hours of pumping each weekday night to fully recharge the upper reservoir on a weekly basis, with additional pumping on weekends. The amount of active storage in the upper reservoir will be 17,700 acre-feet. Tunnels will connect the two reservoirs to convey the water, and the generating equipment will be located in an underground powerhouse.

2.1.1.1 Upper Dams and Reservoir

The Central Pit of the Eagle Mountain (Kaiser) Mine will be utilized for the Upper Reservoir. The bottom of the pit is at El. 2,230, and the existing low point of the rim is at El. 2,380. The active storage portion of the reservoir is planned between El. 2,340 feet and El. 2,485. The volume between these elevations is 17,700 acre-feet, and the respective surface areas are 48 and 191 acres. The existing low points of the pit rim are at El. 2,380 and El. 2,440. To obtain the required volume of storage it will be necessary to construct two dams along the perimeter of the pit. These dams are identified as the West Saddle Dam and the South Saddle Dam.

The dams will be constructed of roller-compacted concrete (RCC) with an upstream membrane liner and foundation grouting to control seepage. The crest elevation of the dams will be El. 2,490 and the crest width will be 20 feet. The South Saddle Dam will have a height of 120 feet and a crest length of 1,300 feet. The West Saddle Dam will have a height of 60 feet and a crest length of 1,100 feet. Dam construction will require preparation of the foundation to remove any waste materials from mining, overburden, and weathered rock to expose firm, un-weathered bedrock prior to placement of dental and leveling concrete and the RCC lifts. An average of 10 feet of excavation would be required for the foundation. Normal freeboard was assumed to be 5 feet between the normal high-water level and the dam crest. A spillway will protect the upper reservoir in the event of overtopping during an over-pumping event and to handle surface runoff from the very small surrounding watershed area into the reservoir.

Control of seepage from the upper reservoir will be important to minimize water losses and to limit the amount of reservoir water that could potentially reach the aquifer in the vicinity of the nearby Colorado River Aqueduct. Geologic data suggest that there is sufficient permeability of the fractured rock that underlies the Central Pit to produce seepage from the upper reservoir. The final design will include seepage control measures in the upper reservoir utilizing localized grouting and shotcrete placement. Further discussion of seepage potentials and control measures are provided in the Final License Application (FLA). The FLA also details a seepage mitigation program consisting of monitoring and pump-back recovery wells.

An excavated approach channel to the inlet/outlet (I/O) structure at the east end of the reservoir will have a bottom width of 100 feet and side slopes of 0.5 horizontal to 1.0 vertical. The approach channel will have an invert at El. 2,287 and slope down to the tunnel invert at El. 2,282. The I/O structure will have a trashrack with a gross area that is about 84-feet-wide by 60-feet-high. Three piers within the flared portion of the I/O structure will assist in spreading flow uniformly over the trashrack area in the pumping mode. The upper reservoir I/O structure will be equipped with a fixed-wheel gate for emergency closure and tunnel inspection. As indicated on the drawings in the FLA the

I/O structure in the upper reservoir will be a reinforced concrete gravity structure founded on competent bedrock.

The upper reservoir area will be fenced and gated to prevent the entry of unauthorized personnel and the public both during and after construction, and for wildlife exclusion purposes where needed to protect wildlife from Project hazards.

Access to the dams and reservoir will be by improved roads (planned as part of the landfill operation but likely to be constructed initially as a part of this Project) and by new 30 feet wide gravel roads constructed from the landfill road to the Project features.

2.1.1.2 Lower Reservoir

The East Pit of the inactive Eagle Mountain Mine will form the lower reservoir for the Project. The bottom of the pit is at El 740, and the existing low point of the rim is at El. 1,100. The active portion of the reservoir is planned between El. 925 and El. 1,092. The volume between these elevations is 17,700 acre-feet, and the respective surface areas are 63 and 163 acres. The entire active reservoir volume can be contained within the pit; therefore, construction of dams will not be necessary to create the lower reservoir.

Seepage potential from the Lower Reservoir is more significant than from the upper reservoir because the east end of the mine pit is in alluvial material. Therefore, the eastern end of the pit will be treated with a seepage control blanket. This blanket would need to be placed at stable slopes for expected loading conditions. Most of the fine tailings that may be suitable for the seepage blanket would come from a large pile of tailings on the south bank of the pit, which will have to be moved in any case to accommodate the Project. Depending upon the impermeability of this material, it may also be necessary to top it with a layer of the finer tailings from the nearby fine tailings ponds or to mix the tailings with imported clay materials (bentonite) to further reduce permeability. Other seepage control options include placement of RCC or soil cement over the areas with greatest seepage potentials. More detail on estimated seepage rates and measures to control seepage can be found in the FLA. In addition, a seepage mitigation program consisting of monitoring and pump-back recovery wells will also be employed to ensure that seepage does not impact downstream waters or the Colorado River Aqueduct.

The I/O structure at the lower reservoir will be located near the west end of the reservoir and will be constructed in the sloping bank of the pit. The inlet/outlet structure approach channel will have an invert at El. 862 and slope down to the tunnel invert at El. 857. The structure will have a trashrack with a gross area that is about 84 feet wide by 60 feet high. A fixed-wheel gate will provide for emergency closure and for tailrace tunnel inspection. The I/O structure in the lower reservoir will be very similar to the one planned for the

upper reservoir and will be a reinforced concrete gravity structure founded on competent bedrock.

The lower reservoir area will be fenced and gated to prevent the entry of unauthorized personnel and the public during construction and operation, and for wildlife exclusion purposes where needed to protect wildlife from Project hazards.

Access to the reservoir will be by improved roads (planned as part of the landfill operation but likely to be built initially for this Project) and by new 30 feet wide gravel roads constructed from the landfill road to the Project features.

2.1.1.3 Conduits

A system of water conductor tunnels will convey water from the Upper Reservoir to the underground powerhouse and from the powerhouse to the lower reservoir in the generating mode. Flow will be reversed in the pumping mode of operation. From the upper reservoir I/O structure, an upper ("low head") pressure tunnel will extend 3,963 feet to a 1,348-foot-deep vertical shaft connecting the upper tunnel to the lower ("high head") tunnel; the lower pressure tunnel will extend 1,563 feet to a 35-foot-long penstock manifold; and four penstocks will extend approximately 500 feet to the turbine inlet valves at the powerhouse. From the powerhouse, the four individual tailrace tunnels will extend approximately 350 feet through a tailrace manifold, and the main tailrace tunnel will extend 6,635 feet from the manifold to the Lower Reservoir I/O structure.

The upper pressure tunnel and the main tailrace tunnel will be excavated by tunnel boring machine (TBM). The finished tunnel diameter for the upper pressure tunnel will be 29 feet. For planning, we have assumed that the upper tunnel will be concrete lined; however, depending on rock quality, the upper tunnel may be not be lined throughout its entire length. A concrete-lined manifold will connect the lower pressure tunnel to the penstocks. The four penstocks will be completed to a finished diameter of 15 feet and will be steel lined. The four tailrace tunnels upstream of the concrete-lined tailrace manifold will be completed to a finished diameter of 16 feet. These tunnels will be concrete lined. The main tailrace tunnel from the manifold to the Lower Reservoir will be completed by TBM or drill and blast methods. This tunnel will be shotcrete lined to a finished diameter of 33 feet.

Surge control facilities will be provided upstream and downstream from the powerhouse. The tailrace surge chamber will consist of two horizontal tunnels, each 550 feet long, connected with a shaft, which continues to a connection with the main tailrace tunnel immediately above a rock trap. The tunnels will be 26 feet wide by 26 feet high and horseshoe shape, and the shaft will be 12 feet in diameter.

2.1.1.4 Powerhouse

The powerhouse cavern will be located underground approximately 6,300 feet from the upper reservoir and 7,200 feet from the lower reservoir. The pump/turbine centerline will be at elevation 770 feet. The cavern will be sized to accommodate four 325 MW units. The cavern will be approximately 72 feet wide, 150 feet high, and 360 feet long. A separate transformer gallery a short distance downstream from the powerhouse will be approximately 46 feet wide, 40 feet high, and 400 feet long.

2.1.1.5 Access Tunnel

Access to the underground powerhouse will be through the main access tunnel. This will be a vehicular tunnel that is 28 feet wide and 28 feet high. The tunnel portal will be south-east of the powerhouse. The invert elevation at the portal will be approximately 1,100 feet, and it will enter the powerhouse at elevation 808 feet. The length will be approximately 6,625 feet and the slope 4.4 percent. The tunnel will be shotcrete lined and will have a concrete roadway on the invert. Rockbolts or other rock support will be used as required where areas of weak or broken rock are encountered. The top portion of the tunnel will carry a powerhouse and tunnel ventilation duct.

2.1.1.6 Reverse Osmosis System

In order to maintain water quality (primarily salinity) within the reservoirs, a water treatment system will be required to remove certain constituents from the reservoir water supply. This facility would treat the make-up water supply to the reservoir system, which will come from groundwater wells in the Chuckwalla Basin.

The design of the treatment facility comprises several pretreatment steps to ensure that the stored surface water is suitable for treatment by the reverse osmosis (RO) process, which will provide for the bulk of the salt concentration. Treated water will be returned to the lower reservoir while the concentrated brine from the RO process will be directed to evaporation ponds. The treatment goal will be to maintain water quality levels in the reservoirs comparable to the existing groundwater quality.

The RO concentrate, containing the bulk of the salts removed from the reservoir system, would be processed to dry salt in an evaporation pond or ponds. From the overall material balance, the total brine to be evaporated is approximately 170 gpm or 270 acre feet per year. This converts to a pond of about 56 acres. The proposed design for the evaporation pond divides the total required pond area into six varying level salinity ponds and five solidifying ponds. Each pond will be about 8.3 acres in size, and each solidifying pond will be about 1.4 acres in size. Ponds will be covered with netting to prevent bird access. The RO concentrate would flow into one pond then be directed to another pond while the solution remaining in the first pond evaporates. Typical pond design includes 8 foot

berms with double liners to protect against seepage. Monitoring wells would be installed to identify a potential liner failure.

Over a period of years, the salt level in the ponds will rise and salts would need to be mechanically removed from the ponds. Based on the pond size and the salt balance the estimated rate of salt build up is 0.25 to 0.5 inches per year. Salt removal would be expected to occur on the order of once every 10 years, at which time the pond liners will be inspected and replaced as needed.

2.1.1.7 Other Structures

A switchyard (Project Connection Point) will be located about 4,500 feet south of the powerhouse, outside the boundaries of the proposed future landfill. It will be located on a level site at an approximate elevation 1,430 feet. It will be 500 by 1,100 feet, with a gravel surface. This area will be surrounded by a security fence. A security and maintenance lighting system will be provided. It will also be designed to protect against bird electrocution if appropriate.

This switchyard will be connected to the underground powerhouse via cables from the transformer gallery to the access tunnel portal and overhead as overhead lines from the portal to the switchyard. The high-voltage cables will run inside the length of the access tunnel to a shaft located near the lower reservoir inlet structure. Here the transmission lines will come up through the shaft to the ground surface. At the ground surface they will follow the upper edge of the lower reservoir as overhead transmission lines to the southwest, connecting to the switchyard. The overhead lines will terminate in the switchyard and be connected through protective breakers and associated switches to a double circuit 500 kV transmission line. The switchyard will contain all necessary disconnect switches, protective equipment and metering equipment.

A fenced area near the access road to the access tunnel portal will contain a storage warehouse building and an administration building. Bottled water for drinking will be provided to Project staff. Sewage disposal will be provided in a properly permitted septic system, incineration, or off-site disposal.

While the primary powerhouse access will be through the main access tunnel described above, safety requires a second means of personnel egress from the underground facilities. This normally would be an elevator shaft from the ground surface directly above the powerhouse. However, to accommodate the landfill development, this access shaft will be provided approximately 800 feet north and west of the powerhouse with connection of this shaft to the powerhouse by a short, curved tunnel section. The elevator shaft would be approximately 1100 feet deep and 9 feet in diameter extending to the erection bay floor at El. 808. The tunnel section would be approximately 800 feet long

and be a 14-foot horseshoe section similar in design to the main access tunnel except smaller in size.

Onsite, new access roads will be constructed to provide access to the upper reservoir dams, both I/O structures, the upper surge chamber and the access tunnel portal, and storage/administration area. The road to the access tunnel portal and the storage/administration will be paved with asphaltic concrete; the other roads will be gravel surfaced.

2.1.2 Site Access

Access to Eagle Mountain Pumped Storage Project facilities will be in part by the roads that were developed for the mining operations and which are planned to be improved for servicing the landfill. The primary access road will be the existing Kaiser Road. No new road crossings of the Colorado River Aqueduct will be required.

2.1.3 Transmission Line

Power will be supplied to and delivered from the Project by a double circuit 500 kV transmission line. The proposed Project transmission line will extend approximately 13.5 miles from the Project switchyard to a proposed new Interconnection Collector Substation for interconnection to the planned Devers-Palo Verde No. 2 500-kV line owned by SCE (Figure 2-1).

The new Interconnection Collector Substation will require an estimated total area of 25 acres located near Desert Center, California (Figure 2-1). Several alternatives for both the transmission line route and the substations are discussed in Section 2.4, below.

The right-of-way (ROW) for the transmission line generally will be about 200 feet. However the ROW width could be reduced in specific locations to mitigate potential impacts to resources (e.g., historic trails, adjacent land restrictions, existing roads and highways, and biological and cultural resources). The total ROW area required, based on a width of 200 feet, is 328 acres (Table 3-1).

2.1.4 Water Supply and Conveyance Pipelines

Water to initially fill the reservoirs and annual make-up water will be pumped from groundwater within the Chuckwalla Valley. Three wells will be utilized to provide initial reservoir fill. Water to replace losses due to seepage and evaporation will be obtained from the same source. The new wells will be connected to a central collection pipeline corridor.

The locations of the three groundwater wells are approximately 11 miles southeast of the Project area (Figure 2-1). ECE has developed estimates of pipe material, pipe sizes,

pumping head, pumping costs, and construction costs for potential alternative water supply systems. The preferred groundwater supply well system consists of the following main components:

- Three 2,000 gallons per minute (gpm), 1,000 horsepower (HP) vertical turbine pumps
- 1.3 miles of 12" diameter well field collection pipe
- 3.3 miles of 18" diameter well field collection pipe
- 10.7 miles of 24" diameter conveyance pipe

The total mileage of pipeline is estimated to equal 15.3 miles. The construction ROW will be 60 feet, for a total of 55.6 acres of surface disturbance (Table 3-1).

One well will have adequate capacity to replenish water lost to evaporation and seepage. A second well will be maintained as a backup water supply for the makeup water needs.

2.1.4.1 Other Projects within the Project Boundary

Plans are currently being developed by Mine Reclamation Corporation (MRC), a division of Kaiser Ventures LLC, to use portions of the mine site for a major landfill serving the Southern California urban areas. The pumped storage Project has been formulated with the assumption that the landfill will exist as proposed by the landfill developers. As detailed in this License Application, the landfill and pumped storage are compatible in that neither would materially interfere with the construction or operation of the other.

2.2 Project Construction

2.2.1 First Year of Construction

General:

- Mobilize and construct temporary office, storage, maintenance and staging facilities.
- Construct and improve permanent and construction access roads.

Water Conduits:

- Proceed and erect Tunnel Boring Machine and start excavation of tailrace tunnel.

Power Plant:

- Construct access tunnel portal and start excavation of access tunnel.

Upper Reservoir:

- Excavation of approach channel to inlet/outlet works.

Lower Reservoir:

- Start moving unstable tailings pile.
- Start implementing seepage control measures.

Switchyard:

- Start switchyard construction.

Transmission line:

- Start construction of transmission line foundations.

2.2.2 Second Year of Construction

Upper Reservoir:

- Complete excavation of approach tunnel.
- Complete construction of the south and west dams.
- Start construction of inlet/outlet structures.
- Start implementing seepage control measures.

Lower Reservoir:

- Complete moving unstable tailings pile.
- Seepage control liner blanketing.
- Construct inlet/outlet works.
- Complete seepage control measures.
- Install water pipeline from wells, pumping plant, and reverse osmosis system.
- Begin to fill lower reservoir.

Water Conduits:

- Complete tailrace tunnel, manifold and draft tube tunnels.
- Move and erect Tunnel Boring Machine and excavate upper pressure tunnel.
- Excavate lower pressure tunnel, manifold and penstock tunnels.
- Excavate pressure shaft.
- Install steel tunnel linings.

Power Plant:

- Complete majority of underground power plant access.
- Finish excavation of access tunnel.
- Excavate powerhouse cavern.
- Excavate transformer gallery caverns.
- Excavate cable tunnel and shaft, imbed spiral cases and draft tube liners.
- Start to install pump/turbines and generators.
- Start first stage and second stage concrete.
- Start to install electrical and mechanical equipment.

Transmission Line:

- Build foundations and towers.
- String high voltage transmission wires.

Switchyard:

- Complete switchyard and install equipment.

2.2.3 Third Year of Construction

Upper Reservoir:

- Seepage control by blanketing with fines and grouting.
- Complete inlet/outlet works.

Lower Reservoir:

- Continue filling lower reservoir.

Water Conduits:

- Finish excavation of pressure shaft.
- Construct downstream surge chambers.
- Concrete line penstock and draft tube manifolds.
- Install steel linings in penstocks and concrete linings in draft tube tunnels.

Power Plant:

- Complete excavation of transformer gallery caverns.
- Construct cable tunnel and shaft.
- Complete first stage concrete.
- Start and complete superstructure concrete.
- Continue installation of pump/turbines.
- Continue installation of motor/generators.
- Continue installation of other mechanical and electrical equipment.
- Install water delivery pipeline, pump, and reverse osmosis system.
- Installation of mechanical and electrical equipment.

Transmission Line:

- Complete foundations and build towers.
- String high voltage transmission wires.

2.2.4 Fourth Year of Construction

Power Plant:

- Finish installation of pump/turbines.
- Finish installation of motor/generators.
- Continue and finish installation of other mechanical and electrical equipment.
- Start architectural construction.

- Begin startup and testing of units.
- Commission unit 1.
- Commission units 2, 3 and 4 at three month intervals ending the beginning of April.
- Complete architectural work.

Transmission Line:

- Test and energize high voltage transmission line.

Commercial Operation:

- June 2016.

A technical memorandum was prepared which described the construction schedule, manpower, and equipment needs of the Project. The full text of this document is in the Section 12.3 of Exhibit E of the Final License Application (ECE 2009). In summary:

- The peak work force is estimated to be 209 laborers.
- The total work force is estimated to be 4,674 person months over the duration of construction.
- The peak monthly on-site equipment items are estimated to be 150 items. The peak daily concrete trucks (on-site) are estimated to be 210 trucks. This estimate assumes the trucks are traveling to and from an on-site batch plant. The peak daily heavy trucks (on-site) are estimated to be 258 trucks. This estimate assumes the trucks are hauling materials to and from locations on-site.
- The peak monthly off-site truck volume is estimated to be 75 trucks. The total off-site truck volume is estimated to be 925 trucks for the duration of construction. This estimate assumes the off-site trucks are importing the necessary construction materials to the site such as steel linings, steel reinforcement, electrical components, etc.
- The peak monthly labor cost is estimated to be $2.51 million.
- The cumulative labor cost for the Project is estimated to be $58 million.

2.3 Project Operation

The basic mode of operation for the Project will be typical of most pumped storage projects: storing low-cost energy for use to provide peaking generation during periods of high power demand. During the weekdays and particularly during morning and afternoon peak demand periods the Project would operate as a hydroelectric generation project, releasing water from the upper reservoir through the reversible turbines to the lower reservoir to generate power. Power would also be generated as needed by the CAISO for voltage regulation, and load following, and would be available for spinning reserves.

As a peaking, voltage regulation, and load-following facility, the plant will normally operate for periods of several hours during weekdays of the peak generating season and shorter periods of rapid load change for load following and voltage regulation benefits during other periods of the week and year. Based on typical projects elsewhere in the U.S. an average annual capacity factor of 20 percent would be expected. However, the Project has been sized with 18.5 hours of energy storage and could support a higher capacity factor. The annual energy production by the plant will similarly depend upon the way it is operated and the peak energy demands being met.

The rated generating capacity of the plant would be 1,300 MW. The generating capacity of the units is limited by the full-gate power produced by the turbines at a given head or by the continuous generating capacity of the motor/generators. The motor rating for pumping will be selected based upon the pumping capacity of the pump/turbines at the minimum pumping head. The plant operation is not dependent upon stream flow; therefore, the operation and plant capabilities are unchanged in adverse, mean, and high flow water years.

2.4 Project Alternatives

In ECE's Final License Application, ECE proposed that the interconnection transmission line route be co-located to the extent possible with existing roads and utility corridors on the shortest path (least total disturbance) to a substation northwest of the town of Desert Center.

ECE's application to the transmission queue was submitted to the California Independent System Operator (CAISO) on January 28, 2010. A scoping meeting with the CAISO for the Project was held on March 17, 2010. Through this consultation process, ECE learned of a potential new substation being considered by Southern California Edison (SCE) and the BLM, known as the Red Bluff Substation. The BLM and SCE have two alternative locations currently under review for the Red Bluff Substation. These two substation locations are also being considered as alternative interconnection points for the several solar energy projects proposed in the area. We cannot determine exact routes and interconnection points until BLM has rendered their decision, which is expected in July 2010. However, SCE provided ECE with maps of the two potential new substation locations, which we refer to as the Western Red Bluff Substation and the Eastern Red Bluff Substation.

In addition, the USFWS has requested that ECE consider interconnection alternatives to these substations that reduce the potential impact to desert tortoise critical habitat (*see* letter from the Department of Interior filed with the Commission on March 12, 2010).

In response to this additional information, and comments from the USFWS, ECE developed three alternative interconnection routes to interconnect to these two substation sites. Both substation alternatives and the interconnection route alternatives are discussed below.

Eastern Red Bluff Substation Alternative

One of the substation sites that the BLM, SCE, and CAISO are considering is known as the eastern Red Bluff substation site. This site is east of the community of Desert Center, south of the I-10 (Figure 2-2).

In order to interconnect at the eastern Red Bluff substation, the project's transmission interconnection would follow one of two paths. One route would go east from the Central Project Site to Kaiser Road, then parallel (and west of) Kaiser Road to south of the community of Lake Tamarisk, then east (to the south of the Chuckwalla Sun Peak Solar Project), then south to the substation site. This alternative is displayed on Figure 2-2 as Alternative #2. The other route would parallel the existing SCE transmission line going southwest to a point just north of the proposed substation, then go south to the substation. The location of this alternative relative to the existing SCE line would be adjacent to the existing line, on one side or the other. This route alternative is displayed on Figure 2-2 as Alternatives #1A (north side) and #1B (south side).

Discussion of the potential impacts of these alternative interconnection routes and substation locations on Federally-listed threatened and endangered species are included in this biological assessment.

Western Red Bluff Substation Alternative

The Western Red Bluff substation alternative would be located west of the town of Desert Center, south of the I-10. The new substation would occupy approximately 78 acres, and would include electrical facilities and supporting infrastructure. The tallest structures in the substation would be dead end structures, bus and transformers, ranging in height from 85 feet to 135 feet. A chain link fence would surround the substation.

In order to interconnect at the Western Red Bluff Substation, Transmission Interconnection Alternative #3 would follow the same alignment south as the proposed Project except for the last 2.5 miles. At this location, the Alternative would continue south, paralleling Eagle Mountain Road, crossing I-10, to the substation located at the terminus of Eagle Mountain Road south of I-10. Alternative #3 includes approximately 9.2 miles of a double-circuit, 500 kV transmission line, 2.5 miles of which is different from the proposed project route, as noted. This alternative is displayed on Figure 2-2 as Transmission Interconnection Alternative 3.

3 Environmental Setting

3.1 Project Area Habitats

3.1.1 Project Vicinity

The Project lies in the California portion of the western Sonoran Desert, commonly called the "Colorado Desert." This includes the area between the Colorado River Basin and the Coast Ranges south of the Little San Bernardino Mountains and the Mojave Desert. Rainfall amounts are low, approximately 2.8 to 5.4 inches per year (Turner and Brown 1982). This is a warmer, wetter desert than the Mojave Desert and while substantial rainfall may occur in the winter months, there is a strong summer component, with warm, monsoonal rains emanating from the Gulf of Mexico. Winter temperatures average approximately 54°F (Turner and Brown 1982). Ambient, summer temperatures are extreme, commonly reaching 110+°F for long periods and averaging approximately 90°F. This period of extremely warm weather is also lengthy, extending from mid-spring through the fall. As a consequence of these climatic conditions, the vegetation is highly drought-adapted, but contains subtropical elements. Where the summer rainfall is more reliable (extreme southeastern California), the arboreal community, largely consisting of microphyllous trees, is a primary component of the flora. But in general, species richness and density are relatively low due to the low rainfall and high temperatures, whether compared to more mesic environments or simply other regions of the Sonoran Desert. The Project extends from the edge of the Eagle Mountains into the adjacent Chuckwalla Valley, via a gently sloping bajada (Figure 3-1). The presence of coarse particles in the substrate varies and is largely dependent on the proximity of the Project to mountains and attendant hydrologic forces. Hence, boulders and cobbles are common in the upper bajadas and toeslopes with smaller particles downslope. Desert pavement is intermittently present along the bajada. Soils generally range from soft sand to coarse-sandy loams. Elevations range from approximately 500 to 1,300 feet.

Drainage patterns reflect the local topography. Along the broad bajada traversed by the Project's linear facilities, drainage is primarily characterized both by scattered, well-defined washes and networks of numerous narrow runnels (sheet flow). The former are several-yards-wide, sandy to cobbly drainages that carry periodic runoff to a regional drainage. They are often incised, from a half to several yards deep, and vegetated along the banks by both shrubs and trees. By contrast, the numerous, shallow runnels are typically only a yard or less wide, one-to-few inches deep, and irregularly vegetated by locally common shrub species. Where there is greater runoff into these runnels, arboreal elements commonly seen in the larger washes are also present, albeit in a stunted form. These small channels often fail to either flow or provide through-flow to larger drainages.

Sheet flow is evident across those bajadas where overland flows result from a combination of heavy precipitation, low permeability surface conditions, and local topography; the substrates there tend to be more gravelly than non-sheeting habitats due to the hydrologic transport of materials. East of the Project in Chuckwalla Valley percolation into the plain or nearby playa occurs where slopes are negligible. Variations of two basic native plant communities (after Holland 1986) are encountered by Project components: Sonoran Creosote Bush Scrub (CNPS Element Code 33100) and Desert Dry Wash Woodland (CNPS Element Code 62200) (Figure 3-2). The variations of Sonoran Creosote Bush Scrub that occur in the Project vicinity are dominated by two species: creosote bush (*Larrea tridentata*) and burro bush (*Ambrosia dumosa*). However, common elements variously include brittlebush (*Encelia farinosa*), white rhatany (*Krameria grayi*), chollas (*Cylindropuntia echinocarpa*, *C. ramosissima*, and occasionally *C. bigelovii*), indigo bush (*Psorothamnus schottii*), and ocotillo (*Fouquieria splendens*). Desert Dry Wash Woodland in the Project area is characterized by broad plains of contiguous runnels (i.e., sheet flow) with intermittent, well-defined washes. For the latter, the wash banks and islands are densely vegetated with aphyllous or microphyllous trees, primarily ironwood (*Olneya tesota*) and blue palo verde (*Cercidium floridum*), with occasional to common smoke tree (*Psorothamnus spinosus*) and catclaw (*Acacia greggii*). In the sheeting areas, the tree species typically found in arboreal drainages are, instead, aspect-dominant elements of the landscape and appear to be homogeneous across the landscape, forming a desert "woodland." Other common wash associates – cheesebush (*Ambrosia [=Hymenoclea] salsola*), galleta grass (*Pleuraphis rigida*), desert lavendar (*Hyptis emoryi*), desert peach (*Prunus fasciculatum*), chuparosa (*Justicia californica*), and jojoba (*Simmondsia chinensis*) grow in both the arboreal drainages as well as the less distinct runnels. (See Appendix B for a list of species observed in the Project Area.)

3.1.1.1 Wetlands, Seeps and Springs, and Artificial Impoundments

There are no perennial streams or natural wetlands in the Project vicinity. Six seeps, springs, or water catchments were identified by the proposed Northern and Eastern Colorado Desert Coordinated Management (NECO) Plan (BLM and CDFG 2002) in the immediate vicinity of the project, all on or near the Metropolitan Water District (MWD) pumping facility (Figure 3-3). Four of these – Buzzard Spring, Dengler Tank, Eagle Tank, and Cactus Spring are outside the Project boundary by at least two miles (County of Riverside and BLM 1996). All may be intermittent. The NECO Plan identified two other springs (unnamed), one of which might be adjacent to, in, or borderline with the Project. However, investigations of these sites for the Project Pre-Application Document (ECE 2008) were unsuccessful in locating any further details on these springs. A May 1994 helicopter survey of all water sources in the Eagle Mountains also did not note them (Devine and Douglas 1996), and it is possible that they no longer exist or were incorrectly mapped. During final engineering design a water source survey will

determine the presence any springs within the Project's area of potential effects, their quality, and value for wildlife.

There are no artificial water impoundments on the transmission line and water pipeline. All possible wells in the Project vicinity were assessed for the potential for water impoundment during 2008 surveys. None of the final three well sites had potential for impoundment. It is reasonable to assume that temporary pools may accumulate in the mine pits as a result of precipitation and runoff and there is evidence that in the past a tamarisk (*Tamarix* sp.) grove grew in the East Pit (Kaiser and MRC 1991). There may also be standing water associated with water treatment facilities for the few remaining residents of the Eagle Mountain townsite. The Colorado River Aqueduct (CRA) has both exposed (open water) and underground sections near the Project site. Open water is present at the site of the Eagle Mountain Pumping Plant, on the CRA south of the Central Project Site.

3.1.1.2 Biological Soil Crusts

Biological crusts, also variously known as crytobiotic, cryptogamic, microbiotic, and microyphytic crusts, form in the upper layers of soils. These soil crusts include a community of microscopic bacteria, fungi, algae, and other microorganisms that function mechanically, chemically, and biologically to stabilize soils against erosion; provide nutrients and water for plant growth; and modify ambient temperatures (West 1990; Belnap et al. 2001). Their function in arid systems has only relatively recently been addressed, especially as it relates to crust disturbance (Rowlands 1980; Belnap et al. 1998; Evans and Belnap 1999). Crusts are highly susceptible to crushing, especially when dry, which can occur via a number of mechanisms, including grazing, vehicular traffic, surface grading, and hiking. Not only do crushed crusts lose their function, but crushed crusts release a flush of nutrients that support the growth of exotic annual species (e.g. *Bromus* spp., *Schismus arabicus*) (Pendleton et al. 2004).

3.1.1.3 Invasive Species

Several species of exotic plants have been introduced to the southwestern deserts. Tamarisk, a medium-sized tree, was introduced to the United States as an ornamental and windbreak. Brought to the United States in the early 1800s (Allen 2002), old hedges of tamarisk are still common along farms and railroads in many areas of the desert. It has especially invaded riparian areas, including springs, rivers, and canals, outcompeting native vegetation for available resources. On the Project, a tamarisk grove was identified in the East Pit (Kaiser and MRC 1991). However, this grove is not currently apparent in aerial photographs of the East Pit.

Highly successful annual exotics in the desert include three grasses - red brome (*Bromus madritensis rubens*), cheatgrass (*B. tectorum*), and split grass (Schismus spp) – and two

dicots – Tournefort's mustard (*Brassica tournefortii*) and filaree (*Erodium cicutarium*). Most were established in the desert in the mid-twentieth century primarily via grazing and agriculture (Allen 2002), but also by road-building and other anthropogenic activities that disturb soil surfaces and/or use equipment capable of transporting exotic seed from sources elsewhere. Brooks (2007) also cited nitrogen deposition from vehicle exhaust as potentially promoting plant invasions.

Exotic species use available resources, thereby competing with native plant species and altering species composition and evenness (a measure of biodiversity). This, in turn, alters the availability of resources (e.g., cover, forage) to wildlife, which may alter species diversity in the affected wildlife community. Lack of native vegetation may also be implicated in the inability of species that are periodically stressed by drought – a normal and relatively frequent phenomenon in the desert - to withstand that stress. Furthermore, exotic annuals are responsible for promoting wildfires in the desert (Brown and Minnich 1986; Brooks 1998; and Allen 2002).

3.1.2 Project

3.1.2.1 Central Project Area

The Central Project Area (i.e., the hydropower plant) is located at the edge of the Eagle Mountains and on the adjacent gently sloping bajada. Access to the Central Project Area has not been approved, so conditions there were assessed using available documentation. A large volume of information on the Central Project Area is available in the public record from studies conducted for the development of a proposed landfill on the site. The existing information includes an environmental impact statement (EIS) and environmental impact report (EIR), a biological assessment (BA), and a biological opinion (BO) prepared for the proposed Eagle Mountain Landfill and Recycling Center (County of Riverside and BLM 1996; RECON 1992; and U.S. Fish and Wildlife Service 1993). In addition, current project conditions were reviewed using recent low level aerial photography.

The hydropower plant consists of mountainous, rocky terrain that has been disturbed extensively as a result of past mining activity (Figure 3-1). The BA (RECON 1992) and EIS (County of Riverside and BLM 1996) for the Eagle Mountain Landfill and Recycling Center identified Sonoran Creosote Bush Scrub in the Central Project Area, surrounding a substantial area heavily disturbed by prior iron ore mining activities and the related town site. Inactive open pits, tailings piles, and remnant tailings ponds exist on site. Remnants of the structures associated with the previous mining, including railhead, haul roads, and ore processing/refining facilities still exist, though most of the ore processing and refining facilities have been removed.

The BA for the proposed landfill project concluded that the landfill does not extend into desert tortoise habitat. This conclusion was based on field surveys of the project site, with 69 person-days expended to document the presence and abundance of sensitive biological resources on the project site. The only desert tortoise sign found near the proposed landfill was on a flat area south of the Eagle Mountain town site on a parcel of public lands in R14E T4S where the existing Eagle Mountain Railroad crosses the boundary of Sections 2 and 11 (RECON 1992). This area is south of, and will not be affected by, the proposed Eagle Mountain Pumped Storage Project. Based on the results of the field surveys, the landfill BA concluded that the landfill will have no direct construction impacts to desert tortoise in the Eagle Mountain landfill site.

The BO for the landfill found that the landfill will impact 150 acres of desert tortoise habitat, all of which is associated with a widening and extension of the Eagle Mountain Road and construction of a new spur of the Eagle Mountain Railroad. The BO did not identify any impact to desert tortoise habitat as a result of construction in the landfill site. Mitigation measures for desert tortoise proposed in the BO for the landfill are focused primarily on potential impacts of the use of the Eagle Mountain Railroad, which transects desert tortoise habitat. It should be noted that the Eagle Mountain Pumped Storage Project does not propose to modify the Eagle Mountain Road, nor to use the Eagle Mountain Railroad for any purpose.

Based on inspection of current aerial photos, there do not appear to be any changes in the amount or quality of habitat in the disturbed areas of the Central Project Site since the 1992 BA was written. Therefore, based on Central Project Area configuration, no native habitats should be affected on the Central Project Area (Table 3-1).

Table 3-1. Acreage of native habitats and developed areas with potential surface disturbance on the Eagle Mountain Pumped Storage Project[1,2]

Project Element	Total Acreage (acres)	Sonoran Creosote Bush Scrub (acres)	Desert Dry Wash Woodland (acres)	Developed (acres)
Central Project Area (acreage of reservoirs and constructed project features)	1101.5	0	0	1101.5
Transmission Line ROW	328 (13.5 miles)	129 (5.3 miles)	175 (7.2 miles)	24 (1 mile)
Tower Footprint plus Construction Area	4.5 – 5.6 (54-68 towers)	1.7-2.1 (21-26	2.4-3.0 (29-36	0.3-0.4 (4-5 towers)

Project Element	Total Acreage (acres)	Sonoran Creosote Bush Scrub (acres)	Desert Dry Wash Woodland (acres)	Developed (acres)
		towers)	towers)	
Access Road	32.4	12.7	17.3	2.4
Pulling/Tensioning Sites	Currently Unknown (intended to fall within the T-Line ROW and substation site)	Currently Unknown	Currently Unknown	Currently Unknown
Equipment Laydown Sites	Currently Unknown	Assume 0	Assume 0	Assume 100%
Proposed Interconnection Collector Substation	25	25	0	0
Water Pipeline	55.6 (15.3 miles)	20.9[3] (8.1 miles)	0 (0 miles)	34.7[3] (7.2 miles)
TOTAL PROJECT ACREAGE	≥1219.8	≥60.3	≥19.7	≥1139

1. Acreage is calculated based on the following assumptions:
    - Transmission Line
        - 13.5 mi long, 200-foot ROW
        - Approximately four towers per linear mile, with more in mountainous terrain (54 to 68 total)
        - Estimated access road width is 20 feet; towers will be immediately adjacent to the access road with no stub road. (Note: This assumption may change when specific towers are engineered. In the two, small mountainous areas, stub roads are more likely to be present to accommodate both the access road and the necessary tower location.)
        - Total tower footprint (40 by 40 feet) plus construction area is 3600 ft^2 (60 by 60 feet)
        - Tensioning and pulling sites are unknown at this time, but are intended to be located within the transmission line ROW and substation site.
        - Equipment laydown areas will be on previously disturbed lands and/or overlapping with other project acreage.

    - Water Pipeline and Wells
        - 15.3 mi long, 30-foot ROW, with access road included in the ROW
        - Along Kaiser Road, half of the ROW is in the disturbed (bladed) road shoulder
        - Three groundwater wells; total estimated disturbance footprint for each is 2500 ft^2 (50 by 50 feet)

2. All calculations of acreage on the Central Project Area are estimates based upon AutoCAD mapping.
3. Part of the mileage was adjacent to Kaiser Road, where only half the width of the ROW was in native habitat. The other half was in the road shoulder.

3.1.2.2 Proposed Project Transmission Line

The Proposed Transmission Route extends south from the Central Project Area along the bajada and over one very low mountain near the Metropolitan Water District (MWD) substation (Figure 3-1). The northern approximately 2.8 miles segment is on Kaiser property, where access has been denied. However, it appears from aerial photos and surveys that were completed along the accessible portions of the transmission line ROW that approximately one mile of the ROW is in developed land (i.e., disturbed by mining) and the remainder is in Sonoran Creosote Bush Scrub. In total this transmission route would cross 1 mile of developed land, 6.3 miles of Sonoran Creosote Bush Scrub and 6.2 miles of Desert Dry Wash Woodland (Table 3-1).

3.1.2.3 Proposed Project Substation

The proposed Project substation is in Sonoran Creosote Bush Scrub habitat. The terrain has sheet flow on flat to gently undulating topography, fine-gravelly substrates, and relatively high plant diversity.

3.1.2.4 Water Pipeline

The water pipeline primarily runs along the same ROW as Transmission Route Alternative 1 (Figure 2-1). At State Road 177, the ROW splits, with one route travelling along State Road 177 (paved), mostly through agriculturally developed parcels, but also through approximately 0.3 miles of native Sonoran Creosote Bush Scrub. The other ROW fork travels southeast along Alternative 1. The combined acreage of native Sonoran Creosote Bush Scrub intersected by the water pipeline ROWs is 20.9 acres (Table 3-1).

3.1.2.5 Interconnection Alternative Routes

Transmission Route Alternatives #1A and #1B travel southeast on the bajada from the Central Project Area, approximately 4.6 miles along the east edge of the Kaiser Road ROW (Figure 2-2). The vegetation community is a sheeting Sonoran Creosote Bush Scrub. This alternative then travels parallel to the existing, SCE 161 kV line, initially through approximately two miles of native Sonoran Creosote Bush Scrub and then through abandoned jojoba (*Simmondsia chinensis*) fields to State Road 177. A dirt access road is present along this portion of the route between Kaiser Road and State Road 177. From State Road 177, the route travels southeast along an existing dirt road along the SCE transmission line until the route turns south to meet the Eastern Substation Alternative. East of State Road 177, habitats include abandoned jojoba, Sonoran Creosote Bush Scrub and Desert Dry Wash Woodland. The total acreage of native Sonoran Creosote Bush Scrub and Desert Dry Wash Woodland intersected by Alternative

#1A is 181 and 97.3 acres, respectively (Table 3-2). The total acreage of native Sonoran Creosote Bush Scrub and Desert Dry Wash Woodland intersected by Alternative #1B is 180.4 and 98.4 acres, respectively (Table 3-2).

Transmission Route Alternative #2 tiers off Alternative #1B, to follow Kaiser Rd. on the west side, crossing State Road 177 just north of Desert Center and continuing east to the point where it is north of the Eastern Substation Alternative, where it bends south into the substation (Figure 2-2). This route crosses well-developed Desert Dry Wash Woodland along Kaiser Rd. and in part of the east-west extension, and Sonoran Creosote Bush Scrub elsewhere. The latter is intersected by several deeply to shallowly incised arboreal washes, especially in the east. Developed and/or disturbed lands are present near Desert Center. The total acreage of native Sonoran Creosote Bush Scrub and Desert Dry Wash Woodland intersected by Alternative #2 is 153.7 and 260.7 acres, respectively (Table 3-2).

Transmission Route Alternative #3, which extends south from the Proposed Route to the Western Substation Alternative, has habitat similar to the Proposed Route, Desert Dry Wash Woodland (182.5 acres) and Sonoran Creosote Bush Scrub (114.6 acres). It crosses Interstate 10 to connect to the Western Substation Alternative. There are disturbed areas near and north of Interstate 10 that are attributed to several gas pipelines and a former Patton encampment. The latter has been recolonized by native species, but is dissimilar to surrounding, undisturbed habitat. The dominant species are burro bush, brittlebush and Chinese lanterns (*Fagonia laevis*).

3.1.2.6 Substation Alternatives

Both the Eastern and the Western Red Bluff substation alternatives are in Sonoran Creosote Bush Scrub habitat. The Western Red Bluff Substation Alternative is in terrain relatively similar to the proposed Project substation, with sheet flow on flat to gently undulating topography, fine-gravelly substrates, and relatively high plant diversity. The Eastern Substation Alternative is characterized by three distinct habitats: a broad wash with large boulders, sparse rolling hills, and incised arboreal washes that intersect broad stretches of desert pavement.

Table 3-2. Acreage of native habitats and developed areas with potential surface disturbance on the substation alternatives and interconnection alternative routes

Project Element	Total Acreage (acres)[4]	Sonoran Creosote Bush Scrub (acres)	Desert Dry Wash Woodland (acres)	Developed (acres)
Transmission Alternative 1A	399.2 (16.4 miles)	181	97.3	120.9
Transmission Alternative 1B	396.7 (16.3 miles)	180.4	98.4	118
Transmission Alternative 2	453.6 (18.6 miles)	153.7	260.7	39.6
Transmission Alternative 3	321.2 (13.2 miles)	114.6	182.5	24
Western Red Bluff Substation	73.7[5]	73.7	0	0
Eastern Red Bluff Substation	73.7	73.7	0	0

3.2 Land Ownership and Uses

3.2.1 Land Ownership

On the Central Project Area, 52 percent is patented or privately owned lands owned by the MWD and Kaiser Eagle Mountain, LLC (Kaiser) (Table 3-3). The rest are lands near the upper reservoir that are managed by the BLM. The Project's transmission line route is located almost entirely on public lands managed by the BLM. Exceptions include private lands within the Central Project Area boundary owned by Kaiser, and a small crossing of land owned by MWD as the route crosses the existing MWD aqueduct and transmission lines. The entire water pipeline ROW crosses undeveloped federal land managed by BLM, with the exception of the southern third of the route, which crosses several private parcels with inactive agricultural fields. As the route approaches the Eagle Mountain area, it crosses the Colorado River Aqueduct before entering the Central Project Area. Land ownership for the Project boundary and surrounding area is shown on Figure 2-1.

[4] Total acreage is based on assumed 200' wide right of way for the transmission line. Acres of surface disturbance will be less. Towers will be spaced approximately four per mile, with more towers in mountainous terrain.

[5] Alternative substations are larger than the proposed Project substation to accommodate interconnection of multiple projects.

Table 3-3. Summary of Land Ownership Within the Project Boundary

Description	Project Boundary Acres[6]	Ownership Acres	Remarks
Total Project Boundary	2221		
Private/Patented Lands*		1162*	
Public Lands		1059*	BLM-Administered Lands
** - 384 acres within project boundary associated with public/private land transfer currently in litigation*			

3.2.2 Existing Land Uses

3.2.2.1 Project Vicinity Overview

While the majority of surrounding lands are publicly owned, undeveloped and managed by the BLM, a number of specific land uses do exist. These are described below and shown on Figure 3-4.

Town of Eagle Mountain. The Town of Eagle Mountain is a 460-acre townsite owned by Kaiser Eagle Mountain, LLC (Kaiser). It is located adjacent to the Central Project Area, but is not proposed to be part of the Project. The town was developed by Kaiser Steel Corporation to house mine workers and consists of 250 single-family dwellings, a store, café, two churches, a school, a post office, and other related features. After the mine closed, the town became largely vacant. A State-run correctional facility once utilized some of the features, but has since been relocated. The townsite is fenced with controlled access and is currently vacant except for a few dwellings still reportedly occupied by Kaiser Ventures employees. The townsite is serviced by public utilities, and a wastewater treatment plant is located southeast of the town**.**

Lake Tamarisk and Desert Center Communities. The small communities of Lake Tamarisk and Desert Center are located approximately nine and ten miles southeast of the Central Project Area along the Kaiser Road. Lake Tamarisk consists of approximately 70 single family dwellings, an executive golf course, a recreational vehicle park, undeveloped lots (150), a staffed County Fire District Station, and two small lakes. Desert Center is located at the junction of Interstate 10 and State Route 177. Desert Center consists of a few small single-family dwellings, a mini market, café, and bar. The community included gas stations at one time, but they are now closed. Public facilities include a county fire station, branch library, post office, and several churches.

Both communities, as well as the Eagle Mountain Townsite are accessed by Kaiser Road and State Route 177 which connect to Interstate 10 at Desert Center.

[6] Includes all lands within the Project boundary, including acres which will be not be disturbed.

Roads, Utilities, Airports, and Miscellaneous Facilities. The principal transportation network in the Project vicinity includes Interstate 10 and State Route 177. Local paved roads include the Kaiser and Eagle Mountain Roads, and the Interstate 10 frontage road (Ragsdale Road) that connects them. Kaiser Road provides direct access to the Central Project Area from Desert Center. Eagle Mountain Road extends from Interstate 10 to the MWD pumping station, and is dirt from the MWD pumping station turnoff to the Eagle Mountain Townsite. East of the MWD pumping plant a small paved road follows the MWD aqueduct. Other transportation resources in the study area include unpaved roads and off-highway-vehicle (OHV) trails. The Eagle Mountain Rail Line, which once serviced the Kaiser Iron Ore Mine operation, also runs through the area from Interstate 10 north to the project site. This facility is proposed to be improved and re-opened as part of the proposed landfill project (see below).

Several existing transmission lines cross through the study area. A 230 kV electrical transmission line (MWD line) crosses the Coxcomb Mountains from the northeast and continues to the MWD pumping station and then through the Eagle Mountains to the south. A 160 kV transmission line, owned by SCE, runs southeast from the Eagle Mountain Townsite to the community of Blythe located approximately 50 miles to the east. South of I-10 the 500 kV Devers-Palo Verde Transmission Line parallels the Interstate. Plans exist for additional transmission lines within the BLM-designated utility corridor that follows Interstate 10. These include a second Devers-Palo Verde Transmission line (approved but not yet built) and a 230kV transmission line from Blythe to the Julian Hinds substation located several miles west of the Desert Center Community.

Two small airports exist in the vicinity. A single private landing strip is located south of the Eagle Mountain townsite and west of Kaiser Road. This airstrip is used by Metropolitan Water District and does not appear on the Airport/Facility Directory http://naco.faa.gov/index.asp?xml=naco/online/d_afd . Desert Center Airport is a larger development located approximately 10 miles southeast of the Central Project Area, accessed from State Route 177. The Desert Center Airport was recently sold to a private entity by Riverside County, and is proposed for development of a motorsports event facility on the premises. One runway oriented northwest-southeast currently exists.

A small disposal site operated by Riverside County is located west of Kaiser Road between Desert Center and Eagle Mountain. This facility provides solid waste disposal for the small communities in the area.

The Colorado River Aqueduct, which is managed by MWD, lies about one-mile south of the proposed lower reservoir within the Central Project site. The Aqueduct runs in a northeast-to-southwest direction and is underground in the immediate Project vicinity,

transitioning to an open channel one-mile north of Kaiser Road and east. Water for residential, commercial and agricultural use is obtained from local wells.

Some limited resource gravel extraction exists in the study area. Several small gravel pits are located between Eagle Mountain and Desert Center, and Kaiser Ventures has stated that it still operates a limited rock products business from the site.

Agricultural Areas. Several small agricultural areas used for irrigated cropland are located southeast of the Central Project Area. Approximately 994 acres within three areas are under California Land Conservation (Williamson) Act Contracts (Figure 3-5). Williamson Act contracts basically enable local governments to provide tax incentives to landowners in turn for protection of agricultural land. Currently, agriculture on the indicated Williamson Act lands is inactive and appears to be abandoned.

Irrigated crops grown in the area initially included jojoba, a seed crop, and asparagus. Approximately 5,000 acres of jojoba were grown in 1992 (Riverside County Agricultural Commissioner 1992). However, due to difficulty in harvesting the seed crop, this acreage has been decreasing. An evaluation of agricultural land use inventoried in 2005 (field verified in 2007 by GEI Consultants, Inc. verifies this decrease in agricultural production. Agricultural lands, which are currently inactive, and/or abandoned cropland total approximately 5,200 acres. A small number of crop types that are currently in production in the area including jojoba, asparagus, citrus, dates, and palms. Based on a field verification of aerial photo information, it is concluded that currently active cropland in the project vicinity is approximately 1,200 acres.

Joshua Tree National Park and Wilderness. The Joshua Tree National Park (JTNP) surrounds the Central Project Area on three sides; the Park boundary is located about two to three miles from the Central Project Area. (Figure 3-4). JTNP encompasses nearly 792,000 acres of land of which approximately 700,000 acres have been designated Wilderness.

Kaiser Mine and Proposed Landfill. As part of the iron ore mining process, Kaiser excavated four principal areas between 1948 and 1982 (CH_2MHill, 1996). Collectively, the mine was called the Eagle Mountain Mine and the four excavated open pits were named the East Pit, Central Deposit, Black Eagle-North Pit, and the Black Eagle-South Pit. Each pit extends approximately one to two miles in length and is aligned in an east-west orientation. During the mining operation significant amounts of overburden were removed, much of which can be seen adjacent to the pits.

The Central Project Area occupies only a portion of the acreage encompassing the Eagle Mountain Mine area. Kaiser Resources, LLC, has proposed to develop much of the area between the East Pit and the Central Pit as a landfill. Additionally, approximately 3,500

acres of public land within this area are proposed to be exchanged for off-site private lands to support the landfill project.

The landfill project was permitted in the 1990's but not all legal issues have been resolved. One component of the landfill proposal is an exchange of lands between Kaiser and the BLM. The land exchange has been subject to litigation, currently pending before the United States Ninth Circuit Court of Appeals. Consequently, the ownership of the requisite property rights for the landfill development has not been accomplished.

3.2.3 Proposed New Land Uses

Information available on the BLM website indicates that several solar energy projects are being proposed in the Chuckwalla Valley. One in particular, proposed by First Solar, abuts the Project area to the east, and would encompass more than 7,000 acres of land.

A number of transmission line projects are proposed and/or have been approved, but are not yet built. These include Southern California Edison's Devers-Palo Verde No. 2 Project, the Desert Southwest Transmission Line Project, and the Blythe Energy Project Transmission Line Modifications.

4 Species Analysis

4.1 Species Description

4.1.1 Taxonomy and Distribution

The desert tortoise is one of five species of North American tortoises, four of which belong to the genus *Gopherus*: *G. agassizii* (desert tortoise), *G. berlandieri* (Texas tortoise), *G. flavomarginatus* (bolson tortoise), and *G. polyphemus* (gopher tortoise). A fifth potential species, is likely in southern Sonora, two individuals of which were found in sourthern Baja California, Mexico and named *Xerobates lepidocephalus* (scaley-headedtortoise) (Ottley et al. 1989). The desert tortoise inhabits the southwest north of Baja California, with a current range extending from southwestern Utah, west to the Sierra Nevada Range in California, and south through Nevada and Arizona into Sonora, Mexico (Ernst et al. 1994; Germano et al. 1994).

4.1.2 General Habitat

The desert tortoise occupies arid habitats below approximately 4,000 ft in elevation (Karl 1983; Weinstein 1989). Common vegetation associations in the Mojave Desert include creosote bush scrub, saltbush scrub, Joshua tree woodland, and Mojave yucca communities. In the Colorado and Sonoran deserts of southern California and Arizona, desert tortoises occupy somewhat lusher desert habitats, with increased bunch grasses, cacti, and trees; thornscrub is occupied in the Sinaloan Desert. Because of the burrowing nature of tortoises, soil type is an important habitat component (Karl 1983, Weinstein et al. 1986). In California, tortoises typically inhabit soft sandy loams and loamy sands, although they are also found on rocky slopes and in rimrock that provide natural cover-sites in crevices. In portions of Nevada and elsewhere, where a near-surface durapan limits digging, tortoises often occupy caverns in the exposed caliche of wash banks. Hills with rounded, exfoliating granite boulders often host higher densities than the surrounding flats, especially in Arizona. Valleys, alluvial fans, rolling hills, and gentle mountain slopes are inhabited; only playas and steep, talus-covered slopes are avoided.

4.1.3 Natural History

Activity Patterns and Home Range. Tortoises are ectotherms. Their body temperatures are not controlled by internal mechanisms, but rather by ambient (surrounding) temperatures and their seasonal and daily activity patterns are, in turn, partially similarly dictated. The greatest activity periods are spring and fall, when ambient temperatures remain below lethal thresholds, forage is most available, and reproductive activities occur. Tortoises are essentially inactive during the hot summer

months when forage is unavailable and ambient temperatures typically exceed lethal levels for most of the day. Tortoises then remain in burrows except during periods of rain, when they exit to replenish bodily water stores. Tortoises hibernate during the winter. Entry into hibernacula begins in mid to late October, with 98% of tortoises in burrows by mid-November (TRW 1997a). Most tortoises exit hibernacula from March through early April. Tortoises are diurnal (active during the day) and during the activity season may be active aboveground when the ground surface temperature is less than approximately 43°C (109°F) (Karl 1992) to 45°C (113°F) (Zimmerman et al., 1994). Above-ground activity was estimated at only 1.7% of the year in one study (Nagy and Medica 1986), but this is probably an underestimate based on the small sample size in the study (11 tortoises) and limited sampling intensity (1-several days at 2–4 week intervals).

Tortoises are opportunistic in their burrowing habits, burrowing into hillsides and using rock caverns where available, and altering the burrows of other burrowing species, such as kit and gray foxes, rodents, and hares. Burrows may extend several feet deep, are generally more or less straight, and are dug at a gentle slope; vertical depths below the soil surface at the end of a burrow are typically less than a meter. The deepest burrows are used in winter for thermal buffering; the greatest short-burrow use (including pallets) occurs in spring (TRW 1997b).

Several reports of the mean number of burrows used in a year of average or better forage are similar: 6.2–13.8 (range: 2–18) (Duda et al., 1999) and 11.7 (range: 4–23) (TRW 1997b). Bulova et al. (1994) reported 9.1 burrows (range: 3–18) for only a five-month period from June to October. An average of 4.8 new burrows may be constructed per year; more new burrows will be constructed following a winter of heavy rainfall with concomitant collapse of existing burrows (TRW 1997b). There was no significant difference between males and females in the number of burrows used, although the pattern of use was different, probably due to reproductive activities (Bulova 1994, TRW 1997b).

Tortoises tend to use a group of burrows, then move to another group, and so on (Rautenstrauch and Holt 1994). Generally, males have been shown to have larger home ranges than females in studies of sufficient length and sample size (O'Connor et al., 1994; TRW 1999). Using Minimum Convex Polygon techniques, home ranges were calculated as 43.5 acres (range: 4.7–143.3 acres) (17.6 ha; range: 1.9–58.0 ha) for adult females and 111.6 acres (range: 10.4–487.8 acres) (45.2 ha; range: 4.2–197.5 ha) for males, in a three-year study when tortoises were recaptured at least 50 times/year (TRW 1999). By contrast, home ranges were substantially smaller in studies with sample sizes of <21 tortoises and/or short study length (e.g., 5 months for Connor et al., 1994): 18–26.4 acres (range: 2.0–84.5 acres) (7.3–10.7 ha; range: 0.8–34.2 ha) for adult females in years of average or better forage levels and 19–65.2 acres (range: 9.1–108.9 acres) (7.7–26.4 ha; range: 3.7–44.1 ha) for adult males (Burge 1977, Barrett 1990, O'Connor et al.,

1994, Duda et al., 1999). Home ranges for both genders (Duda et al, 1999) or for males only (TRW 1999) decreased significantly in drought years.

Foraging Behavior. Desert tortoises are herbivorous, although they have commonly been observed consuming soil and, occasionally, lichen (Henen 1993, TRW 1995) bones (TRW 1995), canid scat, lagomorph scat (TRW 1995) and bovid scat (Bostick 1990). Forage typically comprises annual forbs and grasses, as well as perennial grasses and succulent perennials, including cacti. An annual diet may include many species (43 [Esque 1991], 45 [TRW 1995], and 61 [Esque 1993]), but only a few species account for the majority of biomass consumed. While there is a high correlation of a forage species' availability to its percentage of the diet (Avery 1992), preferences do not always reflect availability. The Mojave Desert is dominated by exotics, in particular, the annual grass, split-grass (*Schismus arabicus*). In combination with other annual grasses (e.g. red brome [*Bromus madritensis rubens*]) and forbs (filaree [*Erodium cicutarium*]) exotics are observed to comprise a high percentage of most tortoise diets; they were preferred forage items in several studies (Esque 1992 and 1993; Avery 1993; TRW 1995). This foraging pattern strongly correlates with seasonal and annual drought, when exotics may be the only species available. For instance, in below-average rainfall years, few species may germinate except for exotics, which have high germination potential and low water requirements (Beatley 1966). Similarly, during spring, plants begin to dry out as temperatures increase in mid-season, but non-native biomass remains relatively high. Oftedal et al. (2002) observed that in a year of high rainfall when native annuals were readily available, juvenile tortoises preferentially chose several native annuals over split-grass, despite extreme dominance of the latter. One study found no significant difference in the nutritional quality between groups (e.g., forbs, grasses) of native and non-native annual species (Shemanski et al. 2002). Again, such a study may not account for diet preference in years of high forage availability. Oftedal et al. (2002) showed that in a year of high annuals' production, wild juvenile tortoises selected a diet that was an order of magnitude more nutritious than the cumulative available forage base. So, while non-native species are consumed, and some are relatively nutritious, the availability of high quality forage items in years of good forage, including native species, may be important for tortoise growth, maintenance, and reproduction.

Reproduction. Mojave Desert tortoises lay eggs from early May through mid-July (Karl 1998a, Wallis et al., 1999). The incubation period is 80–112 days (Mueller et al., 1998), with hatchlings emerging in late summer and early fall. Annual fecundity for Mojave tortoises is correlated with tortoise length (Karl, 1998a, reported this correlation for non-drought years only). As such, reports of average annual fecundity depend on female size in the study cohort. In four studies, average annual fecundity was reported as 6.6 eggs, 7.1 (Karl 1998a) 7.0, 7.3 (Wallis et al., 1999) and 8.2 (Mueller et al., 1998). Karl (1998a) reported an annual fecundity for tortoises over 188.4 mm in length of 5 eggs, plus 1 egg for every 14.4 mm increments in length. The smallest size at first reproduction in wild

tortoises is 180 mm (Karl 1998a), which may be reached when a tortoise is 16–20 years of age (Miller 1955, Nichols 1953, Medica et al., 1975, Turner et al., 1987, Karl 1998b). There is no reproductive senescence – tortoises continue to reproduce until they die, with no decrease in reproductive output with age. In fact, reproductive output increases as tortoises continue to grow with increasing age (i.e., indeterminate growth). Annual clutch frequency ranges from 1.5–1.8 (Karl 1998a, Mueller et al., 1998, Wallis et al., 1999).

4.1.4 Legal Status, Management, and Conservation

The USFWS emergency-listed the desert tortoise as endangered on August 4, 1989 (USFWS 1989). The Mojave population - the species in California, Nevada, Utah, and parts of Arizona north of the Colorado River - was listed in the final rule on April 2, 1990 as threatened (USFWS 1990). The Sonoran population, the species in the remainder of Arizona, is not listed and does not have protected status under the ESA. On June 22, 1989, the California Fish and Game Commission listed the species as threatened under the California Endangered Species Act (CESA) (State of California Fish and Game Commission 1989).

Listing of the desert tortoise was prompted by precipitous declines in several populations throughout the Mojave portion of the species range (USFWS 1990 [55 FR 12178]). The emergency listing package for the desert tortoise identified population declines of at least 10% annually for the previous six years at eight sites in the western Mojave Desert (USFWS 1989 [54 FR 32326]). Concern that an upper respiratory disease, initially labeled as "URDS" (Upper Respiratory Disease Syndrome), was responsible for the declines and could be epidemic further prompted the listing. The final rule, listing the desert tortoise as threatened under the ESA, identified habitat loss and degradation, as well as excessive predation and illegal collections as major threats to the continued existence of the tortoise. Specific activities cited as contributing to these factors included urban expansion, mine development, energy generation facilities and waste facilities, military activities, grazing, off-highway vehicles, and highway construction. The *Desert Tortoise Recovery Plan* (USFWS 1994b) also concluded that desert tortoise populations in the Mojave region were threatened by the cumulative effects of disease-related mortality, habitat destruction and degradation, and population fragmentation. Disease, drought, and anthropogenic impacts have also been reviewed in Luke et al. (1991), USFWS (1994b), Boarman (1999), Lovich and Bainbridge (1999) and Karl (2004a). On February 8, 1994, the USFWS designated critical habitat for the Mojave population of the desert tortoise (USFWS 1994b), encompassing approximately 6,446,200 acres (2,608,741 ha). One critical habitat unit (CHU), the Chuckwalla CHU, intersects the Project (Figure 4-1) The 1994 Recovery Plan (USFWS 1994a) identified six evolutionarily significant units of the desert tortoise in the Mojave region, based on differences in tortoise behavior, morphology and genetics, vegetation and climate. Within those recovery units, suggested DWMAs act as reserves in which recovery

actions are implemented. The NECO Plan (BLM and CDFG 2002) furthers this recovery goal by prescribing conservation and management measures for DWMAs. The Chuckwalla DWMA intersects the Project (Figure 4-1).

4.2 Survey Methods

During March and early April of 2008, 2009, and 2010 surveys were conducted for special-status species along the Project linear elements, including alternative transmission line routes and substation locations, and at potential well sites.

In 2008, the Project routes were preliminary, so surveys were conducted both on areas where the Project would ultimately occur and areas that were eliminated in 2009. Because of the uncertain nature of the routes in 2008, the extensive survey protocol required by USFWS for desert tortoises was not used. Rather, evidence of desert tortoises and other special-status species, including habitat mapping, was gathered via the following procedures:

- Transmission Line ROW: Inside Wildlife Habitat Management Areas (WHMAs), four, 50-foot-wide, adjacent transects were walked in the 200-foot transmission line ROW; outside WHMAs, two, 100-foot-wide, adjacent, meandering transects were walked in the ROW. (The NECO plan places special emphasis on WHMAs; hence the more intensive surveys inside WHMAs; Figure 4-2)

- Water Pipeline ROW: Where the ROW was precise, a 30-foot-wide transect was walked; where the ROW was imprecise, two, 100-foot-wide, adjacent, meandering transects were walked.

- For ROWs through jojoba fields that had access roads, only the roadsides were surveyed.

- Potential Well Sites: All known commercial wells in the Project area that had the potential to supply water to the Project were examined, photographed and analyzed for biological issues (especially ephemeral impoundments that could host Couch's spadefoot).

In 2009 and 2010, pedestrian transects were completed consistent with the U.S. Fish and Wildlife Service (USFWS) "protocol" desert tortoise transects (USFWS 1992). Per those protocols, 100% of the ROWs and all substation alternatives were surveyed using parallel, 30-foot-wide, pedestrian belt transects. The transmission ROW widths were 200 feet wide, except along Kaiser Rd. There, the width was 600 feet, to accommodate uncertainty associated with the location of the First Solar transmission line route along Kaiser Rd. The surveyed water pipeline ROW was 60 feet wide to account for minor route shifts in the final 30-foot-wide ROW. In addition, 30-foot-wide "Zone-of-influence" (ZOI) transects were walked on both sides of the ROWs at 100, 300, 500,

1,200, and 2,400 feet from the outer edges of the ROWs. (The 500-foot ZOI coincided with the 500-foot buffer transect for surveying burrowing owls) The exception to this occurred where the ROWs went through jojoba farms. These are not tortoise habitat, although it is recognized that a tortoise could move in from adjacent native habitat, even if unlikely. Burrowing owls and other special-status vertebrates were, however, possible. So, in addition to full ROW transects, ZOIs/buffer transects were walked at 100-foot intervals out to 500 feet. ZOIs through fenced or residential properties also were not walked, but were visually inspected from the edges of the property.

In all years, all tortoise sign (e.g., individuals, dens, burrows, scat, tracks, pellets, skeletal remains) that was observed were measured, mapped and described relative to condition, size, and (where applicable) gender. Current and recent weather conditions were recorded to identify the potential for tortoise activity. The topography, drainage patterns, soils, substrates, plant cover, anthropogenic disturbances, aspect-dominant, common and occasional plant species, concentrations of invasive exotics, and tortoise predators were described and mapped. Surrounding anthropogenic and natural features that could provide insight into tortoise population functioning (e.g., corridors) were also identified and mapped. All mapping was achieved using Global Positioning System (GPS) units. Every mile of ROW and ZOI transects were photographed.

The timing requirement for USFWS desert tortoise protocol surveys is March 25 to May 31. However, because tortoises are known to be active in the Project area much earlier, the USFWS permitted us to begin tortoise surveys on March 18 in 2009 (Engelhardt 2009b).

For all years, Kaiser Ventures, Inc., denied access to their properties for surveying. This exclusion included the Project water pipeline ROW north of the MWD aqueduct and the transmission line ROW north of UTM 3745200N (North American Datum [NAD] 83). As a result, onsite surveys of the mine pits that will form the reservoirs and other Central Project Area features could not conducted. However, these lands were extensively surveyed during the Section 7 Endangered Species Act consultation for the proposed Eagle Mountain Landfill and Recycling Project. The prior consultation concluded that the Central Project Site is not desert tortoise habitat. In addition, the extreme level of habitat disturbance in the pits and surrounding mine tailings piles was readily observable from the edge of the property and on recent aerial photos, permitting an assessment of these lands. This assessment concluded that the habitat is unchanged since the time of the surveys for the Eagle Mountain landfill.

4.3 Survey Results

The results of surveys for all years, as they pertain to desert tortoises only, are exhibited in Table 4-1 and Figure 4-3 and Figure 4-5.

Habitat for desert tortoise exists on all native habitats on the Project, including on every alternative transmission line route (Tables 4-2 and 4-3). The greatest amount of tortoise sign observed was along Alternative Route #3 and the Western Alternative Substation. A substantial amount of tortoise sign was also found along the Proposed Transmission Route. . There was substantially less sign on Transmission Alternative Routes #1A, #1B, and #2. Transmission Route Alternatives #1A and #1B and also the eastern extension of Alternative #2 are characterized by broad desert pavement patches, with numerous to occasional incised arboreal washes. While this is tortoise habitat, it typically hosts lower tortoise densities than the habitats found further west.

Both the Proposed Substation and the Western Substation Alternative are also high quality habitats; the latter is also adjacent to large, continuous tracts of high quality desert tortoise habitat and is host to several other special-status plant species (Karl 2010). By contrast, the Eastern Substation Alternative has more limited habitat, mostly restricted to the incised arboreal washes that intersect broad stretches of desert pavement; surrounding lands are similar to increasingly gravelly with sparse shrub vegetation.

The Proposed Project transmission line route and all alternatives overlap the Chuckwalla DWMA and/or the Chuckwalla Critical Habitat Unit (CHU) (Tables 4-2 and 4-3; Figure 4-1). The alternatives with the least overlap are Alternatives #1A and #1B. Alternative #1A overlaps 0.3 acres of the CHU and 0.1 acres in the DWMA. While there are 3.8 acres of Category 3 desert tortoise habitat, the quality of that habitat is compromised by fragmentation due to abandoned agriculture.

The proposed Project Substation is not in a DWMA or a CHU. The Western Red Bluff substation is in the CHU, the Eastern Red Bluff substation is in both the DWMA and the CHU.

Table 4-1. Eagle Mountain Pumped Storage Project results of Spring 2008, 2009 and 2010 surveys for desert tortoise. (Note: Only those 2008 observations that were in the area of the current Project configuration are presented here due to relevance.)

Sign Type[1]	Location[2]				Class or Age[3]	Size (mm)[4]	Comments
	Zone		Easting	Northing			
2008 Data							
Burrow	11	S	656191	3733160	3	240	
Burrow	11	S	648196	3741316			
Carcass/Carcass Parts	11	S	643262	3743984	>4 yrs		Bone fragments, more than 4 years old
Burrow	11	S	656191	3733160	5	230	
2009 Data							
Burrow	11	S	646365	3732299	1	240	
Burrow	11	S	643856	3733544	3	280	
Burrow	11	S	643179	3731957	4	280	
Burrow	11	S	645796	3732416	1	340	Part of a kit fox den complex; tracks
Burrow	11	S	643435	3734695	1	270	
Burrow	11	S	643526	3740268	2	340	Wash bank
Burrow	11	S	643868	3733423	1	150	Tracks; in a kit fox den complex
Burrow	11	S	643307	3739696	2	350	Caliche cave; scat
Burrow	11	S	644069	3733378	5	220	
Burrow	11	S	646372	3732240	4	260	
Burrow	11	S	642842	3731144	3	340	2 burrows
Burrow	11	S	646718	3732096	5	270	
Burrow	11	S	643326	3740341	1	265	Tortoise inside
Burrow	11	S	642777	3731436	5	250	
Burrow	11	S	646517	3732188	1	270	Pallet
Burrow	11	S	643331	3740258	1	330	Tortoise and scat inside
Burrow	11	S	643374	3734752	1	270	Tracks inside
Burrow	11	S	643435	3738580	4	600	Under boulder on mountainside
Burrow	11	S	643496	3734096	2	280	Adjacent to road
Burrow	11	S	644380	3742725	3	240	
Burrow	11	S	647403	3731608	3	250	
Burrow	11	S	643817	3739125	3	460	Caliche cave
Burrow	11	S	643824	3739096	2	320	
Burrow	11	S	643842	3738407	2	300	3 caliche caves, with scat, within 2 m
Burrow	11	S	644220	3738117	1	340	Scat and tracks; rock/soil burrow
Burrow	11	S	643284	3739693	2	380	
Burrow	11	S	643067	3741096	3/4	350	Caliche cave
Burrow	11	S	643309	3739697	1	450	Tracks and scat
Burrow	11	S	644109	3742316	3/4	530	Caliche cave; no other sign
Burrow	11	S	642573	3741027	1	410	Caliche cave; tracks and TY-2 scat (21 mm)
Burrow	11	S	642743	3740840	3	360	Caliche cave; large scat inside
Burrow	11	S	647989	3741323	5	195	
Burrow	11	S	645265	3731885	1	300	With tracks
Burrow	11	S	643470	3739656	2	~800	Cave; old scat (11 mm) plus TY-2/3

Sign Type[1]	Location[2]				Class or Age[3]	Size (mm)[4]	Comments
	Zone		Easting	Northing			
							scat (2)
Carcass/Carcass Parts	11	S	641758	3731149	2-3 yrs	265	Male
Carcass/Carcass Parts	11	S	642595	3732874	4 yrs	~230	
Carcass/Carcass Parts	11	S	642998	3732353	>4 yrs	Adult	Single plastron bone
Carcass/Carcass Parts	11	S	643262	3743981	>4 yrs	Adult	Probably road kill - next to road and very fractured
Carcass/Carcass Parts	11	S	644946	3744904	>4 yrs	Adult	
Carcass/Carcass Parts	11	S	643369	3731924	>4 yrs	Adult	1 plastron fragment
Carcass/Carcass Parts	11	S	643252	3731668	>4 yrs	Unknown	1 bone fragment
Carcass/Carcass Parts	11	S	643128	3731406	>4 yrs	Adult	1 carapace fragment
Scat	11	S	642875	3731512	NTY-4	17	
Scat	11	S	646075	3732278	TY-2	18	
Scat	11	S	645619	3732548	TY-1	18	
Scat (3)	11	S	643000	3731571	TY-2	16	
Scat	11	S	643403	3734751	TY-2	14	
Scat	11	S	642615	3733739	NTY-3	12	
Scat	11	S	645639	3732602	NTY-4	18	
Scat	11	S	643251	3734554	2	Not recorded	
Scat (4)	11	S	646442	3732006	TY-2	12	
Scat	11	S	646343	3732082	TY-2	13	
Scat	11	S	642567	3741037	TY-2	17	
Scat	11	S	645071	3745270	TY-1	20	
Scat (3)	11	S	643062	3731886	TY-2	17	
Scat (3)	11	S	645251	3731877	TY-2	15	
Scat	11	S	646858	3742316	TY-2	18	
Scat	11	S	643496	3738860	NTY-3	15	
Tortoise	11	S	643420	3738853		260	Female
Tortoise	11	S	643482	3731568		235	Female
2010 Data							
Burrow	11	S	651132	3731578	2 or 3	280	Broken scat on mound. Under *Larrea tridentata* in runnel
Burrow	11	S	644642	3743848	3 or 6	230	Old canid complex with one hole modified by tortoise at one time. ~1 m deep, definitely not yet used this season. Ready to use with a little cleaning
Burrow	11	S	643147	3729668			Pallet under *Bebbia juncea* in washlet
Burrow	11	S	643096	3729325		250	Front caved in recently
Burrow	11	S	643248	3731602	1	285	With tracks (176 wide) and TY-2 scat

Sign Type[1]	Location[2]				Class or Age[3]	Size (mm)[4]	Comments
	Zone		Easting	Northing			
							(22 mm wide).
Burrow	11	S	643265	3730848	2	280	
Burrow	11	S	654484	3731656	3	310	
Burrow	11	S	643535	3729663	2	410	In caliche washlets, NTY-3 scat inside
Burrow	11	S	643246	3729300	1	315	TY-2 scat around it, tracks
Burrow	11	S	651124	3731579	2	300	Scat inside, egg shell pieces present
Burrow	11	S	643194	3728905	1	300	
Burrow	11	S	646927	3741653	3	300	
Burrow	11	S	646294	3742388	3	400	In incised drainage bank
Burrow	11	S	643371	3733311	4	220	In freshly used entrance of kit fox den
Burrow	11	S	656376	3731365	1	300	With tracks (180 mm); in wash bank of small wash; 0.6 m deep
Burrow	11	S	656584	3731041	3	290	Wash bank, now in use by *Neotoma*
Burrow	11	S	656738	3732193	3	299	Under *Olneya tesota*
Carcass/Carcass Parts	11	S	656614	3731184	2-4 years	~250	Male, nearly complete
Carcass/Carcass Parts	11	S	656375	3730186	> 4 years		Disarticulated
Carcass/Carcass Parts	11	S	651945	3731402	> 4 years		Bone piece, pectoral
Carcass/Carcass Parts	11	S	654435	3731478	2-4 years	Immature	Disarticulated shell
Carcass/Carcass Parts	11	S	652820	3731458	> 4 years	Adult	
Carcass/Carcass Parts	11	S	642607	3732869	> 4 years	> 250	Size estimated
Carcass/Carcass Parts	11	S	651930	3731624	> 4 years		Disarticulated adult
Carcass/Carcass Parts	11	S	643534	3729386	> 4 years		1 piece
Carcass/Carcass Parts	11	S	643543	3729277	2-3 years	275	Scutes remain on marginals; found upright intact
Carcass/Carcass Parts	11	S	643312	3729608	2-3 years	200	Upright with some remaining scutes
Carcass/Carcass Parts	11	S	654124	3731639	> 4 years		Disarticulated adult
Carcass/Carcass Parts	11	S	654449	3731512	> 4 years	210	Male, carapace 2/3 gone, plastron fissured. Scutes mostly gone, bones disarticulating
Carcass/Carcass Parts	11	S	651300	3731456	> 4 years	~170	Totally disarticulated carapace and 1/2 plastron
Carcass/Carcass Parts	11	S	654509	3733126	> 4 years		1 mm size carapace bone fragment
Carcass/Carcass Parts	11	S	655284	3729949	> 4 years		Disarticulated adult

Sign Type[1]	Location[2]				Class or Age[3]	Size (mm)[4]	Comments
	Zone		Easting	Northing			
Carcass/Carcass Parts	11	S	651932	3731348	> 4 years	> 200	Disarticulated adult
Carcass/Carcass Parts	11	S	651006	3731492	2-4 years	260	Male, possibly hit on highway and crawled or washed down
Scat	11	S	643228	3729456	TY-2		
Scat	11	S	643226	3729373	NTY-4		
Scat	11	S	643425	3729313	TY-2		
Scat	11	S	643528	3729376	TY-2		3 pieces, one NTY-4, 3 more scats within 50 ft, this year
Scat	11	S	643385	3729430	TY-3		
Scat	11	S	643329	3729351	TY-2		
Scat	11	S	646589	3742031	NTY-3	18	
Scat	11	S	647186	3741538	NTY-4	21	
Scat	11	S	647111	3741591	NTY-4	23	
Scat	11	S	643337	3729238	NTY-3	17	2 pieces
Scat	11	S	643275	3729242	TY-2	15	2 pieces
Scat	11	S	643096	3729335	TY-2	10	Immature scat
Scat	11	S	643097	3729353	TY-2	10	
Scat	11	S	643099	3729405	TY-2	10	
Scat	11	S	643671	3729642	TY-2	12	
Scat	11	S	643674	3729354	NTY-3	17	
Scat	11	S	643764	3729658	TY-3	16	
Scat	11	S	642974	3729255	TY-2	15	
Scat	11	S	643197	3729149	NTY-3	16	
Scat	11	S	642611	3730459	NTY-3	20	
Scat	11	S	642972	3730695	NTY-3	22	2 pieces
Scat	11	S	642971	3730771	TY-2	20	2 pieces
Scat	11	S	642967	3730874	TY-2	18	3 pieces
Scat	11	S	642978	3731060	TY-2	24	
Scat	11	S	642970	3732054	TY-2	20	
Scat	11	S	642967	3733064	NTY-3	19	
Scat	11	S	643180	3731004	NTY-3	20	2 pieces
Scat	11	S	643268	3731451	NTY-3	18	
Scat	11	S	643569	3729625	TY-2		
Scat	11	S	643504	3729325	NTY-4		
Scat	11	S	643294	3729272	NTY-3		
Scat	11	S	643272	3729790	TY-2		
Scat	11	S	643238	3729695	TY-2		3 pieces
Scat	11	S	643238	3729426	NTY-3		
Scat	11	S	643247	3729322	NTY-3		3 pieces
Scat	11	S	643219	3729261	TY-2		
Scat	11	S	643205	3729346	TY-2		
Scat	11	S	643447	3729268	TY-2		
Scat	11	S	643429	3730898	TY-1	20	
Scat	11	S	645377	3742978	NTY-3	19	

Sign Type[1]	Location[2]				Class or Age[3]	Size (mm)[4]	Comments
	Zone		Easting	Northing			
Tortoise	11	S	647456	3735207		~250	Female, tracks led to tortoise 2 m away; wash edge
Tortoise	11	S	643508	3729641		250	Male, adult, walking in wash, foraging stains on face
Tortoise	11	S	643259	3729214		220	Mouth of burrow, 230 m m wide, face out, female
Tortoise	11	S	643137	3729207		275	Male out walking
Tortoise	11	S	642606	3733728		220	Female in burrow, 240 mm wide
Tortoise	11	S	643378	3729657		190	In washlet, active
Tortoise	11	S	643299	3729685			In pallet, in caliche wash, facing in, pallet width = 190 mm
Tortoise	11	S	656170	3731725		247	Female under *A. dumosa* with tracks down
Tortoise	11	S	643127	3728910		230	Tortoise in burrow
Tortoise	11	S	643340	3730886		278	Male, out in open, foraging, shell wear class early 6
Tracks	11	S	655782	3729926		165	
Tracks	11	S	643832	3743691		215	
Tracks	11	S	646698	3742024		200	
Tracks	11	S	655972	3731672		248	Tracks in wash

1. Number in parentheses is number of sign.
2. All coordinates are Universal Transverse Mercator North American Datum 83,.
3. Class of burrow describes its condition and age of use:
    - 1 Definitely tortoise, fresh (tracks, tortoise inside, freshly disturbed soil on mound/runway, indicating tortoise use within last few days)
    - 2 Definitely tortoise – Used this season
    - 3 Definitely tortoise – Not used this season
    - 4 Possibly tortoise – In good condition but unsure of species using burrow
    - 5 Definitely tortoise – Deteriorated
    - 6 Possibly tortoise – Deteriorated

Class of scat describes age of use:

- TY-1 This year, fresh
- TY-2 This year, dried, possible glaze, unexposed surfaces dark brown, slight odor
- TY-3 This year, dried, no glaze, at least partially faded on exterior, very slight odor
- NTY-3 Not this year, dried, no glaze, at least partially faded on exterior, no or very slight odor
- NTY-4 Not this year, dried, loosening, pale or bleached

4. Although U.S. Equivalent measurements are presented throughout this document, it is standard procedure to collect data on desert tortoises using the metric system.

Table 4-2. Acreage of desert tortoise habitat on the Eagle Mountain Pumped Storage Project[1,2]

Project Element	In DWMA	In Critical Habitat	In Category 3 Habitat	Total in Desert Tortoise Habitat[7]
Central Project Area (acreage of reservoirs and constructed project features)	0	0	0	0
Transmission Line ROW				
Tower Footprint plus Construction Area	1.9 (23 towers)	2.0 (24 towers)	2.1 (25 towers)	4.1 (59 towers)
Access Road	14.1	14.7	15.4	30.1
Pulling/Tensioning Sites	Currently Unknown (intended to fall within the T-Line ROW and substation site)	Currently Unknown (intended to fall within the T-Line ROW and substation site)	Currently Unknown (intended to fall within the T-Line ROW and substation site)	Currently Unknown (intended to fall within the T-Line ROW and substation site)
Equipment Laydown Sites	0	0	0	0
Proposed Interconnection Collector Substation	0	0	25	25
Water Pipeline	0	0	22.9[3]	22.9[3]
TOTAL PROJECT ACREAGE	16	16.7	65.4	82.1

1. Acreage is calculated based on the following assumptions:
    - Transmission Line
        - 13.5 mi long, 200-foot ROW

[7] Total is Critical Habitat plus Category 3 and Category 1 (DWMA) Habitats outside Critical Habitat. In many areas, Critical Habitat and Category 1 and Category 3 Habitat overlap (see Figures 4-1 and 4-4).

- ° Approximately four towers per linear mile, with more in mountainous terrain (54 to 68 total)
- ° Estimated access road width is 20 feet; towers will be immediately adjacent to the access road with no stub road. (Note: This assumption may change when specific towers are engineered. In the two, small mountainous areas, stub roads are more likely to be present to accommodate both the access road and the necessary tower location.)
- ° Total tower footprint (40 by 40 feet) plus construction area is 3600 ft^2 (60 by 60 feet)
- ° Tensioning and pulling sites are unknown at this time, but are intended to be located within the transmission line ROW and substation site.
- ° Equipment laydown areas will be on previously disturbed lands and/or overlapping with other project acreage.

- Water Pipeline and Wells
  - ° 15.3 mi long, 30-foot ROW, with access road included in the ROW
  - ° Along Kaiser Road, half of the ROW is in the disturbed (bladed) road shoulder
  - ° Three groundwater wells; total estimated disturbance footprint for each is 2500 ft^2 (50 by 50 feet)

2. All calculations of acreage on the Central Project Area are estimates based upon AutoCAD mapping.
3. Part of the mileage was adjacent to Kaiser Road, where only half the width of the ROW was in native habitat. The other half was in the road shoulder.

Table 4-3. Acreage of desert tortoise habitat on the substation alternatives and interconnection alternative routes

Project Element	In DWMA acres (# towers)	In Critical Habitat (acres)	In Category 3 Habitat (acres)	Total in Desert Tortoise Habitat[8] (acres)
Transmission Alternative 1A	0.1 (1 tower)	0.3 (3 towers)	3.8 (47 towers)	4.2
Transmission Alternative 1B	0.9 (11 towers)	0.3 (4 towers)	3.5 (42 towers)	4.7
Transmission Alternative 2	2.6 (31 towers)	1.5 (18 towers)	2.7 (32 towers)	6.8
Transmission Alternative 3	1.6 (19 towers)	2.0 (24 towers)	1.6 (20 towers)	3.6
Western Red Bluff Substation Alternative	0	73.7	0.0	73.7
Eastern Red Bluff Substation Alternative	73.7	73.7	0.0	73.7

Alternative Transmission Line acreage is calculated based on the following assumptions:

- ° 200-foot ROW
- ° Approximately four towers per linear mile, with more in mountainous terrain (54 to 68 total)
- ° Estimated access road width is 20 feet; towers will be immediately adjacent to the access road with no stub road. (Note: This assumption may change when specific towers are engineered. In the two, small mountainous areas along Alternative #3, stub roads are more likely to be present to accommodate both the access road and the necessary tower location.)
- ° Total tower footprint (40 by 40 feet) plus construction area is 3600 ft^2 (60 by 60 feet)

[8] Total is Critical Habitat plus Category 1 and Category 3 Habitat. In many areas, Critical Habitat and Category 1 and Category 3 Habitat overlap (see Figures 4-1 and 4-4).

- ° Tensioning and pulling sites are unknown at this time, but are intended to be located within the transmission line ROW and substation site.
- ° Equipment laydown areas will be on previously disturbed lands and/or overlapping with other project acreage.

4.4 Environmental Effects

Project issues and impacts to biological resources are analyzed in two phases; the construction phase and the operation and maintenance phase. The potential project impacts discussed below include Project design features but are analyzed prior to the implementation of proposed mitigation.

4.4.1 Construction

Construction activities associated with the Project will include (1) development of the Central Project Area to accommodate the Project, (2) construction of the transmission line, and (3) construction of the water conveyance and supply system. The description of specific Project facilities is discussed in Section 2.

Construction of the Central Project Area facilities will include:

- Building of the dams at the upper reservoir
- Application of a seepage control blanket in the lower reservoir
- Construction of the below-ground tunnels, surge control facilities, and powerhouse using blasting and boring
- Construction of storage and administration buildings
- Excavation of water treatment ponds

Construction of the transmission line will include:

- Preparation of staging/laydown areas
- Access road and spur road construction/improvement
- Clearing and grading of pole sites
- Foundation preparation and installation of poles
- Wire stringing and conductor installation
- Temporary parking of vehicles and equipment in construction zones
- Equipment laydown/storage
- Cleanup and site reclamation

Construction of the water pipeline collection system will include

- Site preparation and trenching

- Installation, covering and testing of the pipeline
- Temporary parking of vehicles and equipment in construction zones
- Equipment laydown/storage
- Cleanup and site reclamation

Equipment required for construction includes bulldozers, backhoes, graders, air compressors, man lifts, generators, drill rigs, truck-mounted augers, flatbed trucks, boom trucks, rigging and mechanic trucks, small wheeled cranes, concrete trucks, water trucks, crew trucks, and other heavy equipment.

For this analysis, the Project was assumed to receive a 50-year FERC license. The Project is scheduled to begin the four-year construction period in June 2012; beginning operations in July 2015, with entire project becoming operational in 2016. While construction spans four years, construction of the linear facilities will be completed in under a year. Tortoise activity levels, which are affected by weather conditions, forage availability, and season unknown at this time, so the full extent of construction effects on desert tortoise (i.e., incidental take) cannot be assessed. However, the effects discussed below conservatively assume that construction will occur during high activity of desert tortoises.

4.4.1.1 Construction Effects on Desert Tortoise and Desert Tortoise Critical Habitat

Construction on the Central Project Area will take place entirely on highly disturbed, heavily mined areas (but see discussion of the transmission line, below). The water conveyance tunnels connecting the two reservoirs and the power generating equipment will be located in an underground powerhouse. Although future surveys on the Central Project Area will confirm this, it appears that there is no desert tortoise habitat in the Central Project Area. This conclusion concurs with the conclusion of the Biological Assessment prepared for the Eagle Mountain Landfill Project (RECON 1992), which stated that the proposed landfill did not extend to desert tortoise habitat. Tortoises are known to dig burrows into road berms, however, and may enter roadways or work areas from unfenced adjacent native habitat and thereby be subject to injury or death. So, it is possible that a few tortoises might be directly affected by construction on the Central Project Area. Based on monitors' observations for numerous construction projects and oft-observed tortoises adjacent to heavily travelled roads, there is no reason to believe that there would be any indirect construction effects (e.g., due to noise and activity levels) to tortoises living in native habitat adjacent to the Central Project Area.

On the linear facilities, direct impacts from construction will include habitat loss and may include loss of individuals. The greatest amount of tortoise sign found on the Project in 2008 and 2009 is along the transmission line ROW (Figure 4-4). There is tortoise habitat along 11.8 miles of the 15.3 mile water pipeline ROW; 9.8 miles of this is degraded

because half of the ROW is in Kaiser Road or the ROW is either dissected by agriculture, is adjacent to State Road 177 or is in the Eagle Mountain Mine site. Translating sign into a reliable tortoise density from the methods mandated for data collection at the Project is not possible. (The USFWS [1992] protocols identify tortoise presence, relative abundance [i.e., an apparent dearth of wealth of sign], and areas that will require more intensive monitoring during construction. Tortoise density is not a possible result from these surveys.) However, a very rough estimate of relative tortoise abundance can be made for the transmission line ROW from the number of burrows and assuming an average of 10 burrows used per year per tortoise (Bulova et al. 1994, Duda et al. 1999). Counting all burrows, even those that were not recent because of the early spring timing of the surveys (i.e., tortoises had only been active for a few weeks), a total of 11 burrows was found in 10.7 miles of the 200-foot ROW. (This does not include the 2.8 miles of ROW on Kaiser property that were not surveyed.) This translates into 27 burrows per square mile. Dividing by 10 burrows per tortoise yields an estimate of 3 tortoises per square mile on the transmission line ROW, a very low density.

No other surveys in the Project vicinity have provided reliable density estimates. Surveys in the late 1970's using broadly spaced samples estimated tortoise densities in the Project area at 0 to 20 tortoises per square mile (Berry and Nicholson 1984) for all but an approximately 3-mile segment south of the MWD substation; this was estimated (from one sample) at 20 to 50 tortoises per square mile. While these surveys were unable to provide reliable estimates of tortoise density or reliable geographic divisions in tortoise abundance (see Karl, 2001, for review), they were still useful in suggesting extremes of tortoise abundance. In the Project Area, then, the general lack of tortoise sign suggests that in the 1970's tortoise densities were quite low. During tortoise studies for the Eagle Mountain Landfill (RECON 1992, County of Riverside and BLM 1996), tortoise sign and tortoises were observed where the Project transmission line enters the Central Project Area, and along the Project transmission line ROW, from the MWD substation south. No estimates of tortoise density were made.

Due to relatively low densities and intensive, continuous construction monitoring (see section describing Environmental Measures), tortoise losses in the construction zones are expected to be absent to very low. Traffic during project construction will increase on Kaiser Road, Eagle Mountain Road and State Road 177 for four years. This is likely to result in increases in tortoise losses on those roads over current conditions.

Special habitat resources, such as nesting areas or important wintering or summering burrows, may be lost during project construction. Desert tortoises occupy from two to twenty burrows per year (Bulova et al. 1994, Duda et al. 1999), with one estimate of five new burrows in a year. While most desert tortoise biologists would agree that some burrows appear to be important because (a) there is limited burrowing potential in the area due to a near-surface hardpan or other factors, or (b) accumulations of variably aged

scat are present, there are no available studies that specifically identify important burrows. Pre-construction surveys for desert tortoises (see section on Mitigation Measures) will attempt to identify special-resource burrows, which will be avoided if possible.

Habitat loss on the linear facilities, including the substation, is expected to total 82.1 acres (Table 4-2). Functionally, this loss is expected to be a minor impact as the footprint of habitat physically disturbed is discontinuous (i.e., small patches) and is small relative to the surrounding available habitat.

A total of 16.7 acres of designated desert tortoise critical habitat overlaps the Project, along the transmission line (Table 4-2). The Chuckwalla CHU totals 1,020,600 acres (USFWS 1994b), so the Project will affect 0.0019% of the CHU.

The Chuckwalla DWMA intersects 16 acres of the Project. The Chuckwalla DWMA totals 820,077 acres (BLM and CDFG 2002), so the Project will affect 0.0021% of the DWMA. The NECO Plan identifies a maximum of one percent surface disturbance limit in a DWMA.

Loss of native habitat for the sole purpose of construction (as opposed to maintenance) is temporary, but should be considered semi-permanent for the Colorado Desert. Natural regrowth is constrained by limited and unpredictable precipitation and can require several decades to approach pre-disturbance conditions. During this time, the habitat is unavailable for use by native wildlife. As such, all surface disturbances during construction that results in the removal or displacement of vegetation and soil should be considered semi-permanent.

In addition to the semi-permanent loss of habitat, tortoises may experience temporary disruption of normal movements to achieve feeding, breeding, sheltering, and dispersal. Based on anecdotal behavioral observations of hundreds of resident tortoises in many projects, there is no evidence that tortoises are disrupted to the point of potential harm from construction of pipelines and transmission lines. However, if mitigation associated with construction of any Project component includes erecting temporary or permanent exclusion fencing, this could disrupt normal movement patterns. With the exception of the substation (25 acres) tortoises displaced due to construction will be able to return to the area once construction activities have ceased.

Indirect construction impacts also could include dust deposition on neighboring vegetation. This is expected to be both temporary and minimized by maintaining air quality standards (ECE 2009). There will be no permanent impacts on plant growth that could affect desert tortoise forage or shelter.

4.4.2 Operation and Maintenance

Operation and maintenance activities associated with the Project will primarily be restricted to the Central Project Area, but will also include routine, as well as unscheduled, maintenance on the transmission line, pipeline, and wells. The following discussion summarizes the impacts to desert tortoises that may result from the presence and functioning of the Project.

4.4.2.1 Direct, Onsite Effects

In general, the primary onsite impacts to desert tortoises from operation of the Project are limited to loss of individuals that move onto the site, including during transmission line maintenance.

Habitat loss was addressed in the section on construction impacts. Maintenance of tower pads, access and spur roads on the transmission line would perpetuate the vegetation loss of tower pads and roads. The 57.1 acres of disturbed habitat on the transmission line and water pipeline (not including the substation) would be available to use by desert tortoises, but degraded. This is expected to be functionally negligible for desert tortoise because it will exist as small patches of open space, 0.08 acres for each tower pad and an approximately 20-foot road width, interspersed through native habitat.

Based on the lack of desert tortoise habitat on the Central Project Area, the small footprint of the transmission line, low Project area tortoise densities, and infrequent maintenance activities, it is anticipated that losses of desert tortoises and tortoise resources from onsite Project impacts will be minor to negligible. No impacts are anticipated from the water pipeline.

Project wells will be used to fill the reservoirs during construction, and maintain water levels in the reservoirs over time to make up for evaporative losses. Groundwater level reductions will have no impact on plant root zones, and desert tortoise habitat, as the groundwater level is currently far below the root zone of plants.

4.4.2.2 Indirect, Offsite Effects

Offsite, desert tortoises may experience indirect, adverse effects from Project operation. The following effects were considered:

- Loss of dispersal areas and connectivity to other areas
- Altered home ranges and social structure
- Facilitated ingress into the Project area from Project features
- Altered plant species composition due to the introduction of exotic vegetation

- Increased depredation by predators attracted to the site

The water pipeline and transmission line will present neither physical barriers nor deterrents to movement, so they will not affect the normal movements of tortoise to achieve feeding, breeding, sheltering, dispersal or migration. The substation will present a small barrier to movement, but it is adjacent to the town of Desert Center, the frontage road and Interstate 10, so it is unlikely that tortoises would be further affected. The Central Project Area has been developed for decades and does not currently contain habitat that could be considered a corridor, so its development for the Project will not cause an incremental change that would affect tortoise use.

Because of the existence of many roads in the area of the pipeline and transmission line, it is not anticipated that any new recreational access, with concomitant habitat degradation and potential species loss, will be provided by these ROWs. Similarly, paved roads that service the Project are already well-used by Kaiser employees and local residents. Traffic associated with the Project is anticipated to provide a negligible incremental increase over current levels.

Plant community structure and resulting fauna may be altered if non-native invasive species that are currently in the area spread during construction and/or maintenance activities increase both abundance and distribution of those species.

Faunal community structure may be altered if predators are attracted to reservoirs due to available water or night lighting. Common ravens, in particular, are predators as well as scavengers, and may increase as a result of the reservoirs providing a new and secure water supply. Coyotes are another predator species of concern in the project area.

However, the Eagle Mountain townsite and surrounding area currently has open water resources (water treatment plant, open water sections of the Colorado River Aqueduct, ponds at Lake Tamarisk). Because of these existing, continuous subsidies, it is likely that ravens and coyotes already exist at the Central Project Area. A simple increase in the quantity of water when it is already fully available does not change the availability to opportunistic predators. As such, it is not likely that there would be a measurable change in the density of predators, or, as a result, a significant change in impacts to local fauna.

Because of these baseline conditions, it is possible that ravens may increase over baseline levels, but this increase may not be either measurable or have a significant impact on local fauna. A raven monitoring and control plan should be implemented as part of the Project's environmental measures to ensure that raven increases due to the project, if any, will not cause a biologically significant impact to the local fauna.

Indirect impacts to desert tortoises on JTNP from Project operation are unlikely to occur. First, the impacts in the Project area are anticipated to be low and fully mitigated.

Second, there is no reasonable scenario that would suggest that impacts to tortoises would increase farther away from the Project area, in the Park.

If ravens were to increase in response to resources at the Project, these ravens could forage in the Park or disperse into the Park from enhanced reproductive opportunities at the Project. The nearest Park tortoise population is in Pinto Basin, approximately 5 miles away (Karl 1988). Ravens have been known to forage up to 30 miles from their roosts (B. Boarman pers. comm. to A. Karl), although this is unusual. Mean distances from a roost to a point resource have been reported as 3.9 miles (Kristan and Boarman 2003) and 16.8 miles (Mahringer 1970). In two studies observing distances to roosts from landfills, 68 percent of 142 birds remained within 0 miles (Mahringer 1970 [in Boarman and Heinrich 1999], with 94 percent within 4 miles of a landfill. Nesting ravens generally remain within a quarter-mile (Kristan and Boarman 2003) to 0.35 miles of the nest. (B. Boarman, Pers. Comm. to A. Karl). Overall, raven densities tend to decline with increasing distance from point subsidies (Kristan and Boarman 2003).

While the Park tortoise population is well within flight distance for a raven, it is expected that the Project will not provide new or enhanced resources over those already existing on the Kaiser site. A raven monitoring and control plan will be implemented as part of the Project's environmental measures to ensure that raven increases due to the project, if any, will not cause a biologically significant impact to the local fauna.

4.4.3 *Cumulative Effects*

Cumulative effects are defined as those future state, Tribal, local, and private activities that are reasonably certain to occur within the action area of the federal action subject to consultation. Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to Section 7 of the ESA.

There are approximately 15 reasonably foreseeable projects that are being considered for permitting by the CEC and/or BLM within 30 miles of the Project. However, these projects are located on BLM land and are considered federal actions. Therefore, since these projects, if permitted, will require separate ESA Section 7 consultation, they are not considered in this document. There are no state, Tribal, local, or private activities that are reasonably certain to occur within 30 miles of the Project Area.

5 Proposed Mitigation Measures

5.1 Surveys on the Central Project Area

Following licensing and access to the Central Project Area, sensitive species surveys will be conducted on all areas for which access is currently denied. While it is anticipated that the analysis currently in this BA addresses those areas, any necessary modifications in protection measures will be developed in consultation with USFWS and CDFG.

5.2 Mitigation Measures to Protect Desert Tortoise

Mitigation measures proposed in this section are based on the presence of the desert tortoise (the only threatened and endangered species that might be affected by the Project) and the analysis of Project effects on desert tortoises.

These mitigation measures are consistent with the National Environmental Policy Act (NEPA) Handbook (BLM 2007), the NECO Plan (BLM and CDFG 2002), and standard agency recommendations for similar impacts. Avoidance of desert tortoise and biological resources that support this species is the preferred method to minimize Project impacts. If avoidance is not possible, then minimization techniques are identified that will mitigate Project effects. Additionally, site restoration along the transmission line and water pipeline corridors will assist in repairing affected habitats and minimizing long-term Project effects. Off-site compensation is a final category of mitigation that can be used to mitigate impacts to special-status species and habitats when avoidance and disturbance cannot be avoided.

Several monitoring and/or control programs are identified here that will require development through discussion and review with the resource agencies. As described in mitigation measure BIO-1, a comprehensive site-specific mitigation and monitoring program will be finalized by ECE in consultation with the Biological Technical Advisory Team, concurrent with final engineering design. Final engineering design work will commence with the issuance of the FERC license. Design work is anticipated to require two years. Thus, there will be a two-year window for the Technical Advisory Team to reach concurrence on the site specific mitigation and monitoring program.

Consultation with the resource management agencies is currently underway for the other five plans described in BIO-3, BIO-8, BIO-9, DT-4, and DT-5. Consultation will continue during preparation of the Draft Environmental Impact Statement (EIS) and Draft Environmental Impact Report (EIR) and development of the Final EIS and Final EIR.

Mitigation measures developed for special-status wildlife and general biological resource protection will also assist in minimizing impacts to the desert tortoise. They include the following:

BIO–1 **Mitigation and Monitoring Program.** Concurrent with final engineering design a comprehensive site-specific mitigation and monitoring program will be developed in consultation with the Biological Technical Advisory Team. The Technical Advisory Team is composed of the Owner's staff and consultants, including the Project Environmental Coordinator, and staff from the resource managing agencies.

BIO–2 **Designation of an Approved Project Biologist.** A Project Biologist must be designated who will be responsible for implementing and overseeing the biological compliance program. This person must be sufficiently qualified to ensure approval by USFWS and CDFG for all biological protection measures that may be implemented by the Project. USFWS describes a single designation for biologists who can be approved to handle tortoises - "Authorized Biologist." Such biologists have demonstrated to USFWS that they possess sufficient desert tortoise knowledge and experience to handle and move tortoises appropriately. Authorized Biologists are permitted to then approve specific monitors to handle tortoises, at their discretion. The California Department of Fish and Game (CDFG) must also approve such biologists, potentially including individual approvals for monitors approved by the Authorized Biologist.

BIO–3 **Worker Environmental Awareness Program (WEAP).** A WEAP will be developed to ensure that project construction and operation occur within a framework of safeguarding environmentally sensitive resources. Although facility construction has the greatest potential to harm environmental resources, the WEAP will also address those environmental issues that pertain to Project operations, such as general conduct, repairs and maintenance.

The WEAP will include information on biological resources that may occur on the site, with emphasis on listed and special-status species. Education will include, but not be limited to ecology, natural history, endangerment factors, legal protection, site mitigation measures, and hierarchy of command. Site rules of conduct will be identified, including but not limited to: speed limits, work areas that must be accompanied by a biological monitor, parking areas, looking under parked vehicles prior to moving them, trash deposition, off-site conduct in the area of the Project, and other employee response protocols. Teamwork will be emphasized, but it will be clear that willful non-compliance may result in sufficiently severe penalties to the contractor that the contractor may dismiss the offending employee.

The educational format will be a video, shown initially by the Project Biologist and ultimately by a limited staff of trained and approved personnel. The Project Biologist also may be videotaped giving the first program, for assistance to further instructors.

All workers completing the education program will be given a wallet card with site "rules" and contact cell phone numbers, and a sticker to affix to their hard hat. Each will sign a sheet attesting to completing the training program.

BIO-4 **Reporting.** As part of implementing protection measures, regular reports will be submitted to the relevant resource agencies to document the Project activities, mitigation implemented and mitigation effectiveness, and provide recommendations as needed. Reporting will include monthly reports during construction, annual comprehensive reports, and special-incident reports. The Project Biologist will be responsible for reviewing and signing reports prior to submittal to the agencies.

BIO–5 **Minimize Surface Disturbance.** During construction in native habitats, all surface disturbances will be restricted to the smallest area necessary to complete the construction. New spur roads and improvements to existing access roads will be designed to preserve existing desert wash topography and flow patterns.

BIO-8 **Revegetation.** A revegetation plan will be developed for areas that are temporarily disturbed during construction. In order to accommodate the specific features of the desert that make revegetation difficult – namely lack of predictable rainfall, lack of an "A" soil horizon, and the difficulty of re-establishing a soil community of micro-organisms – a detailed and realistic vegetation program will address the following:

- Quantitative identification of the baseline community, both annual, herbaceous perennial and woody perennial species.
- Soil salvage and replacement on areas to be revegetated.
- Final site preparation and grading to include features that will enhance germination and growth of native species. This will include surface pitting for the accumulation of sediments, water and seed and the construction of small swales for such species as California ditaxis and desert unicorn plant, which are commonly found in road swales and shoulders. All disturbed washes should be recontoured to eliminate erosion and encourage the reestablishment of the drainage to its pre-construction condition.
- Vertical mulching and other techniques to promote a hospitable environment for germination and growth.
- Seeding and/or planting of seedlings of colonizing species.

- Development of a soil micro-community by inoculation of mycorrhizal fungi and planting species that develop a mycorrhizal net.
- Weed control.
- Initial irrigation, if necessary.
- A realistic schedule of regrowth of native species, and remedial measures, if needed.
- Monitoring and reporting.

BIO-9 **Invasive Species Monitoring and Control.** To minimize the spread of invasive non-native vegetation a weed control program will be implemented during construction. This program will include:

- Baseline surveys for weed species that are present and/or are most likely to invade the Project site and surrounding area
- Methods to quantify weed invasion
- Methods to minimize weed introduction and/or spread
- Triggers that will prompt weed control
- Methods and a schedule for weed control and eradication
- Success standards

In addition to these critical Project measures to protect biological resources, several desert tortoise-specific measures are proposed. They included the following:

DT – 1 **Pre-construction Surveys and Clearance Surveys.** All tortoises will be removed from harm's way during the construction period. On the linear facilities, this is achieved by first surveying for all desert tortoises that might be within construction zones or are likely to enter construction zones, immediately prior to the start of construction. (These surveys can be simultaneous with those for badger and kit fox.). Active burrows will be identified, measured, and the entrance "gated" (a 3 inch twig inserted into the floor of the runway) for monitoring tortoise use. The locations of all tortoises will be mapped so that those locations can be monitored for tortoise use during construction.

On the Central Project Area, there is little likelihood of desert tortoises except along the southern and eastern edges because of the altered landscape and massive and abundant tailings piles. Surveys first will be conducted in the Central Project Area to determine the presence of desert tortoise. If there is any suggestion of tortoise presence, either due to the presence of tortoise habitat and/or tortoise sign, a clearance survey will be completed in those areas after tortoise-proof fencing is installed (see **DT-3, Exclusion Fencing**). A minimum of two clearance passes will be completed. Surveys will coincide with heightened tortoise activity, from mid-March to mid-April and during October. This will maximize the

probability of finding all tortoises. Any tortoises found will be removed per mitigation **DT-4, Translocation or Removal**.

Surveys and clearance on the substation will proceed identically to that on the Central Project Area, with the exception that a pre-construction survey prior to clearance surveys is not necessary.

DT –2 **Construction Monitoring.** No construction in unfenced areas (see **DT-3, Exclusion Fencing**) on the linear facilities will occur without biological monitors. This includes both construction monitoring and maintenance activities that require surface disturbance. An adequate number of trained and experienced monitors must be present during all construction activities, depending on the various construction tasks, locations, and season. The NECO Plan suggests that construction activities occur when tortoises are inactive – November 1 to March 15 – where possible. However, adequate monitoring will mitigate concerns about take due to heightened activity levels the remainder of the year.

All tortoises will be removed from harm's way by a biologist approved by the Project Biologist (**BIO-2**). The Project Biologist must be sufficiently qualified to ensure approval by USFWS and the California Department of Fish and Game (CDFG) for all tortoise protection measures that may be implemented by the Project. USFWS describes a single designation for biologists who can be approved to handle tortoises - "Authorized Biologist." Such biologists have demonstrated to USFWS that they possess sufficient desert tortoise knowledge and experience to handle and move tortoises appropriately. Authorized Biologists are permitted to then approve specific monitors to handle tortoises, at their discretion. The CDFG must also approve such biologists, potentially including individual approvals for monitors approved by the Authorized Biologist.

Active burrows and special-resource burrows will be avoided, where possible. Where avoidance of any burrow is infeasible, occupancy will first be determined through the use of fiberoptics, probes or mirrors. All burrows that could potentially host a tortoise will be excavated with hand tools in the method prescribed by the Desert Tortoise Council (1994, rev. 1999), *Guidelines for handling desert tortoises during construction projects.* Any tortoises found will be removed from the construction area per **DT-4, Translocation or Removal**.

Pipeline trenches will be closed, temporarily fenced, or covered each day. Each day, any open trenches will be inspected by an approved biological monitor at first light, midday, and at the end of each day to ensure tortoise safety.

If necessary, temporary fencing will be installed in the active work area to separate a tortoise from active construction, in order to maximize protection.

If a tortoise is injured or killed, all activities must cease and the Project Biologist contacted. Injured tortoises will be taken to a qualified veterinarian if their survival is expected. USFWS will determine if the tortoise can be returned to the wild, should it recover.

Following site clearance, a report will be prepared by the Project Biologist to document the clearance surveys, construction monitoring, the capture and release locations of all tortoises found, individual tortoise data, and other relevant data. This report will be submitted to the CDFG and USFWS.

DT –3 **Exclusion Fencing –** The substation will be enclosed with a permanent tortoise exclusion fence to keep adjacent tortoises from entering the site. The fencing type will be one- by two-inch vertical mesh galvanized fence material, extending at least two feet above the ground and buried at least one foot. Where burial is impossible, the mesh will be bent at a right angle toward the outside of the fence and covered with dirt, rocks, or gravel to prevent the tortoise from digging under the fence. Tortoise-proof gates will be established at all site entry points. All fence construction will be monitored by qualified biologists to ensure that no tortoises are harmed. Following installation, the fencing will be inspected monthly and during all major rainfall events. Any damage to the fencing will be repaired immediately. Parking and storage will occur within the substation and disturbed, previously fenced areas.

Any areas on the Central Project Area that are determined through surveys to require fencing will be fenced as outlined above. Where a fence is discontinuous (between tailings piles for example), the fence ends will extend well up the slope of the piles, to ensure that tortoises cannot go around the end. Alternative methods may be explored to ensure that the fences are functional at excluding tortoises.

DT –4 **Tortoise Translocation or Removal Plan.** For both the Central Project Area and the linear facilities, it is anticipated that any tortoises removed would not be "translocated" or "relocated" in the biological sense of putting an animal in a location outside its home range. Instead, any tortoise would simply be removed to another part of its home range. Because construction on the Central Project Area will occur on highly disturbed previously mined areas, any tortoise found there during clearance would likely be a transient or in a peripheral part of its home range, certainly outside its core use areas or parts of its home range that could support its survival. By moving such a tortoise to a location immediately adjacent to its capture site outside the fenced construction

area, the Project would be maintaining the tortoise within its home range, not translocating it. The tortoise merely would be excluded from undesirable areas. For utility corridors and fence construction, tortoises would be removed a short distance from the construction zone. Hence, this plan will describe tortoise removal, not translocation.

Tasks will include the following:

- Tortoise handling and temperature requirements
- Data gathered on removed tortoises
- Translocation site preparation (if any) and choice
- Monitoring – All tortoises removed will be monitored sufficiently to ensure its safety.

DT –5 **Raven Monitoring and Control Program.** Proposed projects on federal lands that may result in increased raven populations must incorporate mitigation to reduce or eliminate the opportunity for raven proliferation. The USFWS has developed a program to monitor and manage raven populations in the California desert in an effort to enhance desert tortoise recovery. In order to integrate monitoring and management, the USFWS has agreed to an "in-lieu" fee to replace quantitative raven monitoring on new projects in the range of the desert tortoise. The Project owner will pay in-lieu fees to USFWS that will be directed toward a future quantitative regional monitoring program aimed at understanding the relationship between ongoing development in the desert region, raven population growth and expansion and raven impacts on DT populations. The vehicle for this program is a Memorandum of Understanding between the Project owner, CDFG and USFWS.

The Project Raven Monitoring and Control Program may include this in-lieu fee if it is determined that ravens may increase over current levels due to the Project. In addition to this in-lieu fee, the program will include, at a minimum:

- A suite of construction and operations measures to reduce food scavenging and drinking by ravens (e.g., trash containment, minization of pooling water
- Roadkill removal
- Qualitative monitoring of raven use of the site during operations, conducted on a pre-determined schedule by the onsite Project environmental compliance officer
- Breeding season nest surveys

DT –6 **Habitat Compensation.** The NECO Plan states that all lands within a DWMA will be designated as Category I Desert Tortoise Habitat, with required compensation of five acres for every acre disturbed. All lands outside a DWMA are considered Category III habitat, with a 1:1 compensation ratio.

The Project overlaps 16.7 acres of Category I Habitat and 65.4 acres of Category III Habitat. A minimum total compensation, then, would be 148.9 acres.

This land would need to be purchased in the same population of desert tortoises as occupy the site. In addition, the following features should apply to compensation lands:

- Be part of a larger block of lands that are currently protected or able to be protected
- Are not subject to intensive habitat degradation (e.g., recreational use, grazing use, agriculture)
- Have inherently moderate to good habitat that will naturally and ultimately regenerate when current disturbances are removed
- Preferably are bordered by native habitat suitable for tortoises
- In part, may represent a buffer for a block of good habitat

DT –7 **Operations and Maintenance.** Tortoises observed during routine maintenance activities will be allowed to voluntarily move out of harm's way. Transmission line repair activities that will result in surface disturbance will require biological monitoring, per mitigation **DT-2**.

6 Determination of Effect

6.1 Desert Tortoise

Desert tortoise may be affected by project construction, particularly along the proposed transmission corridor. The Project may adversely affect desert tortoise, but will not jeopardize its continued existence.

The Project will not result in the destruction or adverse modification of critical habitat.

7 Literature Cited

Allen, E.B. 2002. Invasive weeds in the Northern and Eastern Colorado Desert Planning Area. White paper to Richard Crowe, Bureau of Land Management. 3 pp.

Avery, H.W. 1992. Summer food habits of desert tortoises in Ivanpah Valley, California. Paper presented at the 1992 Desert Tortoise Council Symposium, Las Vegas, NV.

Avery, H.W. 1993. Nutritional ecology of the desert tortoise consuming native versus exotic desert plants. Paper presented at the 1993 Desert Tortoise Council Symposium, Palm Springs, CA.

Barrett, S.L. 1990. Home range and habitat of the desert tortoise (*Xerobates agassizii*) in the Picacho Mountains of Arizona. Herpetologica 46:202-206.

Beatley, J. 1966. Ecological status of introduced brome grasses (*Bromus* spp.) in native vegetation of southern Nevada. Ecology 47(4):548-554.

Belnap, J., K.T. Harper, and S.D. Warren. 1998. Surface disturbance of cryptobiotic soil crusts: nitrogenase activity, chlorophyll content, and chlorophyll degradation. Arid Soil and Rehabilitation 8:1-8.

Belnap, J., J.H. Kaltenecker, R. Rosentreter, J. Williams, S. Leonard, and D. Eldridge. 2001. Biological soil crusts: ecology and management. BLM/ID/ST-01/001+1730. Technical Ref. 1730-2. Denver, Colorado. National Science and Technology Center, Bureau of Land Management. 110 pp.

Berry, K.H. and L.L. Nicholson. 1984. The distribution and density of desert tortoise populations in California in the 1970's. Chapter 2 *in* K.H. Berry (ed.) Status of the Desert Tortoise (*Gopherus agassizii*) in the United States. Unpubl. rept. from Desert Tortoise Council to U.S. Fish and Wildlife Service, Sacramento, California. Order No. 11310-0083-81.

Blythe Energy, LLC. 2004. Blythe Energy Project Transmission Lines Biological Evaluation. Submitted to California Department of Fish and Game, Bermuda Dunes, California, and U.S. Bureau of Land Management South Coast Field Office, North Palm Springs, California. 34 pp.

Boarman, W.I. 1999. Threats to the desert tortoise: a critical review of the "scientific" literature. Draft. Unpubl. doc. U.S. Geological Survey, Western Ecological Research Center, Department of Biology, University of California, Riverside. 88 pp.

Boarman, W.I. and B. Heinrich. 1999. Common Raven (*Corvus corax*). In The Birds of North America, No. 476 (A. Poole and F. Gill, eds.). The Birds of North America, Inc., Philadelphia, PA.

Bostick, V. 1990. The desert tortoise in relation to cattle grazing. Rangelands 12:149-151.

Brooks, M.L. 1998. Ecology of a biological invasion: alien annual plants in the Mojave Desert. Ph.D. Diss., University of California, Riverside. 186 pp.

Brooks, M.L. 2007. Effects of land management practices on plant invasions in wildland areas. Chapter 9 *in* W. Nentwig (ed.) Biological Invasions. Ecological Studies Vol. 93. Springer Verlag Berlin Heidelberg.

Brown, D.E. and R.A. Minnich. 1986. Fire and creosote bush scrub of the western Sonoran Desert, California. Am. Midl. Nat. 116(2):411-422.

Bulova, S.J. 1994. Patterns of burrow use by desert tortoises: gender differences and seasonal trends. Herpetology. Monograph. 8:133-143.

Burge, B.L. 1977. Movements and behavior of the desert tortoise, *Gopherus agassizi*. M.S. Thesis, Univ. of Nevada, Las Vegas. 225 pp.

California Energy Commission (CEC). 2007. Integrated Energy Policy Report. http://www.energy.ca.gov/2007_energypolicy/index.html

California Native Plant Society. 2009. Inventory of rare and endangered plants (online edition, http://cnps.web.aplus.net/cgi-bin/inv/inventory.cgi). Sacramento, California.

CH2MHill. 1996. Draft Environmental Impact Statement/ Environmental Impact Report Eagle Mountain Landfill and Recycling Center Project. State Clearinghouse No. 95052023. 3574p.

County of Riverside Planning Department and U.S. Bureau of Land Management. 1996. Draft Environmental Impact Statement/ Environmental Impact Report for the Eagle Mountain Landfill and Recycling Center Project. Prepared by CH2MHill. State Clearinghouse No. 95052023.

Devine, D. and C. Douglas. 1996. Bighorn sheep monitoring program for the Eagle Mountain Landfill Project. Phase I report. Submitted to Mine Reclamation Corporation. 54 pp.

Duda, J.J., A.J. Krzysik, and J.E. Freilich. 1999. Effects of drought on desert tortoise movement and activity. Jour. Wildlife Mgmt. 63(4):1181-1192.

Eagle Crest Energy Company. 2008. Eagle Mountain Pumped Storage Project Pre-Application Document. Submitted to the Federal Energy Regulatory Commission, January 2008.

Eagle Crest Energy Company. 2009. Eagle Mountain Pumped Storage Project, Final License Application. Submitted to the Federal Energy Regulatory Commission, June 22, 2009.

Engelhard, Tannika. 2009a. U.S. Fish and Wildlife Service, Carlsbad, California. December 3, 2009 e-mail to Carolyn Chainey-Davis, California Energy Commission.

---. 2009b. March 18, 2009 e-mail to Alice Karl.

Environmental Planning Group. 2004. Comparative Analysis of Sensitive Biological Resources for the Proposed 230kV Transmission Line from the Buck Blvd. Substation to the Julian Hinds Substation. Prepared for Southern California Edison, September 2004.

Ernst, C.H., J.E. Lovich, and R.W. Barbour. 1994. Turtles of the United States and Canada. Smithsonian Institution Press, Washington, D.C.

Esque, T.C. 1991. Diet and foraging behavior of *Gopherus agassizii* in the northeast Mojave Desert. Paper presented at the 1991 Desert Tortoise Council Symposium, Las Vegas, NV.

Esque, T.C. 1993. Diet selection and habitat use by the desert tortoise in the northeast Mojave Desert. Pp. 64-68 *in* K. Beaman (ed.) Proceedings of the 1992 Desert Tortoise Council Symposium.

Evans, R.D. and J. Belnap. 1999. Long-term consequences of disturbance on nitrogen dynamics in an arid ecosystem. Ecology. 80:150-160.

Germano, D.J., R.B. Bury, T.C. Esque, T.H. Fritts, and P.A. Medica. 1994. Range and habitats of the desert tortoise (*Gopherus agassizii*). Pp. 73-84 *in* R.B. Bury and D.J. Germano (eds.) Biology of North American tortoises. National Biological Survey, Fish and Wildlife Research 13.

Henen, B. T. 1993. Desert tortoise diet and dietary deficiencies limiting tortoise egg productioj at Goffs, California. Abstract. P. 97 *in* K. Beaman (ed.) Proceedings of the 1992 Desert Tortoise Council Symposium.

Holland, R.F. 1986. Preliminary descriptions of the terrestrial natural communities of California. California Department of Fish and Game, Nongame-Heritage Program. 155 pp.

Lovich, J, H. and D. Bainbridge. 1999. Anthropogenic degradation of the southern California desert ecosystem and prospects for natural recovery and restoration. Env. Mgmt. 24(3):309-326.

Karl, A.E. 1988. Investigations of the status of the desert tortoise, *Gopherus agassizii*, in Joshua Tree National Monument. Rept. to. National Park Cooperative Studies Unit, Univ. of Nevada, Las Vegas, NV, No. 040/02.

Karl, A.E. 1992. Annual report for Federal Permit No. PRT-746058. 11 pp.

---. 1998a. Reproductive strategies of a long-lived herbivore inhabiting a temporally variable environment. Ph.D. Dissertation, Chapter 1. Univ. of California, Davis. 178 pp.

---. 1998b. Growth patterns of the desert tortoise, *Gopherus agassizii*, in an East Mojave population. Ph.D. Dissertation, Chapter 2. University of California, Davis. 178 pp.

--- 2001. Desert tortoise abundance in the Fort Irwin National Training Center expansion area: a review. Unpub. rept. to Chambers Group, Inc., Irvine, CA. 44 pp plus appendices.

--- 2002. Southern California Edison Palo Verde-Devers II 500kV Transmission Line. Survey of biological resources: California. Unpub. rept. submitted to EPG, Tucson, Arizona. 85 pp.

--- 2004a. FPL Energy: Proposed Buck Substation to Julian Hinds Substation 230 kV Transmission Line. Desert tortoise impacts analysis. Unpub. rept. submitted to EPG, Tucson, Arizona. 39 pp.

--- 2004b. Drought: Acute effects and impacts to recovery of the desert tortoise. Paper presented at the 2004 Desert Tortoise Council Symposium, Las Vegas, Nevada.

--- 2005. Blythe Energy Transmission Project. Supplementary survey of special-status species. Draft. Submitted to TetraTech EC, Inc., Santa Ana, California. 52 pp.

---. 2010. Eagle Mountain Pumped Storage Project: 2010 survey results. In prep.

--- and C. Uptain. 1985. Southern California Edison Palo Verde-Devers II Transmission Line: survey of special-status species. Unpub. rept. submitted to E. Linwood Smith and Associates, Tucson, Arizona.

Kristan, W. B. III. and W. I Boarman. 2003. Spatial pattern of risk of common raven predation on desert tortoises. Ecology 84(9):2432-2443.

Luke, C., A. Karl, and P. Garcia. 1991. A status review of the desert tortoise. Unpubl. rept. from Biosystems Analysis, Inc., to the City of Ridgecrest, Ridgecrest, CA.

Mahringer, E. B.. 1970. The population dynamics of the Common Raven (*Corvus corax*) on the Baraga Plains L´Anse, Michigan. M.S. thesis, Michigan Tech. Univ., Houghton, Michigan.

Medica, P.A., R.B. Bury, and F. B. Turner. 1975. Growth of the desert tortosie (*Gopherus agassizi*) in Nevada. Copeia 1975(4):629-643.

Miller, L.M. 1955. Further observations on the desert tortoise, *Gopherus agassizi*, of California. Copeia 1955:113-118.

Mueller, J.M., K.R. Sharp, K.K. Zander, D.L. Rakestraw, K.R. Rautenstrauch, and P.E. Lederle. 1998. Size-specific fecundity of the desert tortoise (*Gopherus agassizii*). Journ. Herp. 32(3):313-319.

Nagy, K. A. and P. A. Medica. 1986. Physiological ecology of desert tortoises in southern Nevada. *Herpetologica* 42:73-92.

National Park Service. 1995. General Management Plan, Development Concept Plan, Environmental Impact Statement. Prepared by Joshua Tree National Park. Twentynine Palms, California.

Nichols, U.G. 1953. Habits of the desert tortoise, *Gopherus agassizii*. Herpetologica 9:65-69.

O'Connor, M. P., L. C. Zimmerman, D. E. Ruby, S. J. Bulova, and J. R. Spotila. et al. 1994. section 4Home range size and movements by desert tortoises, *Gopherus agassizii*, in the eastern Mojave Desert. Herp. Monogr. 8:60-71.

Oftedal, O., S. Hillard, L. Hazard, T. Christopher, and D. Morafka. 2002. Can juvenile tortoises obtain high PEP forage throughout the spring. Paper presented at the 2002 Desert Tortoise Council Symposium, Palm Springs, CA.

Ottley, J.R. and V.M. Velazques Solis. 1989. An extant, indigenous tortoise population in Baja California Sur, Mexico, with the description of a new specis of *Xerobates* (Testudines: Testudinidae). Great Basin Nat. 49(4):496-502.

Pendleton, R.L., B.K. Pendleton, G.L. Howard, and S.D. Warren. 2004. Effects of biological soil crusts on seedling growth and mineral content of four semiarid herbaceous plant species. U.S.D.A. Forest Service Proceedings RMRS-P-31. 3 pp.

Rautenstrauch, K.R. and E.A. Holt. 1995. Selecting an appropriate method for calculating desert tortoise home range size and location. Pp. 172-173 *in* A. Fletcher-Jones (ed.) Proceedings of the 1994 Desert Tortoise Council Symposium.

RECON. 1992. Biological Assessment for the Eagle Mountain Landfill Project. Prepared for the Bureau of Land Management, Palm Springs, CA. 102 pp.

Rowlands, P.G. 1980. Soil crusts. Chapter 2 *in* P.G. Rowlands (ed.) Effects of disturbance on desert soils, vegetation and community processes with emphasis on off-road vehicles: a critical review. Unpub. rept. to Bureau of Land Management, Riverside, California.

Shemanski, D. R., L.C. Hazard, and K.A. Nagy. 2002. Dry matter, energy, and nitrogen digestibility in natural foods eaten by desert tortoises, *Gopherus agassizii*. Paper presented at the 2002 Desert Tortoise Council Symposium, Palm Springs, CA.

Stebbins, R.C. 2003. Western reptiles and amphibians. Houghton Mifflin Company, New York, New York. 533 pp.

Tetra Tech EC, Inc. 2005. Combined desert tortoise protocol survey report. Prepared by Tetra Tech EC, Inc., Irvine, California.

TRW Environmental Safety Systems, Inc. 1995. Diet of desert tortoises at Yucca Mountain, Nevada, and implications for habitat reclamation. Unpubl. rept. to U.S. Department of Energy, Yucca Mountain Site Characterization Office, North Las Vegas, NV. Document No. B00000000-01717-5705-00028. 18 pp. plus appendices.

TRW Environmental Safety Systems, Inc. 1997a. Hibernation behavior of desert tortoises at Yucca Mountain, Nevada. Unpubl. rept. to U.S. Department of Energy, Yucca Mountain Site Characterization Office, North Las Vegas, NV. Document No. B00000000-01717-5705-00031. 13 pp.

TRW Environmental Safety Systems, Inc. 1997b. Patterns of burrow use by desert tortoises at Yucca Mountain, Nevada. Unpubl. rept. to U.S. Department of Energy, Yucca Mountain Site Characterization Office, North Las Vegas, NV. Document No. B00000000-01717-5705-00041. 21 pp.

TRW Environmental Safety Systems, Inc. 1999. Egg production byMovement patterns of desert tortoises at Yucca Mountain, Nevada. ReportUnpubl. rept. to U.S. Department of Energy, Yucca Mountain Site Characterization Office, North Las Vegas, NV. ContractDocument No. DE-AC08-91RW00134B00000000-01717-5705-00049.

Turner, F.B., P.A. Medica, and R.B. Bury. 1987. Age-size relationships of desert tortoises (*Gopherus agassizii*) in California. Herpetologica 42:93-104.

Turner, R.M. and D.E. Brown. 1982. Sonoran desertscrub. *In* D.E. Brown, ed., Biotic. Communities of the American Southwest-United States and Mexico. Desert Plants 4(1-4): 181-221.

United States Department of the Interior Bureau of Land Management. 1988. Desert tortoise management on the public lands: a rangewide plan. Unpub. doc. 24 pp.

United States Department of the Interior Bureau of Land Management and California Department of Fish and Game. 2002. Proposed northern and eastern Colorado Desert Coordinated Management Plan. Final Environmental Impact Statement. Two volumes.

United States Department of the Interior Bureau of Land Management and Imperial Irrigation District. 2003. Desert Southwest Transmission Line Project Draft Environmental Impact Statement/Report. Available online at http://www.ca.blm.gov/palmsprings/xmission line.html.

United States Department of the Interior Bureau of Land Management. 2007. National Environmental Policy Handbook. Manual 1790. 182 pp.

United States Department of the Interior Fish and Wildlife Service. 1989. Proposed rule: endangered and threatened wildlife and plants; desert tortoise. FR 54(197):42270-42278.

United States Department of the Interior Fish and Wildlife Service. 1990. Final rule: determination of the threatened status for the Mojave population of the desert tortoise. FR 55(63):12178-12191.

United States Department of the Interior Fish and Wildlife Service. 1992. Field Survey Protocol for Any Federal Action That May Occur Within the Range of the Desert Tortoise. Available online at http://ventura.fws.gov/es/protocols/de_tortoise_fsp.pdf

United States Department of the Interior Fish and Wildlife Service. 1993. Biological Opinion for the Eagle Mountain Landfill Project. 1-6-92-F-39. Fish and Wildlife Enhancement, Southern California Field Station, Carlsbad, California.

United States Department of the Interior Fish and Wildlife Service. 1994a. Desert tortoise (Mojave population) recovery plan. Portland, Oregon. 73 pp plus appendices.

United States Department of the Interior Fish and Wildlife Service. 1994b. Final rule: determination of critical habitat for the Mojave population of the desert tortoise. FR 59 (26):5820-5866.

United States Department of the Interior Fish and Wildlife Service. 2008. Environmental assessment to implement a Desert Tortoise Recovery Plan task: reduce common raven predation on the desert tortoise. 156 pp.

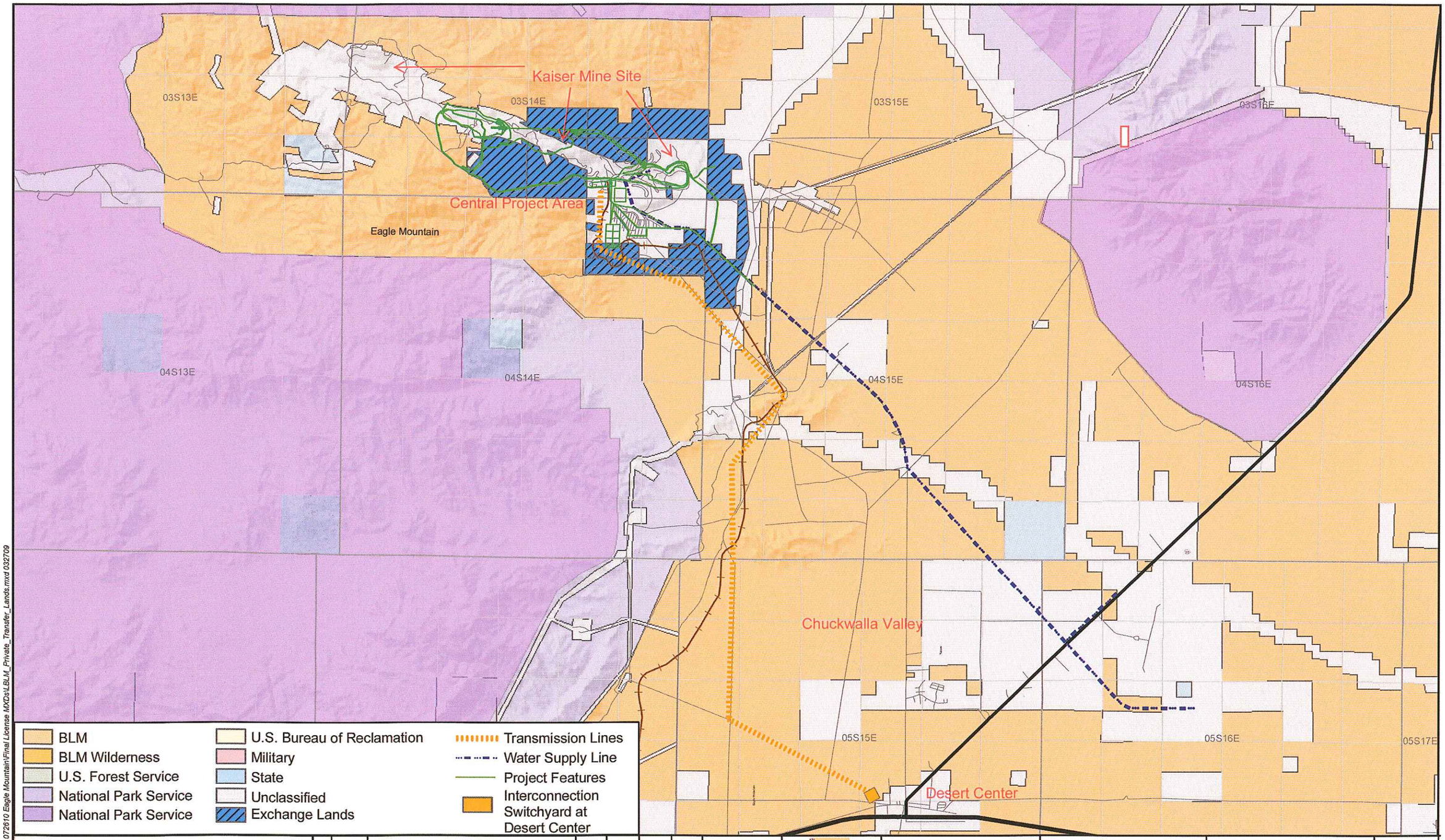
Wallis, I.R., B.T. Henen, and K.A. Nagy. 1999. Egg size and annual egg production by female desert tortoises (*Gopherus agassizii*): the importance of food abundance, body size, and date of egg shelling. Journ. Herp. 33(3):394-408.

Weinstein, M. 1989. Modeling Desert Tortoise Habitat: Can a Useful Management Tool be Developed from Existing Transect Data? Ph.D.. Diss., University of California, Los Angeles. 121 pp.

West, N.E. 1990. Structure and function of microphytic soil crusts in wildlife ecosystems of arid to semiarid regions. Adv. in Ecol. Research 20:179-223.

Zimmerman, L.C., M.P. O'Connor, S.J. Bulova, J.R. Spotila, S. J. Kemp, and C.J. Salice. 1994. Thermal ecology of desert tortoises in the eastern Mojave Desert: seasonal patterns of operative and body temperatures, and microhabitat utilization. Herp. Monogr. 8:45-59.

Figures



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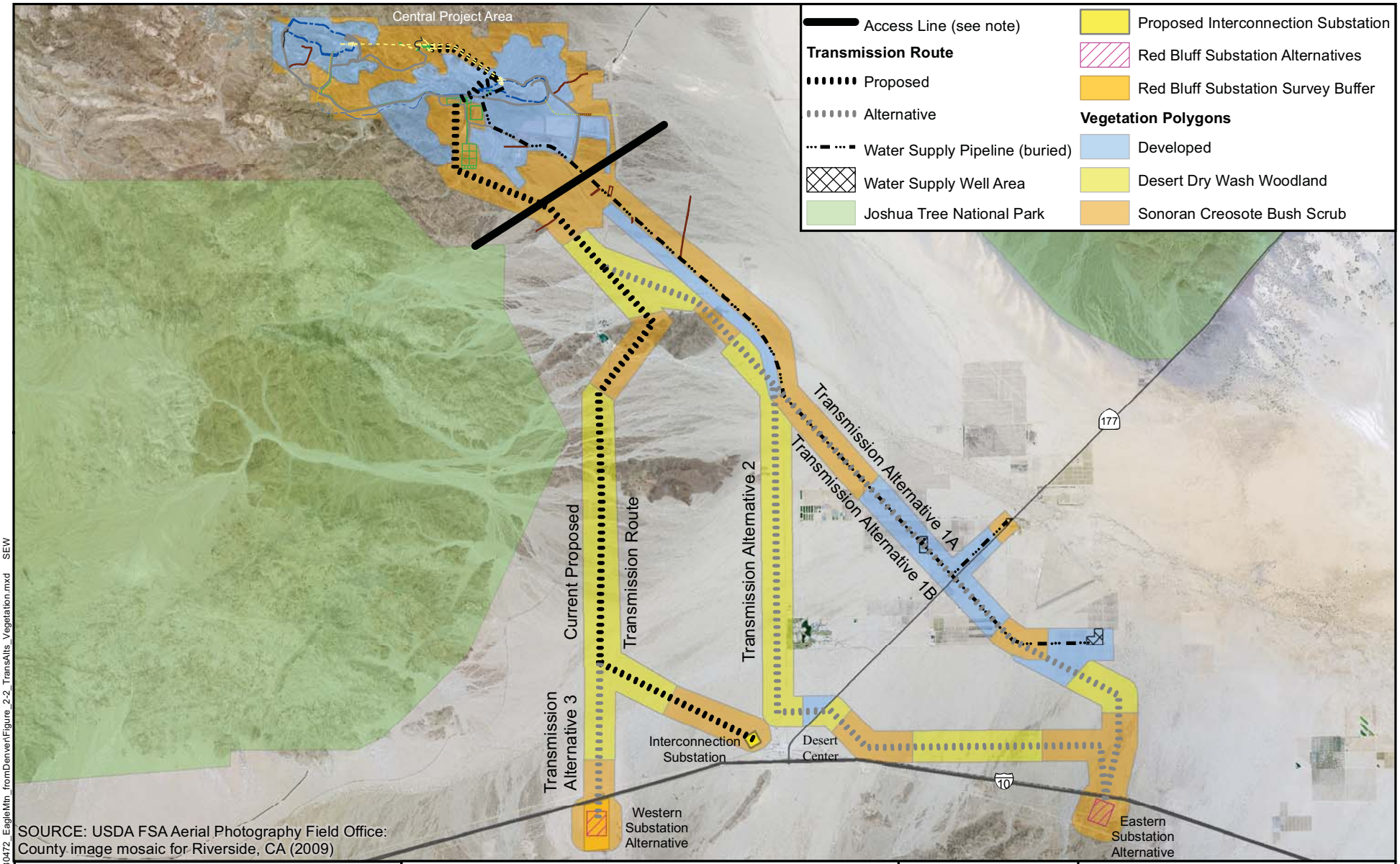
EAGLE CREST ENERGY COMPANY

GEI PROJECT 080474

EAGLE MOUNTAIN PUMPED STORAGE PROJECT
EAGLE MOUNTAIN, CALIFORNIA

Figure 2-1



NOTE: Mapping northwest of Access Line is based on aerial photographs and ground views rather than direct site access.

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Eagle Mountain Pumped Storage Project
Eagle Mountain, California

Eagle Crest Energy Company

Eagle Crest Energy Company

SUBSTATION ALTERNATIVES AND TRANSMISSION INTERCONNECTION ALTERNATIVES; VEGETATION IN PROJECT AREA

July 2010 Figure 2-2

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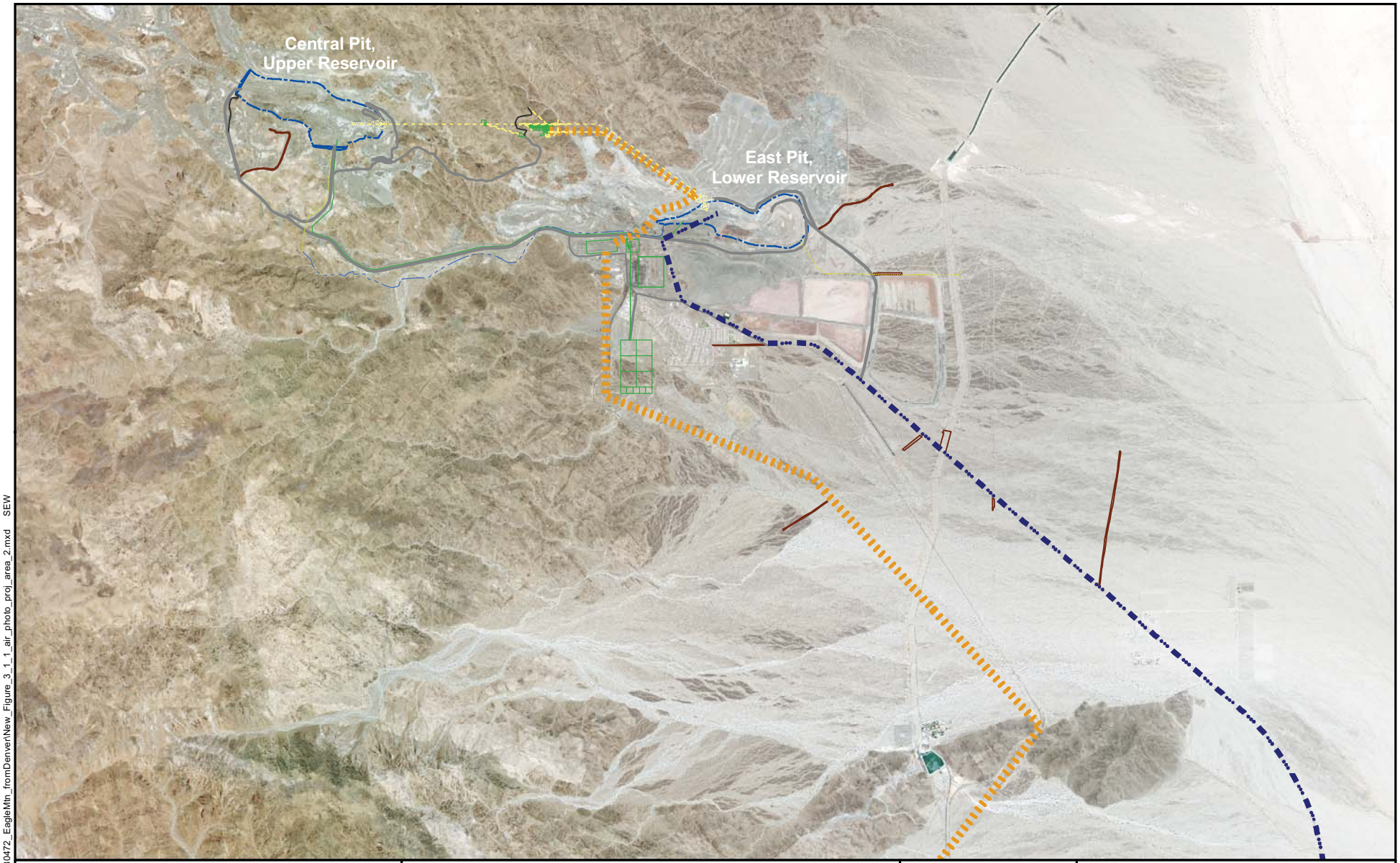

SOURCE: USDA FSA Aerial Photography Field Office: County image mosaic for Riverside, CA (2009)

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Eagle Mountain Pumped Storage Project
Eagle Mountain, California

Eagle Crest Energy Company

AERIAL OVERVIEW OF PROJECT SITE

July 2010 Figure 3-1

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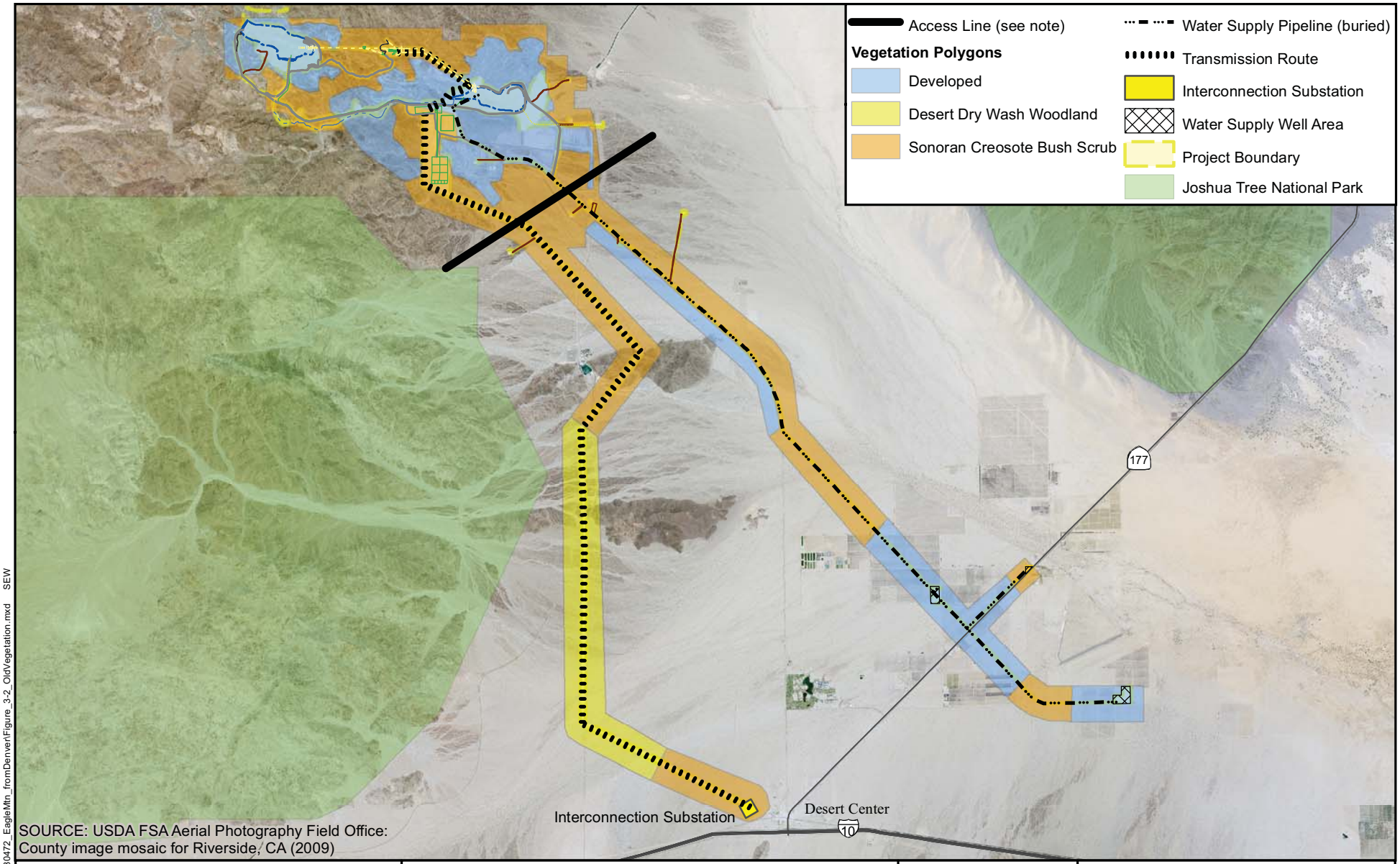

SOURCE: USDA FSA Aerial Photography Field Office:
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NOTE: Mapping northwest of Access Line is based on aerial photographs and ground views rather than direct site access.

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Eagle Mountain, California

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VEGETATION IN PROJECT AREA

July 2010 Figure 3-2

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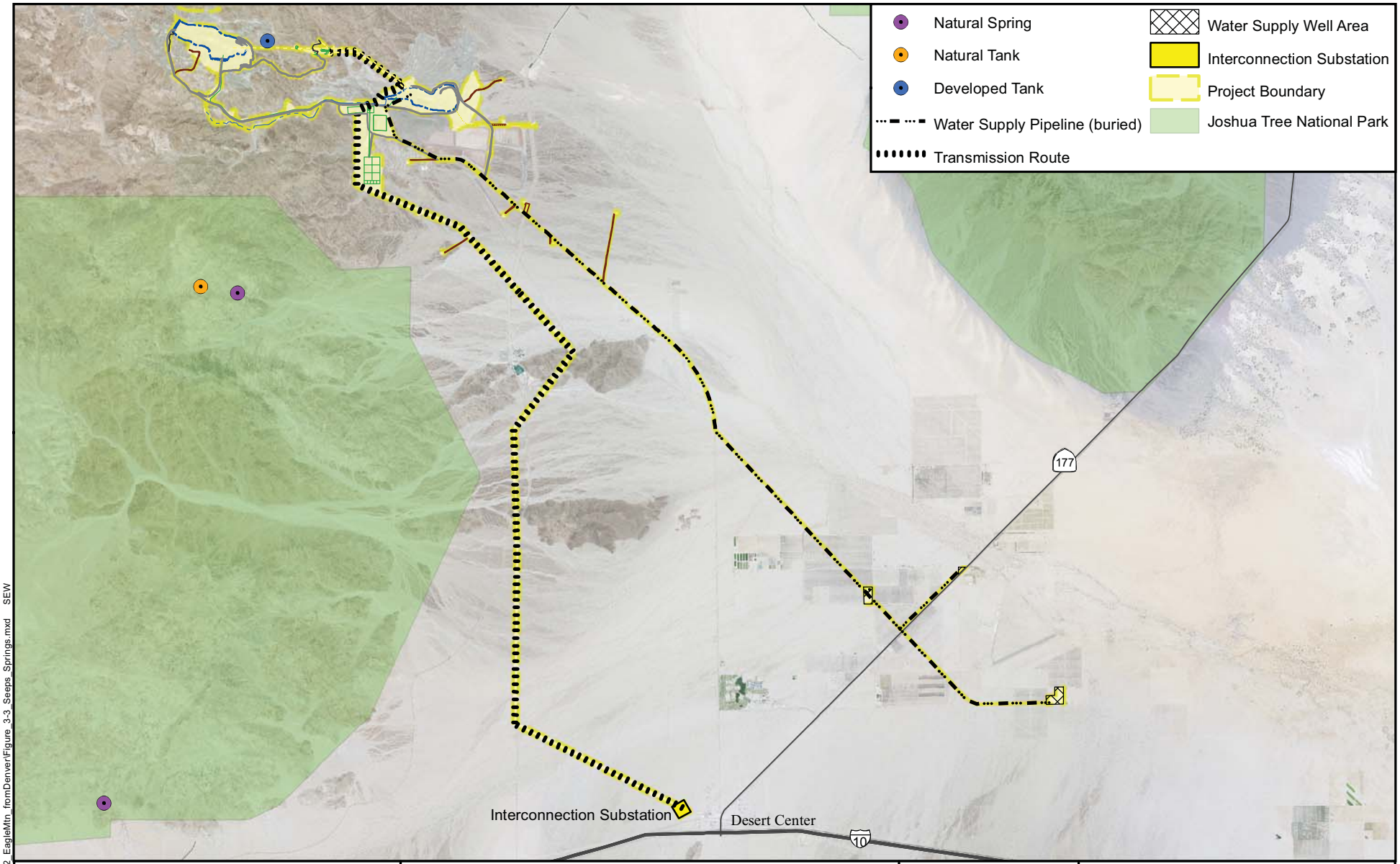

SOURCE: USDA FSA Aerial Photography Field Office: County Image Mosaic for Riverside, CA (2009).

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Eagle Mountain, California

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SEEPS AND SPRINGS NEAR THE PROJECT AREA

July 2010 Figure 3-3

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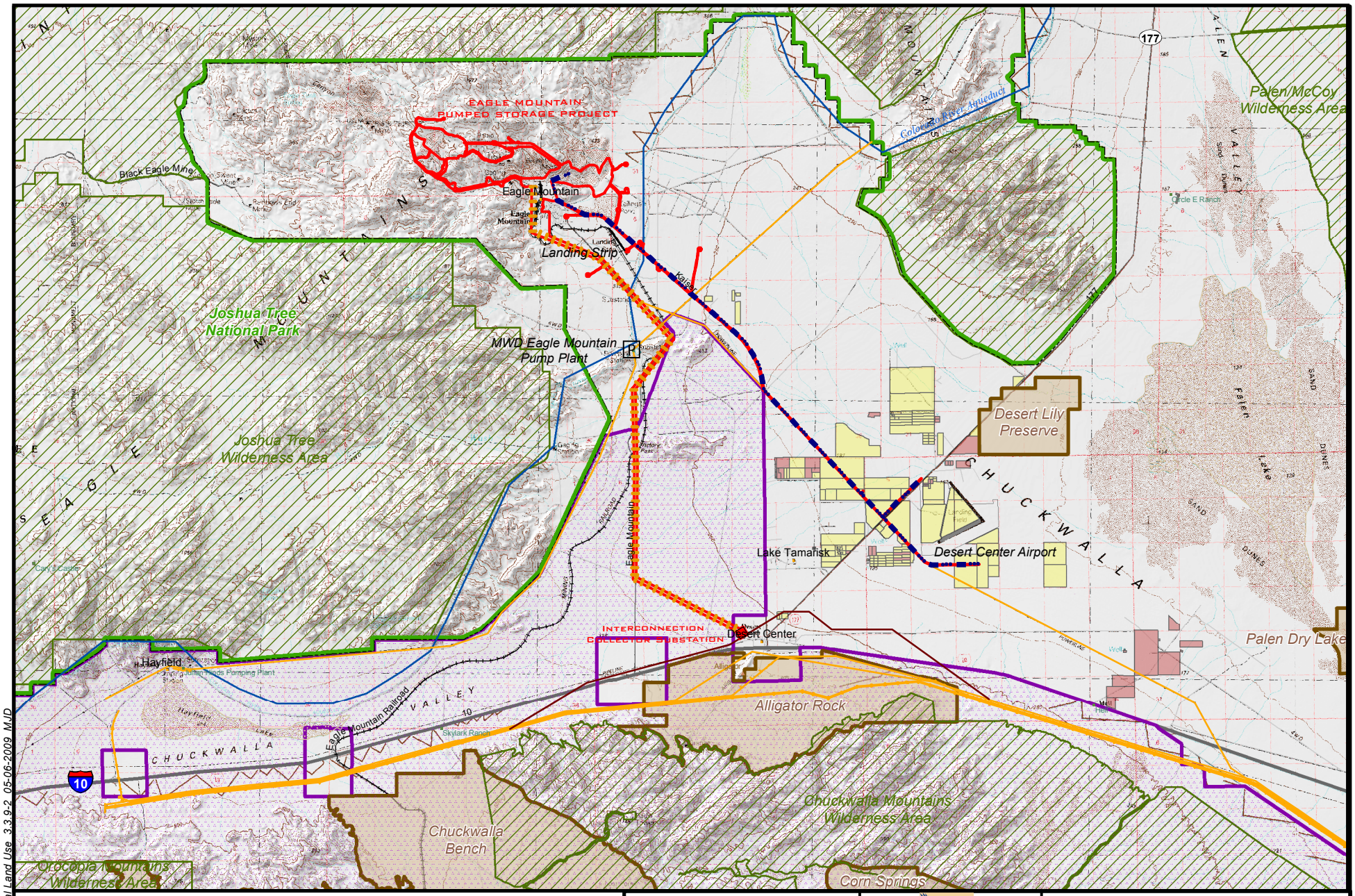
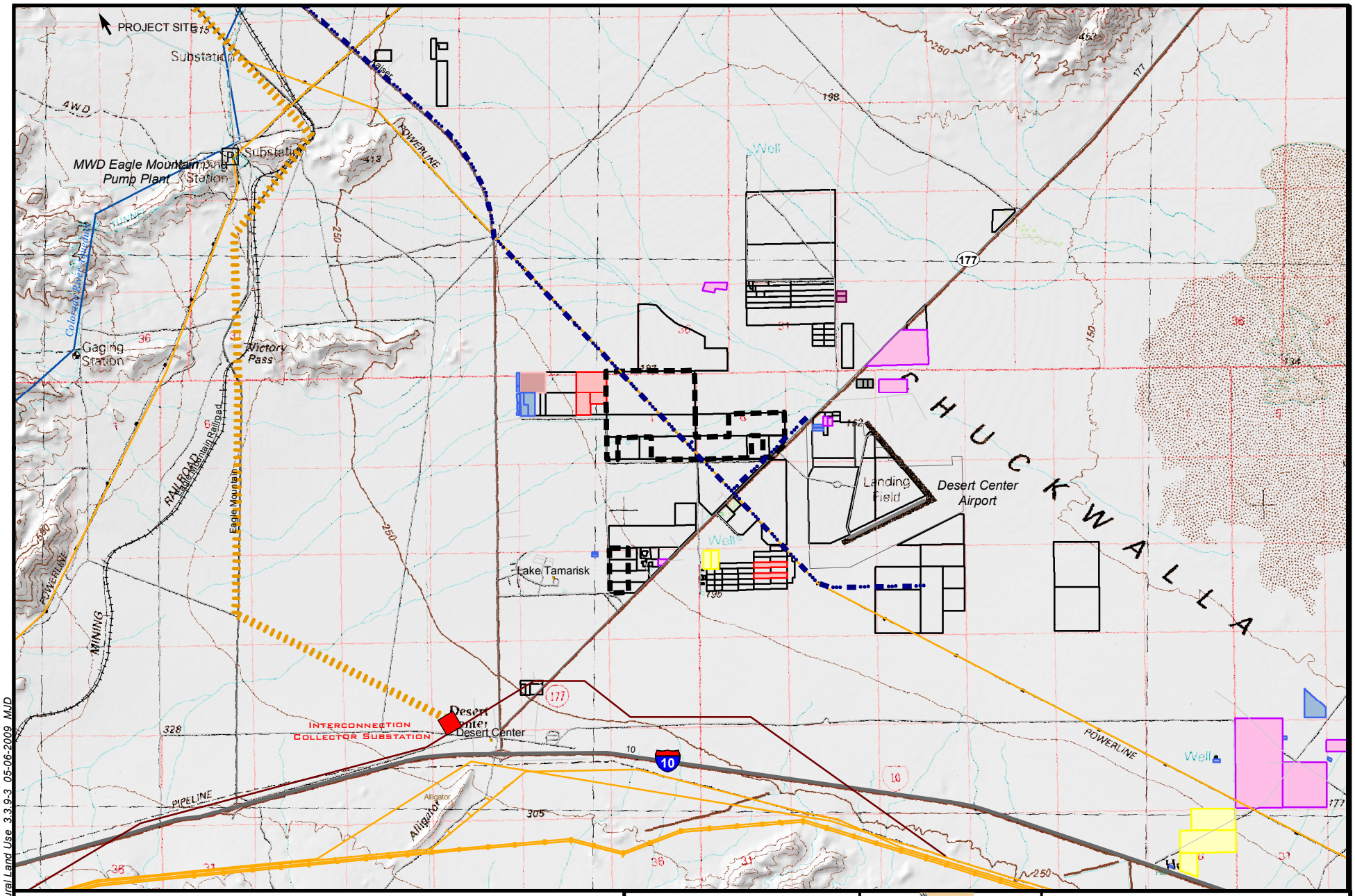


Eagle Mountain - Regional Land Use 3.3.9-2 05-06-2009 MJD

Eagle Mountain Pumped Storage Eagle Mountain, CaliforniaR		REGIONAL LAND USE
Eagle Crest Energy Company	Project 080473	May 2009 Figure 3-4

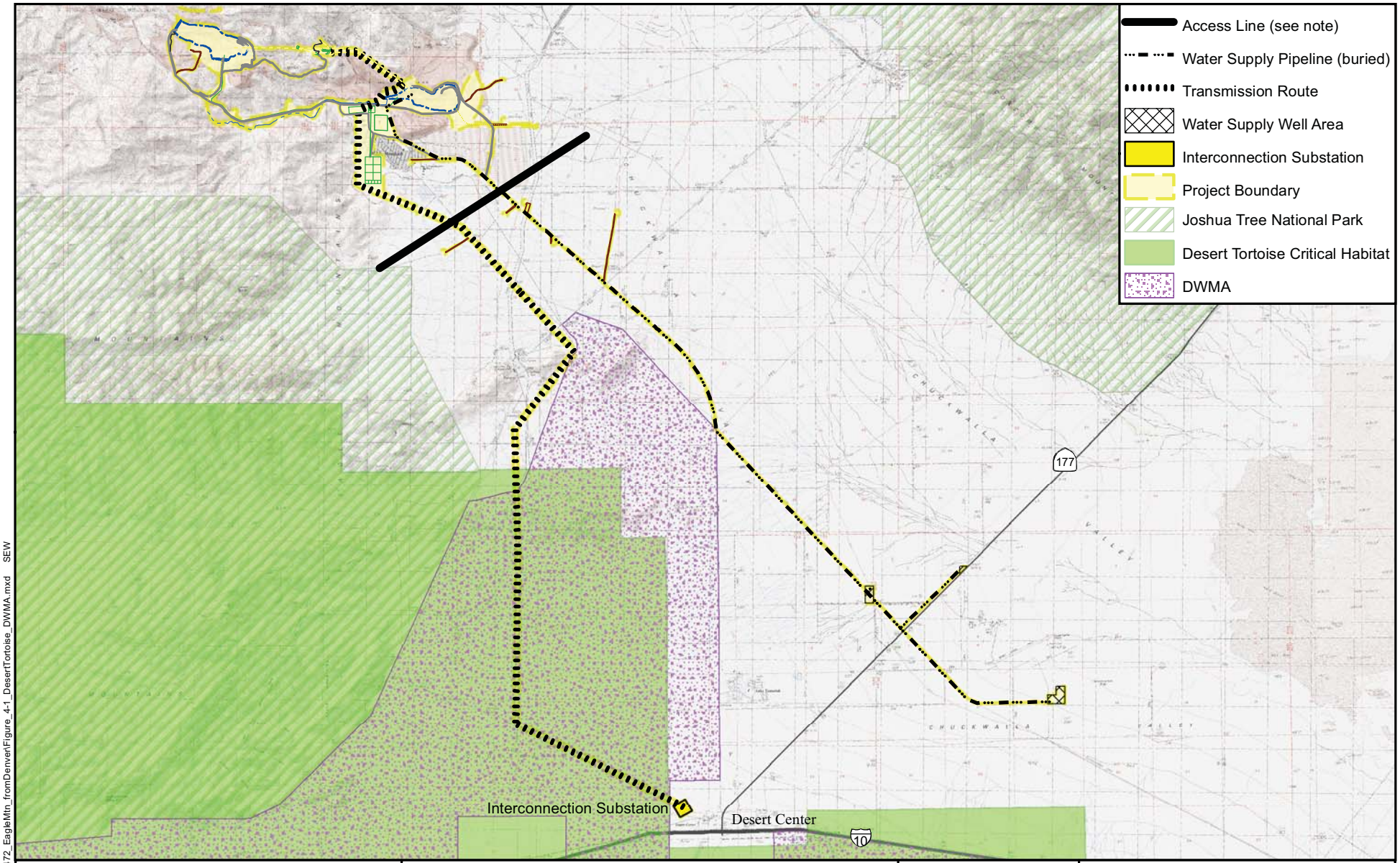


Eagle Mountain
Pumped Storage
Eagle Mountain, California

Eagle Crest Energy Company

AGRICULTURAL LAND USE

Eagle Crest Energy Company | Project 080473 | May 2009 | Figure 3-5



NOTE: Mapping northwest of Access Line is based on aerial photographs and ground views rather than direct site access.

0 1 2 Miles

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Eagle Mountain, California

Eagle Crest Energy Company

Eagle Crest Energy Company

DESERT TORTOISE CRITICAL HABITAT AND DWMA IN THE PROJECT AREA

July 2010 Figure 4-1

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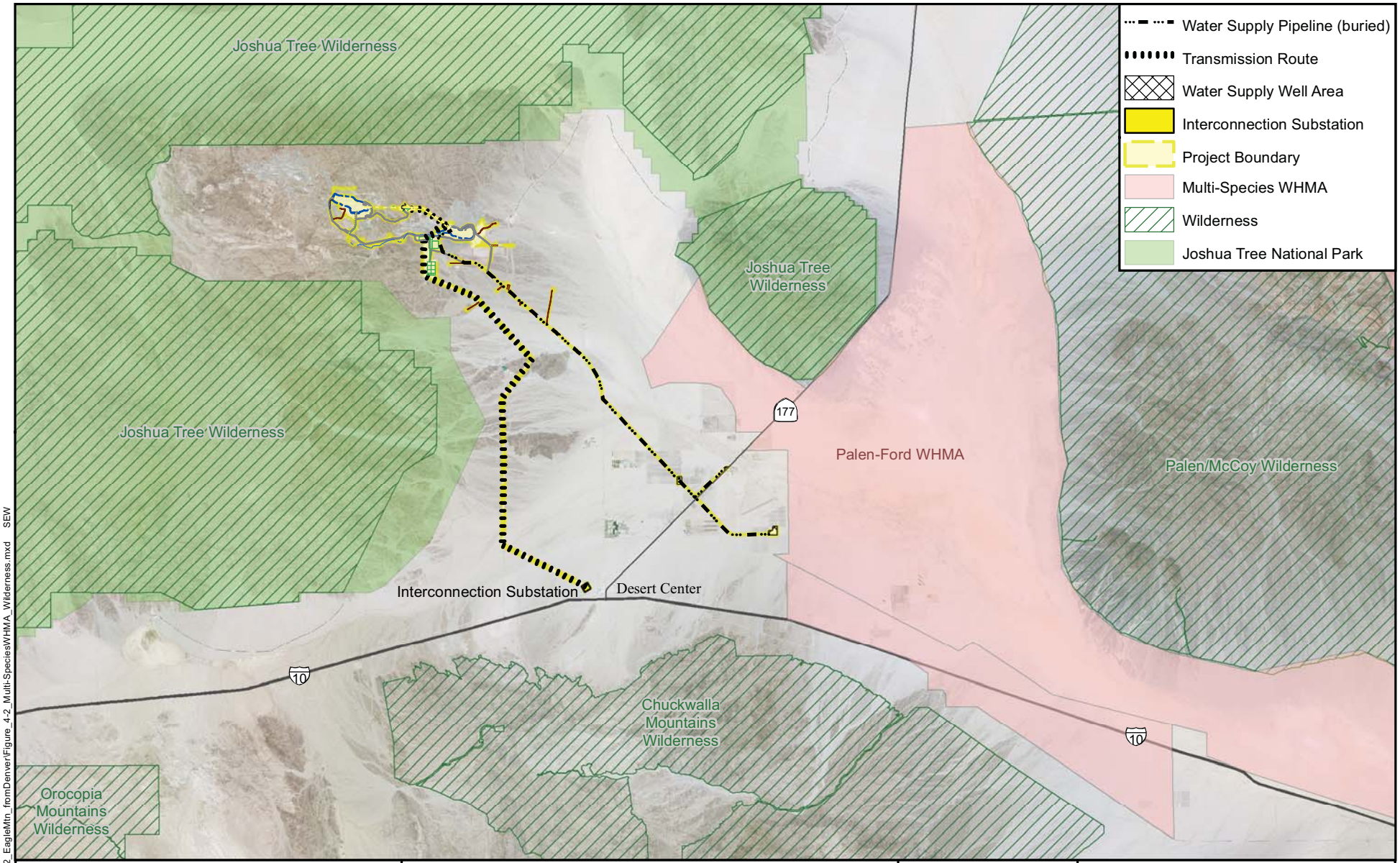

SOURCE: USDA FSA Aerial Photography Field Office: County image mosaic for Riverside, CA (2009). NECO Plan (BLM and CDFG 2002).

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Eagle Mountain Pumped Storage Project
Eagle Mountain, California

Eagle Crest Energy Company

MULTI-SPECIES WHMA AND WILDERNESS NEAR PROJECT AREA

July 2010 Figure 4-2

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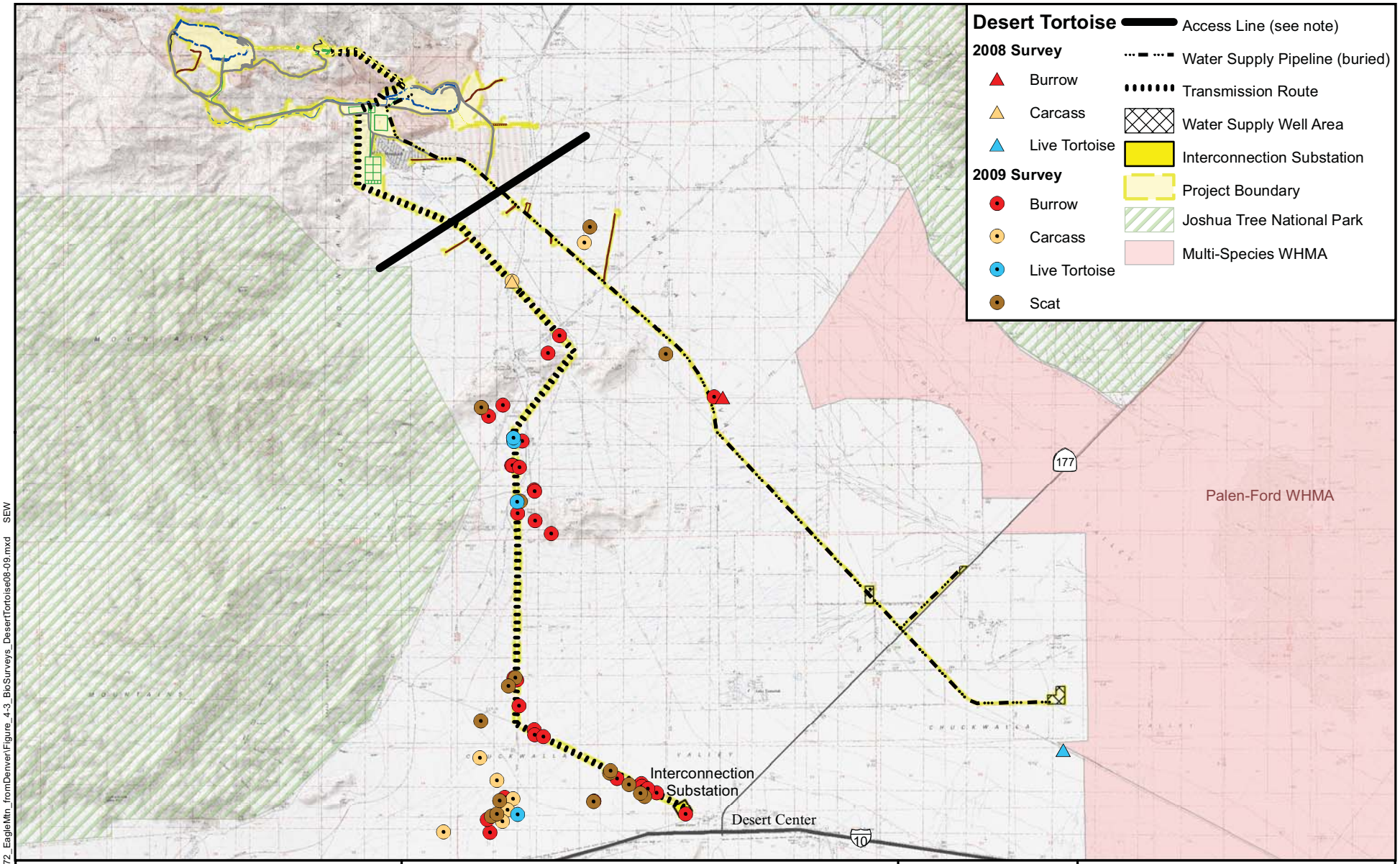

NOTE: Mapping northwest of Access Line is based on aerial photographs and ground views rather than direct site access.

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Eagle Mountain Pumped Storage Project
Eagle Mountain, California

Eagle Crest Energy Company

RESULTS OF SPECIAL BIOLOGICAL RESOURCES SURVEYS IN 2008 AND 2009: DESERT TORTOISE

July 2010 Figure 4-3

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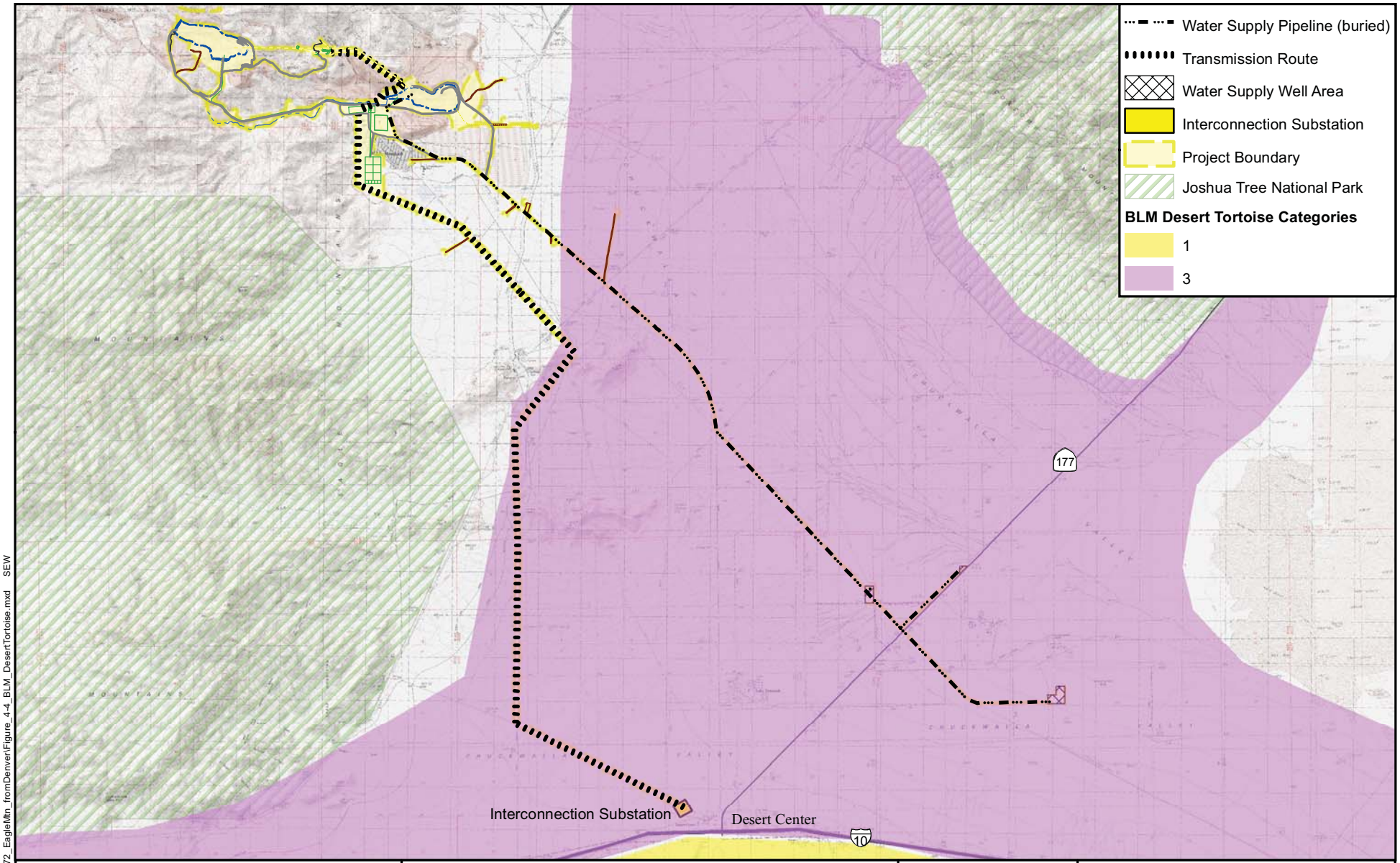
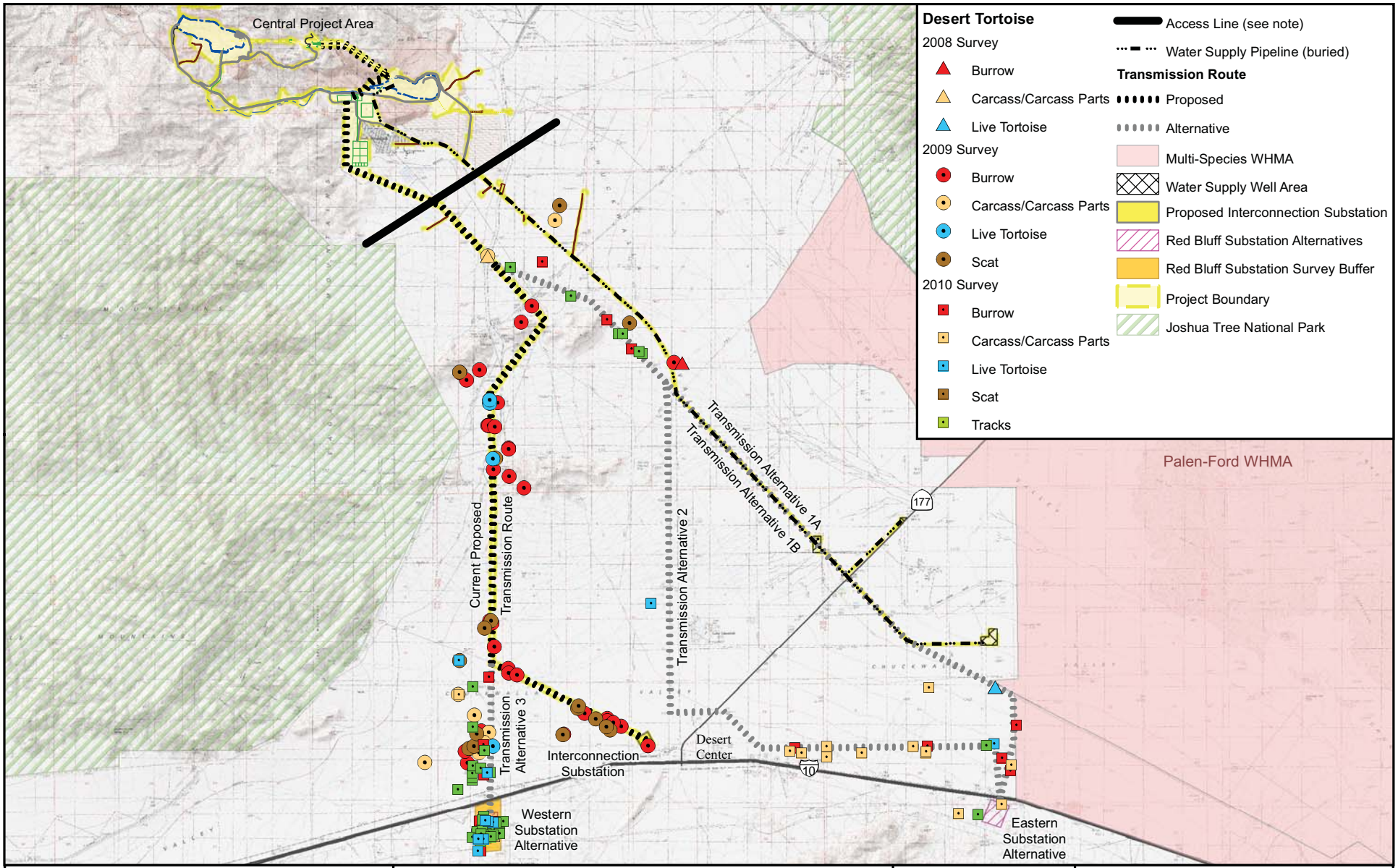


Categories are pre-NECO plan. All lands that fall within NECO-designated DWMAs automatically become Category 1, despite pre-NECO Plan designations. See Figure 4-1.



NOTE: Mapping northwest of Access Line is based on aerial photographs and ground views rather than direct site access.

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Eagle Mountain Pumped Storage Project
Eagle Mountain, California

Eagle Crest Energy Company

Eagle Crest Energy Company

RESULTS OF SPECIAL BIOLOGICAL RESOURCES SURVEYS IN 2008, 2009, 2010: DESERT TORTOISE

July 2010 Figure 4-5

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Appendix A Biological Mitigation Measures

The following table summarizes the mitigation measures that are proposed for terrestrial resources in general, and threatened and endangered species specifically. These measures are elaborated and a full list of mitigation measures for the Project in the Final License Application (ECE 2009).

Resource Area	Measure number	Summary of Mitigation Measure	Timing of Compliance	Responsibility/ Implementation
Terrestrial Resources	BIO-1	**Mitigation and Monitoring Program.** Concurrent with final engineering design a comprehensive site-specific mitigation and monitoring program will be developed in consultation with the Biological Technical Advisory Team. The Technical Advisory Team is composed of the Owner's staff and consultants and staff from the resource managing agencies.	During Design	Applicant in coordination with the Biological Technical Advisory Team
Terrestrial Resources	BIO-2	**Designation of an Approved Project Biologist.** A Project Biologist must be designated who will be responsible for implementing and overseeing the biological compliance program	Construction and operation	**Applicant**
Terrestrial Resources	BIO-3	**Worker Environmental Awareness Program (WEAP).** A WEAP will be developed to ensure that project construction and operation occur within a framework of safeguarding environmentally sensitive resources	Construction and operation	**Applicant and contractor**
Terrestrial Resources	BIO-4	**Reporting.** As part of implementing protection measures, regular reports will be submitted to the relevant resource agencies to document the Project activities, mitigation implemented, and mitigation effectiveness, and provide recommendations.	Construction and operation	**Applicant and contractor**
Terrestrial Resources	BIO-5	**Minimize Surface Disturbance.** During construction in native habitats, all surface disturbances will be restricted to the smallest area necessary to complete the construction.	**Construction**	**Contractor**
Terrestrial Resources	BIO-6	**Pre-construction Surveys: Plants.** Preconstruction surveys will identify special-status plant populations and also species protected by the CDNPA.	**Design**	**Applicant**
Terrestrial Resources	BIO-7	**CDNPA.** In compliance with the CDNPA, the County Agricultural Commissioner will be consulted for direction regarding disposal of plants protected by the CDNPA.	**Construction**	**Contractor**
Terrestrial Resources	BIO-8	**Revegetation.** A revegetation plan will be developed for areas that are temporarily disturbed during construction which accommodates the specific features of the desert that make revegetation difficult.	**Construction**	**Contractor**
Terrestrial Resources	BIO-9	**Invasive Species Monitoring and Control.** A weed control program will be developed prior to construction.	**Construction**	**Contractor**

Resource Area	Measure number	Summary of Mitigation Measure	Timing of Compliance	Responsibility/ Implementation
Terrestrial Resources	BIO-10	**Couch's Spadefoot.** Surveys for couch's spadefoot habitat will be conducted, and habitats avoided if possible.	**Pre-construction and construction**	**Applicant (pre-construction) and Contractor (during construction)**
Terrestrial Resources	BIO-11	**Breeding Bird Surveys and Avoidance.** Surveys will be completed in all potential nesting sites for active bird nests, for construction activities scheduled between February 15 and July 30. Nest sites will be flagged and the flagged zone not disturbed.	**Pre-construction and construction**	**Applicant (pre-construction) and Contractor (during construction)**
Terrestrial Resources	BIO-12	**Evaporation Ponds.** Evaporation ponds will be managed to minimize their attractiveness and access to migratory birds, and a monitoring program implemented.	**Design, construction and operation**	**Applicant (design and operation) and Contractor (during construction)**
Terrestrial Resources	BIO-13	**Burrowing Owls**. A Phase III survey will be completed to further assess bird use of the Project area and potential impacts	**Pre-construction**	**Applicant**
Terrestrial Resources	BIO-14	**Burrowing Owls**. The construction period is limited to September 1 through February 1 if burrowing owls are present. Disruption of burrowing owl nesting activities or nesting activities should be avoided.	**Construction**	**Contractor**
Terrestrial Resources	BIO-15	**Raptors.** Pre-construction surveys will determine if construction buffers will be required during the nesting season.	**Pre-construction**	**Applicant**
Terrestrial Resources	BIO-16	**Pre-construction Surveys: Mammals.** Prior to construction, surveys will be conducted for burrows for badger or kit fox. Active burrows and all fox natal dens will be avoided, where possible. Where avoidance is infeasible, occupancy of burrows will be determined and occupants will be encouraged to leave their burrows. All burrows from which badgers or foxes have been removed will be fully excavated and collapsed after animals have left.	**Pre-construction and construction**	**Applicant (pre-construction) and Contractor (during construction)**
Terrestrial Resources	BIO-17	**Bats.** Bat surveys will be completed in the Central Project Area. Based on the results of these surveys, a mitigation plan will be developed to avoid roosting and foraging impacts to	**Pre-construction and construction**	**Applicant (pre-construction) and Contractor**

Resource Area	Measure number	Summary of Mitigation Measure	Timing of Compliance	Responsibility/ Implementation
		resident bats, minimize that disturbance or, as an inescapable measure, evict bats.		**(during construction)**
Terrestrial Resources	BIO-18	**Fencing.** A security fence will be constructed around portions of the Central Project Area to exclude larger terrestrial wildlife from entering Project areas that could pose a hazard to these species.	**Construction and operation**	**Applicant (operation) and Contractor (during construction)**
Terrestrial Resources	BIO-19	**Construction and Operations**. Construction and maintenance activities will be restricted to minimize Project impacts.	**Construction and operation**	**Applicant (operation) and Contractor (during construction)**
Terrestrial Resources	BIO-20	**Construction.** In areas without wildlife exclusion fencing or those areas that have not been cleared of tortoises, construction activities will only take place during daylight hours.	**Construction**	**Contractor**
Terrestrial Resources	BIO-21	**Construction.** Pipeline trenches will be closed, temporarily fenced, or covered each day. Any open trenches will be inspected by an approved biological monitor at first light, midday, and at the end of each day to ensure animal safety.	**Construction**	**Contractor**
Terrestrial Resources	BIO-22	**Minimize Lighting Impacts**. Facility lighting will be designed, installed, and maintained to prevent casting of light into adjacent native habitat.	**Construction and operation**	**Applicant (operation) and Contractor (during construction)**
Terrestrial Resources	BIO-23	**Jurisdictional Waters.** A Streambed Alteration Agreement will be obtained, which will identify the condition and location of all state jurisdictional waters, impacts, and mitigation measures. Mitigation will include the acreage assessment of washes that may be affected, construction requirements associated with working on or near the washes, and compensation for lost or damaged acreage.	**Pre-construction and construction**	**Applicant (Pre-construction) and Contractor (during construction)**
Threatened and Endangered Species	DT-1	**Pre-construction Surveys and Clearance Surveys.** All tortoises will be removed from harm's way during the construction period.	**Pre-construction and construction**	**Applicant (Pre-construction) and Contractor (during construction)**

Resource Area	Measure number	Summary of Mitigation Measure	Timing of Compliance	Responsibility/ Implementation
Threatened and Endangered Species	DT-2	**Construction Monitoring**. No construction, or maintenance that requires surface disturbance, in unfenced areas on the linear facilities will occur without biological monitors.	**Construction and operation**	**Applicant (operation) and Contractor (during construction)**
Threatened and Endangered Species	DT-3	**Exclusion Fencing –** The substation and other hazardous areas will be enclosed with a permanent tortoise exclusion fence to keep adjacent tortoises from entering the site.	**Construction and operation**	**Applicant (operation) and Contractor (during construction)**
Threatened and Endangered Species	DT-4	**Tortoise Translocation or Removal Plan. T**ortoises removed will be transported to another part of their home range. Any tortoise found in the Central Project Site will be moved to a location immediately adjacent to its capture site outside the fenced construction area.	**Construction and operation**	**Applicant (operation) and Contractor (during construction)**
Threatened and Endangered Species	DT-5	**Raven Monitoring and Control Program.** Mitigation to reduce or eliminate the opportunity for raven proliferation will include payment of an "in-lieu" fee to the USFWS for a raven monitoring and control program.	**Construction and operation**	**Applicant (operation) and Contractor (during construction)**
Threatened and Endangered Species	DT-6	**Habitat Compensation.** Total compensation will be approximately 149 acres.	**Design and operation**	**Applicant**
Threatened and Endangered Species	DT-7	**Operations and Maintenance.** Tortoises observed during routine maintenance activities will be allowed to voluntarily move out of harm's way.	**Operation**	**Applicant**

Appendix B Fish and Wildlife Observed in Project Area (Karl 2004a)

Taxon	Scientific Name	Common Name
REPTILES		
	Callisaurus draconoides	Zebra-tail Lizard
	Cnemidophorus tigris	Western Whiptail
	Crotalus cerastes	Sidewinder
	C. mitchelli	Speckled Rattlesnake
	Dipsosaurus dorsalis	Desert Iguana
	Gambelia wislizenii	Leopard Lizard
	Gopherus agassizii	Desert Tortoise
	Masticophis flagellum	Coachwhip
	Phrynosoma platyrhinos	Desert Horned Lizard
	Sauromalus obesus	Chuckwalla
	Sceloporus magister	Desert Spiny Lizard
	Uma scoparia	Mojave Fringe-toed Lizard
	Urosaurus graciosus	Brush Lizard
	Uta stansburiana	Side-blotched Lizard
MAMMALS		
	Ammospermophilus leucurus	Antelope Ground Squirrel
	Canis latrans	Coyote (scat)
	Dipodomys sp.	Kangaroo Rat (burrows)
	Equus asinus	Feral Burro
	Lepus californicus	Black-tailed Hare
	Neotoma lepida	Desert Woodrat (midden)
	Odocoileus hemionus eremicus	Desert Mule Deer
	Thomomys bottae	Pocket Gopher
	Spermophilus tereticaudus	Round-tailed Ground Squirrel
	Sylvilagus audubonii	Desert Cottontail
	Vulpes macrotis	Desert Kit Fox (digs, scat)
BIRDS		
	Auriparus flaviceps	Verdin
	Buteo jamaicensis	Red-tailed Hawk
	Campylorhynchus brunneicapillus	Cactus Wren
	Callipepla gambelii	Gambel's Quail

Taxon	Scientific Name	Common Name
	Cathartes aura	Turkey Vulture
	Catherpes mexicana	Canyon Wren
	Chordeiles acutipennis	Lesser Nighthawk
	Corvus corax	Common Raven
	Dendroica coronata	Yellow-rumped Warbler
	Eremophila alpestris	California Horned Lark
	Falco mexicanus	Prairie Falcon
	Geococcyx californianus	Greater Roadrunner
	Lanius ludovicianus	Loggerhead Shrike
	Mimus polyglottos	Mockingbird
	Myiarchus cinerascens	Ash-throated Flycatcher
	Phainopepla nitens	Phainopepla
	Piranga ludoviciana	Western Tanager
	Polioptila melanura	Black-tailed Gnatcatcher
	Salpinctes obsoletus	Rock Wren
	Sayornis nigricans	Black Phoebe
	Tyrannus verticalis	Western Kingbird
	Zenaida macroura	Mourning Dove
	Zonotrichia albicollis	White-crowned Sparrow
PLANTS		
	Abronia villosa	Sand Verbena
	Acacia greggii	Catclaw Acacia
	Achyronychia cooperi	Frost-mat
	Allionia incarnata	Windmills
	Allysum fremontii	Desert Allysum
	Ambrosia acanthicarpa	Annual Bursage
	A. dumosa	White Bursage
	A. (=Hymenoclea) salsola	Cheesebush
	Argemone munita	Chicalote
	Aristida purpurea	Three-awn
	Arundo donax	Giant Reed
	Asclepias albicans	Buggy-whip Milkweed
	A. subulata	Desert Milkweed
	Astragalus aridus	Astragalus
	A. didymocarpus	
	A. insularis var. *harwoodii*	Harwood's Milkvetch
	A. lentiginosus var. *coachellae*	Coachella Valley Milkvetch
	Atrichoseris platyphylla	Gravel-ghost
	Atriplex canescens	Four-winged Saltbush
	A. hymenelytra	Desert Holly
	A. lentiformis	Quailbush

Taxon	Scientific Name	Common Name
	A. polycarpa	Allscale
	Baileya pauciradiata	Desert Marigold
	B. pleniradiata	Woolly Marigold
	Bebbia juncea	Chuckwalla Bush
	Bouteloua spp.	Grama Grass
	Brandegea bigelovii	Brandegea
	Brassica tournefortii	Mustard
	Calyptridium monandrum	Sand-cress
	Camissonia arenaria	Sun Cup
	C. boothii decorticans	Bottlebrush Primrose
	C. brevipes	Sun Cup
	C. palmeri	Palmer Primrose
	C. claviformis	Brown-eyed Primrose
	Cercidium floridum (=*Parkinsonia florida*)	Blue Paloverde
	Chaenactis carphoclina	Pebble Pincushion
	C. fremontii	Fremont's Pincushion
	Chamaesyce polycarpa	Spurge
	C. setiloba	Bristle-lobed Sand Mat
	Chilopsis linearis	Desert Willow
	Chorizanthe brevicornu	Brittle Spine-flower
	C. rigida	Rigid Spinyherb
	Croton californica	Croton
	Cryptantha angustifolia	Forget-me-not
	C. micrantha	Purple-rooted Forget-me-not
	C. maritima	White-haired Forget-me-not
	C. nevadensis	Nevada Forget-me-not
	C. pterocarya	Wing-nut Forget-me-not
	Cucurbita palmata	Palmate-leaved Gourd
	Cuscuta sp.	Dodder
	Cylindropuntia acanthocarpa	Staghorn Cholla
	C. bigelovii	Teddybear Cholla
	C. echinocarpa	Silver Cholla
	C. ramosissima	Pencil Cholla
	Dalea mollis	Silk Dalea
	D. mollissima	Silk Dalea
	Datura wrightii	Jimsonweed
	Dicoria canescens	Desert Dicoria
	D. lanceolata	Lance-leaved Ditaxis
	D. neomexicana	Ditaxis
	D. serrata	Saw-toothed Ditaxis

Taxon	Scientific Name	Common Name
	D. serrata var. *californica*	California Ditaxis
	Dithyrea californica	Spectacle-pod
	Echinocactus polycephalus	Cottontop Cactus
	Echinocereus engelmannii	Hedgehog Cactus
	Emmenanthe penduliflora	Whispering Bells
	Encelia farinosa	Brittlebush
	E. frutescens	Rayless Encelia
	Ephedra californica	Mormon Tea
	E. nevadensis	Mormon Tea
	Eremalche rotundifolium	Desert Five-spot
	Eriastrum diffusum	Phlox
	Eriogonum deflexum	Skeleton Weed
	E. inflatum	Desert Trumpet
	Erioneuron pulchellum	Fluff Grass
	Eriophyllum lanosum	Woolly Eriophyllum
	Erodium cicutarium	Filaree
	Eschscholtzia glyptosperma	Gold-poppy
	E. minutiflora	Small-flowered Gold-poppy
	Escobaria vivipera var. *alversonii*	Foxtail Cactus
	Fagonia pachyacantha	Chinese Lanterns
	Ferocactus cylindraceus	Barrel Cactus
	Fouquieria splendens	Ocotillo
	Funastrum (=*Sarcostemma*) *cynanchoides hartwegii*	Climbing Milkweed
	Geraea canescens	Desert Sunflower
	Galium proliferum	Desert Bedstraw
	Gilia spp.	Phlox
	Hesperocallis undulata	Desert Lily
	Hibiscus denudatus	Rock Hibiscus
	Hoffmannseggia microphylla	Little-leafed Hoffmannseggia
	H. glauca	Pig-nut
	Hordeum marinum	Barley
	Hyptis emoryi	Desert Lavender
	Isomeris arborea	Bladderpod
	Justicia californica	Beloperone
	Krameria grayi	White Rhatany

Taxon	Scientific Name	Common Name
	Langloisia setosissima punctata	Spotted Sunbonnet
	Larrea tridentata	Creosote Bush
	Lepidium fremontii	Desert Allysum
	L. lasiocarpum	Pepper Grass
	Loeseliastrum schottii	Schott Gilia
	Lotus strigosus	Hairy Lotus
	Lupinus sp.	Lupine
	Lycium andersonii	Anderson Boxthorn
	L. brevipes	Fruitilla
	Malacothrix glabrata	Desert Dandelion
	Mammillaria tetrancistra	Fish-hook Cactus
	M. grahamii var. *grahamii* (=*milleri*)	Fish-hook Cactus
	Marina parryi	Parry Dalea
	Mentzelia involucrata	Sand Blazing Star
	Mentzelia sp.	Blazing Star
	Mimulus bigelovii var. *bigelovii*	Monkeyflower
	Mirabilis laevis (= *bigelovii*)	Wishbone Bush
	Mohavea confertifolia	Ghost Flower
	Monoptilon bellioides	Mojave Desert-star
	Nama demissum	Purple Mat
	Nicotiana obtusifolia (= *trigonophylla*)	Desert Tobacco
	Oenothera deltoides	Dune Primrose
	Oligomeris linifolia	Mignonette
	Olneya tesota	Ironwood
	O. basilaris	Beavertail Cactus
	O. wigginsii	Wiggins' Cholla
	Palafoxia arida (= *linearis*)	Spanish Needle
	Pectocarya penicillata	Hairy-leaved Comb-bur
	P. recurvata	Arch-nutted Comb-bur
	Perityle emoryi	Emory Rock Daisy
	Petalonyx thurberi	Sandpaper Plant
	Peucephyllum schottii	Desert Fir
	Phacelia campanularia	Campanulate Phacelia
	P. crenulata	Notch-leaved Phacelia
	P. fremontii	Yellow-throats
	P. tanacetifolia	Heliotrope
	Phoradendron californicum	Desert Mistletoe

Taxon	Scientific Name	Common Name
	Physalis crassifolia	Ground-cherry
	Plantago ovata	Plantago
	Pleuraphis rigida	Big Galleta
	Pluchea sericea	Arrow-weed
	Polypogon sp.	Rabbit's Foot Grass
	Porophyllum gracile	Odora
	Proboscidea althaefolia	Devil's Claw
	Prosopis glandulosa	Honey Mesquite
	P. pubescens	Screwbean Mesquite
	Prunus fasciculatum	Desert Peach
	Psathyrotes ramosissima	Turpentine Plant
	Psorothamnus arborescens var. *simplicifolus*	Indigo Bush
	P. emoryi	Emory Dalea
	P. fremontii	Indigo Bush
	P. schottii	Indigo Bush
	P. spinosus	Smoke Tree
	Rafinesquia neomexicana	Chicory
	Salazaria mexicana	Paperbag Bush
	Salsola tragus	Russian Thistle
	Salvia columbariae	Chia
	Schismus arabicus	Arabian Grass
	Senna armata	Desert Senna
	Simmondsia chinensis	Jojoba
	Sisymbrium irio	Mustard
	Sphaeralcea ambigua	Desert Mallow
	S. angustifolia	Fendler Globe Mallow
	Stephanomeria parryi	Parry Rock-pink
	S. pauciflora	Desert Straw
	Stillingia paucidentata	Stillingia
	S. spinulosa	Broad-leaved Stillingia
	Stylocline micropoides	Desert Nest-straw
	Streptanthella longirostris	Mustard
	Tamarix parviflora	Tamarisk
	Tiquilia palmeri	Palmer Coldenia
	T. plicata	Plicate Coldenia
	Tidestromia oblongifolia	Honey-sweet
	Tribulus terrestris	Caltrops
	Trichoptilium incisum	Yellow-head
	Xylorhiza tortifolia	Mojave Aster
	Yucca schidigera	Mojave Yucca

Taxon	Scientific Name	Common Name
	Ziziphus obtusifolia var. *canescens*	Gray-leaved Abrojo

Appendix C – Recent low level aerial photography

Photo 1. View of East Pit, location for the proposed lower reservoir. Note lack of vegetation, and large tailings piles in the foreground.

Photo 2. Lower reservoir area showing the town of Eagle Mountain in the distance and a view up the hill towards the Central Pit (site of the proposed upper reservoir).

Photo 3. View from Central Pit (proposed upper reservoir site) looking towards the lower reservoir, with the town of Eagle Mountain and the Chuckwalla Valley in the distance.

Figure 4. Close up view of the upper reservoir, note existing disturbed conditions.

Appendix D – Documentation of consultation

On September 17, 2007, ECE sent a letter to the U.S. Fish and Wildlife Service (FWS) requesting information about threatened and endangered species in the Eagle Mountain Pumped Storage Project area. The FWS replied on November 17, 2007 with a letter (attached) which specified desert tortoise as the only Federally-listed threatened species in the project area. The FWS letter specified an additional four species that are considered sensitive which may occur on the project area.

The letter also stated that the FWS had no site-specific information for the project area and recommended that ECE seek the assistance of a biologist familiar with the habitat conditions and associated species in the project area. ECE has engaged the services of Dr. Alice E. Karl. Dr. Karl is a nationally-recognized expert in the ecology of the Mojave and Colorado deserts and is well known for her expertise in desert tortoise biology and management. Dr. Karl is the senior author of this biological assessment.

In October 2007, ECE representatives held a pre-scoping meeting with representatives of the FWS to gather more information about desert tortoise and FWS concerns regarding the proposed Project. On January 10, 2008, the FWS made a written request (via email) that hard copies of all pertinent publications and public notices be sent to Pete Sorenson at the Carlsbad Fish and Wildlife Service office. ECE has subsequently sent hard copies of all pertinent documents to this office, including a copy of the draft and final license applications.

The FWS was invited to participate in a "joint meeting" and site visit held April 8 and 9, 2008, which they were unable to attend. However, FWS representatives did attend the scoping meeting and site visit held January 15, 2009.

By letter dated September 5, 2008, ECE requested to be the Commission's non-federal representative for informal consultation pursuant to section 7 of the Endangered Species Act ("ESA"). In a September 16, 2008 letter from the Commission to the Department of Interior, Fish and Wildlife Service ("FWS"), FERC designated ECE as the non-federal representative for ESA informal consultation and required that ECE develop a draft biological assessment.

Since being designated as the non-federal representative for ESA informal consultation, ECE has engaged in discussions with the FWS on the Project, including meetings in person and by teleconference. These consultations include a meeting held October 2, 2008 at the Carlsbad Fish and Wildlife Service Office, a teleconference held March 5, 2009, and email correspondence throughout the consultation period. Most recently, ECE requested advice from the FWS regarding the format for preparation of the biological assessment. The FWS responded to this request by email July 24, 2009.

ECE met with the FWS on March 4, 2010 to brief FWS staff on project details, the draft Biological Assessment, and biological mitigation plans. ECE also received a briefing from FWS staff regarding FWS concerns, and current wildlife mitigation policies at this meeting.

The FWS submitted comments about the Project to the Commission on March 12, 2010 (*see* letter from the Department of Interior filed with the Commission on March 12, 2010). This draft Biological Assessment was revised in response to comments made by the FWS in their March 12, 2010 letter.

ECE will continue to informally and formally consult with the FWS regarding FWS concerns, and measures to minimize impacts to threatened and endangered species, as the Project progresses through the permitting process.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Carlsbad Fish and Wildlife Office
6010 Hidden Valley Road
Carlsbad, California 92011

In Reply Refer To:
FWS-ERIV-08B0101/08SL0096

NOV 19 2007

Ginger Gillin
GEI Consultants, Inc.
10860 Gold Center Drive, Suite 350
Cordova, California 95670

Subject: Request for Information on Endangered and Threatened Species for the Eagle Mountain Pumped Storage Project (FERC #12509), Desert Center, California

Dear Ms. Gillin:

This letter is in response to your inquiry and request for a species list that was received by our office on October 1, 2007, concerning Federal listed endangered and threatened species that may occur on the Eagle Mountain Pumped Storage Project near Desert Center, California. To assist you in evaluating the potential occurrence of species within the areas of interest, we are providing the enclosed list.

We do not have site-specific information for this area. Therefore, we recommend that you seek assistance from a biologist familiar with the habitat conditions and associated species in and around the project site to assess the actual potential for direct, indirect and cumulative impacts likely to result from the proposed activity.

We note that there are State listed wildlife concerns in this area. Therefore, the Service recommends that you contact the California Department of Fish and Game (CDFG) to obtain a State list of sensitive species that may occur in the area of the project site. Surveys would be required for State listed species pursuant to the California Environmental Quality Assessment (CEQA) analysis for a proposed development. For example, burrowing owls (*Athene cunicularia*) are commonly found on sites such as the project area. The state provides survey guidelines and mitigation requirements if this species is found on-site.

We appreciated your efforts to conduct a "pre-scoping meeting" with the agencies on October 25, 2007. The meeting provided valuable information regarding the project site and proposal. Should you have any questions regarding this letter or your responsibilities under the Act, please call Peggy Bartels of my staff at (760) 431-9440.

Sincerely,

Therese O'Rourke
Assistant Field Supervisor

cc: John Kalish, Bureau of Land Management, Palm Springs Field Office
Mark Massar, Bureau of Land Management, Palm Springs Field Office

Federally Listed and Sensitive Species
Which Occur or May Occur on, or Near the Eagle Mountain Project
Desert Center, California

WILDLIFE		
Common Name	**Scientific Name**	**Status**
Desert tortoise	*Gopherus agassizii*	T
Burrowing owl	*Athene cunicularia*	S
Prairie falcon	*Falco mexicanus*	S
California leaf-nose bat	*Macrotus californicus*	S
Le Conte's thrasher	*Toxostoma lecontei*	S

Status

E: endangered
T: threatened
C: candidate
S: sensitive/interest

CH: critical habitat
PCH: proposed critical habitat

United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
Pacific Southwest Region
1111 Jackson Street, Suite 520
Oakland, California 94607

IN REPLY REFER TO:
ER10/42

Electronically Filed

12 March 2010

Honorable Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, D.C. 20426

Subject: Review of Application Ready for Environmental Analysis; Eagle Mountain Pumped Storage Project, FERC No. 13123-002; Riverside County, California

Dear Ms. Bose:

The Department of the Interior has received and reviewed the subject document and has the following comments to offer.

The Carlsbad U.S. Fish and Wildlife Service Office (CFWO) has been informally consulting with the Eagle Crest Company on development of the Project since fall of 2007. CFWO appreciate efforts to avoid and minimize impacts to federal trust species. However, we remain concerned the project may have adverse impacts on desert tortoise (Gopherus agassizii) and other trust species.

Please consider the following recommendations to help Eagle Crest Company further reduce these impacts.

Desert tortoise designated critical habitat occurs within Project footprint. Currently, the project proposes to locate a 500 kilovolt (kV) transmission line within designated critical habitat for desert tortoise. The Service recommends transmission line be relocated out of critical habitat and collocated with existing transmission lines near project site.

New transmission lines not collocated with existing lines introduce new perching and nesting structures for a variety of desert tortoise avian predators. Such adverse effects need to be avoided to prevent increased predation rates on desert tortoise.

Project proposes to construct 13 miles of new transmission line. To avoid and minimize impacts to migratory birds and resident golden eagles, proposed transmission line should be built

according to applicable guidelines in the Service-approved document Avian Protection Plan Guidelines (available at http://www.fws.gov/migratorybirds) and an Avian Protection Plan be developed according to these guidelines.

We recommend applicant and FERC coordinate with the Service to determine whether surveys for golden eagles would be appropriate.

If you have questions regarding FWS comments, please contact Felicia Sirchia of the CFWO at 760-431-9440.

Thank you for the opportunity to review this project.

Sincerely,

Patricia Sanderson Port
Regional Environmental Officer

cc:
Director, OEPC
FWS, Region VIII

Appendix C – Technical Memoranda

12.15 Golden Eagle Aerial Surveys

Phase 1

Golden Eagle Aerial Surveys for Eagle Mountain Pumped Storage Project in the Mojave Desert Region, California

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for

Eagle Crest Energy Company
One El Paseo West Building
74-199 El Paseo, Suite 204
Palm Desert, CA 92260
(760) 889-9665

by

Wildlife Research Institute, Inc.
P.O. Box 2209
Ramona, CA 92065
(760) 789-3992
dbittner@wildlife-research.org
www.wildlife-research.org

July 15, 2010

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EXECUTIVE SUMMARY

This document reports on findings of the **Phase 1** survey**,** the first of 2 phases, for Golden Eagles within 10 miles of the Eagle Crest Energy Company's Eagle Mountain Pumped Storage Project boundary in order to comply with the U.S. Fish and Wildlife Service requirements. Thirteen mountain ranges were surveyed by Wildlife Research Institute biologists via helicopter on March 25th, March 26th, April 2nd, and April 3rd, 2010, between and around Blythe and Desert Center, California. Fourteen territories of Golden Eagles were found containing a combined 34 nests. Nine of the 14 territories were considered active in this year but only 1 was found with an incubating female. In addition, 51 Desert Bighorn Sheep were seen in 6 different locations. Besides 5 Golden Eagles, 12 other species were seen (i.e., Barn Owls, Bighorn Sheep, Cooper's Hawks, Common Ravens, Great Horned Owls, a Long-eared Owl, an Osprey, Prairie Falcons, Red-tailed Hawks, Swainson's Hawks, and Turkey Vultures) for a total of 340 wildlife documentations. All sightings have been documented with GPS locations and recorded on the attached maps and tables.

PROJECT SCOPE

The survey work reported here was conducted to record and report occupancy of Golden Eagles (GOEAs, *Aquila chrysaetos*) on and around the Eagle Mountain Pumped Storage Project (EMPSP) area, including a 10-mile spatial buffer from the proposed project boundary to allow for proper data interpretation of occupied territories, a U.S. Fish and Wildlife Service (USFWS) requirement (Pagel et al. 2010).

The EMPSP survey was completed while surveying 3 other nearby solar project sites. In an effort to reduce the financial burden on each client, the costs for the survey were shared among all 4 proponents. A few additional mountains, immediately south and west of the shared survey area, were covered specifically for the EMPSP proposed project area.

PROJECT BACKGROUND

Eagles are large predatory birds with up to 7-foot wingspans and raising young takes a large investment of time and energy. Breeding in Southern California starts in January, nest building and egg laying in February to March, and hatching and raising the young eagles occur from April through June. Once the young eagles are flying on their own, the adult eagles will continue to feed them and teach them to hunt until late November. They then repeat this process. This huge investment of time and energy on the part of the adults, just to raise one or two young, causes some pairs to take a year off from breeding once in awhile even when food is abundant.

WRI has learned, based on 22 years of helicopter and ground studies on GOEAs, that an initial helicopter survey can successfully identify 80 to 90% of the GOEA territories in a given area. Follow-up ground and helicopter surveys have indicated that some nests, and even some pairs, might be missed during the first survey. Second surveys are conducted to determine reproductive success but can identify successful nesting attempts that were missed during initial surveys as well as reveal fledging success.

STUDY AREA

The study area is approximately 1,600 square miles in size and located in the Mojave Desert, near Blythe, California (Figures 2 and 3). It includes the Big Maria, Chuckwalla, Coxcomb, Eagle, Hodges, Little Chuckwalla, Little Maria, McCoy, Orocopia and Palen mountain ranges as well as the Chuckwalla Valley. It is mostly Creosote Scrub and Yucca-Cactus transitional habitat at the lower areas and Rocky Outcrops at the higher elevations. A portion of the northwest corner of the study area lies in Joshua Tree National Park.

Figure 1. Vicinity Map.

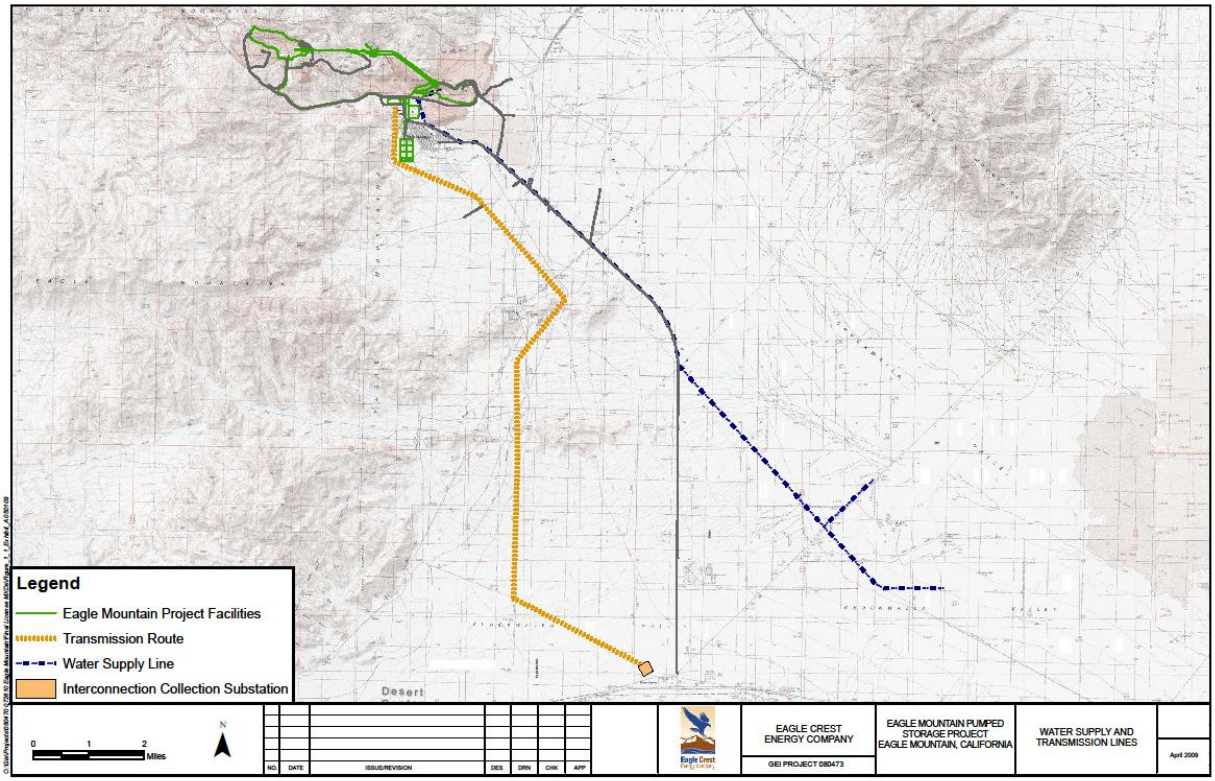

Figure 2. Location Map provided by Eagle Crest Energy Company.

METHODS AND CONSTRAINTS

For this survey, WRI attempted to determine which GOEA territories were active, even in the absence of incubating females, by evidence at the nest sites. Observations such as fresh green branches, material placed in the nest bowl such as yucca, and signs of new nest sticks built into and above old nest material all helped assess activity at the nest site during 2010. We contacted Dr. Larry LaPre, of the BLM, to request available historic records or reports of GOEA nesting activity and/or sightings in the project area. WRI utilized the information provided by Dr. LaPre to improve our survey focus. Surveys conducted over the Joshua Tree National Park required permits from the National Park Service.

It should be noted that all surveying and reporting complies with the current U.S. Fish and Wildlife Service Interim GOEA Inventory and Monitoring Protocols released in 2010 (Pagel et al. 2010).

Survey

On March 25 to 26 and April 2 to 3, 2010, WRI conducted helicopter surveys for the target species, GOEA. We used Hughes-500 helicopters that provided seating for three investigators including 2 GOEA biologists, a Bighorn Sheep biologist, and the pilot. We spent approximately 75 person-hours of actual aerial observations during the helicopter surveys for this phase and

concentrated on any area with suitable GOEA habitat. This included all or part of every mountain range in the study area; areas without suitable GOEA habitat were not surveyed. We also surveyed suitable transmission lines in the project area since GOEAs are known to nest on these types of structures and WRI has documented this activity in other parts of the Mojave Desert (WRI 2002, 2003, 2009).

GPS

Nest site and other location-specific data were determined and documented using hand-held GPS units (Garmin Map60GSx). A sequential number was assigned to each observation that corresponded to the GPS waypoint (see Appendix A for an explanation of acronyms used for waypoints). Waypoints were recorded using the UTM grid in the WGS 84 Datum. GPS was also used to track our survey routes. Handwritten notes were also taken that documented species and corresponded to each GPS waypoint.

Data

We photographed all active GOEA nests, some other raptor nests, representations of numerous inactive GOEA nest sites, and significant other wildlife species observed. The following data were also specifically collected (see Appendices B and C):

- Species
- Number of nests/alternative nests observed
- Condition of each nest and whether or not it was active
- Nest aspect
- Nest elevation
- Nest GPS coordinates
- Nest substrate (cliff, transmission tower, etc.)
- Age class of GOEAs and other species, if determinable
- Behavior of species observed.

An **active nest** is defined by the presence of one or more birds or evidence that new material has been added during the season that the survey is conducted. This often includes the construction of a bowl, used for incubation.
A nest in **good condition** has been worked on within the past 1 to 3 years; a determination made by observing the age of sticks or other materials that make up the nest and the presence of a bowl but no new material.
A nest in **fair condition** has not been used for several years, shows moderate signs of weathering, and could include a rough bowl.
A nest in **poor condition** shows strong signs of weathering, is in the process of deteriorating, and can often even be decomposing.

It should be noted that Red-tailed Hawks (*Buteo jamaicensis*) in particular, as well as other raptors such as Prairie Falcons (*Falco mexicanus*), sometimes utilize GOEA nests for their own nesting, something observed during this survey.

Nest Condition Examples:

Good condition and active

Fair condition

Poor condition

Constraints

In that this was a diurnal survey focused on GOEAs, we were less likely to observe nocturnal and crepuscular raptors (i.e., owls). Aerial surveys also tend to under-represent the smaller species, like the American kestrel (*Falco sparverius*) and burrowing owl (*Athene cunicularia*).

The release of the Interim GOEA Technical Guidance in February and subsequent contracts being finalized in March resulted in survey flights being scheduled late in the GOEA breeding season. Initiating surveys this late in the season may have resulted in missed observations of adult eagles on territory earlier in the year (December-February) that did not attempt to produce young.

High winds encountered during the middle of the first survey required us to abandon surveys for that day and reschedule an additional two days of helicopter flights several days later than originally planned.

RESULTS

Golden Eagles

We observed a total of 34 GOEA nests in the study area that represented an estimated 14 GOEA territories (Figure 4). These nests were in various conditions and some may not have been used for many years. It is important to note that many of the 34 nests are alternative nest sites for the same territory. We indicate "an estimated 14 GOEA territories" because the distinction between adjacent territories is not always clear (see Figure 5) and, often, can only be discerned after multiple seasons of field observations, starting early enough in the spring to document initial activity.

We documented 9 of these territories to be active or possibly active this year; a number of additional territories have apparently been active within the last 2-3 years. One GOEA territory (Northeast Coxcomb) included an incubating female. We will return in May to conduct Phase 2 of the survey and document if the incubating pair is successful and also if any of the other active territories successfully produced young from nests not initially found.

Table 1 lists the waypoint identification number for each GOEA nest identified, the status of the nest (e.g., active, inactive, etc), the territory name (incorporating the US Geological Survey Quad [USGS], the USFWS recommended naming convention), and the geographical area where the nest was located. Additionally, a comprehensive list of all nests identified during the survey and the associated species for each nest is provided in Table 2.

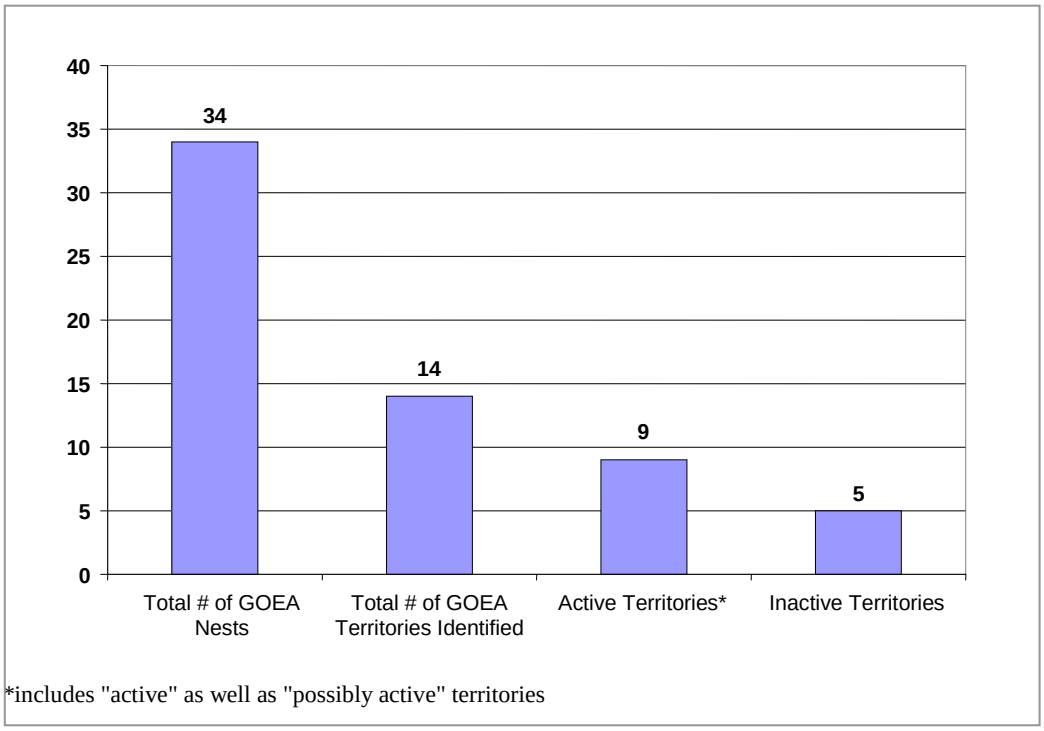

Figure 3. Phase 1 GOEA Territory Data for Eagle Crest Mojave Study Area.

Territory	Trip ID	Waypoint	Active	USGS Quad Territory Name	Geographic Area
1	**B**	**9**	**N**	**CA-SD-33115/E3-001-01**	**Chuckwalla Mtns S**
1	**B**	**49**	**N**	**CA-SD-33115/E3-002-01**	**Chuckwalla Mtns S**
2	A	26	Y	CA-SD-33114/G6-001-01	Big Maria Mtns
3	A	2	Y	CA-SD-33115/E5-001-01	Chocolate N
4	**B**	**43**	**N**	**CA-SD-33115/F3-001-01**	**Chuckwalla Mtns N**
4	**B**	**44**	**N**	**CA-SD-33115/F3-001-02**	**Chuckwalla Mtns N**
4	**B**	**77**	**P**	**CA-SD-33115/F3-001-03**	**Chuckwalla Mtns N**
4	**B**	**77**	**P**	**CA-SD-33115/F3-001-04**	**Chuckwalla Mtns N**
5	**D**	**4**	**N**	**CA-SD-33115/H3-001-01**	**Coxcomb Mtns CW**
5	**D**	**5**	**N**	**CA-SD-33115/H3-001-02**	**Coxcomb Mtns CW**
5	**D**	**43**	**N**	**CA-SD-34115/A4-001-01**	**Coxcomb Mtns CW**
5	**D**	**44**	**N**	**CA-SD-34115/A4-001-02**	**Coxcomb Mtns CW**
5	**D**	**45**	**P**	**CA-SD-34115/A4-001-03**	**Coxcomb Mtns CW**
5	**D**	**46**	**N**	**CA-SD-34115/A4-001-04**	**Coxcomb Mtns CW**
6	**C**	**10**	**N**	**CA-SD-34115/A3-001-01**	**Coxcomb Mtns NE**
6	**C**	**17**	**N**	**CA-SD-34115/A3-002-02**	**Coxcomb Mtns NE**
6	**C**	**12**	**Y-Inc**	**CA-SD-34115/A3-001-03**	**Coxcomb Mtns NE**
6	**C**	**13**	**N**	**CA-SD-34115/A3-001-04**	**Coxcomb Mtns NE**
6	**C**	**14**	**N**	**CA-SD-34115/A3-001-05**	**Coxcomb Mtns NE**
7	**D**	**50**	**Y**	**CA-SD-33115/G3-001-01**	**Coxcomb Mtns SW**
7	**D**	**51**	**N**	**CA-SD-33115/G3-001-02**	**Coxcomb Mtns SW**
7	**D**	**53**	**N**	**CA-SD-33115/G3-001-03**	**Coxcomb Mtns SW**
8	**D**	**32**	**N**	**CA-SD-33115/H5-001-01**	**Eagle Mtns NW**
8	**D**	**34**	**N**	**CA-SD-33115/H5-001-02**	**Eagle Mtns NW**
8	**D**	**35**	**Y**	**CA-SD-33115/H5-001-03**	**Eagle Mtns NW**
9	**B**	**114**	**N**	**CA-SD-33115/F5-001-01**	**Eagle Mtns S**
10	A	4	N	CA-SD-33115/D1-001-01	Little Chuckwalla Mtns
11	A	54	N	CA-SD-33114/G7-001-01	Little Maria Mtns SE
12	A	56	N	CA-SD-33114/F7-001-01	McCoy Mtns SE
13	A	47	P	CA-SD-33115/G1-001-01	Palen Mtns C
13	A	47	P	CA-SD-33115/G1-001-02	Palen Mtns C
13	C	6	N	CA-SD-33115/G1-001-03	Palen Mtns C
14	**B**	**118**	**N**	**CA-SD-33115/G5-001-01**	**Eagle Mtns C**
14	**B**	**124**	**Y**	**CA-SD-33115/G5-001-02**	**Eagle Mtns C**

Inc=Incubating; N=No; P=Possibly; Y=Yes

Table 1. Golden Eagle territories identified during Phase 1 surveys with USGS Quad territory/site names and geographic locations. Active territories are highlighted in yellow; territories impacted by the Eagle Crest Project are bolded and territories not relevant to the Eagle Crest Project are shaded in light grey.

Species	Big Maria Mtns	Chocolate Mtns	Chuckwalla Mtns	Chuckwalla Valley	Coxcomb Mtns	Eagle Mtns	Hodges Mtns	Little Chuckwalla Mtns	Little Maria Mtns	McCoy Mtns	Mecca Hills	Orocopia Mtns	Palen Mtns	Nest Totals
Common Raven nest			4		2	3								9
Common Raven nest (incubating)			6	7							2	1		16
Golden Eagle nest			4		11	4		1	1	1			1	23
Golden Eagle nest (active)	1	1	2		2	2							2	10
Golden Eagle nest (incubating)					1									1
Great Horned Owl cavity nest			1											1
Long-eared Owl (incubating)					1									1
Prairie Falcon cavity nest					1			1						2
Prairie Falcon cavity nest (incubating)						2								2
Red-tailed Hawk nest	3		2	11	6	8				1		5		36
Red-tailed Hawk nest (incubating)	3		8	16	1	4	1	1					1	35
Unidentified			2		3				1					6
Nest Totals	7	1	29	34	28	23	1	3	2	2	2	6	4	142

Table 2. GOEA and all other nest observations; totals presented by geographic area as well as by species.

AERIAL SURVEY MAPS BY MOUNTAIN RANGE

Overview of GOEA Territories Surrounding the EMPSP Project Area

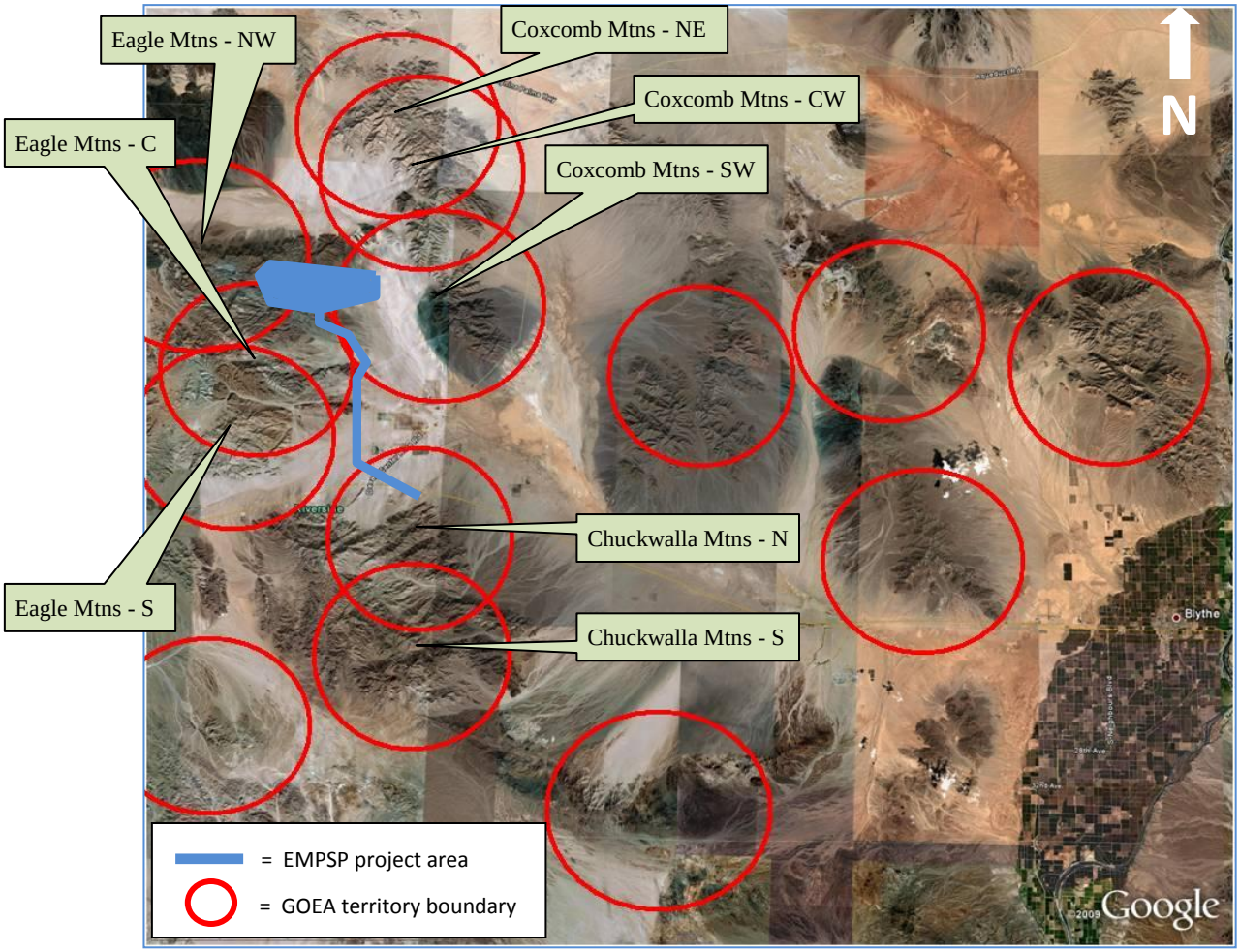

Figure 4. Overview map of all GOEA territories, with an approximate 5-mile GOEA territory radius, surrounding the Eagle Mountain Pumped Storage Project area in the Mojave Desert Region.

Legend for Aerial Surveys Maps

Figure 5 provides a description of the waypoint labels and abbreviations noted on the following survey maps (Figures 6 to 21).

Map Legend	
A50GESN-1	observation ID
A =	trip
50 =	waypoint ID
GE =	Golden Eagle
SN =	stick nest
1 =	one bird/animal present
AK =	American Kestrel
BO =	Barn Owl
BS =	Bighorn Sheep
CN =	cavity nest
CH =	Cooper's Hawk
CR =	Common Raven
GE =	**Golden Eagle**
GF =	Grey Fox
GO =	Great Horned Owl
LO =	Long-eared Owl
NH =	Northern Harrier
OS =	Osprey
PE =	Peregrine Falcon
PR =	Prairie Falcon
RT =	Red-tailed Hawk
SN =	stick nest
SW =	Swainson's Hawk
TN =	tower nest
TV =	Turkey Vulture
U =	unidentified
XX =	other
Helicopter Flight Paths	
=	March 25, 2010
=	March 26, 2010
=	April 2, 2010
=	April 3, 2010
=	Estimated GOEA territory with 5-mile radius

Figure 5. Survey map legend for the GOEA territory maps (Figures 6-21).

Big Maria Mountains

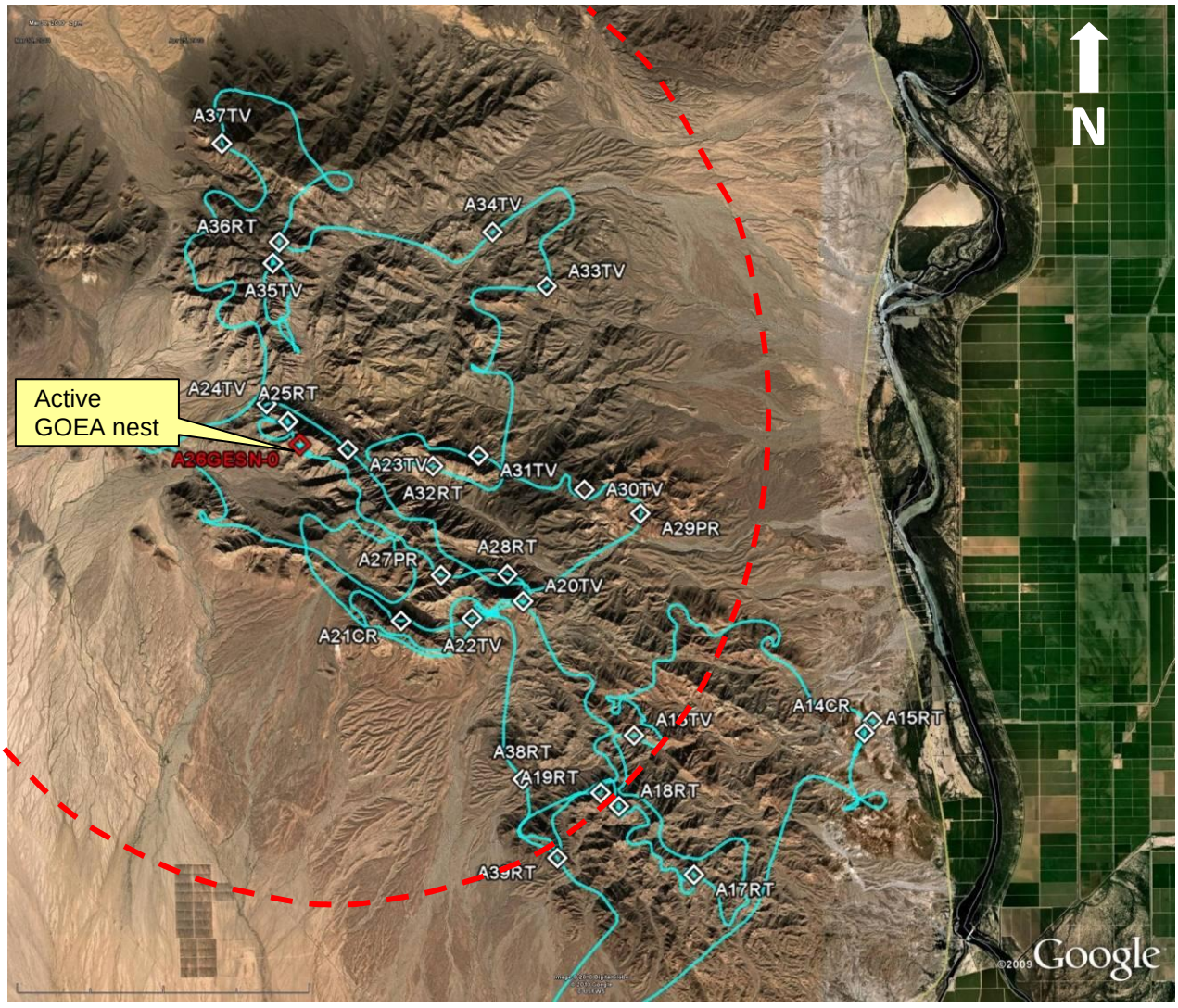

Figure 6. Big Maria Mountains, active territory. All waypoints for species and nests observed, the helicopter flight path, and an approximate 5-mile GOEA territory radius are provided.

Big Maria Mountains

An active GOEA nest (A26GESN-0); good condition, new material this season.

A detailed photograph of the above GOEA nest (A26GESN-0).

Chuckwalla Mountains - North

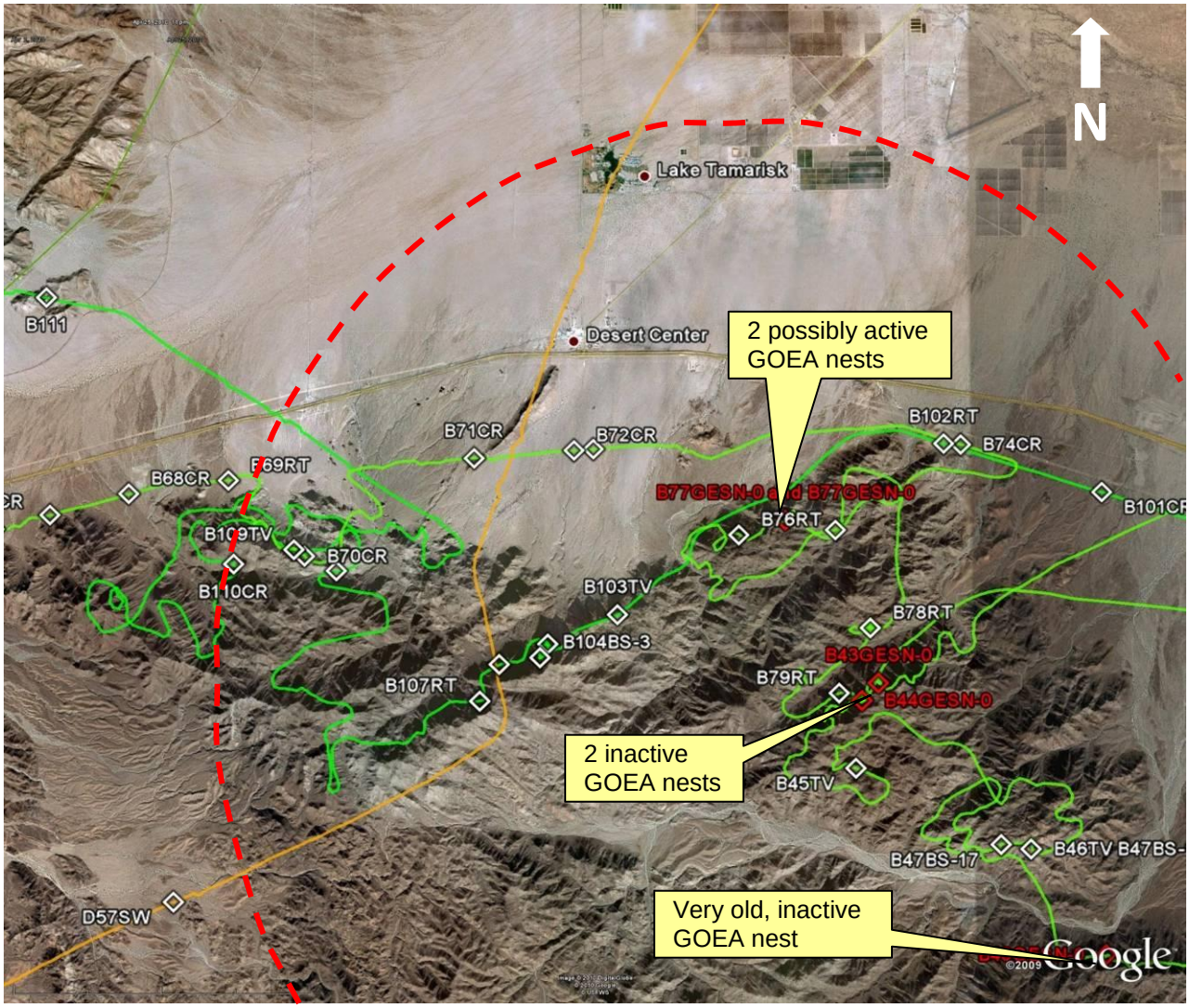

Figure 7. Chuckwalla Mountains - North, possibly active territory. All waypoints for species and nests observed, the helicopter flight path, and an approximate 5-mile GOEA territory radius are provided.

Chuckwalla Mountains - North

An inactive GOEA nest (B44GESN-0); good condition.

A possibly active GOEA nest (B77GESN-0); good condition, 1 of 2 nests at this location.

Chuckwalla Mountains - South

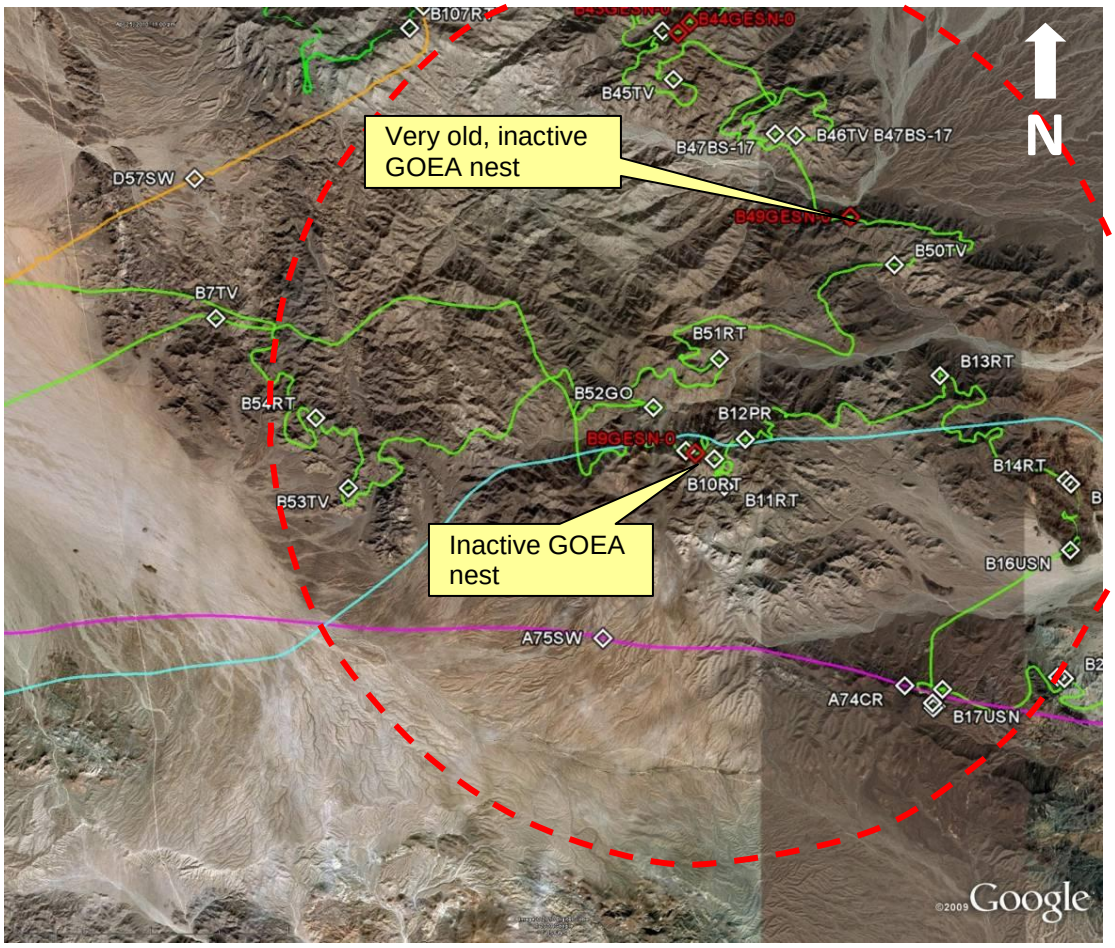

Figure 8. Chuckwalla Mountains - South, inactive territory. All waypoints for species and nests observed, the helicopter flight paths, and an approximate 5-mile GOEA territory radius are provided.

An inactive GOEA nest (B49GESN-0). Poor condition, very old nest.

Chocolate Mountains - North
(just south of designated survey area)

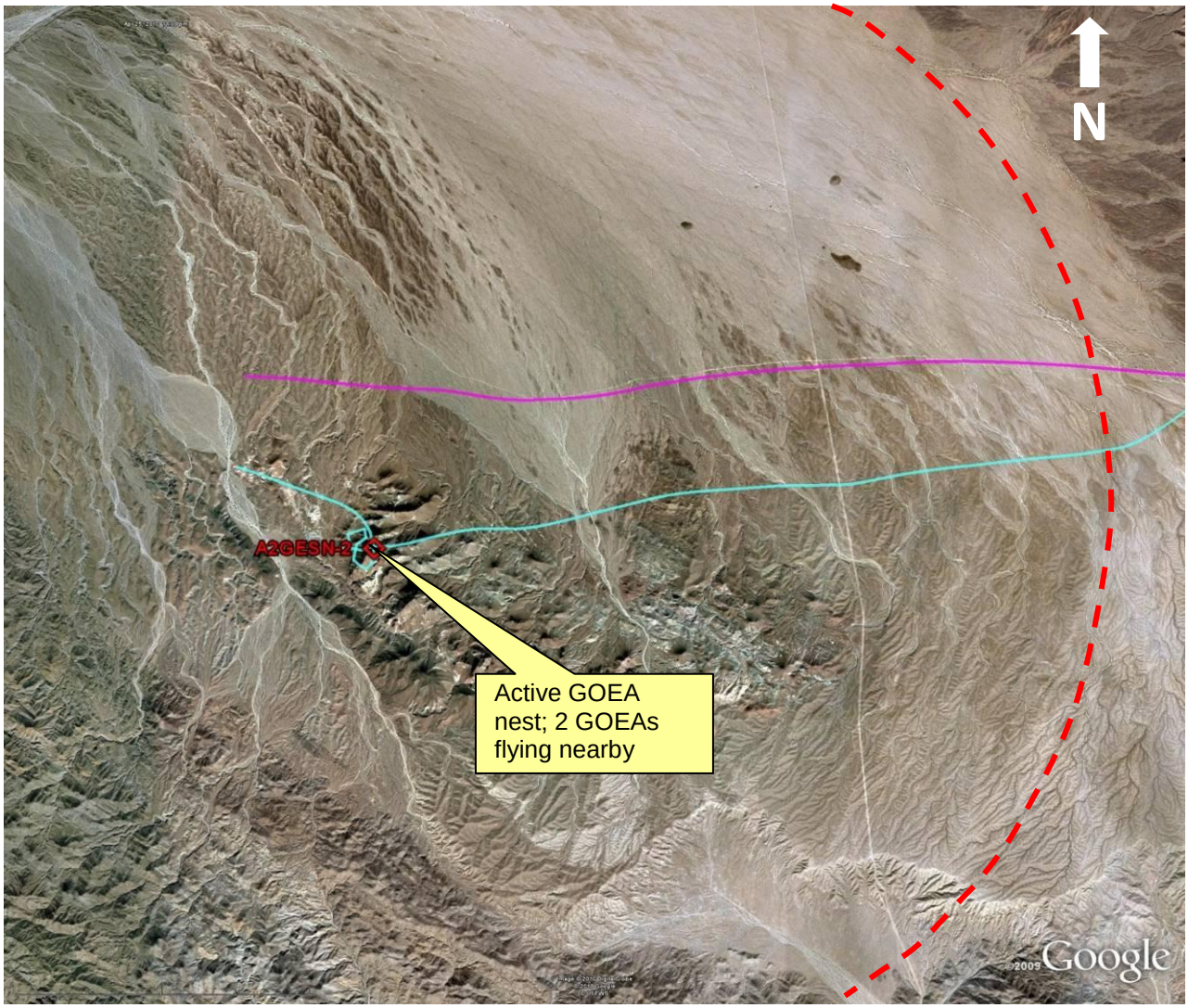

Figure 9. Chocolate Mountains - North, active territory. All waypoints for species and nests observed, the helicopter flight paths, and an approximate 5-mile GOEA territory radius are provided. Two GOEAs were observed flying near the nest site; one adult and one 2 to 3 year-old sub-adult. This territory is outside of the required survey boundaries but is included since GOEAs were found during the flights.

Chuckwalla Valley

Figure 10. Chuckwalla Valley. All waypoints for species and nests observed, the helicopter flight path are provided. No GOEA nests were observed in this area.

Coxcomb Mountains - Northeast

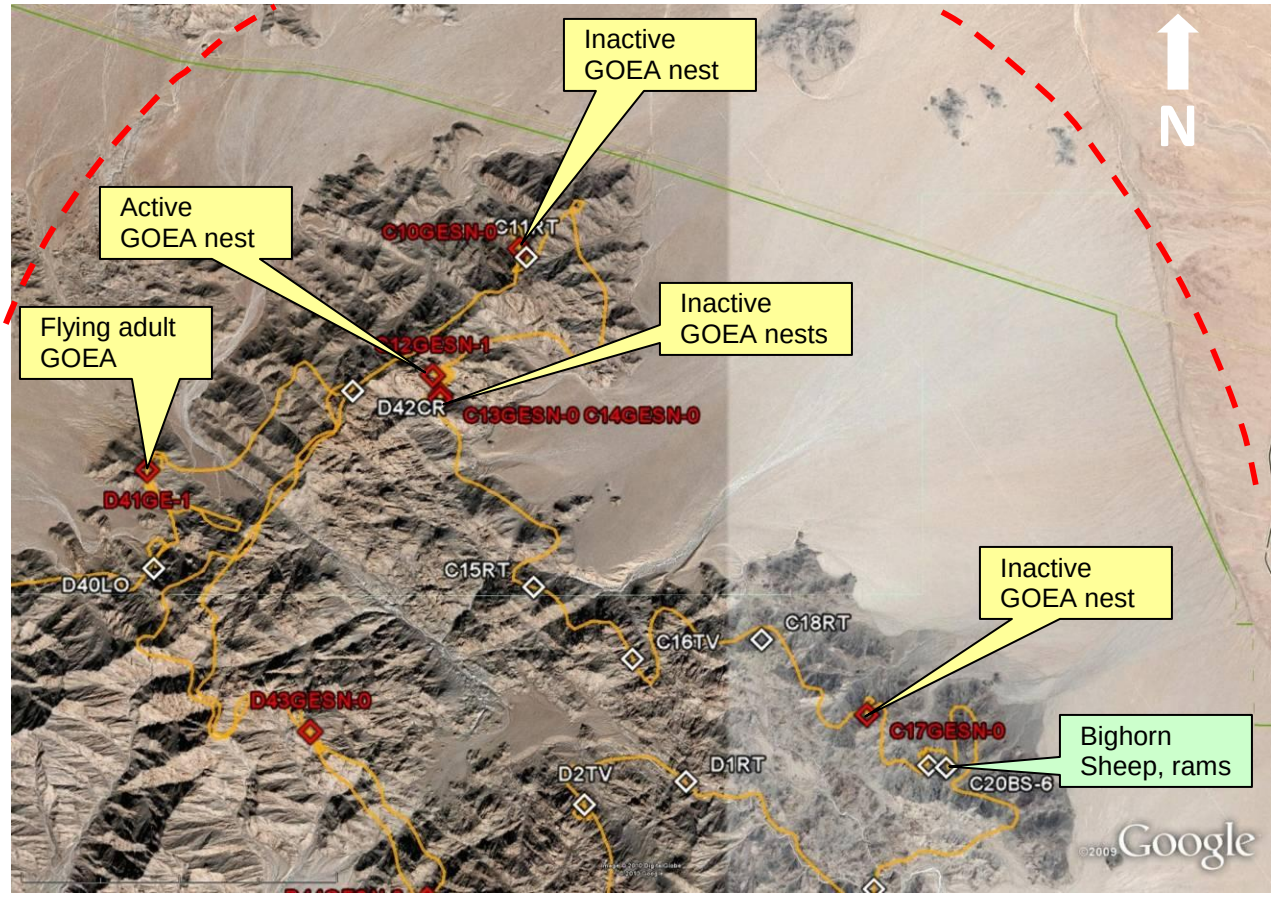

Figure 11. Coxcomb Mountains - Northeast, active territory. All waypoints for species and nests observed, the helicopter flight paths, and an approximate 5-mile GOEA territory radius are provided.

Coxcomb Mountains - Northeast

An incubating Long-eared Owl in old Prairie Falcon cavity nest (D40LOCN-1).

An inactive GOEA nest (C13GESN-0); poor condition, adult GOEA carcass in nest.

Coxcomb Mountains - Northeast

An incubating Golden Eagle (C12GESN-1).

Bighorn Sheep (C20BS-6), 5 of 6 rams observed.

Coxcomb Mountains – Central West

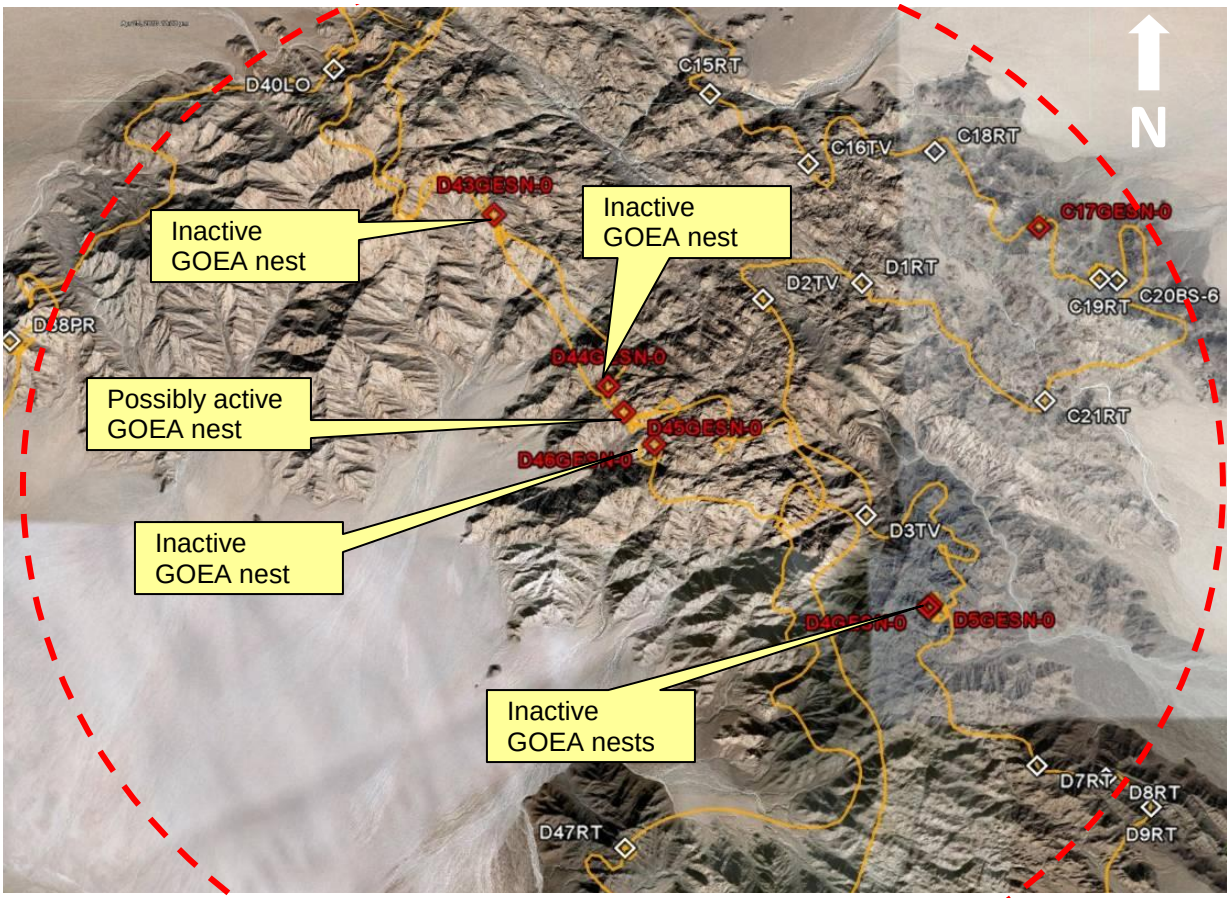

Figure 12. Coxcomb Mountains – Central West, possibly active territory. All waypoints for species and nests observed, the helicopter flight path, and the USFWS recommended 5-mile GOEA territory radius are provided.

Coxcomb Mountains – Central West

An inactive GOEA nest (D46GESN-0); fair condition.

A possibly active GOEA nest (D45GESN-0); good condition.

Coxcomb Mountains - Southwest

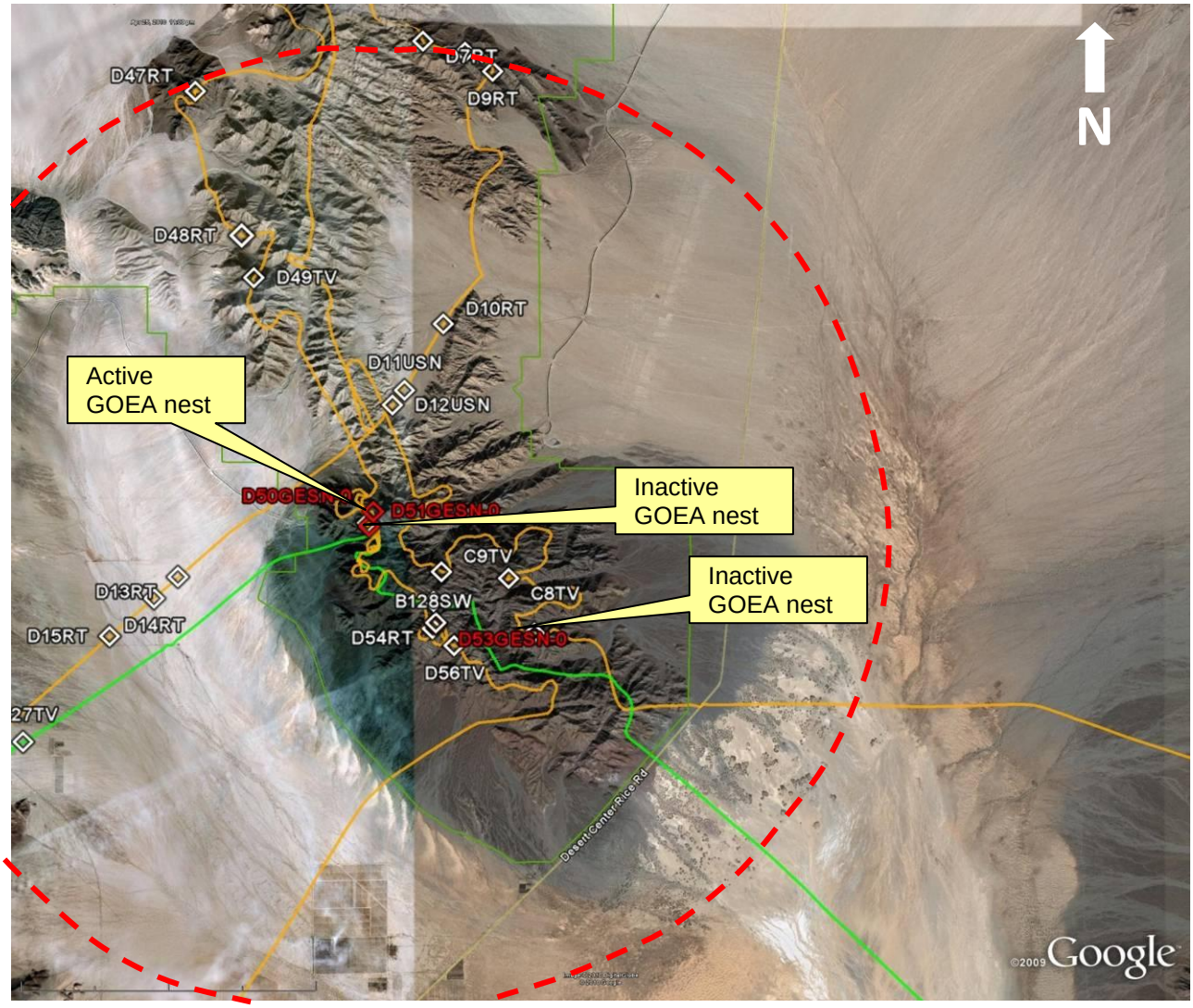

Figure 13. Coxcomb Mountains - Southwest, active territory. All waypoints for species and nests observed, the helicopter flight paths, and an approximate 5-mile GOEA territory radius are provided..

Coxcomb Mountains - Southwest

An inactive GOEA nest (D53GESN-0); good condition.

An active GOEA nest (D50GESN-0); good condition.

Eagle Mountain - North

Figure 14. Eagle Mountain - North, active territory. All waypoints for species and nests observed, the helicopter flight paths, and an approximate 5-mile GOEA territory radius are provided.

An incubating Prairie Falcon in cavity nest (D36PRCN-1).

Eagle Mountain - North

An active GOEA nest (D35GESN-0); good condition.

An inactive GOEA nest (D32GESN-0); good condition.

Eagle Mountain – Central

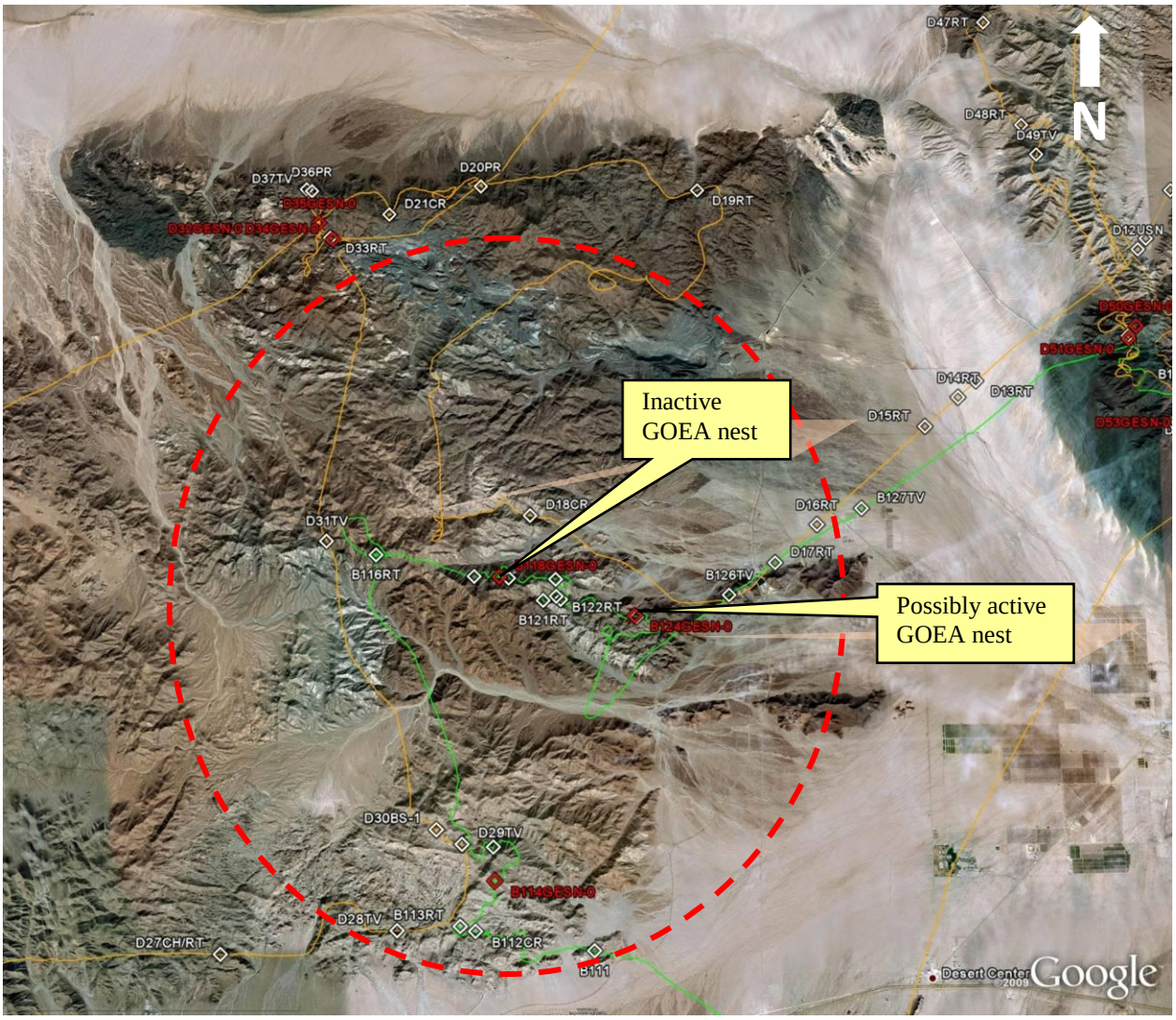

Figure 15. Eagle Mountain - Central, active territory. All waypoints for species and nests observed, the helicopter flight paths, and an approximate 5-mile GOEA territory radius are provided.

Eagle Mountain – Central

A possibly active GOEA nest (B124GESN-0); good condition, possible new material.

An inactive GOEA nest (B118GESN-0); poor condition, likely abandoned due to rock collapse.

Eagle Mountain – South

Figure 16. Eagle Mountain - South, inactive territory. All waypoints for species and nests observed, the helicopter flight paths, and an approximate 5-mile GOEA territory radius are provided.

An inactive GOEA nest (B114GESN-0); fair condition.

Little Chuckwalla Mountains and Hodges Mountains

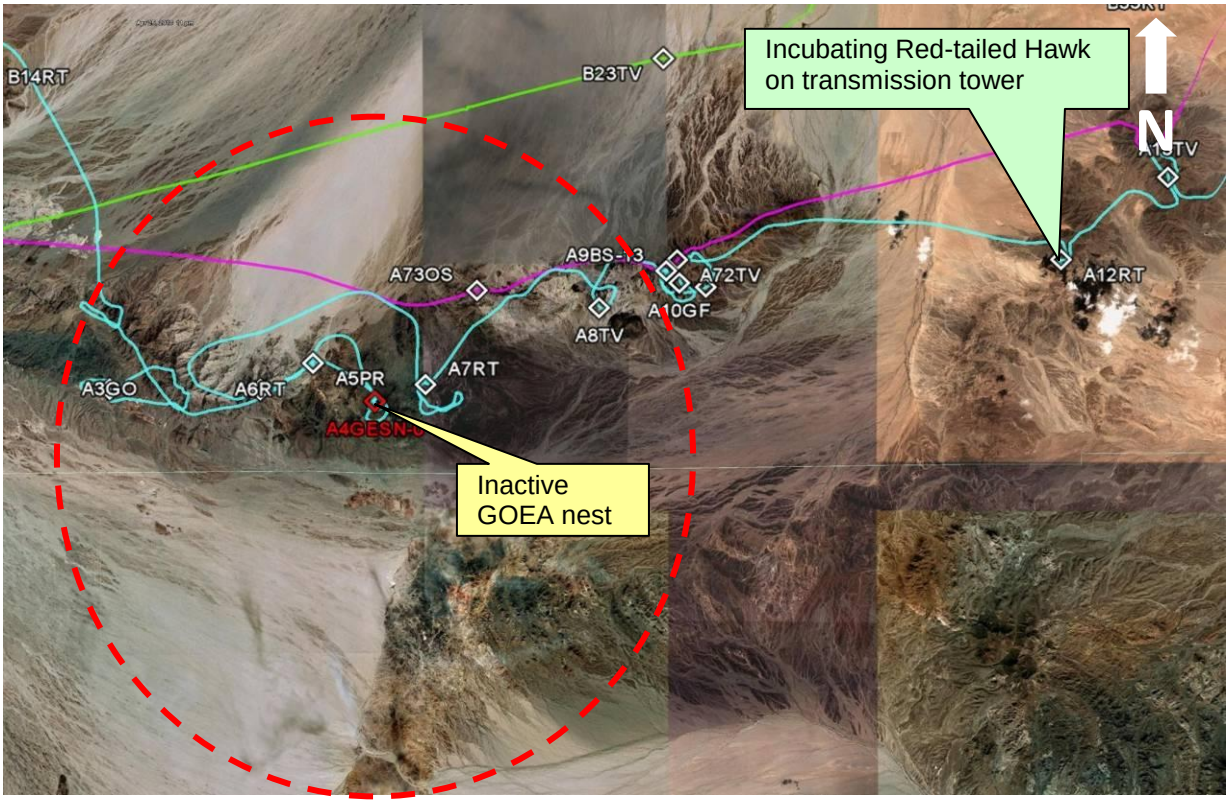

Figure 17. Little Chuckwalla Mountains and Hodges Mountains, inactive territory. All waypoints for species and nests observed, the helicopter flight paths, and an approximate 5-mile GOEA territory radius are provided.

Little Chuckwalla Mountains and Hodges Mountains

An incubating Red-tailed Hawk on a transmission tower nest (A12RTSN-1).

An inactive GOEA nest (A4GESN-0); good condition and likely active within past 1-2 years.

Little Maria Mountains

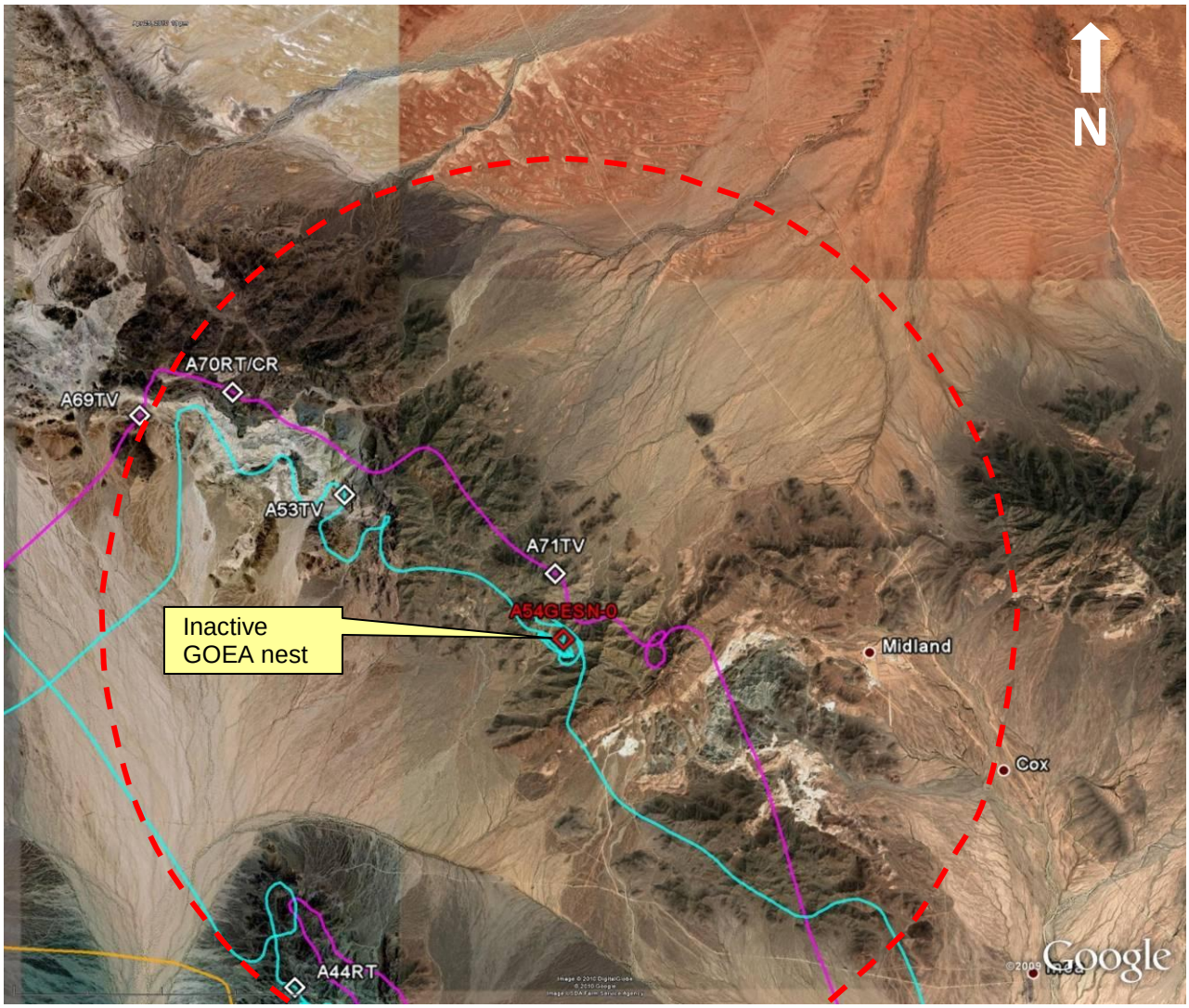

Figure 18. Little Maria Mountains, inactive territory. All waypoints for species and nests observed, the helicopter flight paths, and an approximate 5-mile GOEA territory radius are provided.

McCoy Mountains

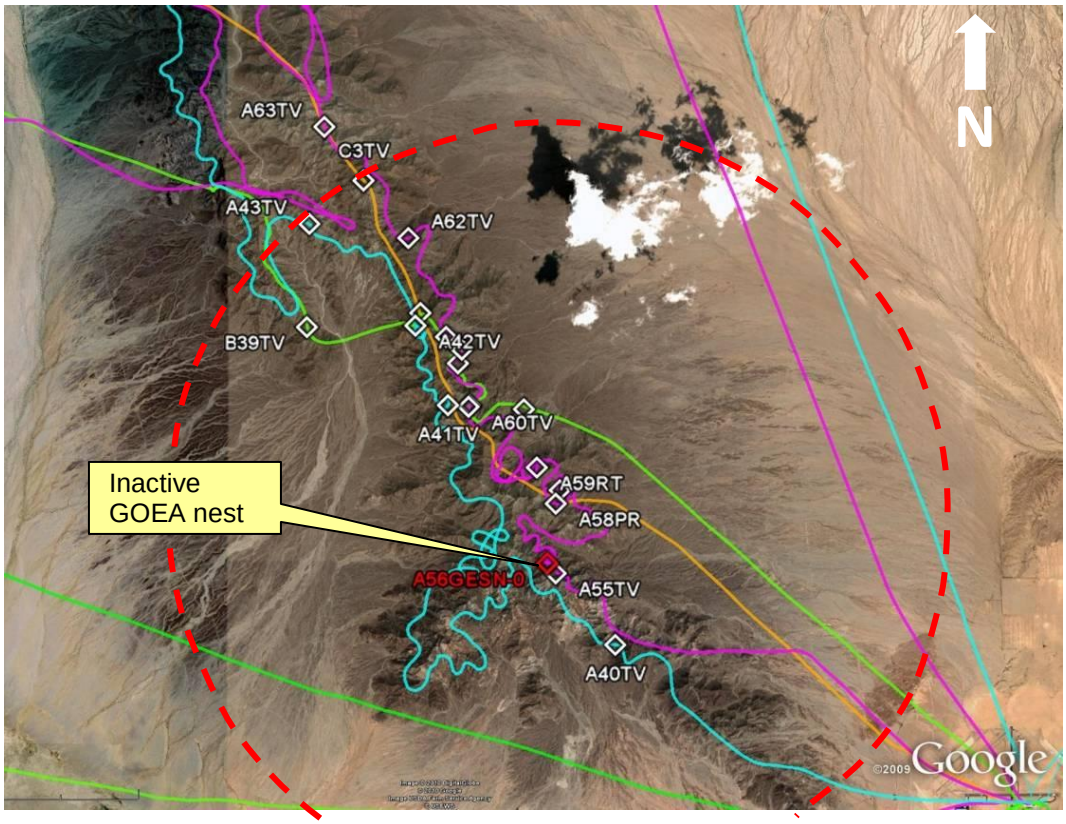

Figure 19. McCoy Mountains, inactive territory. All waypoints for species and nests observed, the helicopter flight paths, and an approximate 5-mile GOEA territory radius are provided.

An inactive GOEA nest (A56GESN-0); poor condition.

Orocopia Mountains

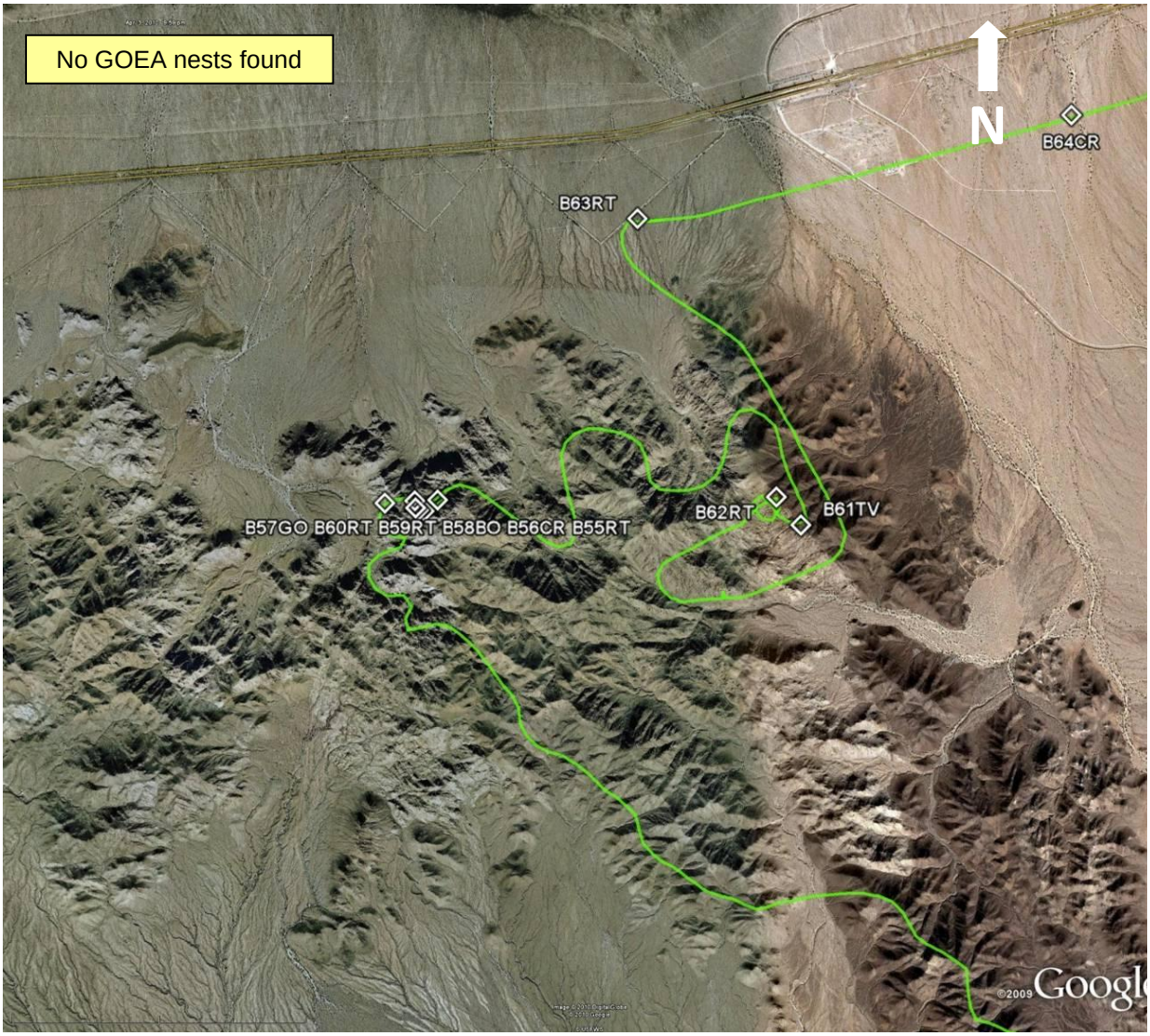

Figure 20. Orocopia Mountains. All waypoints for species and nests observed, and the helicopter flight path. A survey of this entire mountain range was not deemed necessary since the habitat was marginally sufficient to support GOEAs and did not provide adequate GOEA nesting substrate.

Palen Mountains

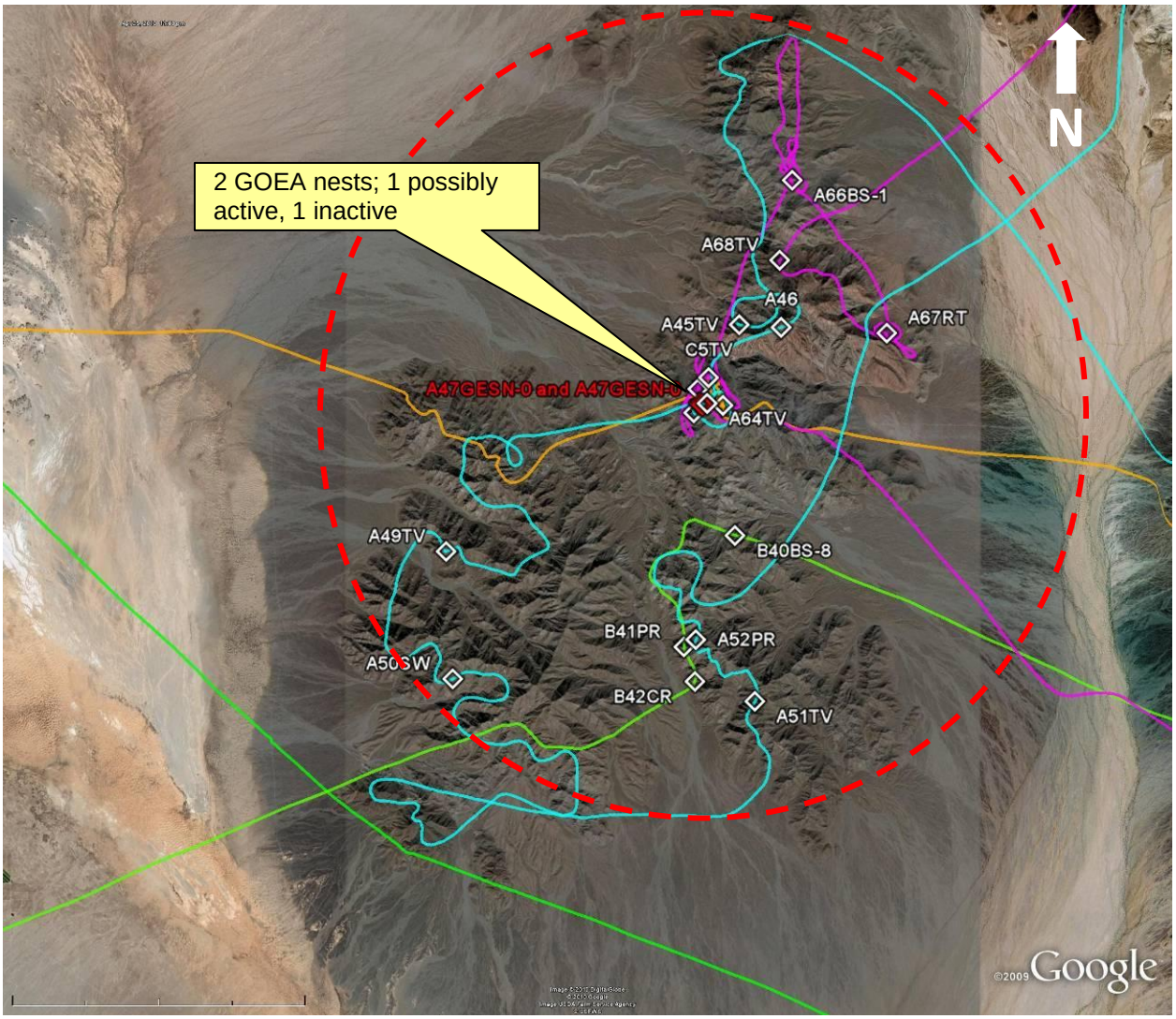

Figure 21. Palen Mountains, possibly active territory. All waypoints for species and nests observed, the helicopter flight paths, and an approximate 5-mile GOEA territory radius are provided.

DISCUSSION OF FINDINGS

While evaluating the data from this 2010 survey, it is important to take the current drought and its effects on GOEA reproduction into account. Without the context of knowing the effects of the drought on GOEA breeding, one might come to a false conclusion about the population of GOEAs in the study area. Since breeding in Southern California starts in January and this study was initiated in late March when only those eagles that were successful would be incubating, no opportunity was afforded to actually get a true number of pairs of GOEAs that attempted to reproduce but failed. Therefore, the number of active territorial pairs of GOEAs in the study area could be higher than those actually identified.

Although a circle with a 5-mile radius (approximately 78 square miles) has been placed around the GOEA core nesting areas on the survey maps, a USFWS requirement in the absence of other data, most desert-nesting GOEAs actually have much larger territories. Research on GOEAs in prime habitat indicates territories are 20 to 25 square miles in size (Hunt and Hunt 2005; Bittner 2010) while most desert-nesting GOEAs have much larger territories encompassing 100 to 120 square miles due to the lack of prime foraging areas (Bittner 2010).

During this Phase 1 survey, we observed 142 total nests, 34 of which were GOEA nests. These nests account for an estimated 14 GOEA territories; 6 active, 3 possibly active, and 5 inactive. Every mountain range in the study area, except for the Orocopia and Hodges Mountains, had nest evidence of GOEA breeding attempts in recent years but not all had evidence of 2010 activity. As previously noted, this is not unusual since healthy populations of GOEAs may average as few as 62% of pairs breeding in any one year (Kochert et al. 2002).

Numerous raptors and mammals were observed (i.e., Barn Owls, Bighorn Sheep, Cooper's Hawks, Common Ravens, Great Horned Owls, a Grey Fox, a Long-eared Owl, an Osprey, Prairie Falcons, Red-tailed Hawks, Swainson's Hawks, and Turkey Vultures) totaling 340 wildlife documentations, including 5 Golden Eagles and 51 Desert Bighorn Sheep.

RECOMMENDATIONS

Further surveys and monitoring of the study area are warranted and recommended since no scientific data are available regarding the effects large solar arrays potentially have on GOEA habitat. The degree of foraging area loss is an unquantified impact at this time and cannot be based simply on the amount within an arbitrary circle. Marking and satellite telemetry of GOEAs in the area is also recommended since this is the best and most economical method of determining the movements and foraging behavior of GOEAs over a large landscape.

Placing satellite transmitters on young GOEAs from nests in the area will allow scientific data to be collected regarding the actual usage of the project area by resident GOEAs. Since this GOEA study was coordinated and cooperatively funded by several proponents, a shared-cost project would be a relatively inexpensive means (per proponent) of satisfying the USFWS requirement for ongoing monitoring of the project area.

LITERATURE CITED

Bittner J.D. Wildlife Research Institute, Inc. 2010. Unpublished data.

Hunt G. and T. Hunt. 2005. The Trend of Golden Eagle Territory Occupancy in the Vicinity of the Altamont Pass Wind Resource Area. Prepared for California Energy Commission. (P500-2006-056).

Kochert M.N., C.L. Steenhof, C.L. McIntyre and E.H. Craig. 2002. Golden Eagle(*Aquila chrysaetos*). In A. Poole and F. Gill (eds). The Birds of North America #684. The Birds of North America, Inc. Philadelphia, PA.

Pagel J.E., D.M. Whittington and G.T. Allen. 2010. Interim Golden Eagle technical guidance: Inventory and monitoring protocols; and other recommendations in support of Golden Eagle management and permit issuance. Division of Migratory Bird Management, U.S. Fish and Wildlife Service.

APPENDIX A: Acronyms and Definitions for Waypoint Data and Maps

Map (reference) Legend	
A50GESN-1	Example
A =	trip
50 =	waypoint id
GE =	Golden Eagle
SN =	stick nest
1 =	one bird present
AK =	American Kestrel
BO =	Barn Owl
BS =	Bighorn Sheep
CN =	cavity nest
CH =	Cooper's Hawk
CR =	Common Raven
GE =	**Golden Eagle**
GF =	Grey Fox
GO =	Great Horned Owl
LO =	Long-eared Owl
NH=	Northern Harrier
OS =	Osprey
PE =	Peregrine Falcon
PR =	Prairie Falcon
RT =	Red-tailed Hawk
SN =	stick nest
SW =	Swainson's Hawk
TN =	tower nest
TV =	Turkey Vulture
U =	unidentified
XX =	other
Helicopter Flight Paths	
=	March 25, 2010
=	March 26, 2010
=	April 2, 2010
=	April 3, 2010
=	Estimate GOEA territory with 5-mile radius

Waypoint Data Key	
Nest Condition	
F =	Fair shape
G =	Good shape
P =	Poor shape/deteriorating (see Methods in text for definitions)
Substrate	
R =	Rock
TT =	Transmission Tower
Active Nest	
Y =	Yes (new material been added or nest has been worked on this season)
N =	No
P =	Possibly

APPENDIX B: Golden Eagles and Significant Other Wildlife Species Observed

Species	Big Maria Mtns	Chocolate Mtns	Chuckwalla Mtns	Chuckwalla Valley	Coxcomb Mtns	Eagle Mtns	Hodges Mtns	Little Chuckwalla Mtns	Little Maria Mtns	McCoy Mtns	Mecca Hills	Orocopia Mtns	Palen Mtns	Species Totals
Barn Owl										1		1	1	3
Bighorn Sheep			20		6	3		13					9	51
Cooper's Hawk						1								1
Common Raven	3		10	9		2				2	2	2	1	31
Golden Eagle		2		1	2									5
Grey Fox								1						1
Great Horned Owl			2					1		1		1		5
Long-eared Owl					1									1
Osprey								1						1
Prairie Falcon	2		2			2				1			2	9
Red-tailed Hawk	8		15	19	8	7	1	3		1			1	63
Swainson's Hawk			2		14								4	20
Turkey Vulture	20		29	1	15	8	1	31	7	23		3	11	149
Species Totals	33	2	80	30	46	23	2	50	7	29	2	7	29	340

APPENDIX C: Waypoints and Related Data for Golden Eagle and Other Observations

Map coordinates (i.e., UTM, latitude/longitude) of the nests for Golden Eagles, Peregrine Falcons, and Prairie Falcons have been withheld per request of federal agencies in order to protect these sensitive species, but are on file at WRI. If needed, this information is available upon request.

Map Reference											
Trip ID	Waypoint	Species	Nest Type	# of Individuals	Position (UTM)	Aspect	Nest Condition	Substrate	Active Nest	Elevation	Notes (age, sex, behavior, etc.)
March 25, 2010 - 3 flights - 8 hours total time - sunny, 60-70F, 0% cloud cover, 10-20mph (gusts 30)											
A	**2**	**GE**	**SN**	**-0**		**N**	**G**	**R**	**Y**	**2590 ft**	
A	**2**	**GE**		**-2**						**2590 ft**	**1 adult and 1 juvenile (2-3 yrs old), both flying**
A	3	GO		-1	11 S 667250 3703282						
A	**4**	**GE**	**SN**	**-0**		**N**	**G**	**R**	**N**	**1742 ft**	**white-wash, active within past 1-2 years**
A	5	PR	CN	-0							
A	6	RT	SN	-1	11 S 672615 3703320						
A	7	RT		-2	11 S 678332 3703623						
A	8	TV		-2	11 S 684416 3706512						
A	9	BS		-13	11 S 686764 3707857						
A	10	GF		-1	11 S 687237 3707449						
A	11	TV		-1	11 S 688183 3707327						
A	12	RT	SN	-1	11 S 700787 3708538						
A	13	TV		-1	11 S 704441 3711538						
A	14	CR		-2	11 S 728470 3739803						
A	15	RT	SN	-0	11 S 728245 3739710						
A	16	TV		-1	11 S 723259 3739569						
A	17	RT	SN	-1	11 S 724590 3736613						
A	18	RT	SN	-0	11 S 722963 3738088						
A	19	RT	SN	-0	11 S 722572 3738354						
A	20	TV		-1	11 S 720861 3742407						
A	21	CR		-1	11 S 718301 3741944						
A	22	TV		-7	11 S 719778 3742009						
A	23	TV		-2	11 S 717112 3745551						
A	24	TV		-1	11 S 715330 3746501						
A	25	RT	SN	-1	11 S 715833 3746132						
A	**26**	**GE**	**SN**	**-0**		**S**	**G**	**R**	**Y**	**2291 ft**	**new material**
A	27	PR		-1							
A	28	RT		-2	11 S 720506 3742963						
A	29	PR		-1	11 S 723191 3744587						
A	30	TV		-2	11 S 722285 3744640						
A	31	TV		-1	11 S 719866 3745480						

Map Reference											
Trip ID	Waypoint	Species	Nest Type	# of Individuals	Position (UTM)	Aspect	Nest Condition	Substrate	Active Nest	Elevation	Notes (age, sex, behavior, etc.)
A	32	RT	SN	-1	11 S 718904 3745239						
A	33	TV		-1	11 S 721221 3749138						
A	34	TV		-1	11 S 720047 3750286						
A	35	TV		-2	11 S 715527 3749421						
A	36	RT		-1	11 S 715668 3749853						
A	37	TV		-1	11 S 714351 3751971						
A	38	RT		-1	11 S 720901 3738545						
A	39	RT		-1	11 S 721677 3736862						
A	40	TV		-1	11 S 702769 3725351						
A	41	TV		-2	11 S 698969 3730661						
A	42	TV		-3	11 S 698227 3732412						
A	43	TV		-1	11 S 695855 3734624						
A	44	RT		-1	11 S 691854 3741999						
A	45	TV		-1	11 S 680296 3745393						
A	46	XX			11 S 681228 3745303					4236 ft	2 people on top of mountain
A	**47**	**GE**	**SN**	**-0**		**N**	**G**	**R**	**P**	**2871 ft**	
A	**47**	**GE**	**SN**	**-0**		**N**	**F**	**R**	**N**	**2871 ft**	
A	48	BO		-1	11 S 679262 3743327						
A	49	TV		-1	11 S 673524 3740012						
A	50	SW		-4	11 S 673730 3737044						
A	51	TV		-2	11 S 680815 3736643						
A	52	PR		-1	11 S 679400 3738066						
A	53	TV		-2	11 S 692687 3752019						
A	**54**	**GE**	**SN**	**-0**		**W**	**P**	**R**	**N**	**2304 ft**	**very old nest**
March 26, 2010 - 2 flights - 3.25 hours total time - sunny, 60-70F, 0% cloud cover, 10-20mph (gusts 25)											
A	55	TV		-2	11 S 701410 3726953						
A	**56**	**GE**	**SN**	**-0**		**N**	**P**	**R**	**N**	**1995 ft**	**old nest**
A	57	TV		-1	11 S 701482 3728780						
A	58	PR		-1	11 S 701384 3728507						
A	59	RT	SN	-0	11 S 700953 3729303						
A	60	TV	SN	-4	11 S 699424 3730628						
A	61	BO		-1	11 S 699255 3731890						
A	62	TV		-1	11 S 698035 3734351						
A	63	TV		-1	11 S 696137 3736794						
A	64	TV		-1	11 S 679558 3743536						
A	65	TV		-1	11 S 679359 3743891						
A	66	BS		-1	11 S 681492 3748791						
A	67	RT	SN	-1	11 S 683795 3745287						

Map Reference											
Trip ID	Waypoint	Species	Nest type	# of Individuals	Position (UTM)	Aspect	Nest Condition	Substrate	Active Nest	Elevation	Notes (age, sex, behavior, etc.)
A	68	TV		-2	11 S 681201 3746887						
A	69	TV		-1	11 S 688509 3753576						
A	70	U	SN	-0	11 S 690445 3754059						RT or CR
A	71	TV		-4	11 S 696920 3750480						
A	72	TV		-27	11 S 687150 3708280						
A	73	OS		-1	11 S 680085 3707089						
A	74	CR		-1	11 S 658668 3709520						
A	75	SW		-1	11 S 651441 3710540						
April 2, 2010 - 3 flights - 8 hours total time - sunny, 60-70F, 0% cloud cover, 10-20mph (gusts 30)											
B	7	TV		-1	11 S 642020 3718153						
B	8	PR		-1	11 S 653303 3715103						
B	**9**	**GE**	**SN**	**-0**		**N**	**P**	**R**	**N**	**4251 ft**	
B	10	RT		-1	11 S 653970 3714917						
B	11	RT		-1	11 S 654250 3714263						
B	12	PR		-1	11 S 654731 3715403						
B	13	RT	SN	-0	11 S 659445 3717029						
B	14	RT		-1	11 S 662642 3714553						
B	15	GO		-1	11 S 662754 3714446						
B	16	U	SN	-0	11 S 662752 3712831						
B	17	U	SN	-0	11 S 659333 3709116						
B	18	RT	SN	-1	11 S 659600 3709430						
B	19	CR	SN	-1	11 S 659436 3709019						
B	20	CR	SN	-1	11 S 659363 3708994						
B	21	RT		-1	11 S 662415 3709746						
B	22	GO		-1	11 S 662558 3709721						
B	23	TV		-1	11 S 686571 3715735						
B	24	RT	SN	-1	11 S 692408 3718791						
B	25	CR	SN	-1	11 S 693376 3718761						
B	26	CR	SN	-1	11 S 693936 3718749						
B	27	RT	SN	-1	11 S 696156 3718709						
B	28	RT	SN	-1	11 S 697117 3718684						
B	29	CR	SN	-1	11 S 698093 3718663						
B	30	RT	SN	-1	11 S 699799 3718614						
B	31	RT	SN	-1	11 S 700767 3718599						
B	32	RT		-1	11 S 701124 3718589						
B	33	RT	SN	-0	11 S 701534 3718577						
B	34	TV		-1	11 S 706791 3720210						
B	35	CR		-1	11 S 699445 3730661						

Map Reference											
Trip ID	Waypoint	Species	Nest Type	# of Individuals	Position (UTM)	Aspect	Nest Condition	Substrate	Active Nest	Elevation	Notes (age, sex, behavior, etc.)
B	37	GO		-1	11 S 698904 3732172						
B	38	TV		-1	11 S 698331 3732692						
B	39	TV		-1	11 S 695807 3732327						
B	40	BS		-8	11 S 680286 3740495					2392 ft	4 ewes, 4 lambs
B	41	PR		-1	11 S 679131 3737884						
B	42	CR		-1	11 S 679422 3737056						
B	**43**	**GE**	**SN**	**-0**		**N**	**P**	**R**	**N**	**2358 ft**	**very old and deteriorated**
B	**44**	**GE**	**SN**	**-0**		**N**	**G**	**R**	**N**	**2374 ft**	
B	45	TV		-1	11 S 652926 3724110						
B	46	TV		-2	11 S 655879 3722780						
B	47	BS		-17	11 S 655396 3722833						
B	**49**	**GE**	**SN**	**-0**		**NW**	**P**	**R**	**N**	**2129 ft**	**very old nest**
B	50	TV		-1	11 S 658348 3719724						
B	51	RT	SN	-1	11 S 654124 3717344						
B	52	GO	SN	-0	11 S 652559 3716143						
B	53	TV		-4	11 S 645279 3714083						
B	54	RT		-1	11 S 644502 3715767						
B	55	RT	SN	-0	11 S 629635 3723912						
B	56	CR		-1	11 S 629879 3723933						
B	57	GO		-1	11 S 630051 3723944						
B	58	BO		-1	11 S 629954 3723857						
B	59	RT	SN	-0	11 S 629910 3723863						
B	60	RT	SN	-0	11 S 629888 3723879						
B	61	TV		-3	11 S 632877 3723811						
B	62	RT	SN	-0	11 S 632686 3724021					2406 ft	old eagle nest
B	63	RT	SN	-0	11 S 631576 3726195						
B	64	CR	SN	-1	11 S 635034 3727085						
B	65	RT	SN	-1	11 S 636475 3727490						
B	66	CR	SN	-1	11 S 638150 3727981						
B	67	RT	SN	-1	11 S 639102 3728242						
B	68	CR	SN	-1	11 S 640455 3728633						
B	69	RT	SN	-1	11 S 642154 3728890						
B	70	CR		-1	11 S 643552 3727596						
B	71	CR	SN	-0	11 S 646375 3729340						
B	72	CR	SN	-0	11 S 648095 3729504						
B	73	CR	SN	-0	11 S 648427 3729532						
B	73	CR	SN	-0	11 S 648427 3729532						
B	73	CR	SN	-1	11 S 648427 3729532						

Map Reference											
Trip ID	Waypoint	Species	Nest Type	# of Individuals	Position (UTM)	Aspect	Nest Condition	Substrate	Active Nest	Elevation	Notes (age, sex, behavior, etc.)
B	74	CR	SN	-1	11 S 654792 3729707						
B	75	TV		-4	11 S 652606 3728173						
B	76	RT		-1	11 S 650926 3728067						
B	**77**	**GE**	**SN**	**-0**		**N**	**G**	**R**	**P**	**1730 ft**	
B	**77**	**GE**	**SN**	**-0**		**N**	**G**	**R**	**P**	**1730 ft**	
B	78	RT	SN	-0	11 S 653196 3726487						
B	79	RT		-1	11 S 652665 3725361						
B	80	CR		-2	11 S 675633 3724513						
B	81	RT	SN	-0	11 S 689828 3718783						
B	82	RT	SN	-1	11 S 688135 3718820						
B	83	CR		-1	11 S 685885 3718876						
B	84	RT	SN	-0	11 S 685398 3718885						
B	85	RT	SN	-0	11 S 684995 3718891						
B	86	CR	SN	-1	11 S 683926 3718911						
B	87	RT	SN	-0	11 S 682577 3718880						
B	88	RT	SN	-3	11 S 682479 3718975						
B	89	RT	SN	-1	11 S 679313 3719036						
B	90	CR	SN	-1	11 S 678657 3718925						
B	91	RT	SN	-1	11 S 675844 3719714						
B	92	RT	SN	-1	11 S 674828 3720387						
B	93	RT	SN	-1	11 S 672230 3722116						
B	94	RT	SN	-0	11 S 671267 3722754						
B	95	RT	SN	-1	11 S 669654 3723813						
B	96	RT	SN	-1	11 S 666347 3726017						
B	97	RT	SN	-1	11 S 664785 3726648						
B	98	CR	SN	-1	11 S 664343 3726785						
B	99	RT	SN	-1	11 S 661846 3727513						
B	100	RT	SN	-1	11 S 659792 3728145						
B	101	CR	SN	-1	11 S 657255 3728905						
B	102	RT	SN	-1	11 S 654497 3729720						
B	103	TV		-2	11 S 648878 3726664						
B	104	BS		-3	11 S 647584 3725931					3914 ft	ewe with 2 lambs; 1 this year, 1 last year
B	105	RT	SN	-1	11 S 647708 3726155						
B	106	TV		-9	11 S 646897 3725798						
B	107	RT	SN	-1	11 S 646594 3725193						
B	108	TV		-1	11 S 644082 3727347						
B	109	TV		-4	11 S 643370 3727706						
B	110	CR		-2	11 S 642349 3727442						

Map Reference											
Trip ID	Waypoint	Species	Nest Type	# of Individuals	Position (UTM)	Aspect	Nest Condition	Substrate	Active Nest	Elevation	Notes (age, sex, behavior, etc.)
B	111	XX			11 S 638987 3732043						campers
B	112	CR	SN	-0	11 S 635816 3732578						
B	113	RT	SN	-0	11 S 635417 3732729						
B	**114**	**GE**	**SN**	**-0**		**SE**	**F**	**R**	**N**	**3816 ft**	
B	115	TV		-2	11 S 636252 3734790						
B	116	RT	SN	-1	11 S 632886 3742473						
B	116	RT	SN	-0	11 S 632886 3742473						
B	117	BS		-2	11 S 635563 3741933					3888 ft	2 rams
B	**118**	**GE**	**SN**	**-0**		**N**	**P**	**R**	**N**	**3938 ft**	**abandoned; rocks collapsed in nest**
B	119	RT	SN	-1	11 S 636495 3741903						
B	120	RT		-1	11 S 637779 3741892						
B	121	RT	SN	-0	11 S 637450 3741313						
B	122	RT	SN	-1	11 S 637801 3741430						
B	123	RT	SN	-0	11 S 637924 3741346						
B	123	RT	SN	-0	11 S 637924 3741346						
B	123	RT	SN	-0	11 S 637924 3741346						
B	**124**	**GE**	**SN**	**-0**		**N**	**G**	**R**	**P**	**2878 ft**	**possible new material**
B	125	CR	SN	-0	11 S 640017 3740909						
B	126	TV		-1	11 S 642581 3741544						
B	127	TV		-1	11 S 646316 3744015						
B	128	SW		-14	11 S 655225 3747290						
April 3, 2010 - 2 flights - 7 hours total time - sunny, 57-68F, 0% cloud cover, 0-5mph											
C	1	CR		-1	11 S 700662 3730567						
C	2	TV		-4	11 S 699177 3731581						
C	3	TV		-1	11 S 697036 3735597						
C	4	TV		-2	11 S 679927 3743499						
C	5	TV		-1	11 S 679599 3744151						
C	**6**	**GE**	**SN**	**-0**		**N**	**G**	**R**	**N**	**2745 ft**	
C	7	TV		-2	11 S 657348 3746616						
C	8	TV		-2	11 S 656795 3747805						
C	9	TV		-2	11 S 655377 3747926						
C	**10**	**GE**	**SN**	**-0**		**N**	**G**	**R**	**N**	**2410 ft**	
C	11	RT		-1	11 S 650663 3771176						
C	**12**	**GE**	**SN**	**-1**		**NE**	**G**	**R**	**Y**	**3013 ft**	
C	**13**	**GE**	**SN**	**-0**		**E**	**P**	**R**	**N**	**2827 ft**	**dead adult GOEA in nest**
C	**14**	**GE**	**SN**	**-0**		**NE**	**P**	**R**	**N**	**2697 ft**	
C	15	RT		-1	11 S 650811 3767316						
C	16	TV		-1	11 S 651973 3766498						

Map Reference											
Trip ID	Waypoint	Species	Nest Type	# of Individuals	Position (UTM)	Aspect	Nest Condition	Substrate	Active Nest	Elevation	Notes (age, sex, behavior, etc.)
C	**17**	**GE**	**SN**	**-0**		**N**	**F**	**R**	**N**	**2227 ft**	
C	18	RT		-1	11 S 653487 3766710						
C	19	RT	SN	-0	11 S 655494 3765222						
C	20	BS		-6	11 S 655698 3765206						
C	21	RT		-1	11 S 654872 3763739						
D	1	RT	SN	-0	11 S652617 3765076						
D	2	TV		-2	11 S 651448 3764841						
D	3	TV		-2	11 S 652681 3762313						
D	**4**	**GE**	**SN**	**-0**		**S**	**F**	**R**	**N**	**2796 ft**	
D	**5**	**GE**	**SN**	**-0**		**N**	**P**	**R**	**N**	**2692 ft**	
D	6	RT	SN	-0	11 S 653466 3761205						
D	7	RT		-1	11 S 654807 3759330						
D	8	RT		-1	11 S 655681 3759171						
D	9	RT	SN	-0	11 S 656266 3758798						
D	10	RT	SN	-0	11 S 655288 3753305						
D	11	U	SN	-0	11 S 654489 3751840						on TT, med size, not eagle
D	12	U	SN	-0	11 S 654240 3751516						on TT, med size, not eagle
D	13	RT	SN	-0	11 S 649612 3747692						
D	14	RT	SN	-0	11 S 649098 3747212						
D	15	RT	SN	-0	11 S 648147 3746365						
D	16	RT	SN	-0	11 S 645055 3743538						
D	17	RT	SN	-0	11 S 643878 3742455						
D	18	CR		-2	11 S 637036 3743636						
D	19	RT		-1	11 S 641635 3753055						
D	20	PR	CN	-1							
D	21	CR	SN	-0	11 S 632851 3752155						
D	22	CR	SN	-1	11 S 590199 3722945						
D	22	RT	SN	-1	11 S 590199 3722945						
D	25	RT	SN	-0	11 S 618063 3730295						
D	26	RT	SN	-1	11 S 618087 3730327						
D	27	XX		-2	11 S 629062 3731887						CH chasing RT
D	28	TV		-4	11 S 633746 3732586						
D	29	TV		-1	11 S 635426 3734867						
D	30	BS		-1	11 S 634744 3735247						
D	31	TV		-1	11 S 631536 3742823						
D	**32**	**GE**	**SN**	**-0**		**N**	**G**	**R**	**N**	**1946 ft**	
D	33	RT	SN	-0	11 S 631164 3751489						
D	**34**	**GE**	**SN**	**-0**		**N**	**F**	**R**	**N**	**1955 ft**	

Map Reference											
Trip ID	Waypoint	Species	Nest Type	# of Individuals	Position (UTM)	Aspect	Nest Condition	Substrate	Active Nest	Elevation	Notes (age, sex, behavior, etc.)
D	**35**	**GE**	**SN**	**-0**		**W**	**G**	**R**	**Y**	**1953 ft**	
D	36	PR	CN	-1							
D	37	TV		-2	11 S 630417 3752931						
D	38	PR	CN	-0							
D	40	LO	CN	-1	11 S 646439 3767489						
D	**41**	**GE**		**-1**	**11 S 646360 3768631**					**3236 ft**	**flying**
D	42	CR	SN	-0	11 S 648734 3769587						
D	**43**	**GE**	**SN**	**-0**		**W**	**P**	**R**	**N**	**3941 ft**	
D	**44**	**GE**	**SN**	**-0**		**W**	**P**	**R**	**N**	**3640 ft**	
D	**45**	**GE**	**SN**	**-0**		**E**	**G**	**R**	**P**	**3571 ft**	**possible new material**
D	**46**	**GE**	**SN**	**-0**		**N**	**F**	**R**	**N**	**3350 ft**	
D	47	RT	SN	-1	11 S 649960 3758231						
D	48	RT		-1	11 S 650982 3755135						
D	49	TV		-3	11 S 651319 3754184						
D	**50**	**GE**	**SN**	**-0**		**NW**	**G**	**R**	**Y**	**2709 ft**	
D	**51**	**GE**	**SN**	**-0**		**SW**	**G**	**R**	**N**	**2175 ft**	
D	52	CR	SN	-0	11 S 653781 3748950						
D	**53**	**GE**	**SN**	**-0**		**E**	**G**	**R**	**N**	**2346 ft**	
D	54	RT	SN	-0	11 S 655272 3746829						
D	55	U	SN	-0	11 S 655197 3746698					2259 ft	medium-sized nest
D	56	TV		-1	11 S 655659 3746334						
D	57	SW		-1	11 S 641400 3721582						
April 17, 2010 - Subsequent Field Observation											
E	1	GE		-1							flying over Chuckwalla Valley

12.0 Appendix C – Technical Memorandum

12.16 Results of Class I record search and Class III field inventory of Eagle Mountain Pumped Storage Project alternative transmission line corridors and substations

June 22, 2010

Ginger Gillin, Senior Environmental Scientist
GEI Consultants, Inc.
311 B Avenue
Suite F
Lake Oswego, OR 97034

Re: Results of Class I record search and Class III field inventory of Eagle Mountain Pumped Storage Project alternative transmission line corridors and substations.

Dear Ms. Gillin

Eagle Crest Energy contracted ASM Affiliates, Inc. (ASM) to carry out a Class I record search and Class III field inventory for the proposed Eagle Mountain Pumped Storage Project Area of Potential Effects (APE) alignment alternatives in Riverside County, California. A full description of the preferred route survey results is documented in a previously submitted technical report (Schaefer and Iversen 2009). An addendum to this technical report is forthcoming from ASM documenting the results of a Class III inventory of four alternative transmission routes and two substation alternatives. This letter report provides the preliminary results of the Class I record search and Class III inventory conducted for the project alternatives. ASM surveyed Transmission Route Alternatives 2 and 3. Prior to our work, ECORP conducted a recent Class III inventory encompassing Transmission Route Alternatives 1A, 1B, the proposed Western Red Bluff Substation, Eastern Red Bluff Substation Alternative A-1, and portions of Transmission Route Alternatives 2 and 3. ASM did not resurvey Alternatives 1A and 1B or the substation alternatives. ASM relocated all of the sites recorded by ECORP within Transmission Route Alternatives 2 and 3 and concurs with the character and content of the recordation, and to the best professional practices that characterize their survey and site records. We have applied their survey results to the Eagle Mountain Pumped Storage Project alternatives where appropriate.

ASM identified one previously undocumented site and three isolated cultural resources during the Class III Inventory of the alternative transmission routes. Additionally, ASM encountered but did not record 26 previously documented sites within the alternative transmission routes as the existing records were found to accurately characterize the sites. ASM identified but did not revisit 12 previously recorded sites within the alternative substation locations (Table 1). In addition to the three isolated artifacts identified by ASM, ECORP recorded 33 isolates within the Project APE, including 21 historic isolates and 12 prehistoric isolates (Table 2).

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2319 Foothill Drive, Suite 140C, Salt Lake City, Utah 84109 • (801) 485-1464 • (801) 485-2908
20912 Frank Waters Rd., Stanwood, WA 98292 • (760) 845-0284
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The following sections describe the records search results, initial results of site recordation, and preliminary significance evaluation for each of the newly identified and previously recorded sites within the project alternatives.

RECORDS SEARCH RESULTS

A records search at the Eastern Information center of an area extending one mile from the alternative transmission line routes and APE indicate that 30 cultural resources studies have been previously conducted, of which 18 bisect the APE. This record search does not include the most recent ECORP survey that has not yet been submitted to the information center. ECORPS, however, generously provided us with GIS maps of their survey coverage and draft site records. All of their newly recorded sites are numbered with the prefix: DS. That information is presented below as current to our Class III inventory. Six of the previous studies provide overviews of cultural resources in the general area. Only two previous studies substantially cover elements of the alternatives. An archaeological assessment for TPM 18983 by Bowles (1983) covered most of the Western Red Bluff Substation area and most of the buffer zone. No sites were recorded during that survey, which may not have been a full Class III intensive survey and was conducted too long ago to meet current best professional practices. The northern most mile of transmission Route Alternative 3 was recently surveyed by ASM Affiliates (Schaefer and Iversen 2009) for the Eagle Mountain Pumped Storage. The survey report has not yet been registered at the Eastern Information Center although the site records have been registered.

A total of 92 cultural resources are recorded within one mile of the project alternatives, of which four are located in the APE. They include two historic World War II Desert Training Center/Arizona-California Maneuver Area (DTC/C-AMA) sites along Eagle Mountain Road and Transmission Route Alternative 3. The other two sites are prehistoric and include a cleared circle and rock ring with distant quartz lithic assay-reduction station (chipping station), and another prehistoric quartz lithic assay-reduction station. Both are located in the southern portion of Transmission Route Alternative 2. All of the sites are described below.

P-33-015971

This site is a 45 meter long rock alignment marking the edge of a tent associated with the 36th Evacuation Hospital. The hospital was stationed here from May to December, 1943 as part of the DTC/C-AMA. The site straddles both sides of Eagle Mountain Road. It was recorded by Southern California Edison for the North Alligator Rock Alternative of the Devers-Palo Verde 2 Project. To the south of the archaeological complex of which this site is a part is a plaque and monument recognizing the historical significance of the 36th Evacuation Hospital, dedicated May 2, 2009 by the Bureau of Land Management and E Clampus Vitus.

P-33-017642 (CA-RIV-9139)

This site consists of three rock-lined tent bases and a flag pole base that appears to be associated with the 36th Evacuation Hospital. A contemporary World War II era artifact scatter is associated with the site. The site is located on the west side of Eagle Mountain Road.

P-33-015091

This prehistoric site consists of a cleared circle and poorly defined rock ring. Approximately 25 meters to the south is a quartz chipping station described as an assay/reduction station of 25-30 pieces of lithic debitage. This site and the one described below and were recorded by Applied Earthworks for an alternative alignment of the Devers-Palo Verde 2 Project.

P-33-015093

This prehistoric site consists of more than 50 pieces of quartz debitage from a chipping station described as an assay/reduction station.

SURVEY RESULTS

Transmission Route Alternative 1B

Three sites are recorded in Alternative 1B, DS-316, DS-494, and DS-495. Preliminary eligibility assessments suggest that none of these sites represent significant resources. DS-316 consists of a historic trash scatter that is unlikely to produce significant research value worthy of consideration for listing in the NRHP. One of the ECORP sites, DS-495, straddles the center line delineating Transmission Route Alternative 1A and 1B may extend within both of these alignments, with the majority of the site concentrated in Alternative 1B. Both DS-494 and DS-495 consist of historic refuse deposits possibly associated with military operations conducted during World War II as part of the Desert Training Center/California-Arizona Maneuver Area (DTC/C-AMA). Although the sites are potentially associated with this historically significant military undertaking, the lack of features and character of the artifacts make it unlikely that the sites are eligible for the NRHP. The date range and low quantity of military rations suggest these may be trash deposits that are more associated with the town of Desert Center than with the DTC/C-AMA.

Transmission Route Alternative 2

A total of 21 archaeological sites are recorded within Transmission Route Alternative 2. Recorded sites include 13 historic refuse deposits, four prehistoric lithic scatters, three historic mining sites, and one prehistoric habitation site (see Table 1). Only one of these resources, DS-240, is potentially eligible for listing in the NRHP. DS-240 consists of a prehistoric habitation site containing lithic artifacts, ceramics, and fire affected rock (FAR). Although the site components are relatively sparse, further investigation of the site could provide information relevant to the poorly understood prehistoric utilization of the Chuckwalla Valley. Site DS-240 is discrete in size and can be avoided through project design to mitigate effects.

Transmission Route Alternative 3

Three sites are recorded within Transmission Route Alternative 3. Two of these sites, P-33-17642 and P-33-15971 are potentially eligible for the NRHP. Both sites consist of historic features related to the DTC/C-AMA, and are both potentially associated with 36th Evacuation Hospital. The third site, DS-203, represents the remains of a possible historic road, and is not likely eligible for listing in the NRHP. Existing and on-going records of the main 36th Evacuation Hospital site, P-33-17542, confirm that this alternative is likely to have the greatest direct and indirect impacts to a historic property and its setting of any of the alternatives.

Western Red Bluff Substation Alternative

A total of nine sites are recorded in the area of the Western Red Bluff Substation. These resources include three sites associated with historic mining, three prehistoric lithic scatters, one historic telephone/telegraph line, one historic refuse deposit, and a possibly historic fire ring (see Table 1). None of the resources recorded in the Western Red Bluff Substation are recommended as potentially eligible for listing in the NRHP based on preliminary evaluations.

Eastern Red Bluff Substation Alternative

Three historic sites, DS-326, DS-327, and DS-330 are recorded in this alternative. Based on preliminary significance evaluations, none of these sites are potentially eligible for listing in the NRHP.

CONCLUSIONS AND RECOMMENDATIONS

The Class III field inventory conducted for the proposed Eagle Mountain Pumped Storage Project Alternatives resulted in the identification of a total of 39 archaeological sites and 36 isolated resources within the Project APE. Based on preliminary evaluations, only three of these resources, P-33-17642, P-33-15971, and DS-240, are potentially eligible listing in the NRHP. Of all the alternatives, Alternative Route 3 along Eagle Mountain Road is the only one likely to have significant impacts to historic properties.

Respectfully,

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REFERENCES

Bowles, Larry L.
1983 *An Archaeological Assessment for TPM 18983, Parcel No. 808-083-004*. On file, Eastern Information Center.

Schaefer, Jerry and David Iversen
2009 *A Class III Field Inventory for the Proposed Eagle Mountain Pumped Storage Project, Riverside County, California*. Prepared by ASM Affiliates, Inc. for Eagle Crest Energy Co., Palm Desert, California.

Attachments: Tables 1-2

Table 1. Archaeological Sites Recorded in the Proposed Eagle Mountain Pumped Storage Project Alternatives

Project Component	Site Designation	Description	Preliminary NRHP Eligibility Assessment
Alternative 1A/1B	DS-495	Historic Refuse	Not Eligible
Alternative 1B	DS-316	Historic Refuse	Not Eligible
Alternative 1B	DS-494	Historic Refuse	Not Eligible
Alternative 2	P-33-15091	Prehistoric Lithic Scatter/Rock Ring	Not Eligible
Alternative 2	P-33-15093	Prehistoric Lithic Scatter	Not Eligible
Alternative 2	DS-115	Historic Refuse	Not Eligible
Alternative 2	DS-120	Historic Refuse	Not Eligible (Desert Center Dump)
Alternative 2	DS-123	Historic Refuse	Not Eligible
Alternative 2	DS-124	Historic Mining	Not Eligible
Alternative 2	DS-125	Historic Refuse	Not Eligible
Alternative 2	DS-132	Historic Refuse	Not Eligible
Alternative 2	DS-137	Historic Mining	Not Eligible
Alternative 2	DS-178	Historic Refuse	Not Eligible
Alternative 2	DS-179	Historic Refuse	Not Eligible
Alternative 2	DS-195	Historic Refuse	Not Eligible
Alternative 2	DS-239	Historic Refuse	Not Eligible
Alternative 2	DS-240	Prehistoric Habitation	Potentially Eligible
Alternative 2	DS-245	Prehistoric Lithic Scatter	Not Eligible
Alternative 2	DS-313	Historic Refuse	Not Eligible
Alternative 2	DS-314	Historic Refuse	Not Eligible
Alternative 2	DS-315	Prehistoric Lithic Scatter	Not Eligible
Alternative 2	DS-703	Historic Refuse	Not Eligible
Alternative 2	DS-705	Historic Mining	Not Eligible
Alternative 2	EM-1	Historic Refuse	Not Eligible
Alternative 3	P-33-17642	Desert Training Center	Potentially Eligible
Alternative 3	P-33-15971	Desert Training Center	Potentially Eligible
Alternative 3	DS-203	Historic Road	Not Eligible
Western Red Bluff Substation	P-33-01811	Prehistoric Lithic Scatter	Not Eligible
Western Red Bluff Substation	P-33-13987	Historic Telegraph/Telephone Line	Not Eligible
Western Red Bluff Substation	DS-227	Historic/Modern Fire Ring	Not Eligible
Western Red Bluff Substation	DS-228	Prehistoric Lithic Scatter	Not Eligible
Western Red Bluff Substation	DS-231	Prehistoric Lithic Scatter	Not Eligible
Western Red Bluff Substation	DS-232	Historic Refuse	Not Eligible
Western Red Bluff Substation	DS-485	Historic Mining	Not Eligible
Western Red Bluff Substation	DS-486	Historic Mining	Not Eligible
Western Red Bluff Substation	DS-487	Historic Mining	Not Eligible
Eastern Red Bluff Substation	DS-326	Historic Rock Features	Not Eligible
Eastern Red Bluff Substation	DS-327	Historic Post	Not Eligible
Eastern Red Bluff Substation	DS-330	Historic Rock Feature	Not Eligible

Table 2. Isolated Cultural Resources Recorded in the proposed Eagle Mountain Pumped Storage Project APE

Project Component	Isolate Designation	Description
Alternative 1A	DS-102-I	Historic solder-dot can
Alternative 1B	DS-490-I	Historic hole in top can
Alternative 1B	DS-507-I	Historic fuel can
Alternative 2	EM- ISO 1	Prehistoric volcanic flake
Alternative 2	EM- ISO 2	Prehistoric chert core
Alternative 2	EM- ISO 3	Historic survey marker
Alternative 2	DS-116-I	Historic solder-dot can
Alternative 2	DS-128-I	Historic tobacco tin
Alternative 2	DS-129-I	Historic solder-dot can
Alternative 2	DS-130-I	Historic tobacco tin
Alternative 2	DS-131-I	Historic solder-dot can
Alternative 2	DS-133-I	Prehistoric chalcedony utilized flake
Alternative 2	DS-134-I	Historic solder-dot can
Alternative 2	DS-135-I	Prehistoric chert flake
Alternative 2	DS-138-I	Historic solder-dot can
Alternative 2	DS-157-I	Prehistoric quartzite flakes (n = 2)
Alternative 2	DS-158-I	Historic solder-dot can
Alternative 2	DS-177-I	Historic vehicle remains
Alternative 2	DS-180-I	Historic solder-dot can
Alternative 2	DS-182-I	Prehistoric quartzite flake
Alternative 2	DS-196-I	Prehistoric quartzite utilized flake
Alternative 2	DS-242-I	Prehistoric quartz flake
Alternative 2	DS-306-I	Prehistoric chalcedony utilized flake
Alternative 2	DS-312-I	Historic vehicle fender
Alternative 2	DS-346-I	Historic tobacco tin
Alternative 2	DS-349-I	Historic bottle
Alternative 2	DS-468-I	Historic hole in top can
Alternative 2	DS-707-I	Historic bottles (n = 2)
Proposed Project Substation	P-33-17648	Historic highway monument
Western Red Bluff Substation		None found
Eastern Red Bluff Substation		None found