12 Appendix C – Technical Memoranda

12.14 Biological Mitigation and Monitoring Reports

1. **Executive Summary of Biological Mitigation and Monitoring Plans**
2. **Revegetation Plan**
3. **Weed Control Plan**
4. **Revised Desert Tortoise Clearance and Relocation/Translocation Plan**
5. **Revised Predator Monitoring and Control Plan**
6. **Worker Environmental Awareness Program (Biological Resources).** Note: the Worker Environmental Awareness Program Plan for cultural resources is included with the Historic Properties Management Plan in Appendix E
7. **Bighorn Sheep Report**
8. **Biological Assessment (FERC, 2011)**

3000 Ocean Park Boulevard Suite #1020
Santa Monica, CA 90405

Tel: (310) 450-9090
Fax: (310) 450-9494

www.EagleCrestEnergy.com

Eagle Mountain Pumped Storage
FERC Project No. 13123

Executive Summary of Biological Mitigation and Monitoring Plans:

Revegetation Plan,

Weed Control Plan,

Revised Desert Tortoise Clearance and Relocation/Translocation Plan,

Revised Predator Monitoring and Control Plan, and the

Worker Environmental Awareness Program

Submitted to: Federal Energy Regulatory Commission

Submitted by: Eagle Crest Energy Company

June 2011

3000 Ocean Park Boulevard Suite #1020
Santa Monica, CA 90405
Tel: (310) 450-9090
Fax: (310) 450-9494
www.EagleCrestEnergy.com

TABLE OF CONTENTS

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	**Biological Mitigation and Monitoring Program.** Concurrent with final engineering design a comprehensive site-specific biological mitigation and monitoring program shall be developed in consultation with the Biological Technical Advisory Team. The Technical Advisory Team shall be composed of the Owner's staff Environmental Coordinator and consultants, and staff from the resource managing agencies (BLM, USFWS, and CDFG).	Final Engineering / Pre-Construction / Life Of Project	Environmental Coordinator / Biological Technical Advisory Team / Project Biologist
Terrestrial Resources	BIO-2	**Biological Reporting to Resource Agencies.** As part of implementing protection measures, regular reports shall be submitted to the relevant resource agencies to document the Project activities, mitigation implemented and mitigation effectiveness. As a performance standard, adaptive management recommendations shall be updated as needed and in consultation with the coordinating agencies. Reporting shall include monthly reports during construction, annual comprehensive reports, and special-incident reports. The Project Biologist shall be responsible for reviewing and signing reports prior to submittal to the agencies.	Final Engineering / Pre-Construction / Life Of Project	Environmental Coordinator / Biological Technical Advisory Team / Project biologist
Terrestrial Resources	BIO-3	**Designation of an Authorized Project Biologist.** An Authorized Project Biologist shall be responsible for implementing and overseeing the biological compliance program. This person shall be sufficiently qualified to ensure approval by the USFWS and the CDFG for all biological protection measures that may be implemented by the Project. The USFWS describes a single designation for biologists who can be approved to handle tortoises - "Authorized Biologist." Such biologists have demonstrated to the 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.	Final Engineering / Pre-Construction / Life Of Project	Environmental Coordinator / Biological Technical Advisory Team / Project Biologist
Terrestrial Resources	BIO-4	**Worker Environmental Awareness Program.** A Worker Environmental Awareness Program (WEAP) shall be implemented 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 shall be designed to address those environmental issues that pertain to Project operations, such	Construction / Life Of Project	Environmental Coordinator / Contractor

		as general conduct, repairs and maintenance. The WEAP shall include information on biological resources that may occur on the site, with emphasis on listed and special-status species. Education shall include, but not be limited to, ecology, natural history, endangerment factors, legal protection, site mitigation measures, and hierarchy of command. Site rules of conduct shall 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. Willful non-compliance shall 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 shall be given a wallet card with site “rules” and contact cell phone numbers, and an environmental training completion sticker to affix to their hard hat. Each shall sign a sheet attesting to completing the training program.		
Terrestrial Resources	BIO-5	**Minimize Surface Disturbance.** During construction in native habitats, all surface disturbance shall be restricted to the smallest area necessary to complete the construction. New spur roads and improvements to existing access roads shall be designed to preserve existing desert wash topography and flow patterns. The NECO Plan requires the following mitigation measures for plants: • Avoid plant populations during construction. Where avoidance is not practical, Project effects on the species and population must be assessed. • Require mitigation of project impacts in suitable habitat within the range of the impacted species, using commonly applied mitigation measures.	Construction	Environmental Coordinator / Contractor
Terrestrial Resources	BIO-6	**California Desert Native Plants Act.** In compliance with the California Desert Native Plants Act (CDNPA), the County Agricultural Commissioner shall be consulted for direction	Final Engineering / Construction	Project Biologist / Contractor

		regarding disposal of plants protected by the CDNPA. This may include salvage for subsequent revegetation of temporarily disturbed areas on site, salvage by an approved nursery, landscaper or other group, or other methods of disposal.		
Terrestrial Resources	BIO-7	**Revegetation Plan.** A revegetation plan (*see* Section 12.14) shall be implemented 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 Revegetation Plan shall address the following measures and include: • 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 enhance germination and growth of native species. This includes 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 shall 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.	Final Engineering / Construction	Project Biologist / Contractor
Terrestrial	BIO-8	**Invasive Species Monitoring and Control.** To minimize the	Construction	Project Biologist /

Resources		spread of invasive non-native vegetation a weed control program shall be implemented during construction. This program (*see* Section 12.14) includes: • Baseline surveys for weed species that are present and/or are most likely to invade the Project site and surrounding area. • Methods quantifying weed invasion. • Methods for minimizing weed introduction and/or spread. • Triggers which prompt weed control. • Methods and a schedule for weed control and eradication. • Success standards.		Contractor
Terrestrial Resources	BIO-9	**Couch's Spadefoot.** The Northern and Eastern Colorado Desert Coordinated Management **(**NECO) Plan requirements shall be implemented to avoid disturbance of impoundments and restriction of surface flow to impoundments. Surveys on the Central Project Area shall elucidate the presence of any artificial impoundments that could subsidize Couch's spadefoot reproduction. Should those exist then surveys shall be conducted at the appropriate time to determine if larvae are present. If present, the impoundment will be avoided, if possible. If avoidance is not possible, then a new impoundment will be constructed as close as is feasible, to replicate and replace each lost impoundment with similar characteristics. All larvae shall be removed to the new impoundment. During construction on all Project facilities, should ephemeral pools develop in response to intense rainfall showers from early spring through fall these shall be examined for larvae of Couch's spadefoot. If larvae are present, the pools shall be flagged and avoided by construction activities. Where pools cannot be avoided, new pools shall be constructed and larvae transplanted under the supervision of the Project Biologist.	Construction	Project Biologist / Contractor
Terrestrial Resources	BIO-10	**Breeding Bird Surveys and Avoidance.** For all construction activities in vegetated habitat that are scheduled to occur between approximately February 15 and July 30, surveys shall be completed in all potential nesting sites for active bird nests. Unless otherwise directed by the CDFG, if an active bird nest is located, the nest site shall be flagged or staked a minimum of five yards in all directions. This flagged zone shall not be disturbed until the	Construction	FERC / CDFG

		nest becomes inactive. Alternatively, grading and site preparation may occur prior to February 15 to preclude interference with nesting birds.		
Terrestrial Resources	BIO-11	**Brine Ponds Management.** Brine ponds shall be managed to minimize their attractiveness and access to migratory birds. This consists of making resources provided by the ponds less available (by designing the ponds to be unattractive to birds) and netting the ponds to prevent access by birds (Figure 3.5-19).	Final Engineering / Construction / Life Of Project	FERC / State Water Board
Terrestrial Resources	BIO-12	**Burrowing Owls Phase III Survey.** Based on the results of the 2009 surveys, a Phase III survey shall be completed to further assess bird use of the Project area and potential impacts if required by the CDFG (CBOC, 1993). This includes a nesting season survey, followed by a winter survey if no burrows or owls are observed during the nesting season. Each of these surveys shall spans several visits and days. A pre-construction survey shall be conducted within 30 days of the start of Project construction to assess species presence on-site. Recommendations from the surveys shall be implemented as adaptive management measures.	Pre-Construction / Life Of Project	State Water Board / FERC
Terrestrial Resources	BIO-13	**Burrowing Owl Breeding Season.** The Northern and Eastern Colorado Desert Coordinated Management **(**NECO) Plan limits the construction period to September 1 through February 1 if burrowing owls are present, to avoid disruption of breeding activities. CDFG (1995) has recommended several mitigation measures for resident owls. Disruption of burrowing owl nesting activities shall be avoided during construction. Active nests shall be avoided by a minimum of a 250-foot buffer until fledging has occurred (February 1 through August 31). Following fledging, owls may be passively relocated.	Construction	State Water Board / FERC
Terrestrial Resources	BIO-14	**Raptor Buffer.** The Northern and Eastern Colorado Desert Coordinated Management **(**NECO) Plan identifies ¼-mile as an important buffer distance for prairie falcon or golden eagle aerie. No aeries or nests have been observed within a ¼ mile, but pre-construction surveys on the Central Project Area will confirm if a ¼ mile construction buffer will be required during the nesting seasons.	Pre-Construction / Construction / Life Of Project	FERC / BLM
Terrestrial Resources	BIO-15	**Bat Survey.** The following applicable measures are required by the Northern and Eastern Colorado Desert Coordinated Management **(**NECO) Plan: • Survey for bat roosts within 1 mile of a project, or within 5	Pre-Construction / Construction / Life Of Project	FERC / State Water Board

		miles of any permanent stream or riparian habitat on a project site. • Projects authorized within 1 mile of a significant bat roost site would have applicable mitigation measures, including, but not restricted to seasonal restrictions, light abatement, bat exclusion, and gating of alternative sites. Any exclusion must be performed at a non-critical time, by an authorized bat biologist. Pre-construction bat surveys shall be completed by a qualified bat biologist to determine the existence, location and condition of bat roosts on the site. Because foraging areas used by resident bats may be critical to the functioning of those colonies, foraging habitat on the Project also will be identified, if possible. If needed based on the results of these surveys, a mitigation plan shall be developed to avoid roosting and foraging impacts to resident bats, minimize that disturbance or, as an inescapable measure, evict bats. This plan shall include (as relevant): • Designation of avoidance areas and associated measures. • Eviction of bats outside of the maternity season. • A monitoring program to determine impacts from the Project. • Extending the monitoring program for the brine ponds to include bats, as deemed necessary.		
Terrestrial Resources	BIO-16	**Wildlife Fencing.** The Northern and Eastern Colorado Desert Coordinated Management (NECO) Plan recommends fencing potential hazards to bighorn sheep. A security fence shall 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 (Figure 3.6-4). Such areas shall 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.	Final Engineering / Construction / Life Of Project	FERC/BLM

		Permanent security fences will be installed around the upper and lower reservoirs, switchyard and brine ponds, for security, safety and general liability purposes, and will prevent wildlife access except at designated drinking points. Fences will contain "dips" where the fence will go below the high water mark so that wildlife can reach the water for drinking. These fences will also be equipped with tortoise exclusion fencing. In addition, temporary tortoise exclusion fences will be installed around work zones during construction, and will be sufficiently low (3 feet) to permit passage by sheep. These temporary fences will be removed at the end of construction. Figure 3.6-4 shows the concept for the temporary construction fencing, if additional fencing is needed during construction to protect tortoises, this fencing will be installed and maintained during the construction period. All required exclusion fencing shall 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.		
Terrestrial Resources	BIO-17	**Construction and Operation Restricted Areas.** Construction and maintenance activities shall be restricted to minimize Project impacts. These restrictions shall include vehicle speed limits on both paved and dirt roads (the speed limit shall be based on County regulations); avoidance areas, work areas in which workers must be accompanied by a biological monitor, specified parking areas, trash deposition, repair, and refueling areas; looking under parked vehicles prior to movement; and the appropriate response upon finding a special-status species. For construction, this will include the entire construction period. For operations, this will apply to scheduled and unscheduled maintenance activities.	Final Engineering / Construction / Life Of Project	BLM
Terrestrial Resources	BIO-18	**Construction during Daylight Hours.** The Northern and Eastern Colorado Desert Coordinated Management (NECO) Plan requires that, 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. This permits avoidance of construction-related mortalities of fossorial, diurnal species such as the desert tortoise, or nocturnally active species, such as the desert rosy boa.	Final Engineering / Construction	BLM

Terrestrial Resources	BIO-19	**Construction of Pipeline Trenches.** The Northern and Eastern Colorado Desert Coordinated Management (NECO) Plan identifies that pipeline trenches must be closed, covered, and/or inspected. Pipeline trenches shall be closed, temporarily fenced, or covered each day. Each day, any open trenches shall be inspected by an approved biological monitor, under the supervision of the Authorized Biologist, at first light, midday, and at the end of each day to ensure animal safety. Ramps shall be provided to encourage animals to escape on their own. The biological monitor shall be confirmed by the Approved Project Biologist.	Final Engineering / Construction	FERC / BLM
Terrestrial Resources	BIO-20	**Minimize Nightime Lighting Impacts.** Facility lighting will be designed, installed, and maintained to prevent casting of nighttime light into adjacent native habitat. See also MM AES-1.	Final Engineering / Construction / Life Of Project	State Water Board / FERC
Terrestrial Resources	BIO-21	**Dry Desert Washes.** There are many small washes crossed by the pipeline and transmission line that are regulated by the CDFG. A Streambed Alteration Agreement (Section 1602 of the CDFG Code) shall be obtained, which will identify the condition and location of all State jurisdictional waters, impacts, and mitigation measures. Mitigation includes 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. It is anticipated that this compensation will be included in the habitat compensation for special-status species (MM BIO-22 and MM TE-6).	Pre-Construction / Life Of Project	FERC / CDFG
Terrestrial Resources	BIO-22	**Habitat Compensation.** CDFG standard off-site compensation for loss of occupied burrowing owl habitat consists of a minimum of 6.5 acres of lands, approved by CDFG and protected in perpetuity, for each pair of owls or unpaired resident bird. In addition, existing unsuitable burrows on the protected lands should be enhanced (i.e., cleared of debris or enlarged) or new burrows installed at a ratio of 2:1. Habitat compensation for burrowing owls, if needed, will be subsumed by compensation for lost desert tortoise habitat, which also constitutes burrowing owl habitat. The Northern and Eastern Colorado Desert Coordinated Management (NECO) requires compensation for disturbance of Desert Dry Wash Woodland in WHMAs at the rate of 3:1. The Project does not disturb any Desert Dry Woodland inside a WHMA. However, the compensation for desert tortoise habitat (148.9 acres of compensation habitat) that is lost to the Project will	Construction / Life Of Project	FERC / BLM / CDFG / USFWS

		compensate for the loss of approximately 15.4 acres of Desert Dry Wash Woodland expected to be lost or disturbed during construction activities.		
Threatened and Endangered Species	TE-1	**Desert Tortoise Pre-construction Surveys and Clearance Surveys.** Desert tortoises shall be removed from construction areas by the Project Biologist. Such tortoises shall be processed (cataloged, photographed, and numbered) prior to placement outside the construction zones but on public or private land, or the Project ROW (*see* Appendix 12.14 Desert Tortoise Removal and Translocation Plan). 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 desert 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 (*see* Appendix 12.14 Desert Tortoise Removal and Translocation Plan) will be completed in those areas after tortoise-proof fencing is installed (*see* MM TE-3: Desert Tortoise 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 MM TE-3: Desert Tortoise 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.	Pre-construction	Project Biologist
Threatened and Endangered	TE-2	**Desert Tortoise Construction Monitoring.** No construction in unfenced areas (*see* MM TE-3: Desert Tortoise Exclusion Fencing) on the linear facilities will occur without biological	Construction	Project Biologist

Species	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 Northern and Eastern Colorado Desert Coordinated Management (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 desert tortoises will be removed from harm's way by a biologist approved by the Project Biologist (MM BIO-2). The Project Biologist must be sufficiently qualified to ensure approval by USFWS and 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 MM TE-4: Revised Desert Tortoise Clearance and Relocation/Translocation Plan. 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, surface- disturbing activities must cease in the area of the killed or injured tortoise 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. As a mitigation performance standard, 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.		
Threatened and Endangered Species	TE-3	**Desert Tortoise 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 (Figure 3.6-4). 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.	Construction / Life Of Project	Project Biologist / Contractor
Threatened and	TE-4	**Desert Tortoise Removal and Translocation Plan.** The Desert Tortoise Removal and Translocation Plan is found in its entirety	Construction	Project Biologist / Contractor

Endangered Species		within Section 12.14. 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. 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 safety.		
Threatened and Endangered Species	TE-5	**Predator Monitoring and Control Program.** The Predator Monitoring and Control Plan is found in its entirety within Section 12.14. Proposed projects on federal lands that may result in increased desert tortoise predator populations must incorporate mitigation to reduce or eliminate the opportunity for raven proliferation. One of the most significant desert tortoise predators are ravens. 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	Construction / Life Of Project	Project Biologist

		between ongoing development in the desert region, raven population growth and expansion and raven impacts on desert tortoise populations. The vehicle for this program is a Memorandum of Understanding between the Project owner, CDFG and USFWS. The Predator Monitoring and Control Plan 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, minimization of pooling water on roadways and construction right-of-ways) • Roadkill removal • Qualitative monitoring of raven use of the site during operations, conducted on a pre-determined schedule by the on-site Project environmental compliance officer and • Breeding season nest surveys • Baseline and post-construction surveys for other desert tortoise predators, including coyotes, wild dogs, and gulls • Mitigation measures to be implemented if the number of predators increases • A schedule for post-construction surveys during the second year of project operation, followed by surveys once every 5 years.		
Threatened and Endangered Species	TE-6	**Habitat Compensation.** The Northern and Eastern Colorado Desert Coordinated Management (NECO) Plan states that all lands within a DWMA will be designated as Category I Desert Tortoise Habitat[1], with required compensation of 5 acres for every acre disturbed. All lands outside a DWMA are considered Category III habitat, with a 1:1 compensation ratio.	Final Engineering / Pre-Construction	Project Applicant

[1] BLM habitat categories (BLM 1988), ranging in decreasing importance from Category I to Category III, were designed as management tools to ensure future protection and management of desert tortoise habitat and its populations. These designations were based on tortoise density, estimated local tortoise population trends, habitat quality, and other land-use conflicts. Category I habitat areas are considered essential to the maintenance of large, viable populations.

		The Project overlaps 19 acres of Category I Habitat and 65 acres of Category III Habitat. A minimum total compensation, then, would be 160 acres (Figure 3.6-3). 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.		
Threatened and Endangered Species	TE-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 MM TE-2.	Pre-Construction / Construction / Life Of Project	Project Biologist / Contractor

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–4 **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-7 **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-8 **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

TE –4 **Revised Desert Tortoise Clearance and Relocation/Translocation Plan.** The Desert Tortoise Removal and Translocation Plan is found in its entirety within Section 12.14.

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. 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 safety.

TE –5 **Revised Predator Monitoring and Control Plan.** The Predator Monitoring and Control Plan is found in its entirety within Section 12.14. Proposed projects on federal lands that may result in increased desert tortoise predator populations must incorporate mitigation to reduce or eliminate the opportunity for raven proliferation. One of the most significant desert tortoise predators are ravens. 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 desert tortoise populations. The vehicle for this program is a Memorandum of Understanding between the Project owner, CDFG and USFWS.

The Predator Monitoring and Control Plan 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, minimization of pooling water on roadways and construction right-of-ways)
- 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 and
- Breeding season nest surveys
- Baseline and post-construction surveys for other desert tortoise predators, including coyotes, wild dogs, and gulls
- Mitigation measures to be implemented if the number of predators increases
- A schedule for post-construction surveys during the second year of project operation, followed by surveys once every 5 years.

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.

3000 Ocean Park Boulevard Suite #1020
Santa Monica, CA 90405
Tel: (310) 450-9090
Fax: (310) 450-9494
www.EagleCrestEnergy.com

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

TABLE OF CONTENTS

FIGURES

TABLES

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.

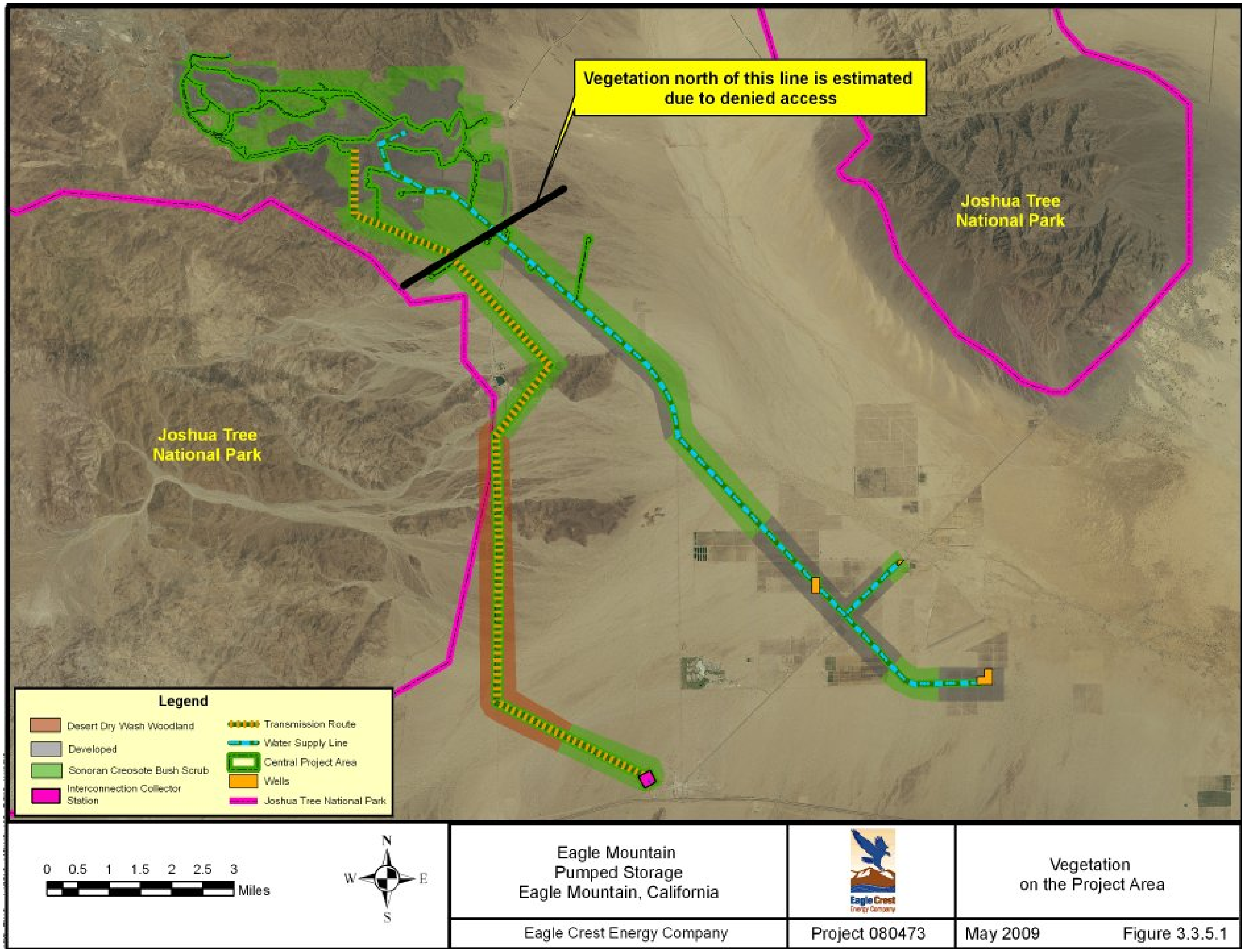


Figure 1: Vegetation of the Project Area

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.

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**

.

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™

Eagle Crest
Energy Company

3000 Ocean Park Boulevard Suite #1020
Santa Monica, CA 90405
Tel: (310) 450-9090
Fax: (310) 450-9494
www.EagleCrestEnergy.com

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

TABLE OF CONTENTS

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.

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) <u>Manual Removal</u> - 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) <u>Mechanical Control</u> - 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.

3000 Ocean Park Boulevard Suite #1020
Santa Monica, CA 90405

Tel: (310) 450-9090
Fax: (310) 450-9494

www.EagleCrestEnergy.com

EAGLE MOUNTAIN
PUMPED STORAGE PROJECT

DESERT TORTOISE CLEARANCE AND RELOCATION/TRANSLOCATION PLAN

Submitted to:
Federal Energy Regulatory Commission

Submitted by:
Eagle Crest Energy Company
3000 Ocean Park Blvd.
Suite 1020
Santa Monica, CA 90405

Prepared by:

Alice E. Karl, Ph.D.
P O Box 74006
Davis, CA 95617
and
GEI Consultants, Inc.
10860 Gold Center Drive
Suite 350
Rancho Cordova, CA 95670

March 2011

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Abbreviations and Acronyms

°C	degrees Celsius
°F	degrees Fahrenheit
AB	Authorized Biologist
BA	Biological Assessment
BLM	U.S. Bureau of Land Management
BM	biological monitors
BO	biological opinion
CDFG	California Department of Fish and Game
DTCC	Desert Tortoise Conservation Center
DWMA	Desert Wildlife Management Area
ECE	Eagle Crest Energy Company
EMPSP	Eagle Mountain Pumped Storage Project
ft	feet
FERC	Federal Energy Regulatory Commission
Genesis Solar	Genesis Solar, LLC
GPS	Global Positioning System
ha	hectares
I-10	Interstate 10
km	kilometer
km^2	square kilometer
m	meter
mm	millimeter
MW	megawatt
Plan	Relocation/Translocation Plan
Project	Eagle Mountain Pumped Storage Project
ROW	right-of-way
USFWS	U.S. Fish and Wildlife Service
ZOI	zone-of-influence

1.0 Background

1.1 Project Description and Setting

Eagle Crest Energy Company (ECE) proposes to develop the 1300 MW Eagle Mountain Pumped Storage Hydroelectric Project (Project) at the inactive Kaiser Mine site near the town of Desert Center, Riverside County, California. The Federal Energy Regulatory Commission (FERC or Commission) is the federal licensing agency for the Project, the details of which can be found in the draft Biological Assessment (BA) (ECE 2011) and Environmental Impact Statement (FERC 2010).

In summary, the 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 Project footprint (Figure 1) includes:

- The 1,101.5-acre hydropower plant or Central Project Area (CPA), which will include: (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 (I/O) structures; (5) water conveyance tunnels consisting of a 4,000-foot-long by 29-foot-diameter upper tunnel, 1,390-foot-long by 29-foot-diameter shaft, a 1,560-foot-long by 29-foot-diameter lower tunnel, four 500-foot-long by 15-foot-diameter penstocks leading to the powerhouse, and a 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 four Francis-type turbine units; (8) water supply facilities including a reverse osmosis (RO) system; (9) access roads; and (10) appurtenant facilities.
- A double circuit, 500 kV transmission line extending along the FERC recommended alternative and existing Southern California Edison (SCE) 161-kv transmission line, approximately 16.4 miles from the Project switchyard to the FERC recommended new Interconnection Collector Substation (Eastern Red Bluff Substation) southeast of Desert Center, for interconnection to the Devers-Palo Verde 500-kV line owned by SCE. The total right-of-way (ROW) area required for permanent and temporary disturbance, based on a width of 200 feet, is 400.5 acres, including stub roads; at least 97.6 acres will be on lands previously developed for agriculture. Access will be via the existing access road to the 161-kv line, with stub roads leading to the individual tower pads. The new Eastern Red Bluff Substation will require an estimated total area of 74 acres.
- A 15.3-mile long water pipeline connecting the CPA to three groundwater wells approximately 11 miles southeast of the CPA. The pipeline route lies along Kaiser Road, SCE's 161-kv line, Highway 177, or other existing development for its entire length. The construction ROW will be 60 feet, for a total of 55.6 acres of temporary surface disturbance, at least 34.7 acres of which will be on lands previously developed.

The CPA consists of mountainous, rocky terrain that has been disturbed extensively as a result of past mining activity (Figure 2). The Kaiser Landfill BA (RECON 1992) and EIS (County of

Riverside and U.S. Bureau of Land Management [BLM] 1996) for the Eagle Mountain Landfill and Recycling Center identified Sonoran Creosote Bush Scrub in the CPA, surrounding a substantial area heavily disturbed by prior iron ore mining activities and the related townsite. 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. 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 CPA since the 1992 BA was written. Therefore, based on CPA configuration, no native habitats should be affected on the CPA.

The linear features for the EMPSP (water pipeline and transmission line) extend from the CPA, at the edge of the Eagle Mountains, into the adjacent Chuckwalla Valley, via a gently sloping bajada. 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). 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.

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 a 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.

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.

While the majority of surrounding lands are undeveloped, public lands managed by the BLM, a number of specific land uses exist in the Project vicinity (Figure 4). These include the largely vacant town of Eagle Mountain, a 460-acre townsite on Kaiser property adjacent to the CPA that still operates the Eagle Mountain School, serving the rural Chuckwalla Valley and local communities. The small communities of Lake Tamarisk and Desert Center are located approximately nine and ten miles southeast of the CPA along the Kaiser Road. Other small developments in the Project vicinity include the Metropolitan Water District (MWD) pumping plant and Colorado River Aqueduct, two small airports, a small disposal site west of Lake Tamarisk, and several small gravel pits. While irrigated crops, especially jojoba, formerly were farmed on approximately 5000 acres, only approximately 1200 acres remain in agricultural production, mostly for jojoba, asparagus, citrus, dates, and palms.

The principal transportation network in the Project vicinity includes I-10 and SR-177, local paved roads and dirt roads. The abandoned Eagle Mountain Rail Line, which once serviced the Kaiser Iron Ore Mine operation, runs through the area from I-10 north to the CPA. Several existing transmission lines cross the Project vicinity

Joshua Tree National Park (JTNP or Park) surrounds the CPA on three sides; the Park boundary is located about 2 to 3 miles from the CPA (Figure 3-4). JTNP encompasses nearly 792,000 acres of land of which approximately 700,000 acres have been designated Wilderness.

1.2 Desert Tortoise Occurrence in the Project Area

Comprehensive surveys were conducted in March and early April of 2008, 2009, and 2010. The results and details of all surveys can be found in ECE (2011). All Project alternatives were surveyed one or more years, except where they crossed Kaiser property. For all years, Kaiser denied access to their properties for surveying. This exclusion included the CPA, the Project water pipeline ROW north of the MWD aqueduct and the transmission line ROW north of Universal Transverse Mercator 3745200N (North American Datum 83).

Habitat for desert tortoise exists on all native habitats on the Project (Figure 5). Relatively little sign was observed on the FERC Staff Recommended Transmission Alternative (#1A) and Alternative #1B (which are immediately adjacent, so are considered here together). Cumulatively over the 3 years of survey, there were five scat, two burrows and two sets of tracks west of SR-177, all west of Kaiser Road, and one tortoise, three burrows and one carcass part east of SR-177, in the native habitat north of I-10. The EMPSP draft BA (ECE 2011) estimated tortoise density on the transmission ROW at 1.2 tortoises per square mile. On and in the buffer around the Eastern Red Bluff Substation, one set of tracks and two carcass parts were observed. This substation alternative has relatively 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.

There is also 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 SR-177 or is in the Eagle Mountain Mine site. No tortoise sign was observed in 2010 on the water pipeline route east of Kaiser Road. Along Kaiser Road, surveys were only conducted in 2008 and 2010, but two burrows one scat and one carcass part were found. Based on the similarity of habitat, tortoise density along Kaiser Road is probably approximately the same as estimated for native habitats on the transmission route, approximately 1.2 tortoises per square mile (ECE 2011).

On the CPA, no tortoises are expected to occur, although there is a low likelihood that one or few tortoises may be present, either as transients or residents. Conditions on the CPA are highly disturbed from past mining activities, and remain denuded of vegetation. Based on aerial photographs, there do not appear to be any changes in the amount or quality of habitat in the disturbed areas of the CPA since the 1992 Kaiser Landfill BA (RECON 1992) and 1993 BO (U.S. Fish and Wildlife Service [USFWS] 1993) were written; both of those documents concluded that there is no tortoise habitat in the area that overlaps the CPA.

2.0 Purpose and Structure of the Plan

The purpose of this Relocation/Translocation Plan (Plan) is to provide direction for the removal of tortoises from harm's way on the Project during all Project activities. A draft Plan was submitted to FERC, BLM, USFWS, California Department of Fish and Game (CDFG) in September 2009. The current version of the Plan incorporates newer written guidance from USFWS (2009a and 2010a), as well as newer verbal guidance from USFWS, BLM, and CDFG. Because USFWS is in the process of analyzing desert tortoise translocation in general, relevant newer guidance will be incorporated into this Plan as it become available.

It should also be noted that this is an adaptive plan – i.e., while the likely scenario related to desert tortoise translocation is identified, all potential contingencies that could happen are also addressed in the unlikely event that they do happen.

Biologically, translocation refers to moving an animal outside its home range. For desert tortoises, males generally have been shown to have larger home ranges than females in studies of sufficient duration and sample size (O'Connor et al. 1994; TRW 1999a), approximately 111.6 acres (range: 10.4–487.8 acres) (45.2 hectares [ha]; range: 4.2–197.5 ha) for adult males and 43.5 acres (range: 4.7–143.3 acres) (17.6 ha; range: 1.9–58.0 ha) for adult females. These areas result in home range diameters of 2,482 feet (ft) (752 meters [m]) for males and 1,554 ft (470 m) for females. Studies of shorter duration or with a smaller sample size found smaller home ranges (e.g., Burge 1977, Barrett 1990, O'Connor et al. 1994, Duda et al., 1999). Home ranges for both genders (Duda et al, 1999) and for males, only, in one study (TRW 1999a), decreased significantly in drought years.

Current terminology regarding translocation is in flux. For clarity in this Plan, then, the following terms, which are biologically defensible and consistent with the USFWS 2009 *Desert Tortoise Field Manual*, will be used:

- Relocation – Moving a tortoise a short distance (up to 500 m) out of harm's way to a point within that tortoise's home range.
- Translocation – Moving a tortoise out of harm's way to a point distant from the tortoise's home range, over 500 m.

The structure of this Plan is first to describe general procedures applicable to all tortoise relocations/translocations: data collected on all tortoises; tortoise transportation; authorized handlers; and reporting. The Plan then addresses desert tortoise clearance and translocation during various Project phases, from site perimeter fencing through construction, restoration activities following construction, operations, and Project decommissioning. All avoidance, protection, and minimization measures that are identified in other Project documents for other biological and cultural resources will be implemented in concert with this Plan.

3.0 Procedures Applicable to All Relocations and Translocations

3.1 Data Gathered on Relocated and Translocated Tortoises

Each captured tortoise will be processed at capture, prior to relocation or translocation. The gender, carapace length, width along the widest area between and inclusive of Marginals 5 and 6, height at the third vertebral, distinguishing morphology, clinical signs of disease, capture site location and description, and the amount of void, if any, will be recorded. In addition, the tortoise will be photographed and drawn. All release site locations will also be recorded at relocation/translocation, along with their descriptions. All tortoise handling will be accomplished by techniques outlined in the USFWS (2009a: Sections 7.6-7.8) and including the most recent disease prevention techniques (e.g., Wendland et al. 2009). Each tortoise will be assigned an individual number, with a number series to be provided by USFWS. Marking techniques will be approved by USFWS, but temporary marks using very small epoxy numbers (e.g., clear epoxy over a small, indelible number on a correction fluid [Wite-Out©] background) on a costal or interior marginal area that receives little to no abrasion are suggested, with a Project-specific identifier. Such numbers will last for several years, which will facilitate identifying specific tortoises if they are subsequently observed during Project maintenance or other activities, included repeated observations during construction (e.g., on unfenced linear facilities).

3.2 Transmitters

Where needed for monitoring relocated or translocated tortoises, transmitters will be affixed to the tortoises. Holohil R1-2B transmitters (24 mm wide by 11 mm thick; 14.9 g; www.holohil.com) will be epoxied onto a carapace scute using five-minute gel epoxy. For males, transmitters will be affixed to the fifth vertebral; for females, transmitters will be affixed to the anterior carapace in the most appropriate location for the animal's shell shape that will preclude interference with righting. The transmitter antenna will be fed through a plastic sheath with a diameter slightly greater than the antenna. This sheath will be epoxied low on the carapace, just above the marginal scutes, and split at the scute seams (growth areas) to preclude distortion of the tortoise's shell during growth. This technique permits the antenna to remain protected from abrasion, but move freely, thereby not affecting tortoise growth. Juvenile tortoises will be similarly equipped but with smaller transmitters, appropriate for their mass and size (<10 percent of the tortoise's mass). Because the antenna sheath is tightly curved on a very small tortoise, potentially constricting antenna movement with subsequent growth distortion, much more of the antenna will remain free on small tortoises.

3.3 Tortoise Transportation and Holding

Tortoises that only need to be moved a few hundred feet will be hand-carried to the release site. Each tortoise that is hand-carried will be kept upright and the handler, wearing disposable examination gloves (one pair per tortoise) will move the tortoise as quickly and smoothly as possible. Tortoises that must be moved further from the capture site will be placed in individual, sterilized tubs with taped, sterilized lids or single-use cardboard boxes with lids. During transport by vehicle, the tortoise tub will be kept shaded and the tub will be placed on a well-padded surface that is not over a heated portion of the vehicle floor. These measures are consistent with USFWS (2009a: Section 7.10).

Should a tortoise void or defecate between capture and release, it will be thoroughly rinsed to remove potential attracting odors to predators. Then, it will be hydrated in one of three ways: epicoelomically, nasal/orally, or by soaking in a shallow tub of water[1]. The tortoise's mass following this procedure will be recorded.

3.4 Handling Temperatures

Handling will adhere to USFWS (2010a) handling guidelines, which state that tortoises can only be handled when air temperatures, measured at 2 inches (5 centimeters) above the ground (shaded bulb), are not expected to exceed 95 degrees Fahrenheit (°F) (35 degrees Celsius [°C]) during the handling session. If the air temperature exceeds 95°F during handling or processing, desert tortoises will be kept shaded in an environment where the ambient air temperatures do not exceed 91°F (32.7°C) and air temperature does not exceed 95°F. The desert tortoise will not be released until air temperature at the release site declines to 95°F.

Tortoises must go underground to escape surface heat at ground surface temperatures of 109°F (43°C) (Karl 1992) to 113°F (45°C) (Zimmerman et al., 1994). Because surface temperatures can easily exceed 109°F when air temperatures at two inches are still below 95°F, the more conservative temperature will govern all tortoise handling described in this Plan, to minimize harm to tortoises. In other words, tortoises will not be handled if ground surface temperatures exceed 109°F even if air temperatures are less than 95°F.

USFWS (2009a and 2010a) has not provided guidance relative to handling temperatures for tortoises found during cold temperatures (e.g., less than approximately 50°F [10°C]) except as they relate to moving the tortoise. This is addressed in the relevant sections below on relocation and translocation.

3.5 Authorized Handlers

USFWS describes a single designation for biologists who can be approved to handle tortoises – Authorized Biologist (AB) (http://www.fws.gov/ventura/speciesinfo/protocols_ guidelines/docs/dt; USFWS 2009a). Such biologists have demonstrated to USFWS that they possess sufficient desert tortoise knowledge and experience to handle and move tortoises appropriately. Specific ABs will be approved to conduct specific tasks, including such specialized tasks as health assessments, blood sampling and transmitter attachment. Only those biologists authorized by USFWS, CDFG, BLM and FERC can conduct specific tortoise handling tasks and clearance surveys. For USFWS, ABs are permitted to approve specific desert tortoise monitors to assist in certain tasks, at the AB's discretion, without further approvals from USFWS. Direct supervision of monitors by the AB (i.e., voice and sight contact) is required for all clearance surveys and certain other specialized tasks, but limited tortoise handling (e.g., removal from harm's way) may occur without supervision, following appropriate training and approvals from the AB.

[1] These three methods were approved by the Desert Tortoise Recovery Office and the San Diego Zoo, working in concert with the Desert Tortoise Conservation Center, on 9 March 2011.

CDFG and BLM also generally require that they independently approve all BMs for the specific activities requested.

Only experienced, dedicated personnel will conduct clearance surveys. The Project AB will be responsible for approving biologists to conduct clearance surveys and ensuring that all clearance activities are conducted effectively. CDFG and BLM may require approval of all biological monitors for specific activities, such as clearance.

3.6 Tortoise Exclusion Fencing

Specific desert tortoise exclusion fencing needs are discussed in the relevant sections below that describe construction of the CPA perimeter fences (Section 4.1), and utilities' construction (Section 4.3). General requirements for fencing are described here.

Desert tortoise exclusion fencing will be used to keep tortoises from entering the CPA, Eastern Red Bluff Substation, and construction areas on the utility lines, as needed in place of or in addition to biological monitoring. (See each relevant section below for discussion of fencing requirements.) Tortoise exclusion fence will be constructed per USFWS (2009a) guidelines. Permanent exclusion fence material will consist of galvanized one-inch by two-inch vertical wire mesh fence, extending at least two feet above the ground and buried at least one foot. Tortoise-proof gates will be established at all site entry points, to remain closed except during entry by vehicles. If shown to be effective and not potentially injurious to tortoises, tortoise "cattle guards" may be installed instead of or in addition to gates.

Temporary fencing will follow guidelines and materials for permanent fencing except in very temporary situations, when silt fencing may be used. Rebar may replace t-stakes or chain link poles for temporary fencing. In both cases, supporting stakes will be sufficiently spaced (e.g., ≤8 ft for wire mesh; ≤5 ft for silt fencing) to maintain fence integrity. On the CPA, where burial is impossible, the mesh will be bent at a right angle toward the outside of the fence, at or below ground level, with the bent portion anchored by stakes and further held down by rocks and soil to prevent tortoises from digging under the fence. Outside the CPA, fencing may be buried if it will not create a biologically significant disturbance; alternatively, it may be bent outward at the ground level, with the bent portion tacked or held down by rocks and soil.

All permanent exclusion fencing will be inspected monthly and during all major rainfall events; temporary fencing will be inspected at least weekly. Any damage to the fencing will be repaired immediately. If it cannot be repaired immediately, any gaps that are open to tortoise habitat will be continuously monitored until the gap can be repaired, to ensure that a tortoise has not entered the site through the gap.

3.7 Injured or Dead Tortoises

Any tortoise injured or killed during any Project activity, including post-translocation monitoring, will be reported by phone to USFWS, CDFG, BLM, and FERC no later than noon on the first business day following the discovery of the injured/killed tortoise; a follow-up written report will be e-mailed or faxed within 48 hours. Prior to any desert tortoise monitoring or surveys, the AB will contact CDFG for the name of an approved veterinarian or wildlife rehabilitation clinic, for use in the event of an emergency. If a tortoise is injured, the tortoise will be taken immediately to one of these facilities if the AB determines that veterinary care is warranted. If the AB is uncertain, then he/she can discuss this with the contact biologist at the USFWS and CDFG immediately upon discovery of the injured tortoise, or simply take the tortoise to the approved veterinarian. If a tortoise is killed, it will be salvaged for necropsy.

4.0 Clearance and Relocation/Translocation During Specific Project Phases

For the EMPSP, moving tortoises to protect them is most likely only to occur during construction on some portions of the utilities (transmission line and water pipeline). There is a low possibility of moving tortoises from the Eastern Red Bluff Substation site but no tortoises are expected on the CPA.

However, tortoise relocation/translocation may occur during Project construction, including initial perimeter fence construction on the CPA and Eastern Red Bluff Substation, CPA and substation tortoise clearance surveys, utilities' construction, revegetation of temporarily disturbed areas, or initial grading on the CPA. Project operations and decommissioning may also necessitate tortoise relocation/translocation.

Based on the survey results, it is anticipated that no or very few desert tortoises would require removal from the CPA during any Project phase. Depending on weather conditions during the construction period, one or more tortoises may need to be removed from harm's way (relocated) during construction of the utilities and revegetation of temporarily disturbed areas. No translocation (i.e., moving a tortoise outside its home range) is anticipated for any phase of the EMPSP.

For the reader's ease in locating information in this section, the organization largely follows the order of Project construction:

Perimeter fencing around the Central Project Area	Section 4.1
Pre-construction clearance of the Central Project Area	Section 4.2
Construction activities in unfenced habitats, specifically for the utilities and revegetation of temporarily disturbed habitat –	Section 4.3
Operations	Section 4.4

The Eastern Red Bluff Substation is proposed to be constructed by SCE for interconnection of several proposed energy projects, including the Desert Sunlight Solar Project and this proposed Project. The Desert Tortoise Translocation Plan developed for the Desert Sunlight Project addresses translocation of desert tortoises in the Eastern Red Bluff Substation (Ironwood Consulting, Inc. 2010). Eagle Crest Energy Company proposes to collaborate with SCE, Desert Sunlight Holdings, LLC (the developers of the Desert Sunlight Solar Project), and other solar projects in the translocation of desert tortoises from the substation site under the requirements of the desert tortoise translocation plan for that site, when that plan is approved.

4.1 Central Project Area Perimeter Fencing

Once the CPA can be accessed, surveys will be conducted in the CPA to determine the presence of desert tortoise of any available habitat. If there is any suggestion that tortoises could be present in the construction area or along routes used by construction personnel on the Kaiser property to reach the CPA, 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. The purpose of the exclusion fence is to keep tortoises in habitat adjacent to the CPA from entering this part of the Project during all Project phases. Surveys will also determine the placement and configuration of fences. For instance, where a fence may need to be discontinuous between tailings piles, the fence ends will extend well up the slope of the tailings 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, once the site can be evaluated. Temporary fencing may be used to exclude tortoises from the CPA until the permanent fence is installed, to facilitate site grading, as needed.

4.1.1 Surveys and Monitoring during Fence Construction

For areas of native or regrown habitat in the CPA, biologists will survey the staked fenceline for all desert tortoise burrows and tortoises, within 24 hours prior to fence installation, covering a swath of at least 90 ft centered on the fenceline, using 15-ft-wide transects. Tortoise burrows will be mapped using Global Positioning System (GPS), and the size and occupancy recorded; if not occupied, indications of how recently the burrow was used will be recorded. Flagging will not be likely to attract poaching in the CPA, so those burrows also will be flagged. Burrows will be avoided if at all possible. Assuming that temporary fencing is installed prior to permanent fencing, it will be routed around an occupied burrow or any burrow that is too deep and/or tortuous to fully determine occupancy (e.g., a kit fox den), to exclude the burrow from the CPA if at all possible. In the unlikely event that a burrow must be destroyed for fencing to occur, then it will be examined for occupancy by tortoises and other wildlife and carefully excavated with hand tools, using standardized techniques approved by USFWS (2009a). Any desert tortoises will be removed as described below in Section 4.1.2, Tortoise Relocation Methods During Fence Construction.

All fence construction in native or regrown habitat, or wherever it is determined that tortoises could be present, will be monitored by ABs or BMs to ensure that no desert tortoises are harmed. The level of monitoring will depend on the specific fencing activity and proximity of crews, but at least one BM will accompany each separate construction crew (or possibly more than one crew if and only if fencing activities and proximity of crews would permit thorough and successful monitoring), such that no driving, trenching, fence pulling, or any surface disturbing activities will occur without the immediate presence of a BM. Maps of burrows from the pre-construction survey will be provided to all BMs to assist in protecting tortoises. Such maps will also be potentially useful for relocating tortoises.

Following the onset of the tortoise activity season, or if exclusion fencing is installed when tortoises are known to be active (for example, if unusually warm weather occurs before fencing is completed), then all installed exclusion fence will be checked at least twice a day for the first week to ensure that no tortoise is fence-walking inside or outside the fence, attempting to gain access to the other side of the fence. If inside the fence, the tortoise will be relocated outside of the fence, as identified below. A tortoise fence-walking outside the fence will be monitored continuously until the tortoise uses a suitable burrow outside the fence.

4.1.2 Tortoise Relocation Methods during Fence Construction

Because tortoise densities are likely to be non-existent on the CPA, every attempt will be made to minimize handling tortoises during the perimeter fence construction and following, and during CPA clearance. This will minimize take as well as all activities associated with relocated tortoises, such as intensive surveys in the Translocation Area for resident diseased tortoises (see Section 4.1.4 below), quarantining tortoises (Section 4.2.2), and a long-term, follow-up monitoring effort (Section 4.1.5). Fence gaps and erection of temporary fencing will be used to "encourage" a tortoise to return to the outside of the fence. For instance, if an active tortoise is observed inside the Project boundary, construction and equipment can be temporarily moved to another section of the fence, a large gap can be left in the fence nearest the tortoise and a temporary (e.g., silt) fence can be quickly constructed from the gap edges well around the tortoise so that it moves through this channel to the outside of the Project. Following exit from Project boundary, the tortoise would then be immediately monitored as identified below in Section 4.1.4, Post-Release Monitoring.

4.1.2.1 Tortoises Found During the Active Season

Any tortoise that must be moved during perimeter fencing will be transmittered and relocated immediately outside the construction zone, but onto either BLM land (with BLM permission) or Project land. Release points will be as close as possible to the capture point, to keep tortoises within their home range, but will always be on or immediately adjacent to suitable habitat. Specific release points cannot be identified at this time without knowing where tortoises are.

Generally, tortoises will be placed in the shade of a shrub or, if known, in the entrance of that tortoise's burrow (but see below in the event that ambient temperatures are high). The most recent USFWS guidance (USFWS 2010a) states that all "perimeter fence" tortoises must be moved to the interior of the Project site. Because there is likely to be no tortoise habitat in the CPA, all tortoises found during fence construction that must be moved will be placed outside of the Project boundary rather than inside.

All tortoises relocated from harm's way during perimeter fencing will be transmittered as described in Section 3.2, above. The exception will be tortoises who are brumating (≈hibernating) in burrows during winter (see below for a discussion of handling tortoises outside of USFWS temperature guidelines).

USFWS guidance (2009a and 2010a) regarding translocation temperatures states that translocation occur when air temperatures at 2 inches (5 centimeters) above the ground, are not forecasted to exceed 90°F (32°C) within three hours of release and 95°F (35°C) within one week of release; additionally, daily low temperatures should not be cooler than 50°F (10°C). Because fence construction can occur during any time of the year, when air and ground temperatures will exceed lethal levels or may be lower than 50°F during some winter days and evenings, contingencies must be in place in the event that a tortoise must be relocated if it cannot be avoided. The following options to protect tortoises address potential contingencies during periods of high temperatures. (Note, however, that no tortoise would be moved when temperatures exceeded 95°F air temperature or 109°F ground temperature.) A summary of these activities is found in Table 1.

- *If a tortoise is found under a shrub*, a temporary fence can be erected to keep the tortoise from entering the construction zone. The fence will be flagged to ensure avoidance. Fencing will be 1 by 2-inch mesh or other, adequate temporary fencing (e.g., silt fencing can be used for very short-term needs). If practical, the fence would be removed later in the day (or several days later if needed to protect the tortoise) when the tortoise could be safely moved or allowed to move away from the construction area of its own accord. The tortoise would not be transmittered unless the AB determines that keeping track of the tortoise via telemetry would increase the tortoise's safety.

  If the AB determines that leaving the tortoise under a shrub would potentially result in overexposure to high temperatures and no burrow is known for that tortoise, construction in that area will halt and all personnel will depart so that the tortoise is not disturbed in its pursuit of a burrow. Construction can be resumed later in the day when air temperature has dropped below 95°F. Less preferably, the tortoise can be collected in a sterile, covered tub, held in a climate-controlled location approved by USFWS, CDFG, and BLM (e.g., Project office), transmittered, and released the same day in early evening, when air temperature has dropped below 95°F or the following morning. All boxed tortoises would be checked several times until release, to ensure their safety. All released tortoises would be followed until they found a suitable burrow.

Table 1. Alternatives for relocating or translocating tortoises found during periods of ambient temperatures outside the USFWS (2009a, 2010a) translocation guidelines. (Note that in all cases, no tortoises will be handled during air temperatures at 2 inches above the ground that exceed 95°F or ground surface temperatures that exceed 109°F.)

<table>
<tr><th rowspan="3">Project Phase</th><th rowspan="3">Project Activities</th><th colspan="3">Alternatives for Relocation or Translocation[1]</th></tr>
<tr><th colspan="2">During Periods of High Temperatures</th><th rowspan="2">During Winter[2]</th></tr>
<tr><th>Tortoise Found Under Shrub</th><th>Tortoise Found In Burrow</th></tr>
<tr><td>Construction</td><td>Construction of CPA perimeter fence, and linear facilities; revegetation activities</td><td>• Relocate to known burrow; monitor
• Erect temporary fence between tortoise and construction; monitor; remove fence when appropriate
• Temporarily move construction to another area
• Collect and hold in climate-controlled facility; release in evening or the following morning; monitor</td><td>• Erect temporary fence between tortoise and construction; monitor; remove fence when appropriate
• If cannot be avoided, collect and hold in climate-controlled facility; release late afternoon/early evening or following morning; monitor</td><td>• If cannot be avoided, place tortoise in artificial burrow, temporarily block in and monitor; remove block at two weeks (or earlier depending on the weather) and monitor
• If tortoise fails to find suitable winter burrow and will not use artificial burrow, hold in climate-controlled facility, in the dark at temperatures simulating burrow temperatures, until seasonal temperatures warm and tortoises are active; release within 100 ft of capture burrow; monitor</td></tr>
<tr><td></td><td>Grading of CPA</td><td>• Capture and hold in climate-controlled facility, contact USFWS , CDFG, and BLM for direction</td><td>• Capture and hold in climate-controlled facility, contact USFWS, CDFG, and BLM for direction</td><td>Not applicable</td></tr>
<tr><td>Operations</td><td>CPA</td><td>• Capture and hold in climate-controlled facility, contact USFWS , CDFG, and BLM for direction</td><td>• Capture and hold in climate-controlled facility, contact USFWS, CDFG, and BLM for direction</td><td>Not applicable</td></tr>
<tr><td></td><td>Access road, utilities maintenance</td><td>• Allow tortoise to proceed out of area unimpeded; monitor
• Relocate to known burrow; monitor
• Erect temporary fence between tortoise and construction; monitor; remove fence when appropriate
• Temporarily move construction to another area
• Collect and hold in climate-controlled facility; release in evening or the following morning; monitor</td><td>• Erect temporary fence between tortoise and construction; monitor; remove fence when appropriate
• Collect and hold in climate-controlled facility; release late afternoon/early evening or following morning; monitor</td><td>• If cannot be avoided, place tortoise in artificial burrow, temporarily block in and monitor; remove block at two weeks (or earlier depending on the weather) and monitor
• If tortoise fails to find suitable winter burrow and will not use artificial burrow, hold in climate-controlled facility, in the dark at temperatures simulating burrow temperatures, until seasonal temperatures warm and tortoises are active; release within 100 ft of capture burrow; monitor</td></tr>
</table>

Project Phase	Project Activities	Alternatives for Relocation or Translocation[1]		
		During Periods of High Temperatures		During Winter[2]
		Tortoise Found Under Shrub	Tortoise Found In Burrow	
Decommissioning	CPA decommissioning and site restoration, outside fenced areas	• Relocate to known burrow; monitor • Erect temporary fence between tortoise and construction; monitor; remove fence when appropriate • Temporarily move construction to another area • Collect and hold in climate-controlled facility; release in evening or the following morning; monitor	• Erect temporary fence between tortoise and construction; monitor; remove fence when appropriate • If cannot be avoided, collect and hold in climate-controlled facility; release late afternoon/early evening or following morning; monitor	• If cannot be avoided, place tortoise in artificial burrow, temporarily block in and monitor; remove block at two weeks (or earlier depending on the weather) and monitor • If tortoise fails to find suitable winter burrow and will not use artificial burrow, hold in climate-controlled facility, in the dark at temperatures simulating burrow temperatures, until seasonal temperatures warm and tortoises are active; release within 100 ft of capture burrow; monitor

1 See the text for the details of each alternative.

2 Winter is defined as the period when tortoises are brumating, approximately 15 November to 15 March.

- At the AB's discretion, if this tortoise's burrow is known, the tortoise can be placed at that burrow and watched until it enters the burrow. *If a tortoise is in a burrow that cannot be avoided by construction activities*, then the tortoise will be collected in a sterile, covered tub, held in a climate-controlled location (e.g., Project office) until early evening, when air temperature has dropped below 95°F. At that time, the transmittered tortoise will be released outside the CPA within a few feet of the point of collection. It will be followed until it finds a suitable burrow or night falls. (If this exercise occurs in the morning, the threshold will be air temperatures exceeding 95°F or ground temperatures exceeding 109°F.) If no suitable burrow has been found, then the tortoise will again be tracked the morning until it finds a suitable burrow or the threshold temperature has been reached. If the latter occurs, the tortoise will again be collected and the process repeated that evening. Because a tortoise uses many burrows and is being relocated only a short distance within its home range, where other refuges are known to the tortoise, it is anticipated that the tortoise would locate a suitable burrow quickly.

4.1.2.2 Tortoises Found During Winter

If fencing occurs during winter when tortoises are inactive (approximately 15 November to 15 March in the Project area), tortoises found in burrows will be avoided, and the burrow fenced with high visibility fencing (if this would not attract poaching) and mapped on construction drawings; a biological monitor will continually monitor the burrow and fence while construction is proceeding in the immediate area of the burrow, to ensure tortoise safety (Table 1). The high visibility fencing will be removed once all danger of construction is past. A brumating tortoise will not be removed from its burrow for the sole purpose of transmittering it.

If a tortoise in a burrow that cannot be avoided[2] and tortoises are still in brumation, then an artificial burrow that replicates the capture burrow (i.e., location relative to a shrub, direction, length) will be constructed as nearby as possible outside the Project fence and in an area where construction has finished (i.e., the tortoise will not be disturbed). All burrows that cannot be avoided will be completely excavated using standardized techniques approved by USFWS (2009a) and the Desert Tortoise Council (1994). The tortoise will be captured at night, affixed with a transmitter and placed in the artificial burrow along with soil and scat from the capture burrow. The tortoise will be blocked into the burrow for two weeks (unless the weather warms, in which case the barriers will be removed), at which time the blocks will be removed and the tortoise continually monitored to ensure that it either remains in the burrow or finds another suitable burrow. If the tortoise fails to find a burrow in several days, and the nighttime air temperatures fall below approximately 50°F, then it will be captured and held in a climate-controlled, dark, quiet, and safe location (e.g., room in Project office) at an air temperature equivalent to the air temperature one meter inside a natural burrow, until seasonal temperatures warm and tortoises are observed to be active in the area. At that point, it will be released within 100 ft of its capture burrow and monitored as described in Section 4.1.4, Post-Release Tortoise Monitoring, below.

Any tortoise found aboveground during winter is highly likely to be near its burrow, except during extended periods of warm weather. Tortoises will not be touched if at all possible and

[2] This could occur where the permanent fence was the first and only perimeter fence constructed.

various options will be explored to ensure that the tortoise has a safe, adequate winter burrow, but is encouraged to leave the CPA on its own. For instance, if a tortoise is found inside the CPA during perimeter fencing, and its apparent burrow is outside, construction and equipment can be temporarily moved to another section of the fence and a large gap left in the fence nearest the tortoise. The tortoise would be monitored continuously until it occupies that burrow or another burrow outside the Project boundary, at which time the fence gap would be closed. If, for any reason, the AB feels that the burrow chosen by the tortoise is unlikely to be its actual, winter burrow, the fence gap will not be closed and the tortoise will be monitored continuously until it is safely sequestered in an adequate winter burrow. (This might occur, for instance, if the tortoise has merely taken temporary refuge in this other burrow.) If this or any tortoise's winter burrow is within a few hundred feet inside the fence, a channel of temporary fencing can be constructed around the burrow to the fence gap, with the gap left open so that the tortoise can move outside of the Project once the weather warms. If a tortoise's winter burrow is found to be too far inside the CPA to feasibly create a channel to a fence gap, then the tortoise will be transmittered for relocation/translocation in spring and left *in situ* inside the site.

4.1.3 Health Considerations

Visual health assessments will be conducted on all tortoises relocated during CPA fencing by an experienced biologist approved by the USFWS. The most recent written guidance from USFWS (2010a) is that tortoises that are translocated >500m will be subject to blood sampling, while those relocated <500 m will not be blood-tested. Furthermore, no tortoises with clinical signs of mycoplasmosis may be relocated. Schumacher et al. (1997) observed that clinical signs had a high statistical correlation with positive serology (i.e., exposure to *Mycoplasma agassizii*). A mucous nasal discharge was the clinical sign that was the most reliable predictor (93 percent of tortoises with a mucous nasal discharge were seropositive), although it could be caused by pathogens other than *M. agassizii*. Furthermore, a purulent nasal discharge was the only clinical sign that was relatively objective; other clinical signs were far more subjective, were potentially present for other reasons, and reduced the statistical predictability of positive serology. For the EMPSP, a purulent nasal discharge will be the threshold to identify a diseased tortoise, unless and until USFWS mandate that other specific clinical signs be used to identify mycoplasmosis.

For tortoises from which blood samples are taken, blood samples (no more than 2 cubic centimeter) will be collected via standardized techniques of brachial or subcarapacial venipuncture (University of Florida, Department of Pathobiology, no date) to test for the presence of antibodies to *M. agassizii*, *M. testudineum* and other pathogens. Whole blood will be centrifuged and the plasma packaged on ice and sent overnight express freight to the University of Florida Mycoplasma Research Lab for analysis via enzyme-linked immunosorbent assay (ELISA). USFWS (2010a) has determined that blood sampling on translocated tortoises cannot be collected until 15 May. If this should change, then tortoises will be sampled as early as permitted. Only experienced, approved persons who have been previously permitted to conduct this work on desert tortoises will be permitted to collect the samples.

Desert tortoises that have clinical signs of disease or are seropositive will undergo additional blood testing and if determined to be infectious, will be either (1) sent to the Desert Tortoise Conservation Center (DTCC) or other agency-approved facility where they will undergo further assessment, treatment, and/or necropsy (USFWS 2010a), or (2) undergo further evaluation by

USFWS to determine their disposition. If sent to the DTCC or other approved facility, ECE will provide a flat fee of $9,000 for each desert tortoise sent to the DTCC commensurate with the cost to provide housing, care, treatment, and other services for five years ($3,000 for Year 1, $1,500 for Years 2 to 5) (USFWS 2010a).

All desert tortoises determined to be infectious or unhealthy may undergo additional blood testing and if still determined to be infectious will be sent to the Desert Tortoise Conservation Center (DTCC) or other agency-approved facility where they will undergo further assessment, treatment, and/or necropsy. ECE will provide funding commensurate with the cost to provide housing, care, treatment, and other services, as required by USFWS. Another option may be to quarantine such tortoises in the quarantine pens for further evaluation.

Directives regarding disease testing and algorithms for translocation decisions are currently in a state of development at USFWS. Most recently, the USFWS has stated that all tortoises moved from a site likely will be blood-tested, no matter how far they are moved (R. Averill-Murray, Desert Tortoise Recovery Office, pers. comm. to A. Karl). Furthermore, a new algorithm that examines specific clinical signs, rather than antibody status, may be used to determine if a tortoise may be translocated. So, before tortoises are translocated or relocated from the EMPSP, the most current procedures from USFWS will be incorporated into the program.

4.1.4 Post-Release Tortoise Monitoring

While tortoises moved a short distance (< 500 m) from construction activities along the perimeter fence would be assumed to be within their home range and familiar with burrow locations, they would receive immediate post-release monitoring. This may be especially critical for juvenile tortoises, which are highly subject to depredation. Any tortoise moved will be watched for at least one hour to determine if it is behaving safely (e.g., seeking shade or a burrow) or if it is likely to try and re-enter the construction area. Because each relocated tortoise will have a transmitter, it will also be located via telemetry for the next two days during tortoise activity temperatures to ensure that the tortoise is not fence-walking and is using burrows.

As described above in Section 4.1.3, Tortoise Relocation Methods during Fence Construction, any tortoise moved in the evening during a period when daily air temperatures exceed 95°F (late April through early October) will be followed until it either finds a suitable burrow or night falls. (If this exercise occurs in the morning, the threshold will be air temperatures exceeding 95°F by which a tortoise must find a suitable burrow.) If it has not found a suitable burrow, the tortoise would be again tracked in the morning until it finds a suitable burrow or the threshold temperature has been reached. If the latter occurs, the tortoise will again be collected, held in a climate-controlled environment and the process repeated that evening. Because tortoises use many burrows, it is anticipated that the tortoise would locate a suitable burrow quickly.

USFWS (2010a) recommends a five-year monitoring program for translocatees, including tortoises removed from the perimeter fence. Further, USFWS has determined that resident and control study cohorts are required unless fewer than five translocatees/relocatees are moved. Because it is likely that no tortoises will be moved during perimeter fence construction for the CPA, alternative monitoring programs will be explored with USFWS, CDFG, BLM and FERC. One alternative would be to combine efforts with a local, much larger, solar project effort.

Unless a modified monitoring program is approved by USFWS, CDFG, BLM, and FERC, the following minimum elements will be basic procedures for the monitoring program, per USFWS (2010a):

- Tortoises will be located by telemetry according to the schedule identified in USFWS (2010a) guidelines. Each time the tortoise is located, the behavior, location (UTM), and burrow description (if any) will be recorded.

- Survival and general health will be monitored through body condition indices (mass to volume ratios), clinical signs of disease, serology, and inspection for injuries. Any time a tortoise is handled, it will be examined for clinical signs of disease. Formal health assessments will be conducted during April (following brumation), July (following oviposition), and October (prior to brumation). At these times, body condition (mass to volume ratio) also will be measured (mass, carapace length, width at Marginal 5 or 6, height).

- Blood samples will be taken and analyzed annually, in July or October. An approved biologist will conduct the assessments and tissue sampling. While blood samples may not be required of tortoises moved <500 m during relocation, blood will be sampled shortly after relocation[3] in order to provide baseline data.

- Sampling frequency and techniques for disease analysis will be updated as necessary during the study, based on the newest disease information from this and other studies. This may include tests for other pathogens (e.g. *Mycoplasma.* spp., herpesvirus, iridovirus) as their importance and evaluation techniques become validated for desert tortoises. Data will be recorded on a data sheet similar to that in Appendix 1, with an additional health assessment data sheet to be provided by USFWS.

- Any health problems observed (*e.g.*, rapid declines in body condition, perceived outbreaks of disease, mortality events) will be reported to the USFWS, CDFG and BLM such that appropriate actions can be taken in a timely manner.

- Transmitters will be changed as necessary.

Per USFWS (2010a) guidelines, triggers for implementation of adaptive management will be developed through coordination with USFWS, CDFG and BLM. ECE may also request a re-evaluation of the tortoise monitoring program after two years of monitoring have been completed, depending on results.

[3] USFWS (2010a) requires that blood sampling be conducted no sooner than 15 May, "based on activity of the immune system." More recent communications from USFWS have identified that blood samples may be taken after tortoises have been active at least two weeks following brumation (K. Fields, Desert Tortoise Recovery Office, pers. comm.. to A. Karl).

4.1.5 Nest Relocation

Any nests found between November 1 and April 15 are unlikely to be viable and will not be moved; hatching is typically completed by October. In the event that nests are found between April 15 and October 31 and must be moved (e.g., for construction of linear facilities), the nests will be moved. Eggs will be inspected to determine if they are viable and, if so, will be moved to an identical microsite (e.g., cover, plant species, soil type, substrate, aspect) on the approved Recipient Site (see Section 4.2.2 Designated Recipient (Translocation) Site and Translocation Area, below) using standard techniques (e.g., USFWS 2009a). Translocated nests will be fenced with open-mesh fencing (e.g. 2-inch wide mesh) that will permit hatchlings to escape but prevent depredation by canids that might be attracted to the new nests by human scent. Open-mesh fencing or avian netting also will be installed on the roof of the nest enclosure to prevent predator entry. Nests will be monitored from a 30-ft distance once a month until late November, at which time they will be excavated for examination. If possible, hatchlings will be weighed, measured, photographed, described and marked.

4.2 Central Project Area Construction

4.2.1 Clearance Surveys

Upon receiving access to the CPA, a reconnaissance survey will be conducted to determine the presence of desert tortoise of any available habitat. If there is any suggestion that tortoises could be present in the construction area or along routes used by construction personnel, 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

A clearance survey for tortoises will be conducted inside the completed perimeter CPA tortoise fence in any potential tortoise habitat. Clearance surveys will coincide with heightened tortoise activity to maximize the probability of finding all tortoises. The USFWS guidelines (USFWS 2010a) state that heightened tortoise activity occurs in April, but this timing is for Mojave Desert tortoises, not Colorado Desert tortoises in the region of the Project. Tortoises in the Project vicinity become active in early to mid-March, coincident with elevated temperatures (A. Karl, 2011, e-mail to T. Engelhard) and maximum forage biomass; in fact, most forage is dried by 1 April. Data were provided to USFWS in March 2009 (A. Karl, 2009, e-mail to T. Engelhard) demonstrating this, prompting USFWS to permit desert tortoise presence-absence surveys in Chuckwalla Valley beginning 15 March (T. Englehard, e-mail to A. Karl, 18 March 2009). Clearance beginning by mid-March is also necessary to translocate tortoises during appropriate temperatures. Tortoises must be relocated or translocated from the CPA at least one week before daily, midday temperatures are expected to exceed 95°F (35°C) air temperature (at 2 inches) or 108°F (42°C) ground surface temperature (see discussion in Section 4.1.3 Tortoise Relocation Methods during Fence Construction, above) whichever is lower. The rationale is that tortoises must find or dig new refuges in the potentially unfamiliar translocation area, prior to the onset of lethal daily temperatures.

Per USFWS (2010a) guidelines, a minimum of three, 100 percent coverage clearance passes will be completed. For the CPA to be deemed cleared of tortoises, no additional tortoises may be found on the two, final, consecutive clearance passes. If a tortoise is found on one of these passes, two clean passes (i.e., no new tortoises) must follow before the CPA can be declared to be cleared of tortoises.

Clearance transects will be 15 ft wide. Transects narrower than 15 ft wide will be used if dictated by dense shrub vegetation or where visibility is otherwise compromised. On each subsequent pass, an attempt will be made to view all shrubs and the terrain from as many angles as possible. To achieve this, transects programmed into GPS units will be either perpendicular, parallel but offset, and/or approached from the opposite direction on each subsequent pass (Karl and Resource Design Technology, Inc., 2007).

All tortoise sign will be mapped and evaluated (e.g., type, age, size) during all passes, and all scat collected. During subsequent passes, areas where fresh scat is found will prompt concentrated searches. After the second pass, concentrated searches will be conducted in all areas where recent sign is concentrated, unless a tortoise has been found in that area. If this concentrated search occurs after two clean passes, no additional clearance surveys of the CPA will be required if a tortoise is found during this additional search.

No burrows will be collapsed until the third pass, by which time it is assumed that all tortoises probably will have been relocated from the CPA. (Fresh burrows used by other wildlife, including badgers or foxes, will not be collapsed until occupants have been removed via active or passive techniques approved by CDFG.) While clearance is planned to occur when ambient temperatures are safe for translocating tortoises, ambient temperatures may rise unexpectedly during the second pass such that tortoises or other wildlife might be trapped in the open if its burrow has been excavated and collapsed during the search effort. To assist the identification of currently used burrows, all burrows will be inspected and assessed for occupation or recent use by tortoises during the first two passes, gated with small sticks along the entrance to detect future use, mapped and flagged. On the third pass, burrows will be excavated using standardized techniques approved by USFWS (2009a). During excavation, attention will be given to potential tortoise nests (see Section 4.2.6 Nest Relocation, below).

Once all tortoises have been translocated from the CPA, heavy equipment will be allowed to enter the site to conduct construction activities. However, the Project AB(s) will be continuously available during the construction period to remove any tortoises overlooked during the clearance surveys.

4.2.2 Designated Translocation Site and Translocation Area

The following discussion for the CPA is probably moot, since there is a nearly negligible chance of finding a tortoise there. However, the discussion is provided in the unlikely event that a tortoise must be relocated or translocated from the site.

For the CPA, the surrounding area is generally highly degraded and it is fully possible that there is no suitable habitat immediately outside the perimeter fence. Suitable habitat is not merely a patch of habitat, but one of sufficient size that is connected to a large, continuous block of occupied or occupiable tortoise habitat such that the tortoise population there is self-sustaining and not disjunct from other populations in the region. If suitable habitat exists, and a tortoise is found inside the CPA within 500 m, then it will be relocated immediately outside the perimeter fence to that area. If suitable habitat does not exist, then the tortoise would need to be translocated >500 m to a designated Translocation (Recipient) Site.

USFWS (2010a) has mandated that any tortoise moved >500 m be quarantined onsite or offsite until the serology lab report is obtained in mid to late May. (Note: This directive is likely to change such that only tortoises that are clinically ill may be quarantined until USFWS evaluates the practicality of translocating the tortoise and all asymptomatic tortoises, regardless of serology, may be translocated without quarantining [R. Averilll-Murray, pers. comm.. to A. Karl]. Because of the current state of flux in this procedure, the discussion below is written based on the USFWS (2010a) guidance.

For the CPA, there is not likely to be any native habitat that would be suitable for housing tortoises. Pens therefore would be constructed in the Translocation Site. The Translocation Site would serve tortoises translocated from the CPA. The location of this site will be determined in consultation with the USFWS, CDFG, and BLM, but may include the following alternatives:

1. Collaboration with other energy developments (e.g., First Solar) in the area
2. Establish a Translocation Site on Kaiser's BLM-exchange lands (Figure 1). There is ample continuous habitat there that is well outside of Kaiser planned landfill activities and within 1.5 kilometers of the CPA. Pens could probably be reasonably protected from vandalism because of the remote location and Kaiser security.

The actual Translocation Site constitutes the release area and pen sites for tortoises moved >500 m. The Translocation Site plus surrounding area to 6.5 km (per USFWS 2010a) collectively would be considered the Translocation Area. Both options above would need to address the following considerations:

- Acclimation by translocatees from the CPA would be facilitated by site familiarity.
- The translocation area is within the same population as the CPA, so genetic, morphological and behavioral integrity would be maintained.
- There is minimal anthropogenic use of the area and it is protected by its immediate proximity to JTNP.
- The Translocation Area is part of a broad expanse of occupied tortoise habitat, sufficient to accommodate a few translocated tortoises. Tortoise populations are currently well below carrying capacity throughout their documented range, including the western Mojave Desert, due to a long-term drought and other factors (Karl 2004 and 2010b, McLuckie et al. 2006, Boarman et al. 2008). Based on the pattern of range-wide and local declines, it is likely that tortoise densities in the Project vicinity have similarly declined, so long-term carrying capacity would not be exceeded by the addition of a few tortoises. USFWS (2010a) has estimated that adult tortoise density in any Translocation Area should not exceed 130% of the current density in the recovery unit within which the translocation occurs. The most recent estimates from USFWS' range-wide sampling program in 2007, 2008, 2009, and 2010a are 5.0 to 5.9 tortoises/km^2 for the eastern portion of the Colorado Desert Recovery Unit (USFWS 2009b, 2010b and c). This would translate into a maximum allowable density in the Translocation Area (130% of 3.1-4.7)) of approximately 7 tortoises/km^2, including both resident tortoises and translocated tortoises. During surveys of the Translocation Area to determine the health status of the resident population (see Section 4.2.4, Health Considerations, below), the

current tortoise density in the Translocation Area will be determined. Assuming it is lower than 7 tortoises/km^2, the number of tortoises that can be translocated into the Translocation Area can be calculated. If the current Translocation Area density is already >7 tortoises/km^2, then USFWS will be contacted to determine the number of tortoises that can be translocated.

The Translocation Site pens will be sufficiently large to support each tortoise pending disease testing results. Each will be a minimum of 165 by 165 ft (50 by 50 m), thereby providing adequate forage and sufficient habitat for a tortoise to find and/or construct adequate cover sites. (If necessary, supplemental food and water may be supplied to tortoises if they are required to remain in the pens longer than the activity season in which they were collected. In this event, ECE will submit a husbandry plan to USFWS, CDFG, BLM, and FERC, for their approval, which will detail how the penned tortoises will be cared for and monitored, including providing supplemental water and food, if necessary.) Two artificial burrows, each at least 4 ft (1.2 m) long, will be constructed for each tortoise, using a gas-powered auger or shovel/plywood, per USFWS (2009a) guidance. Pens will be constructed using 1 by 2 inch tortoise-proof fencing, installed as identified in Section 4.1, CPA Fencing and Temporary Fencing, above. They will be double-walled separated by a minimum of 100 m so that tortoises will not be crowded once the fences are removed (if tortoises are seronegative) and tortoises fully released. All pens will be surveyed prior to and following their construction to ensure that no resident tortoises inhabit the pen.

Juvenile enclosures will be a minimum of 20 ft in diameter, extending to 50 ft or more, as necessary, depending on the number of tortoises found. (Morafka et al. [1997] successfully penned juvenile tortoises at the rate of 62-123 tortoises per acre [152-305 animals per hectare].) All will be made predator-proof by using 5-ft-tall “Non-Climb”, 2 by 4 inch vertical mesh fencing for the walls, buried at least 1 ft and with avian netting over the top.

All pen fences and penned tortoises will be monitored as described in Section 4.2.5, Post-Release Tortoise Monitoring, below.

4.2.3 Translocation Methods

All tortoises relocated or translocated will be measured, weighed, assessed for health, and affixed with a transmitter at the time of initial capture, and transported as described in detail in Section 3.0, Procedures Applicable to All Relocations and Translocations, above. Transmittered tortoises are anticipated to remain in the site until the second clearance pass is completed. During that time, they will be located daily the first week after transmittering and weekly thereafter until relocation or translocation from the CPA.

All tortoises will be relocated or translocated at least one week before daily, midday temperatures are expected to exceed 95°F (35°C) air temperature (at 2 inches) or 109°F (43°C) ground surface temperature, whichever is lower. This is expected to occur following the second clearance pass. No tortoise will be moved when air temperatures are expected to exceed 90°F (32°C) within three hours of release (USFWS 2010a). Moving tortoises from the CPA to the Translocation Site following the second clearance pass in March will ensure that tortoises are only moved once, well prior to lethal temperatures. Because blood samples must be collected on tortoises moved >500 m, possibly on all tortoises, and blood sampling potentially cannot occur prior to 15 May (USFWS 2010a)[3], if tortoises were left on the CPA until blood samples could be collected, then the spring translocation temperature window would be missed. If lab results are negative for exposure to *M. agassizii*, then the pen fence simply will be removed, thereby passively releasing the tortoise.

USFWS (2010a) guidance is that all translocated tortoises be rehydrated within 12 hours prior to release, via USFWS (2009a) methods. Currently, USFWS is planning to rehydrate only those tortoises that void during the translocation process (K. Field, pers. comm. to A. Karl).

All tortoises moved <500 m (1650 ft) will be placed in the shade of a shrub or at the entrance to a known burrow for that tortoise, and monitored as described in Section 4.2.5 Post-Release Tortoise Monitoring, below.

For any tortoise found further inside the CPA than 500 m, an evaluation will be made to determine if the tortoise is merely a transient or has a home range that is mostly or largely inside the CPA. Following an examination of the available habitat, the tortoise either will be monitored visually or transmittered and monitored daily for one week to determine if it typically lives that far inside the CPA or if the observed location was outside its core use area. If its burrows or core use areas are closer to the perimeter fence than 500 m, or outside the fence (i.e., the tortoise fencewalks), it will be relocated as identified above for tortoises moved < 500 m.

Any tortoise translocated >500 m will be placed in an individual quarantine pen in the relevant Translocation Site (see above), under a shrub or near an artificial burrow.

Juvenile tortoises, especially those under 4.4 inches (110 mm) in length, are highly subject to depredation by canids, badgers, and ravens, and require special consideration for successful translocation. Little is known about juvenile tortoise movements. Based on two studies of hatchling and/or juvenile tortoises, the mean distance translocatees moved in approximately one month was 521-723 ft (158-219 m; Hazard and Morafka 2002). For non-translocated hatchlings, the distance between nests and first-year hibernacula was 304-350 ft (92-106 m; TRW 1999b). Based on these values, as well as other data reported in these studies, a juvenile tortoise moved farther than 330 ft (100 m) may be outside its recent or familiar use area. For the CPA clearance, if juvenile tortoises are moved within 330 ft of the capture location, where they may have site familiarity, they will be released under a shrub and monitored initially as described in Section 4.2.5 Post-Release Tortoise Monitoring, below. For distances >330 ft, they will be moved to the Translocation Site into a predator-proof juvenile enclosure (see Section 4.2.2 Designated Translocation Site and Translocation Area, above. Juvenile tortoises will remain in their pens until disease test results are received (see Section 4.2.4, Health Considerations, below). Seronegative and clinically healthy tortoises will be passively released via escape holes opened in the lower edge of the pen (e.g., Morafka et al. 1997). Modifications to the design and process may occur in response to predator interest in the enclosure or juvenile tortoise behavior in the enclosure, incorporating new and relevant head-starting techniques such as those used at Twenty-nine Palms Marine Corps Air Ground Combat Center.

For the period of time that tortoises are in the pens, pen fences and the penned tortoises will be checked twice daily for the first two weeks, or until fence-walking (should it occur) ceases, whichever is longest. Until serology reports are obtained, the penned tortoises will be checked daily.

This Plan recognizes that a tortoise may be found during site grading or routine fence monitoring, after the tortoise clearance. This may occur at ambient temperatures that are higher than the USFWS translocation guidelines or in winter. In such cases, the disposition of the tortoise will be determined by the AB, in consultation with USFWS, CDFG and BLM. In any case, the tortoise will be captured, secured in an individual, sterilized box and temporarily placed in a quiet, climate-controlled environment (e.g., the onsite Project office) until the agencies reply. Depending on temperatures and other factors, it is possible that the tortoise could be affixed with a transmitter and relocated outside the CPA or translocated into the Recipient Site the same day, when temperatures subside (or the following morning for juvenile tortoises), and monitored to ensure its safety. Options are provided in Table 1. If the tortoise would likely be harmed or die, it will be held in captivity at a location approved by USFWS, CDFG and BLM, away from other tortoises, to be released into the Recipient Site during the next available window. Other options will also be investigated. The goal of the translocation is to keep the tortoise in the population, in order to promote recovery.

4.2.4 Health Considerations

Visual health assessments, blood and other tissue sampling, and translocation options will proceed as outlined in Section 4.1.3, Health Considerations, above.

USFWS (2010a) has determined that no tortoise will be relocated or within 1.5 km (0.9 mi) of a diseased resident tortoise if tortoises are relocated <500 m or within 6.5 km (4 mi) of a seropositive or diseased resident tortoise if tortoises are translocated >500 m. This directive only applies to tortoises moved during CPA fence construction or site clearance surveys; it does not apply to tortoises relocated along the utility lines. Based on survey results during the first clearance pass, ECE would conduct surveys for resident tortoises during the second clearance pass if tortoises are anticipated to require relocation or translocation from either the CPA. Surveys would provide full coverage (100 percent) surveys within 1.5 km of the release point for each tortoise to be relocated or 6.5 km of the Translocation Site, if tortoises will be translocated. These survey limits and intensity may be altered through discussion with USFWS, CDFG, and BLM depending on the number of animals translocated and data from other surveys in the area.

Any resident tortoise will be processed (weighed, measured, described, photographed) and marked with an epoxy number for future identification. Health assessments will be conducted on all residents. If any tortoises from the CPA will be moved more than 500 m, any resident tortoise within 6.5 km of the Translocation Site will be transmittered so that its blood can be sampled at the earliest date approved by USFWS. All transmittered residents will be located the first day following the transmitter attachment, every other day for two weeks to determine the tortoise's use area (for ease of future monitoring), and then according to the USFWS (2010a) schedule. If a resident tortoise has clinical disease signs or is seropositive following lab testing, the release site for relocated tortoises that is within 1.5 km of the diseased or seropositive tortoise will be shifted to be outside the 1.5-km range. For tortoises moved >500 m, the Translocation Site would again be shifted to be outside the 6.5 km limit. (Note: Due to the logistical difficulty inherent in this process, USFWS is currently undergoing a modification of this procedure, which looks more at a threshold of disease prevalence in the resident and translocated population, rather than the disease status of a single resident tortoise [R. Averill-Murray, pers. comm. to A. Karl].)

4.2.5 Post-Release Tortoise Monitoring

All relocated or translocated tortoises will receive immediate post-release monitoring. Each will be located via telemetry for the first two days following release, during tortoise activity temperatures to ensure that the tortoise is not fence-walking or otherwise compromised.

Tortoises in quarantine pens will be checked twice daily for the first two weeks, or until fence-walking (should it occur) ceases, whichever is longest. Following this, all tortoises sequestered in pens will be monitored daily. All pen fences, including juvenile pens, will be monitored at least once daily to ensure that they remain intact. No additional food or water would be provided to quarantined tortoises because of the large pen size, which will provide ample natural cover and food for an extended period.

All relocated or translocated tortoises will become part of the five-year monitoring study, as described for Project Area Perimeter Fencing in Section 4.1.4, Post-Release Tortoise Monitoring, above.

4.2.6 Nest Relocation

Nest relocation and monitoring during CPA clearance will follow the same procedures as outlined in Section 4.1.5 Nest Relocation, above.

4.3 Linear Facilities Construction and Post-Construction Revegetation of Temporarily Disturbed Areas

Construction of the transmission line and water pipeline, plus revegetation of temporarily disturbed areas following construction, will occur in unfenced, native habitat. Tortoise protection measures, including but not limited to pre-construction surveys, construction monitoring, and relocation, will be identical to those for construction of the perimeter fence (Section 4.1 CPA Fencing, above), with the exception that no tortoises would be transmittered or included in a long-term monitoring program.

These measures will apply to any work conducted in unfenced tortoise habitat.

Temporary fencing may be installed as needed along linear facilities at the AB's discretion, to optimize tortoise protection in place of or in addition to BMs. Temporary fencing will follow guidelines and materials for permanent fencing except in very temporary situations, when silt fencing may be used. In both cases, supporting stakes will be sufficiently spaced to maintain fence integrity.

4.4 Operations Phase

Tortoises observed on the utility corridors during routine maintenance activities or along the main access road by personnel leaving or entering the Project Site will not be disturbed or handled and will be allowed to move away of their own accord. Any routine maintenance or emergency/unexpected repairs that require surface disturbance or heavy equipment will require the same protection measures described for CPA fence construction (see Section 4.1.3 Tortoise Relocation Methods during Fence Construction, above) and linear facilities construction.

Because the reservoirs and roads in the CPA will be entirely devoid of vegetation following surface grading, (except for small, landscaped areas at the offices) there will be no areas where a tortoise could reside onsite. Therefore, any tortoise found during Project operations likely will have entered the CPA through a gate or breach in the fence. It is likely, although not impossible, that any tortoise found during Project operations would not yet have constructed a burrow and would have entered the site only recently. Any such tortoise will be relocated, under supervision of the AB, to the nearest suitable, safe habitat outside the fence onto BLM land adjacent to the CPA (pending approval from BLM). Because any tortoise found inside the CPA is likely to be a transient, it is anticipated that the tortoise would seek a familiar burrow when released outside the CPA. All tortoises will be placed in the deep shade of a large shrub and monitored as described for tortoises moved during CPA fencing (Section 4.1.4 Post-Release Tortoise Monitoring, above) and linear facilities construction.

In the event that surface temperatures are in excess of USFWS translocation temperatures, the tortoise will be secured in an individual, sterilized box and placed in a quiet, climate-controlled environment (e.g., the onsite Project office). Under supervision of the AB, the tortoise will be released in the late afternoon/early evening of the same day, when ambient temperatures subside. Juvenile tortoises will be released in the early morning to minimize depredation. All boxed tortoises or tortoises affixed with transmitters will be monitored periodically during the day and following release, to ensure their safety, according to Section 4.2.5 Post-Release Tortoise Monitoring, above.

It would be highly unlikely for a tortoise to be discovered wintering in a burrow on the site. However, if such an inactive tortoise were found, it would be handled and removed from the site as specified for wintering tortoises in Section 4.1.3 Tortoise Relocation Methods during Fence Construction, above.

5.0 Reporting

A report will be provided to FERC by the lead AB within 30 days following the initiation of relocation/translocation activities. This report will document which Plan items have been implemented and a summary of all modifications made during that implementation.

In addition, summary reports will be prepared by the AB in charge of relocation/translocation following fencing and again after initial site clearance to document the surveys, the capture and release locations of all desert tortoises found, immediate post-release monitoring, individual tortoise data, and other relevant data. These reports will be submitted to FERC, USFWS, CDFG and BLM. Annual reports that document similar data, collected during all monitoring activities, will be submitted to FERC, USFWS, BLM and CDFG.

For the post-relocation monitoring study, an annual report will be submitted to FERC, USFWS, CDFG and BLM to document activities and analyze preliminary results. A comprehensive report will be conducted at the end of the monitoring program. Interim contact will be made (e.g., via e-mail or letter reports) if important findings could assist the resource agencies in desert tortoise recovery.

6.0 Funding

ECE will provide adequate funds to complete all work as described.

7.0 Literature Cited

Averill-Murray, R. 2011. Personal communication to the DTCC Health Assessment Training Group, 9 March 2011.

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

Berry, K.H. and L.L. Nicholson. 1984. The distribution and density of desert tortoise populations in California in the 1970's. Chapter 5 *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

Boarman, W.I. 1994. Effectiveness of fences and culverts for protecting desert tortoises along California State Highway 58: summary of the 1993 field season. Draft. Unpub. rept. to the California Energy Commission. Contract No. 700-90-015, Phase 3, Task 3-3. 23 pp. plus appendices.

---, W.B. Kristan, III, and A.P. Woodman. 2008. Neither here nor there: current status of Sonoran desert tortoise populations in Arizona. Paper presented at the 2008 Desert Tortoise Council Symposium, Las Vegas, NV.

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

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.

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. 2011. Eagle Mountain Pumped Storage Project, FERC Project Number 13123, Biological Assessment, Second Revision. Submitted to FERC. 109 pp.

Federal Energy Regulatory Commission. 2010. Draft Environmental Impact Statement from Hydropower License. Eagle Mountain Pumped Storage Hydrolelectric Project – FERC Project No. 13121-002, California. Office of Energy Projects, Division of Hydropower Licensing, Washington, D.C. 312 pp.

Field, K. 2011. Personal communication to the DTCC Health Assessment Training Group, 9 March 2011.

Hazard, L.C. and D.J. Morafka. 2002. Comparative dispersion of neonate and headstarted juvenile desert tortoises (*Gopherus agassizii*): a preliminary assessment of age effects. Chelonian Conserv. Biol. 4(2):406-409.

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

Ironwood Consulting Inc. 2010 and R. Woodard. Desert Tortoise Translocation Plan, Desert Sunlight Solar Farm Project, Case File Number CACA-48649. Riverside County, California. Prepared for Desert Sunlight Holdings, LLC.

Karl, A.E. 1989. Investigations of the desert tortoise at the California Department of Health Services' proposed low-level radioactive waste facility site in Ward Valley, California. Unpub. rept. submitted to US Ecology and Ecological Research Services. 116 pp.

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

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

---. 2009. E-mail to T. Engelhard, USFWS Carlsbad Field Office. heliophile@mindspring.com. 24 February 2009.

---. 2011. E-mail to T. Engelhard, USFWS Carlsbad Field Office. heliophile@mindspring.com. 4 January 2011.

--- and Resource Design Technology, Inc. 2007 Mesquite Regional Landfill. Initial desert tortoise clearance-October 2005. Submitted to the Los Angeles County Sanitation Districts, Whittier, CA. 28 pp plus attachments.

LaRue, E.L. 1993. Distribution of desert tortoise sign adjacent to Highway 395, San Bernardino County, California. Draft. Unpub. rept. from Tierra Madre Consultants to Gratten, Gersick, Karp, and Miller, Sacramento, CA. 17 pp.

Marlow, R.W., K. von Seckendorff Hoff, and P. Brussard. 1997. Management of wild tortoise populations is complicated by escape or release of captives. Pp. 479-480 *in* J. van Abbema (ed.), Proceedings: Conservation, Restoration, and Management of Tortoises and Turtles – an International Conference. Joint publ. of the New York Turtle and Tortoise Society and the WCS Turtle Recovery Program.

McLuckie, A.M., M.R.M. Bennion, R.A. Fridell, and R. Radant. Status of the desert tortoise in the Red Cliffs Desert Reserve. Paper presented at the 2006 Desert Tortoise Council Symposium, Las Vegas, NV.

Morafka, D.J., K.H. Berry, and E.K. Spangenberg. 1997. Predator-proof field enclosures for enhancing hatching success and survivorship of juvenile tortoises: a critical evaluation. Pp. 147-165 *in* the New York Turtle and Tortoise Society, Proceedings: Conservation, Restoration, and Management of Tortoises and Turtles – an International Conference.

Nicholson, L.L. 1978. The effects of roads on desert tortoise populations. Pp. 127-129 *in* M. Trotter (ed.) Proceedings of the 1978 Desert Tortoise Council Symposium.

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.

Orr, W. 2009. Personal communication. Paleontologist, Dept. of Geology, Univ. of Oregon, Eugene, OR. rr_bll@yahoo.com. May 15.

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

Rosen, P.C., P.A. Holm, and E.B. Wirt. 2007. Studies of drought and highway effects on tortoises at Organ Pipe Cactus national Monument, Arizona. Paper presented at the 2007 Desert Tortoise Council Symposium, Las Vegas, NV.

Schumacher, I.M., M.B. Brown, E.R. Jacobson, B.R. Collins, and P.A. Klein. 1997. Detection of antibodies to a pathogenic Mycoplasma in desert tortoises (*Gopherus agassizii*) with upper respiratory tract disease. J. Clin. Microbiol. 31(6):1454-1460.

TRW Environmental Safety Systems, Inc. 1999a. 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.

---. 1999b. Cover use and movement patterns of hatchling 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. B00000000-01717-5705-00073. 11 pp.

United States Bureau of Land Management (BLM). 2010a. Genesis Solar Energy Project Biological Assessment. 51 pp.

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

---. 2009a. Desert Tortoise Field Manual. Available online at http://www.fws.gov/ventura/speciesinfo/protocols_guidelines/docs/dt.

---. 2009b. Range-wide monitoring of the Mojave Population of the desert tortoise: 2007 annual report. Desert Tortoise Recovery Office, Reno, NV.

---. 2010a. Translocation of desert tortoises (Mojave Population) from project sites: plan development guidance. August 2010a. Unpub. document. 11 pp.

---. 2010b. Draft range-wide monitoring of the Mojave Population of the desert tortoise: 2008 and 2009 reporting. Desert Tortoise Recovery Office, Reno, NV. 67 pp.

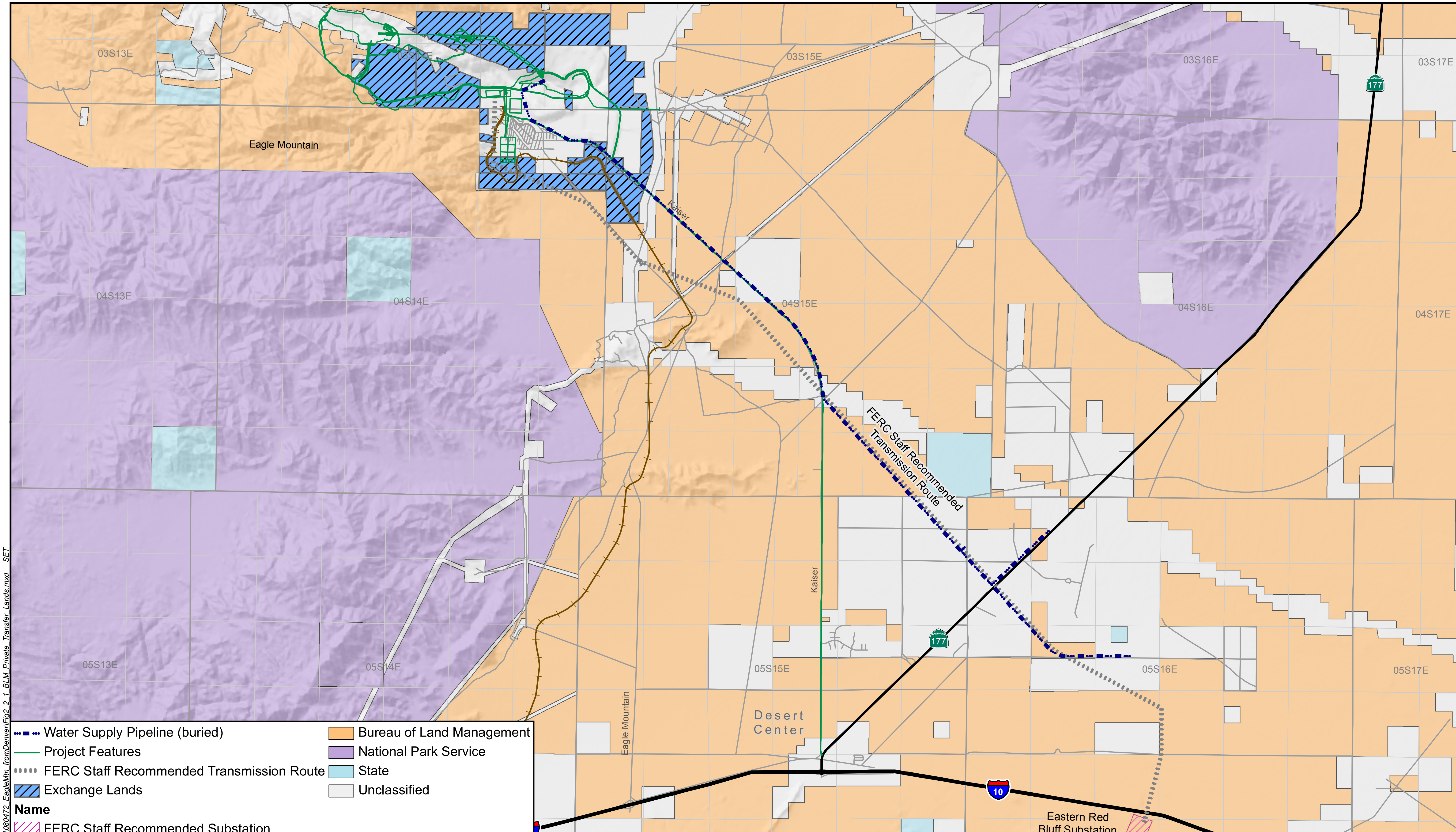
---. 2010c. Draft range-wide monitoring of the Mojave Population of the desert tortoise: 2010 annual report. Desert Tortoise Recovery Office, Reno, NV. 51 pp.

University of Florida, Department of Pathobiology. No date. Serologic test for tortoise exposure to *Mycoplasma*. Unpub. doc. 5 pp.

Wendland, L, H. Balbach, M. Brown, J. Diemer Berish, R. Littell, and M. Clark. 2009. Handbook on gopher tortoise (*Gopherus polyphemus*). U.S. Army Corps of Engineers, ERDC/CERL. TR-09-1. 81 pp.

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



EAGLE CREST ENERGY COMPANY

GEI PROJECT 080474

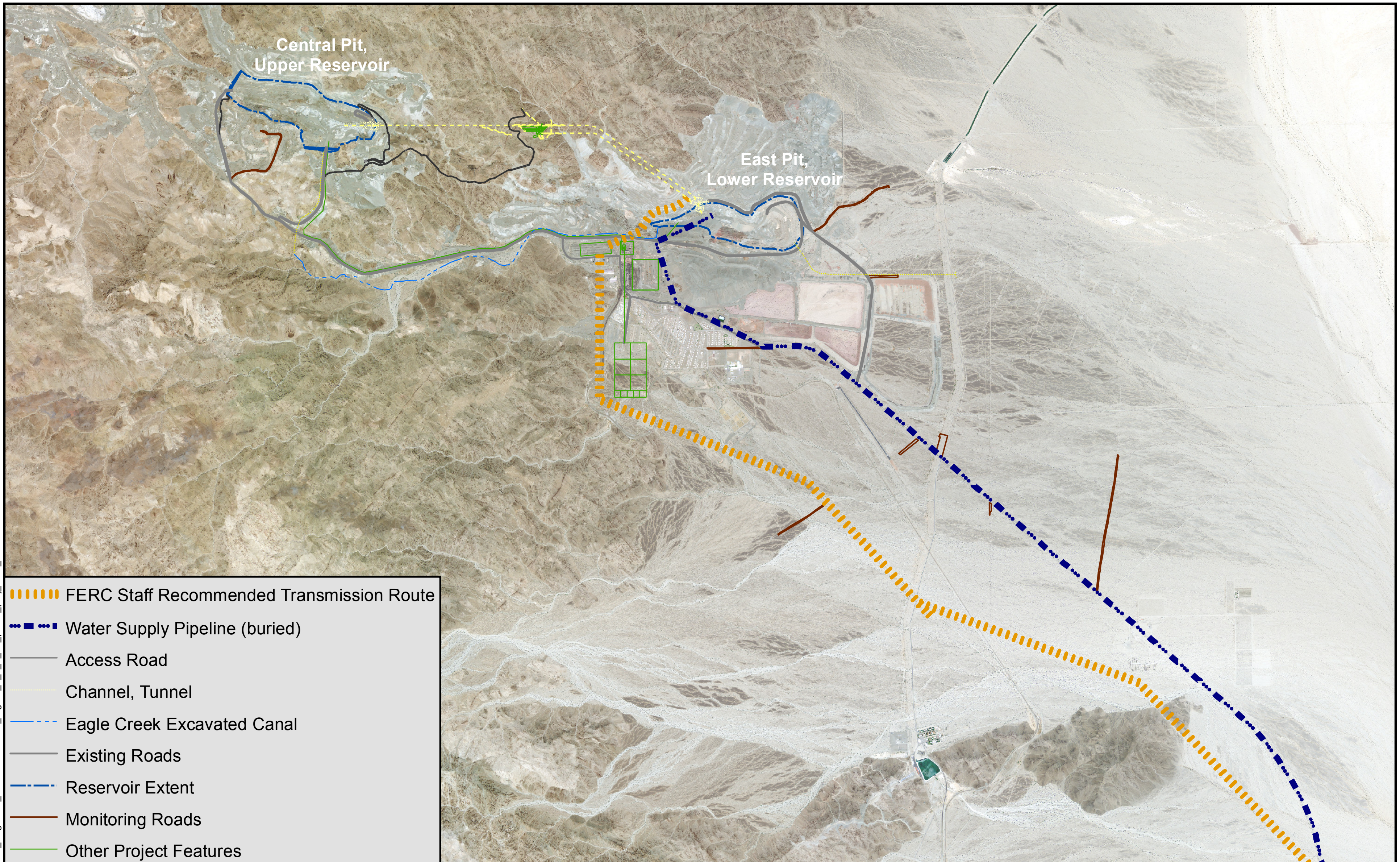
EAGLE MOUNTAIN PUMPED STORAGE PROJECT
EAGLE MOUNTAIN, CALIFORNIA

PROJECT LOCATION AND LAND OWNERSHIP

FIGURE 1

March 2011

24-Feb-2011 Z:\Projects\080472_EagleMtn_fromDenver\Fig2_2_1_BLM_Private_Transfer_Lands.mxd SET



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

0 1 2 Miles

N

Eagle Mountain Pumped Storage Project
Eagle Mountain, California

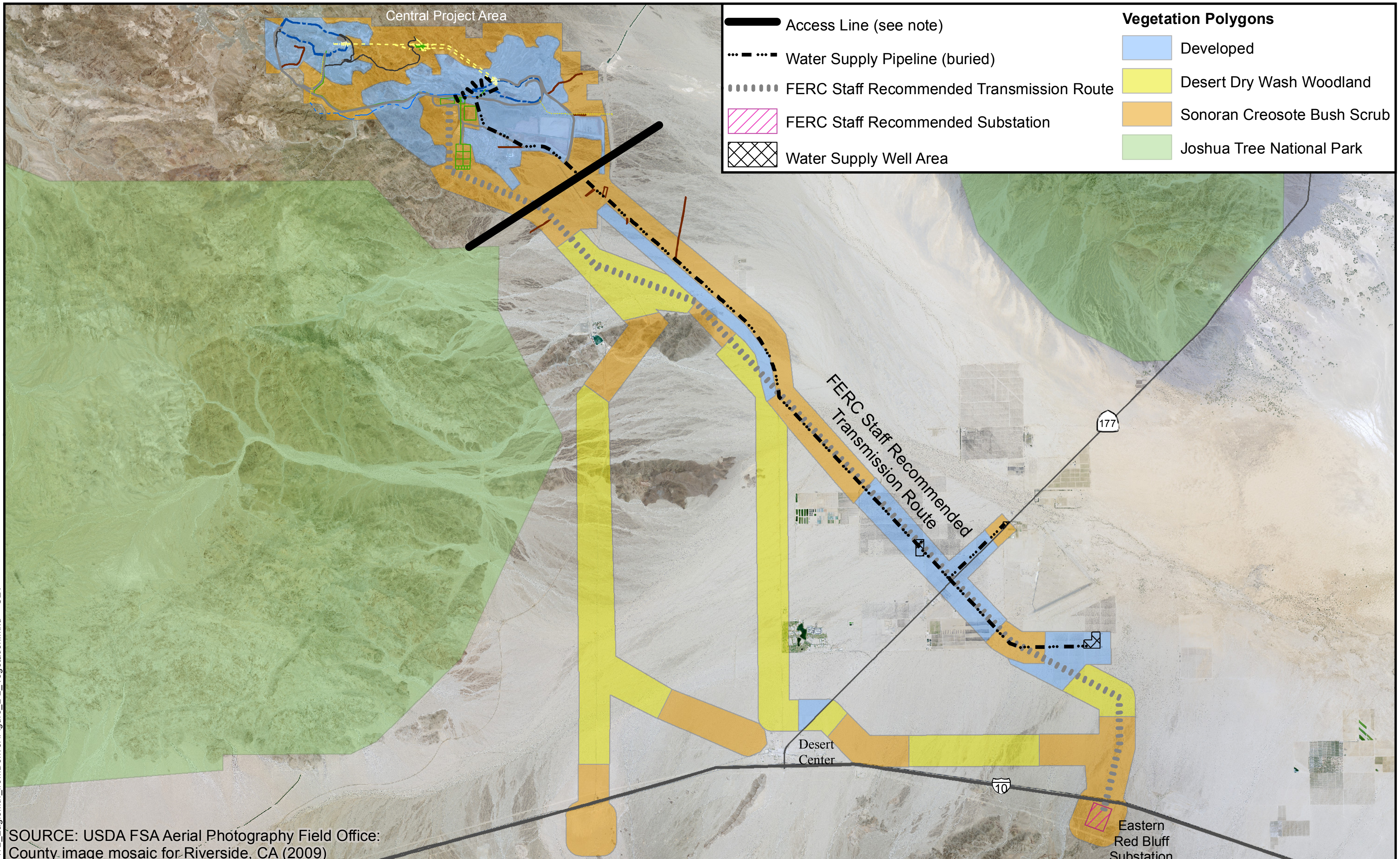
Eagle Crest Energy Company

Eagle Crest Energy Company

AERIAL OVERVIEW
OF PROJECT SITE

March 2011 Figure 2

1-Jul-2010 Z:\GIS\Projects\080472_EagleMtn_fromDenverNew_Figure_3_1_1_air_photo_proj_area_2.mxd SEW



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

0 1 2 Miles

N

Eagle Mountain Pumped Storage Project
Eagle Mountain, California

Eagle Crest Energy Company

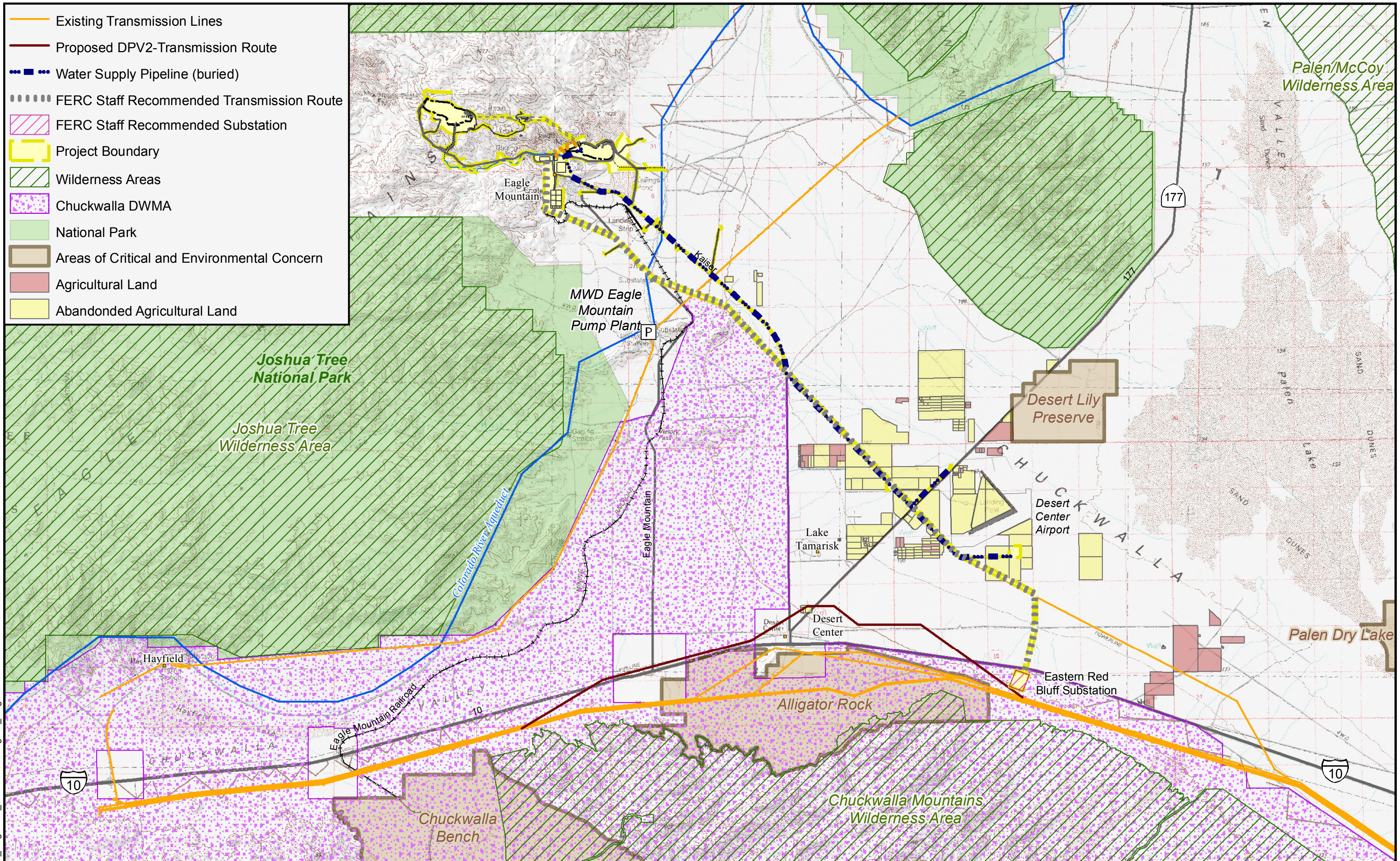
Eagle Crest Energy Company

VEGETATION IN PROJECT AREA

March 2011

Figure 3

2-Feb-2011 Z:\GIS\Projects\080472_EagleMtn_fromDenver\Figure_2-2_Vegetation.mxd SET



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

0 3 6 Miles

N

Eagle Mountain Pumped Storage Project
Eagle Mountain, California

Eagle Crest Energy Company

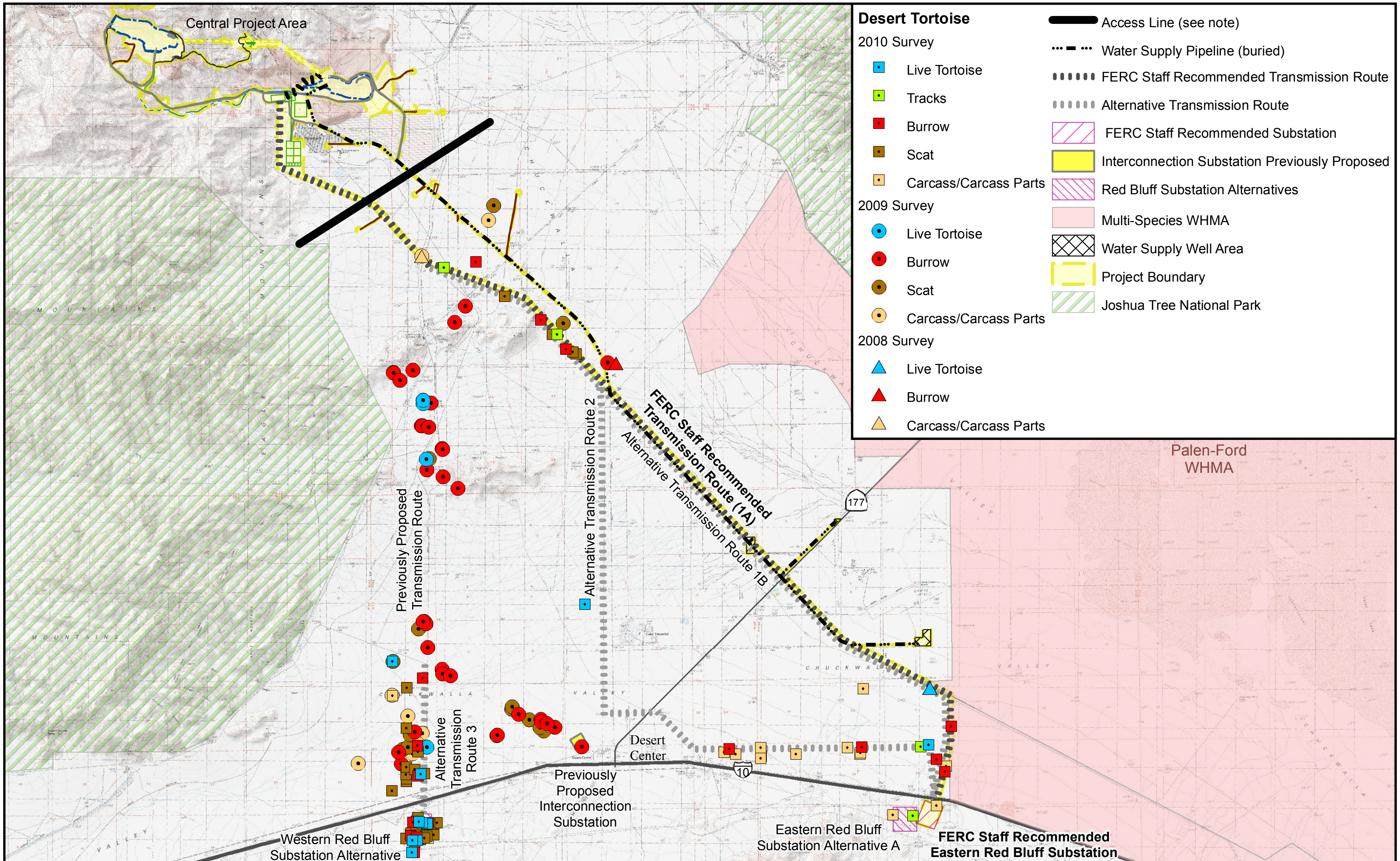
Eagle Crest Energy Company

REGIONAL LAND USE

March 2011

Figure 4

24-Feb-2011 Z:\Projects\080472_EagleMtn_fromDenver\Fig3-4_RegionalLandUse.mxd SET



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

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

March 2011 Figure 5

24-Feb-2011 Z:\Projects\080472_EagleMtn_fromDenver\Figure_4-3_BioSurveys_DesertTortoise2010.mxd SET

Attachment A

Sample Desert Tortoise Data Form

(Note: While some health data are included on this form, this is not the detailed data form that will be used for health assessments.)

LIVE TORTOISE DATA FORM

HYUNDAI MOTOR AMERICA TEST TRACK PROJECT
CALIFORNIA CITY, KERN COUNTY, CALIFORNIA

OBSERVER Eli Bernstein
PROCESSOR Karl
DATE 10-18-03
TIME (pst) FOUND ~1000 on 10/17 0903
START PROC. 0837 found / 1003 retr. from burrow
FINISH PROC. 1019
T_a 22.7°C T_{gs} 23.9°C WIND 0-1 mph T_{5cm} 22.9
PPT/CC 90% cirrostratus

TORTOISE # H-08
TRANSMITTER: TYPE HOL # 87159
DATA LOGGER # NONE

CAPTURE LOCATION:
GENERAL LOCATION NE ¼ of S16
UTM: E 0404614 N 3878932
RELEASE LOCATION:
GENERAL LOCATION
UTM: E N

BEHAVIOR (check one, elaborate as necessary):
IN BURROW, ~~FACE IN~~ @ end (~167cm)
IN BURROW, FACE OUT
ENTERING BURROW
RUNWAY, EXITING
BASKING
TRAVELLING when found on 10/17
UNDER SHRUB IN SHADE
UNDER SHRUB, FACE INTO STEM
OTHER T-P out

GENDER ♀
If unknown, check the following indicators and elaborate:
TAIL LENGTH PYGAL
ABDOMINALS
ANALS WIDTH OF FOREFOOT
CHIN GLANDS
MASS (g): INITIAL 3790 FINAL (w/transmitter) 3815
VOID: URINE? SCAT VISCOSITY
COLOR PPT
TOTAL MASS OF EXCRETA (g)

DISEASE INDICATIONS (elaborate as necessary; grade severity of *abnormal conditions*: (1) mild; (2) moderate; (3) severe)
BEAK/NARES (answer all):
GREEN NO DRY ✓ OCCLUDED NO
NASAL EXUDATE NO
SEROUS
NON-SEROUS(severity, color, quality)
CAKED DIRT ON BEAK/FORELIMBS NO
EXUDATE ON FORELIMBS NO

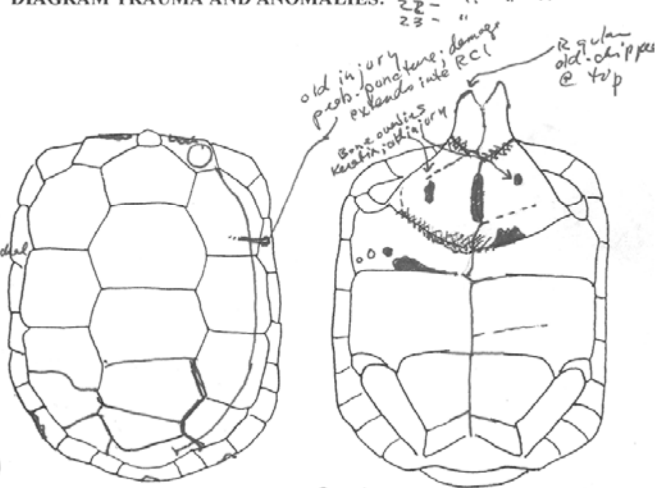
MEASUREMENTS (mm):
MCL 280 PLN 247.5 HT 110
WIDTH M7/8 (seam) 214 GW ≥222 @ PM 6
WIDTH M6 (mid) if GW is not M5, M6, or M7 X

SHELL WEAR CLASS 6
SUPER- or SUB-NUMERY MARGINALS? NO, but xtra ver
NUMBER OF GROWTH RINGS Can't count
GENERAL TORTOISE SHAPE (check one): □ ○ ✓ △

BREATHING (ck all that apply; describe/grade abn. cond):
CLEAR ✓ WHISTLING
OBSTRUCTED
EYES (ck all that apply; describe/grade abn. cond.):
CLEAR, BRIGHT ✓ MOIST LIDS NO
SWOLLEN OR SUNKEN NO
DISCHARGE NO
CONJUNCTIVITIS NO
CHIN GLANDS DRAINING? NO
ORAL CAVITY (ck all that apply; describe/grade abn. cond):
COLOR Pale pink
LESIONS NO
ODOR NO
ATTITUDE (check all that apply)
STRONG ✓ ACTIVE
QUIET, WITHDRAWN ✓
RELAXED LETHARGIC,WEAK
SHELL (ck all that apply; describe/grade abn. cond.):
NORMAL ABNORMALLY SCALEY Sl. scaley along midline to ant. M1,2, nuchal
LESIONS TO BONE/~~BLOODY~~ Loss of keratin in small "divots" - may be lesions. Bone shows along humeral + pectoral seams +
EXTERNAL PARASITES (answer all that apply)
NONE ✓ TYPE #
LOCATION

PHOTO: ROLL #1 FRAMES 17 - Plastron L.h. 18 - Ant. plastron 19 - Foo 20 - C 21 - C w/ transmitter 22 - " " 23 - "

DIAGRAM TRAUMA AND ANOMALIES:



these seams are deep; appear to have some keratin loss. Ant. margs 1+2 + nuchal also seem abnormally scaley (1-2)

Both front legs medial surfaces have experienced some loss of scales, esp. L. Prob. chewing.

Scales missing ~⅓ plantar surface L hind foot

⬤ = bone showing
▦ = deep; some keratin loss
---- = deep crease (cut?)

Eagle Crest
Energy Company

3000 Ocean Park Boulevard Suite #1020
Santa Monica, CA 90405

Tel: (310) 450-9090
Fax: (310) 450-9494

www.EagleCrestEnergy.com

Eagle Mountain Pumped Storage
FERC Project No. 13123

Predator Monitoring and Control Plan

Submitted to: Federal Energy Regulatory Commission

Submitted by: Eagle Crest Energy Company

Revised March 2011

TABLE OF CONTENTS

1.0 Introduction

In October 2009, Eagle Crest Energy Company prepared a Draft Raven Monitoring and Control Plan for the Eagle Mountain Pumped Storage Project. That Plan was prepared in accordance with an information request from the Federal Energy Regulatory Commission (FERC) as a part of the licensing proceeding for the Eagle Mountain Project[1]. The Draft Raven Monitoring and Control Plan was prepared in consultation with the U.S. Fish and Wildlife Service (USFWS), Bureau of Land Management (BLM), and California Department of Fish and Game (CDFG). In December 2010, FERC issued a Draft Environmental Impact Statement (DEIS) on the proposed Project. The DEIS included a FERC Staff Recommended Alternative, which included a recommended mitigation measure to modify the Draft Raven Monitoring and Control Plan to include:

- Baseline surveys and post-construction monitoring methods for coyotes, wild dogs, and gulls
- Mitigation measures to be implemented if increases in population levels are detected following construction
- A monitoring schedule that would begin the second year after project completion
- Surveys to be conducted once every 5 years

In addition, the FERC sent a request to the U.S. Fish and Wildlife Service (USFWS) on December 23, 2010, requesting the initiation of formal consultation on potential Project impacts to federally listed threatened and endangered species. The USFWS replied with a request for additional information[2]. In the letter, the USFWS requested clarification if the technical appendices from the Draft Environmental Impact Report prepared by the State Water Resources Control Board are to be considered as part of the Project description under the DEIS. The USFWS commented that these documents describe the conservation and monitoring measures proposed by Eagle Crest Energy to minimize impacts to sensitive biological resources. Some of these measures may affect desert tortoise and should be addressed accordingly.

In response to the recommended modifications to the Draft Raven Monitoring and Control Plan in the FERC DEIS, and the request for additional information from the USFWS, Eagle Crest Energy modified the October 2009 Draft Raven Monitoring and Control Plan. As requested by the FERC, this plan has been modified to be a Predator Monitoring and Control Plan (PMCP), and described measures to protect desert tortoise from all the potential predators in the Project area. In addition, the plan has been updated to reflect the current guidance on raven control from the USFWS.

---

[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.

[2] Letter from Kennon A. Corey, Assistant Field Supervisor, U.S. Fish and Wildlife Service to Timothy J. Welch, Chief, West Branch, Division of Hydropower Licensing, Federal Energy Regulatory Commission, January 31, 2011

The PMCP has been developed to reduce the opportunity for predator proliferation and describes the monitoring and control of the predator population in the Project area. Additional components of the PMCP are to reduce Project resource subsidies for predators and to evaluate the effects of common ravens (*Corvus corax*) and other potential predators in the Project area on the federally and state threatened desert tortoise (*Gopherus agassizii*).

This PMCP is considered a living document and may be subject to revision based upon on-going environmental assessment with resource management agencies. The PMCP 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 the USFWS, CDFG, National Park Service [NPS], and BLM).

2.0 Conditions of Concern

2.1 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. In addition, tortoises are present in low densities in the area of the linear features of the proposed Project (the Project's proposed transmission line and buried water pipeline). 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*). Other potential predator species include coyote, feral dogs, and gulls.

Existing attractants for ravens on the Project site include open water sources, human occupation, and roads. Existing water sources in the Project area include a water treatment pond on the Central Project Area, the open water portions of the Colorado River Aqueduct (CRA), ponds at Lake Tamarisk, and the Eagle Mountain Pump 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 Eagle Mountain is operational, and there are several offices in use. The communities of Lake Tamarisk and Desert Center have year round residents. There are also residences scattered throughout the Chuckwalla Valley and employee housing at the Eagle Mountain Pump Station. The roads in the Project area (Interstate 10, State Route 177, Kaiser Road and Eagle Mountain Road) potentially attract ravens because they may provide food from litter and road kill. With existing buildings and transmission lines, perching, roosting, and nesting sites for ravens are plentiful under the existing conditions of the Project area.

Ravens were detected during field surveys of the Project area in 2008 and 2009 (Final License Application Exhibit E, Appendix B). Biological surveys conducted for the nearby Desert Sunlight Solar Farm Project also noted ravens in the Project area, with 192 individual ravens tallied (Ironwood 2010). Ravens and raven nests were also noted on existing power lines and trees during helicopter surveys of the Chuckwalla Valley and surrounding mountains during golden eagle surveys conducted in April and May 2010. This survey noted two active nests just northeast of the proposed Desert Sunlight Project (Ironwood 2010).

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 and other predators to the area. Ultimately, the increased predation on young [and possibly adult] tortoises by common ravens and other predators may reduce recruitment into breeding populations.

However, because of the baseline condition of continuous subsidies, it is likely that predators already exist in 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 PMCP will be implemented as part of the Project's environmental measures to ensure that predator increases due to the Project, if any, will not cause a biologically significant impact to the local fauna.

2.2 Purpose and Objective

The purpose of this PMCP is to identify the conditions of concern specific to the Eagle Mountain Pumped Storage Project area that may attract the common raven (*Corvus corax* [raven]) and other predators and to define a monitoring and control plan that will: 1) monitor predator 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 PMCP include:

1. Identify the conditions of concern specific to the Project that may attract predators to the area
2. Identify how the Project will use project design features (PDF) and mitigation measures (MM) to manage the conditions of concern
3. Document the effectiveness of predator management and control measures.
4. Specify how, when, and what other measures will be selected and implemented if the monitoring suggests the need for additional controls
1. Define triggers for modification of management and control measures using adaptive management principles

2.3 Conditions of Concern

There are five basic conditions of concern that have the potential into increase predators in the Project area and that have been identified for the Eagle Mountain Pumped Storage Project, as listed below.

2.3.1 Water from reservoirs and evaporation ponds

The Project includes two reservoirs located in the existing Central and Eastern mine pits on the Central Project Area. In addition, evaporation ponds will be constructed for the reverse osmosis water treatment system. The reservoirs and evaporation 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]; 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).

2.3.2 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. Most raven predation on prey species is thought to take place during the spring, most likely by breeding birds that have been shown to spend most of their time foraging within 1,300 feet of their nests (Kristan and Boarman 2003). Therefore, structures that facilitate nesting in areas where ravens could not otherwise nest may pose a danger to nearby prey populations.

2.3.3 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.

2.3.4 Construction/operation waste management

Ravens are considered scavengers that obtain a high percentage of their diet from human subsidies such as food brought onsite by employees, landfills, dumpsters behind restaurants and grocery stores, open garbage drums and plastic bags placed on the curb for garbage pickup, and road kills. The construction and operation phases of the Project will result in increased food and waste generation; therefore, improper waste management could attract ravens to the Project area potentially resulting in increased predation on raven prey species.

Other species, such as gulls and feral dogs, are also scavengers who may take advantage of increased food sources from the Project.

2.3.5 Raven food sources from soil disturbance

During construction, disturbance of the soil and/or vegetation will occur from heavy equipment operation. This disturbance will result in the "unearthing" and exposure of natural food sources for ravens such as rodents and insects. Ravens could be attracted to the soil disturbance areas to prey upon unearthed, injured, and dead animals.

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

3.0 Management Practices

This section specifies PDFs and MMs that Eagle Crest Energy Company will either implement or has incorporated in the Project design to accomplish the objectives of this Plan. The PDFs include standard design elements known to effectively reduce the attraction of birds to similar Project components. The five basic conditions of concern identified are addressed separately for the construction and operation phase of the Project. The Authorized Biologist or qualified designees (e.g., biological monitors [BMs]) with expertise identifying common raven nests and tortoise remains (e.g., carcass, shell, and bone fragments) will be responsible for implementing raven management and control measures throughout Project construction and operation.

3.1 Regional Raven Management and Monitoring Program

To reduce raven populations in the California desert, the USFWS, in conjunction with several cooperating agencies and local partners has developed a comprehensive, Regional Raven Management and Monitoring Program (Program) in the California Desert Conservation Area to address the regional, significant threat that increased numbers of ravens pose to desert tortoise recovery efforts (USFWS 2010). As part of this Program, cooperating agencies and local partners will integrate federal, state, and local management plans and develop a major public outreach and education program as identified and evaluated in the USFWS *Environmental Assessment to Implement a Desert Tortoise Recovery Plan Task: Reduce Common Raven Predation on the Desert Tortoise* (USFWS 2008). 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 desert tortoise populations. The vehicle for this program is a Memorandum of Understanding between the Project owner, CDFG, and USFWS.

The Project PMCP may include this in-lieu fee if it is determined that ravens may increase over current levels due to the Project.

3.2 Construction

Construction phase impacts are considered more temporary in nature than operational impacts and therefore require temporary management practices to avoid or minimize the potential of attracting ravens to the Project area.

3.2.1 Evaporation ponds

Prior to netting and becoming operational, the evaporation ponds may temporarily collect rainwater during the construction phase, which could serve as an attractant to ravens. Ponding during construction is expected to be minimal and temporary, given the xeric conditions in the Project area. The evaporation pond will be non-operational and un-netted for only a short duration during this phase; however, if ravens are observed congregating in the evaporation pond as a result of temporary ponding from rain water, consistent monitoring and hazing will be employed to deter raven use.

Hazing techniques employed would include visual and/or auditory devices designed to scare birds and reduce the attractiveness of an area. Potential methods might be air or gas cannons, human flushing, bio-acoustic deterrents, and/or flags and streamers to create an integrated system of negative stimuli. Because many birds, especially ravens, quickly habituate to a static program, this technique would be more effective during construction since the type, timing, and location of deployed techniques would be changed frequently to accommodate construction patterns (Bishop et al. 2003). If ravens are observed establishing communal roots or otherwise congregating in significant numbers (>5) at the evaporation ponds, a hazing program would be designed by the Authorized Biologist with approval by the FERC and USFWS.

3.2.2 Raven perching, roosting, and nesting sites

Construction activities may create temporary perch or roost sites (and rarely, nest sites) for ravens by introducing equipment or materials to the landscape that provide suitable sites for ravens. Monitoring will evaluate the presence of ravens during construction. If ravens are regularly observed perching, roosting, or nesting on building materials, equipment, waste piles, or other construction debris, measures will be taken to change the quality or location of these materials to discourage their use. Measures may include installation of either visual deterrents or physical bird deterrents such as bird spikes or similar products. Alternatively, hazing may be used since the presence of these construction related features will be relatively short-term.

3.2.3 Ponding water

The application rates of water for dust suppression activities will be limited to minimize ponding. The application rate will consider soil infiltration and evaporation rates. The Authorized Biologist will patrol areas daily to ensure water does not puddle for long periods (more than 1 hour) and make recommendations for reduced water application rates where necessary. The fill station(s) will be designed to adequately drain water to prevent ponding.

3.2.4 Raven food sources from soil disturbance and road kill

During construction activities, specifically grading, there is a potential for animals to be unearthed, providing a food subsidy for scavengers and thereby potentially attracting ravens. Although this will be a temporary food source, primarily occurring during initial site grubbing and grading, the Project owner will limit soil disturbance areas and stabilize disturbed areas which will reduce the attractiveness of disturbed soils to ravens.

Ravens are well known for scavenging road killed animals, which are often abundant along roads and highways in the desert region (Boarman and Heinrich 1999). Road kill provides a food source for ravens, which facilitates increased raven nesting near roads and highways in areas that might otherwise offer little food (Kristan et al. 2004). Enforced speed limits of 25 miles per hour on dirt roads will minimize road kills during construction. In addition, road kills along the proposed Project access road will be patrolled daily and cleared by the Authorized Biologist or designee.

3.2.5 Human good and waste management

A trash abatement program will be established during the construction phase of the Project. Trash and food items will be contained in closed, secured containers on the Project and removed daily to reduce the attractiveness to scavengers such as ravens. In addition, the Worker Environmental Awareness Program will assist in ensuring that no trash is available that might attract scavengers to the Project area.

3.3 Operations

Operational impacts are considered ongoing and require management practices to avoid or minimize the potential to attract ravens to the Project area. No significant soil disturbance is anticipated during operation or maintenance that could result in raven food sources becoming exposed; therefore, this condition of concern is not addressed in this section. In addition, dust control should not be needed once construction is complete, therefore ponded water from dust suppression is not a condition of concern addressed in this section.

3.3.1 Evaporation ponds

Because the ponds need to remain uncovered to maximize evaporation rates, nets will be installed over the ponds prior to operations (i.e., any discharge into ponds). Evaporation ponds shall be managed to minimize their attractiveness and access to birds. This consists of making resources provided by the ponds less available (i.e., habitat modification) and netting the ponds to prevent access by birds. Nets will be designed to exclude ravens and other wildlife from drinking or landing on the water of the ponds. The Authorized Biologist will be responsible for monitoring the evaporation ponds, reporting on the relative success of the netting, and providing recommendations for future improvements.

3.3.2 Raven perching, roosting, and nesting sites

The Project's transmission line may create perches, roost sites, and nest sites for ravens. Physical bird deterrents such as bird spikes and auditory and visual deterrents will be used to reduce raven perching, roosting, and nesting during operations. Nest removal may occur if ravens are confirmed nesting in Project components.

3.3.3 Human food and waste management

The trash abatement program, developed for the construction phase, will also include operational measures that will be implemented for the life of the Project. These will include items such as requiring that trash and food items be contained in closed, secured containers and removed daily, if necessary, to reduce the attractiveness to scavengers such as ravens. The on-site Environmental Manager will continue to ensure that these practices are enforced and make recommendations for improvements where applicable.

4.0 Monitoring Practices

The monitoring effort for the Eagle Mountain Pumped Storage Project will address Project-specific impacts and will focus monitoring and management activity on the areas and facilities directly under the control of the Project owner, since a regional monitoring and management program is beyond the capacity of a single entity to implement. Semi-quantitative and qualitative monitoring will be implemented to assess the effectiveness of the mitigation program and to determine the need for implementing additional control measures.

4.1 Predator Population Baseline

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. Each survey will consist of systematically searching the immediate Project area and within 3,281 feet (1 kilometer) 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 98 foot (30 meter) 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.

During pre-construction monitoring, incidental sightings of other predators such as coyotes, gulls, and feral dogs, will also be recorded.

4.2 Construction Phase

To identify potential increases in raven activity, the Authorized Biologist will conduct monthly point count surveys of the Project Disturbance Area. In addition, during the raven breeding season, nest surveys will be conducted bi-weekly (every 2 weeks). Monthly and bi-weekly surveys will be conducted throughout the entire construction period.

To the extent practical, monitoring will be conducted at the same point count locations for both the construction and operation phases. The survey area will include areas of temporary disturbances associated with waste disposal areas, erected structures, staging areas where large equipment or material may be stored, evaporation ponds, and any area where water is applied to control dust and erosion or where there are recent surface disturbances.

Data recorded for each raven observed will include raven activity (categorized as flying, perched, or on the ground); type of perch (if applicable); and the general location of the bird within the Project Disturbance Area. Any nesting locations will be recorded and unoccupied nests will be reported to the Authorized Biologist for removal. In addition to weekly surveys, the Authorized Biologist or designees will record incidental observations of raven occurrences and behavior on daily construction monitoring logs to supplement data collected during point count surveys.

4.3 Operation Phase

To identify potential increases in predator activity during operation of the Project, the Authorized Biologist or designee will implement a monitoring program which will begin the second year after project completion and will be repeated every 5 years. During survey years, monitoring will be monthly, except during raven breeding season when monitoring will be bi-weekly.

The designees will be trained by the Authorized Biologist and accompanied by the Authorized Biologist during the first six surveys to ensure appropriate data collection. At least three of the six surveys will be during the raven breeding season surveys (see below). The Authorized Biologist will determine if the designee is sufficiently trained after six surveys. If the designee is replaced at any time during operations, the Project owner will ensure their replacement is properly trained. The Authorized Biologist will also review the data and discuss the monitoring results with the designee each quarter to ensure that monitoring objectives are being achieved.

4.3.1 Predator monitoring

4.3.1.1 Monthly Raven Surveys

The Authorized Biologist or designee will conduct monthly surveys for predator activity at pre-designated locations throughout the Project area during seasons outside of the raven breeding season. Exact locations of point count surveys will be determined based on agency input. An area with a radius of about a half mile (800 meters) around each point will be surveyed. The survey point will be associated with Project components including transmission poles and lines, and support structures, as well as evaporation ponds and waste disposal facilities. The point count locations will be located on areas and facilities directly under the control of Project owner, but the survey area may extend beyond the Project boundary.

A 10 minute sampling session observing and listening for ravens will occur at each survey location. The surveyor will record the number of ravens and will document the behavior of the raven (e.g., perched, flying, on the ground, nesting), perch type (if applicable), and distance and direction from the survey location. Additional data collected will include the survey start/stop time, and weather (including temperature, average wind speed, and percent cloud cover). Point counts will not be conducted when weather conditions may affect raven behavior, specifically when wind or rain interferes with audible detection; rain interferes with visual detection; or when the temperature is above 95 degrees Fahrenheit.

During monthly raven surveys, the presence and activity of other predators will also be noted.

4.3.1.2 Breeding Season Raven Surveys

The Authorized Biologist or designee will conduct bi-weekly breeding season surveys, starting at the beginning of the typical breeding season (mid-February) and continue to the end of June, to identify raven nests and evidence of desert tortoise predation at raven nests (Boarman 2002, 2003).

Surveys will be conducted by vehicle when possible and on foot when necessary. Native trees, landscape trees, utility poles, and other structures will be searched for nests. UTM coordinates (in North American Datum [NAD] 83), as well as nesting substrate and current breeding status (if detectable), will be recorded for each nest located. Once data have been collected, the Authorized Biologist or designee will determine if the nest is unoccupied (i.e., no eggs in the nest or nestlings have fledged), in which case the nest will be removed by the Authorized Biologist or the on-site environmental manager.

During bi-monthly raven surveys, the presence and activity of other predators will also be noted.

In the event that a common raven is documented initiating a new nesting attempt during the surveys, the Authorized Biologist will conduct follow up visits to that nest in the subsequent months to establish whether or not the pair is bringing tortoises back to the nest. The Authorized Biologist will evaluate whether the designee is qualified to conduct these follow-up nest surveys. If the designee is not deemed qualified, then the Authorized Biologist will conduct the follow-up surveys. The Authorized Biologist or designee will search a 98 foot (30 meter) radius surrounding each nest or perch site for evidence of desert tortoise predation. All depredated desert tortoise will be photographed, a UTM coordinate collected (in NAD 83), and the length measured (or estimated). In addition, each desert tortoise will be marked to avoid duplication of data recording on subsequent surveys. Throughout the survey period, if tortoise remains are found below an active nest, the Authorized Biologist or qualified on-site environmental manager will document the remains and verify the nesting status of the common ravens (e.g., incubating, feeding nestlings), herein referred to as offending ravens, and notify the USFWS and CDFG verbally (via phone call) and in writing (via e-mail or fax) within 24 hours of documenting the remains. Upon being notified, the USFWS will contact the Common Raven Management Working Group which will coordinate immediate removal of the offending common raven(s). The Project owner will establish a Cooperative Service Agreement with the U.S. Department of Agriculture's Animal and Plant Health Inspection Service (USDA/APHIS) allowing for USFWS to conduct the removal efforts of offending common raven(s) within the Project area, where feasible. The Project Owner will be responsible for expenses attributed to removal of offending ravens nesting on Project facilities.

4.3.1.3 Evaporation Pond Monitoring

The netted evaporation ponds will be monitored to verify that the netting remains intact, is fulfilling its function in excluding birds and other wildlife from the ponds, and does not pose an entanglement threat to birds and other wildlife. The Authorized Biologist or designee will be responsible for monitoring the evaporation ponds, reporting on the relative success of the netting, and providing recommendations for future improvements.

Monitoring will be conducted by the Authorized Biologist or designee experienced with bird identification and survey techniques. Each survey will consist of the surveyor walking the perimeter of each evaporation pond a minimum of three times in a single day. To provide an accurate assessment of bird and wildlife use of the ponds during all seasons and times of day, surveys will be conducted a minimum of 2 hours following sunrise (i.e., dawn), 1 hour mid-day (i.e., 1100 to 1300), and 2 hours preceding sunset (i.e., dusk). The surveyor will record observations on the designated reporting form.

The Authorized Biologist will report any bird or other wildlife deaths or entanglements within 2 days of the discovery to the CDFG and USFWS.

4.4 Reporting

Predator monitoring summary reports will be prepared after each survey year to document survey results and data analyses. Each report will include recommendations for mitigation in accordance with identified triggers and the conditions identified below.

If management objectives of the PMCP are not being met, actions may need to be modified. The Authorized Biologist and Technical Advisory Team will meet within 1 year of completion of each PMCP survey to discuss progress and submit a report of the findings to the FERC.

4.5 Adaptive Management

Implementation of the PMCP 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, the measures 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 PMCP, the Authorized Biologist and Technical Advisory Team will consult with applicable resource agencies to determine the best course of action.

If monitoring data shows a potential increase in raven roosting or nesting behavior within the Project site or immediate area, several additional measures may be implemented to minimize the attractiveness of the Project site to this species, including facilities to discourage roosting or nesting on Project-related structures.

4.6 Discourage Roosting

If long-term monitoring data show an increase in roosting by common ravens, measures to discourage roosting will be implemented using one or more of the following methods:

- Bird spikes installed on top of potential perches designed to prevent birds from gaining a foothold on the perch because of their porcupine design
- Repellent coils installed on top of potential perches to deter birds from gaining footholds because of their destabilizing coil design
- Bird control wire designed so that a line or grid of variable height posts is interconnected by a wire. This creates a confusing landing area in the same spirit as trip wires used for unsuspecting people
- Bird netting
- Electric shock deterrents with low voltage pulses

4.7 Discourage Nesting

If long-term monitoring data show an increase in nesting by common ravens, measures to discourage nesting will be implemented, using one or more of the methods described above for discouraging roosting. Inactive raven nests discovered during the monitoring efforts will be dismantled and passive nest deterrents would be installed to inhibit future nest building at the site. In the event that an active nest is found, it will be monitored closely throughout the season by a biological monitor to determine number of fledglings and status of development. As soon as it is determined that the nest is no longer active, it would be removed and passive deterrents installed.

4.8 Removal of Problem Ravens

Non-lethal deterrents previously described will be the first course of action. However, ravens may adapt quickly to avoid passive deterrents. If problem ravens are proven to be an active threat to resident desert tortoises then they could be subjected to lethal removal in coordination with the BLM, USFWS, and CDFG. Because ravens and their active nests are protected under the Migratory Bird Treaty Act (MBTA) they cannot be indiscriminately killed, harmed, trapped, or harassed. Any management action would need to be coordinated with and possibly carried out by the BLM, USFWS, and CDFG.

5.0 Documentation of Consultation

On August 3, 2009, Eagle Crest Energy Company sent letters to the resource agencies notifying them of the 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 Eagle Crest Energy Company 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
2. 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 Eagle Crest Energy Company 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 Eagle Crest Energy Company, 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 Eagle Crest Energy Company 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. Eagle Crest Energy Company 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 e-mail 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 Eagle Crest Energy Company received comments from the NPS on the Draft 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.

Eagle Crest Energy Company filed the response to FERC's request for additional information on October 26, 2009. Appendix D of the response to the FERC additional information request includes a contact register and copies of correspondence with the land managing agencies.

FERC published a Draft Environmental Impact Statement (DEIS) on the proposed Project on December 23, 2010. The comment period on the DEIS closed on February 28, 2011. This Plan has been revised in response to recommendations included in the FERC Staff-recommended alternative described in the DEIS.

6.0 Literature Cited

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

Ironwood Consulting Inc. 2010. Common Raven Management Plan Desert Sunlight Solar Farm Project, BLM Case File Number CACA-48649. Riverside County, CA. Prepared for Desert Sunlight Holdings, LLC. Oakland, CA. Prepared by Ironwood Consulting, Inc. Redlands, CA.

Victorville 2 Hybrid Power Project. Draft Biological Resources Technical Report. Retrieved September 11, 2009 from the California Energy Commission Web site 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 Web site at: http://www.dmg.gov/documents/EA_Raven_Final_USFWS_033108.pdf

3000 Ocean Park Boulevard Suite #1020
Santa Monica, CA 90405
Tel: (310) 450-9090
Fax: (310) 450-9494
www.EagleCrestEnergy.com

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

TABLE OF CONTENTS

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:

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 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).

Eagle Crest
Energy Company

3000 Ocean Park Boulevard Suite #1020
Santa Monica, CA 90405
Tel: (310) 450-9090
Fax: (310) 450-9494
www.EagleCrestEnergy.com

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

TABLE OF CONTENTS

FIGURE

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.

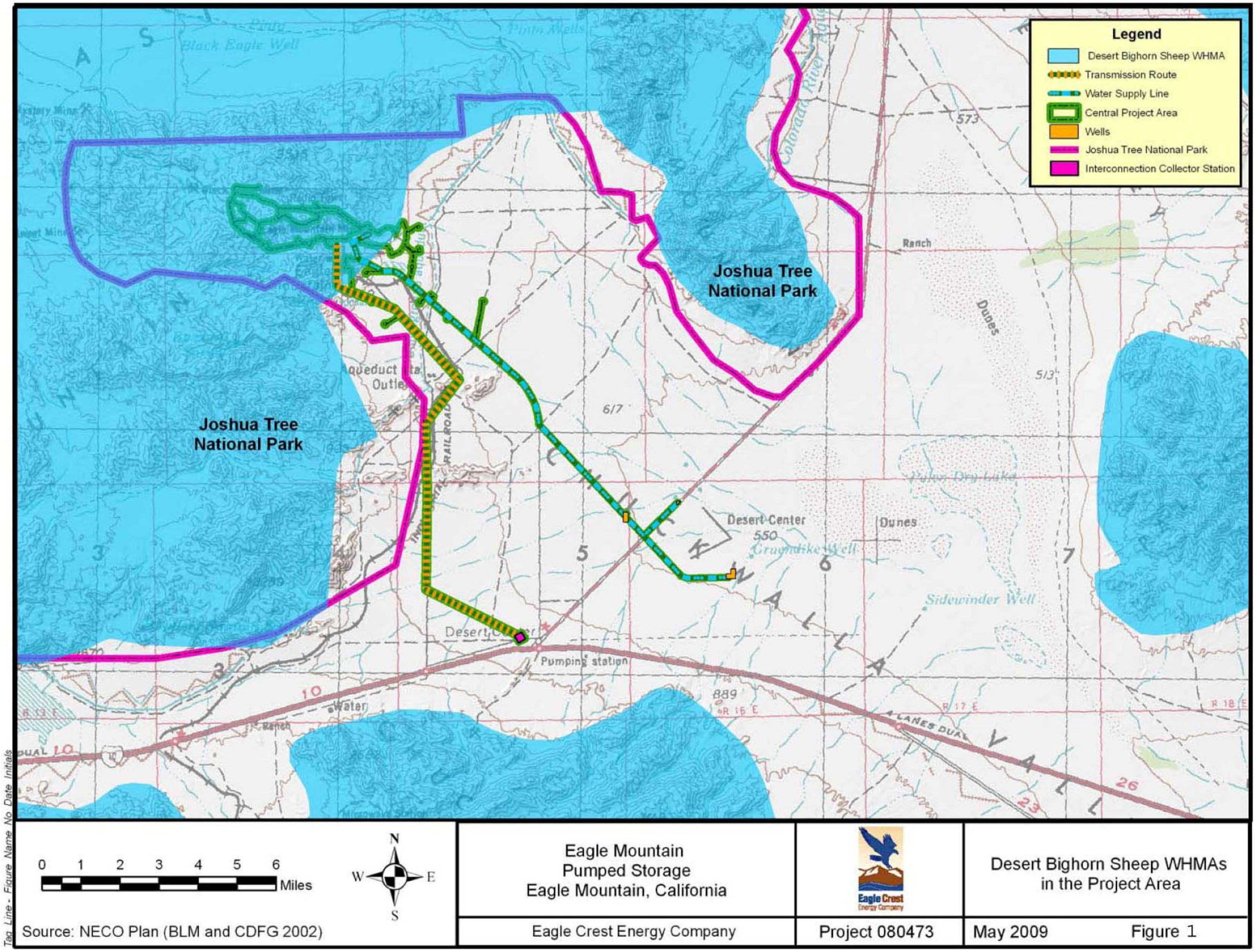
BASELINE CONDITIONS BIGHORN SHEEP

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
Ranch
Dunes
Desert Center
550
Dunes
Sidewinder Well
Pumping station
Black Eagle Well
Pinto Wells
573
513
617
889
Water
Ranch
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
Eagle Crest Energy Company
Project 080473
Desert Bighorn Sheep WHMAs
in the Project Area
May 2009
Figure 1
Tag Line - Figure Name No Date Initials

POTENTIAL PROJECT IMPACTS

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.

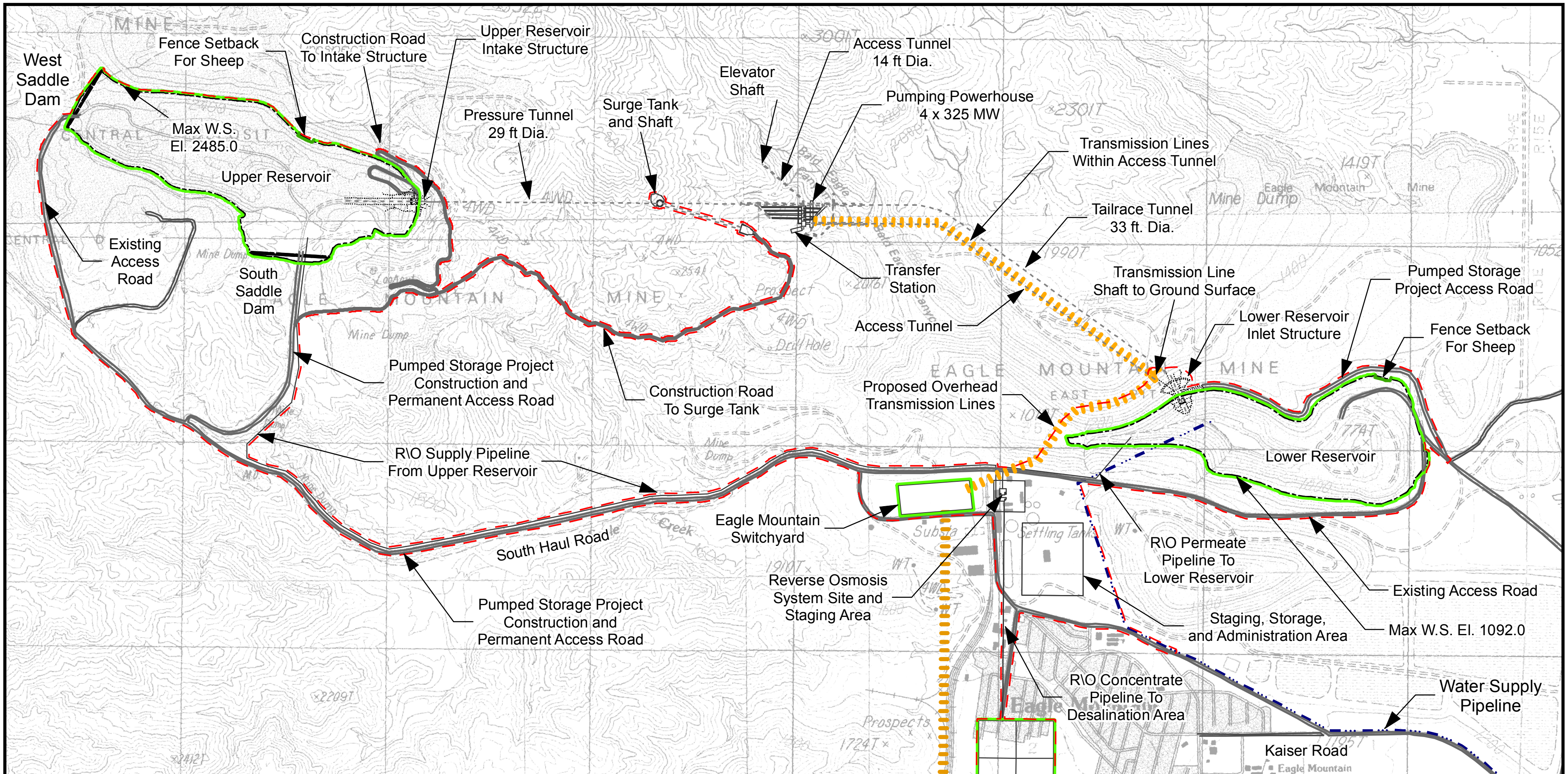
Other Project Facilities

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.



Legend

- Temporary -- Tortoise Exclusion Fencing (During Construction Only)
- Permanent-- 8'-10' Chain Link Exclusion Fencing with Tortoise-Proof Mesh
- Setback in Permanent Exclusion Fencing, allows Bighorn Sheep water access
- Water Supply Line
- Transmission Line

0 2,500 5,000 Feet

N W E S

Eagle Mountain Pumped Storage
Eagle Mountain, California

Eagle Crest Energy Company

Eagle Crest Energy Company

Project 080475

WILDLIFE EXCLUSION FENCING

October 2009 Figure 3.3.6-4

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

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.

FINAL BIOLOGICAL ASSESSMENT

EAGLE MOUNTAIN PUMPED STORAGE HYDROELECTRIC PROJECT

FERC Project No. 13123-002
California

April 2011

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

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABBREVIATIONS AND ACRONYMS

°F	degrees Fahrenheit
APE	area of potential effects
BA	Biological Assessment
BLM	Bureau of Land Management
BO	Biological Opinion
California SHPO	State Historic Preservation Office
California DFG	California Department of Fish and Game
CARB	California Air Resources Board
central project area	portion of project area where hydropower plant is located
cfs	cubic feet per second
CHU	critical habitat unit
CRA	Colorado River Aqueduct
CNPS	California Native Plant Society
Commission	Federal Energy Regulatory Commission
draft EIS	draft environmental impact statement
DWMA	Desert Wildlife Management Areas
Eagle Crest	Eagle Crest Energy Company
EIS	environmental impact statement
ESA	Endangered Species Act
FERC	Federal Energy Regulatory Commission
FWS	U.S. Fish and Wildlife Service
gpm	gallons per minute
GWh	gigawatt hour
ha	hectare
HPMP	Historic Properties Management Plan
JTNP	Joshua Tree National Park
Kaiser	Kaiser Eagle Mountain, LLC
kV	kilovolt
mm	millimeters
MMP	mitigation and monitoring program
MW	megawatt
MWD	Metropolitan Water District of Southern California
msl	mean sea level
MWh	megawatt hour
NECO	Northern and Eastern Colorado Desert Coordinated Management
Park	Joshua Tree National Park
project	Eagle Mountain Pumped Storage Project
RCC	roller-compacted concrete
RO	reverse osmosis
ROW	right-of-way

SCE	Southern California Edison
State Water Board	State Water Resources Control Board
WEAP	Worker Environmental Awareness Program
WHMA	Wildlife Habitat Management Area
ZOI	zone-of-influence

EXECUTIVE SUMMARY

Eagle Crest Energy Company (Eagle Crest) proposes to develop the Eagle Mountain Pumped Storage Hydroelectric Project (project) at the largely inactive Eagle Mountain Mine site near the town of Desert Center, Riverside County, California. The proposed project would 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 weekdays, especially during the summer months.

The project would 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. Ancillary services are employed as a means to increase stability of the electrical system and provide improved transmission reliability.

This Biological Assessment (BA) has been prepared in accordance with legal requirements set forth under section 7 of the federal Endangered Species Act (ESA) (16 United States Code Section 1536(c)), to provide the necessary information for the U.S. Fish and Wildlife Service (FWS) to consult under section 7 of the ESA.

Federally listed Threatened or Endangered Species Addressed in this Biological Assessment

Two species with potential to be affected by the proposed project were considered for inclusion in this BA: 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 recommended transmission corridor and water pipeline route. Based on our analysis presented in the draft EIS, we conclude the project may adversely affect desert tortoise.

The project may also affect desert tortoise critical habitat and the potential for such effects are discussed in this BA. As proposed, the project would result in the alteration of 0.4 acre of critical habitat.

1.0 INTRODUCTION

1.1 BACKGROUND TO PROPOSED PROJECT

Eagle Crest Energy Company (Eagle Crest) proposes to develop the Eagle Mountain Pumped Storage Hydroelectric Project (project) at the largely inactive Eagle Mountain Mine site near the town of Desert Center, Riverside County, California. The proposed project would use two existing mining pits, pumping water from a lower pit/reservoir to an upper pit/reservoir during periods of low demand, then releasing water to the lower reservoir to generate 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 weekdays, especially during the summer months.

The Federal Energy Regulatory Commission (FERC or Commission) must decide whether to approve a license to Eagle Crest for the project and what license conditions should be placed in any license issued.

1.1.1 Need for Power

The Eagle Mountain Pumped Storage Hydroelectric Project would provide hydroelectric generation during the daytime to meet part of southern California's power requirements, resource diversity, and capacity needs. The project would then use available nighttime energy to pump water back to the upper reservoir for re-use. The project would have an installed capacity of 1,300 megawatts (MW) and would generate about 4,308 gigawatt hours (GWh) annually, while consuming 5,744 GWh annually to pump water back up to the upper reservoir.

The North American Electric Reliability Corporation (NERC) annually forecasts electrical supply and demand nationally and regionally for a 10-year period. The Eagle Mountain Pumped Storage Hydroelectric Project would be located on the southern end of the California-Mexico subregion of the Western Electricity Coordinating Council region of NERC. According to NERC's most recent 2009 forecast, summer peak demands and annual energy requirements for the United States' portion of the California-Mexico subregion are projected to grow at annual rates of 0.9 percent and 1.2 percent from 2009 through 2018, respectively (NERC, 2009). NERC projects summer and winter resource capacity margins (generating capacity in excess of demand) will not drop below target reserve levels during the 2009 to 2018 period.

As noted above, pumped storage facilities are net energy consumers. The amount of energy produced as water passes from the upper reservoir to the lower reservoir through the turbines is less than the amount of energy required to operate the plant and to pump water back up to the upper reservoir. However, the benefits of pumped storage facilities are realized when the price for pumping is much less than the value of generation. Typically, there are sources of power such as nuclear, solar, and wind projects that can provide power at low rates during nighttime or low-demand hours, compared to rates available during daytime, high-demand hours. Therefore, the pumped storage facility can provide power during the day when energy demands are high, and can use power from other facilities during the night when energy demand is low. Power benefits of pumped storage projects are discussed further in section 4.1, *Power and Developmental Benefits of the Project* of the draft environmental impact statement (EIS).

Staff concludes that power produced by the project would help to provide renewable energy to the California-Mexico subregion in both the short- and long-term and that during overnight hours, the project may serve as a user for power that is continually produced by other facilities that might not otherwise be used.

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 [FWS]: *Threatened*) Desert tortoise occurs on the project, and the effects are discussed in this BA.

Coachella Valley Milkvetch (*Astragalus lentiginosus* var. *coachellae*) – (FWS: *Endangered*). This variety of *A. lentiginosus* is known primarily from the Coachella Valley (Bureau of Land Management [BLM] and California Department of Fish and Game [California DFG], 2002; CNPS, 2011; Consortium of California Herbaria, 2011. A population was also allegedly found in the aeolian areas of Chuckwalla Valley, along State Route-177 (BLM and California DFG, 2002; Consortium of California Herbaria, 2011). 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 project, all of the plants found in the aforementioned population keyed to A. l. var. variabilis. In 2009, A.E. Karl and FWS conducted thorough investigations of this taxonomic issue that included discussions with species experts, reviews of relevant unpublished literature, and re-keying of herbarium specimens by herbaria botanists 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*; FWS concurred (Englehardt, 2009a). Therefore, Coachella Valley milkvetch is not expected to be found on the project due both to lack of habitat and lack of 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, 2003;

Karl, 2002, 2004a, 2005, and 2007 field notes; Environmental Planning Group, 2004; Blythe Energy, 2004). Based on these factors, Coachella Valley milkvetch is not further discussed in this BA.

1.3 CRITICAL HABITAT ADDRESSED IN THIS BIOLOGICAL ASSESSMENT

The recommended project intersects 20.3 acres of designated desert tortoise critical habitat along the transmission line route, of which 0.4 acres would experience surface disturbance, and 73.7 acres of critical habitat at the Red Bluff Substation, in the Chuckwalla Critical Habitat Unit (CHU) (see section 4.1.4, figure 5, of this BA). The disturbance associated with the substation would occur as a component of the Desert Sunlight Solar Project and be mitigated as per the EIS and Biological Opinion (BO) for that project (BLM, 2010). We expect that connecting the project to the substation would not require any additional disturbance beyond the 73.7-acre footprint. Eagle Crest would conduct final design engineering of the interconnection during the first 2 years after license issuance. If final engineering determines any additional disturbance would be required, Eagle Crest would amend the desert tortoise habitat compensation plan to include a 5:1 compensation for any additional disturbance. As such a total of 0.4 acre of desert tortoise critical habitat may be disturbed by construction (see table 4-3).

1.4 STAFF-RECOMMENDED ALTERNATIVE (PREFERRED ALTERNATIVE)

Several alternatives to transmission routes and substations have been considered for this project. In December 2010, we issued a draft EIS for the proposed project. The draft EIS identifies a staff recommended transmission line route and one substation. This BA was prepared to analyze the potential impacts of the staff recommended alternative on federally listed threatened and endangered species and critical habitat and provide additional information requested by FWS. This final BA evaluates the staff recommended alternative.

Under the staff-recommended alternative, the proposed project would be operated as follows:

- Construct the project transmission line along the State Water Resources Control Board's (State Water Board) recommended transmission line route (transmission alternative 1A). This route would diverge from the applicant's proposed line after crossing the Colorado River Aqueduct (CRA) and would then parallel the existing 160-kilovolt (kV) Southern California Edison (SCE) transmission line for about 10.5 miles going southeast to a point just north of the recommended substation, then it would travel south about 2 miles to the State Water Board's recommended substation location (the Eastern Red Bluff Substation).

- Connect the project to the electrical grid by terminating the transmission line at a substation located immediately south of Interstate 10 (I-10) (Eastern Red Bluff Substation) at about 33° 42'03.25" N 115°18'48.77"W.

Geology and Soils

- Implement the Erosion and Sediment Control Plan filed July 7, 2010, that describes the erosion and sediment control practices to minimize soil erosion in construction areas and prevent sediment transport into stormwater discharges away from the construction site (Measure GEO-1).

Water Quality/Water Quantity

Measures for Drawdown Monitoring and Control

- Develop a groundwater level monitoring network (including existing and new monitoring wells) to confirm that project pumping throughout the project operations would be maintained at levels that are in the range of historical pumping in the Chuckwalla Aquifer (Measure WS-1). Possibly extend monitoring from quarterly to bi-annually or annually, depending on findings and prepare annual reports for submittal to the Commission and State Water Board, confirming actual drawdown conditions (Measure WS-4).
- Using the network of groundwater monitoring wells proposed under Measure WS-1, monitor groundwater levels on a quarterly basis for the first 4 years of project pumping; possibly extend monitoring from quarterly to bi-annually or annually, depending on findings (Measure SR-5). Unlike WS-4, this measure would focus on assessing seepage conditions in the project vicinity, rather than drawdown conditions as a result of project pumping in the Desert Center area.
- Implement a comprehensive monitoring Well Placement and Monitoring Program around the proposed brine and solidification ponds to allow for the earlier detection of leaks in the lining of the ponds. The monitoring methods would be designed to determine if the water levels in the ponds are falling at the expected rate based on inflow and evaporation rates and the monitoring wells would be placed partly horizontally beneath the ponds.
- In addition to a Comprehensive Groundwater Monitoring Program, develop a Groundwater Hydrologic Budget Report that incorporates data on pumpage, seepage recovery, precipitation, evaporation, and groundwater flow direction.
- During the initial fill pumping period, monitor existing water supply wells on neighboring properties whose water production may be impaired by project groundwater pumping; if project pumping would adversely affect these wells, replace or lower the pumps, deepen the existing well, construct a new well, and/or compensate owner for increased pumping costs (Measure WS-3).

- Develop and implement a reservoir-level Monitoring Plan to ensure that water levels are managed properly within operational restraints and help determine possible water-level effects on terrestrial resources.

Measures for Seepage Monitoring and Control

- To confirm aquifer characteristics and adequate pumping rates in the reservoir seepage recovery wells, perform aquifer tests during final engineering design (prior to project operations) (Measure SR-1).
- To effectively control seepage from the upper reservoir, use a separate set of seepage recovery wells, employ a testing program for these seepage recovery wells, and make drawdown observations in nearby observation wells to support final engineering design (Measure SR-2).
- Confirm that seepage recovery well pumping would be effective at managing groundwater levels beneath the Metropolitan Water District's CRA and in the Eagle Creek Canyon portion of the proposed landfill, and record groundwater levels, water quality, and production at the project seepage recovery wells (Measure SR-3).
- Maintain seepage from the upper reservoir at a groundwater level below the bottom of the elevation of the landfill liner and maintain seepage from the lower reservoir to prevent a significant rise in water levels beneath the CRA (Measure SR-4).
- As an adaptive management measure pending the initial findings of measures SR-1 through SR-5, manage seepage from the reservoirs, which if left unimpeded could raise groundwater levels by up to 3 feet (implementation of this alternative would require confirmation of groundwater level rises and water quality of the resulting seepage) (Alternative Measure SR-1A).

Measures for Water Quality Monitoring and Control

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

- Develop and implement a brine pond-level monitoring plan to ensure that the ponds are managed properly and help determine if a leak has developed in the linings of the ponds.

Other Water Resources Measures

- Replace four existing wells located within the proposed reservoirs with wells located outside of reservoirs (Measure LF-1).
- Release excess water from the reservoirs during large rainfall events, such as the 100-year event and up to and including the probable maximum flood.
- Construct and operate two extensometers—one in the upper Chuckwalla Valley near Observation Well 3 and the other in the Orocopia Valley near Observation Well 15—to measure potential subsidence that could affect the operation of the CRA (Measure WS-2).
- Perform channel modifications and other measures to contain flows associated with the probable maximum flood to the Eagle Creek Channel and to direct these flows toward the proposed lower reservoir.

Terrestrial Resources

- Concurrent with final design engineering, develop a comprehensive site-specific mitigation and monitoring program in consultation with the Biological Technical Advisory Team, made up of representatives from Eagle Crest, BLM, FWS, and California DFG (Measure BIO-1) to protect state sensitive, BLM sensitive, and federally listed plant and wildlife species.
- Implement the Worker Environmental Awareness Program (WEAP) filed October 27, 2009, to ensure that project construction and operation would be conducted within a framework of safeguarding environmentally sensitive resources (Measure BIO-3).
- Submit quarterly reports to BLM, FWS, California DFG, and the Commission, documenting project activities, mitigation implemented, and mitigation effectiveness, and providing recommendations, as needed (Measure BIO-4).
- Prior to construction in native habitats prepare, in consultation with BLM, FWS, and California DFG, and file for Commission approval, a plan that details construction plans and limits of disturbance such that surface disturbance is restricted to the smallest area necessary to complete the construction; and new spur roads and improvements to existing roads are designed in a way that would preserve existing desert wash topography and flow patterns, and avoid disturbing or restricting flow to impoundments that could support Couch's spadefoot toad (Measures BIO-5 and BIO-10).

- Use pre-construction surveys to identify state special-status plant populations and species, and establish avoidance areas in construction zones for special plant resources. Where avoidance is not feasible, salvage and transplant any species that can be reasonably transplanted in an approved area (Measure BIO-6). Include location of sensitive plant resources, construction avoidance areas, and transplant locations on construction plans filed with the Commission.
- Implement the Revegetation Plan filed October 27, 2009, for areas that are temporarily disturbed during construction (Measure BIO-8).
- Implement the Invasive Species Monitoring and Control Plan filed October 27, 2009, to minimize the spread of invasive non-native vegetation (Measure BIO-9). Modify the proposed Invasive Species Monitoring and Control Plan, and file for Commission approval, to include criteria for success and an adaptive management plan to be implemented if initial efforts do not prove successful. Include the reservoirs and water seepage areas along with other areas to be monitored for invasive plants. Monitor water seepage and reservoirs on an annual basis following vegetation establishment.
- For construction activities scheduled to occur between about February 15 and July 30 in vegetated habitat, survey all potential nesting sites for active bird nests. Active nests would be flagged and provided a 15-foot buffer from construction activities (Measure BIO-11).
- Develop, in consultation with FWS and California DFG, and implement a plan to manage evaporation ponds to minimize their attractiveness and access to migratory birds and establish a monitoring program to identify bird usage of the evaporation ponds, effectiveness of bird deterrents, and water quality. Based on monitoring results, implement adaptive management to include more intensive hazing measures or exclusionary pond covers (Measure BIO-12). Include in the plan proposed hazing and habitat modification techniques, methods for measuring success, and thresholds for implementing exclusionary pond covering and file for Commission approval.
- Conduct a pre-construction survey to further assess burrowing owl use of the project area and potential effects. Incorporate survey results and mitigation measures into the comprehensive mitigation and monitoring program (Measure BIO-13). If burrowing owls are present, limit the construction to September 1 through February 1, to avoid disruption of breeding activities; avoid disruption of burrowing owl nesting activities; use a minimum of a 250-foot buffer to avoid active nests until fledging has occurred (Measure BIO-14).
- Determine through pre-construction surveys if 0.25-mile construction buffers would be required during prairie falcon or golden eagle nesting seasons (Measure BIO-15).

- Conduct pre-construction surveys for all burrows that might host badger or kit fox, avoiding active burrows, where possible, and mark the perimeters of all avoidance areas with 3-foot-high and no more than 10-foot-apart, wooden stakes. Where avoidance is infeasible, encourage occupants to leave their burrows (Measure BIO-16).
- Conduct pre-construction surveys to determine the existence, location, and condition of bat roosts and identify foraging habitat. Based on results of surveys, develop a mitigation plan to avoid roosting and foraging effects on resident bats, minimize disturbance, or, as an inescapable measure, evict bats (Measure BIO-17). Prepare the bat mitigation plan after consultation with FWS and California DFG and file for Commission approval, to include proposed environmental measures, methods for determining success, and adaptive management strategies to ensure successful mitigation for loss of bat habitat is achieved.
- Construct security fencing around project reservoirs, collection substation, and evaporation ponds to exclude larger terrestrial wildlife, including bighorn sheep, deer, coyotes, foxes, and badger, from entering project areas that pose hazards (Measure BIO-18).
- In areas without wildlife exclusion fencing or those areas that have not been cleared of tortoises, conduct construction activities only during daylight hours (Measure BIO-20).
- Close, temporarily fence, or cover pipeline trenches each day. Conduct inspections of any open trenches at first light, midday, and at the end of each day to ensure animal safety (Measure BIO-21).
- Design, install, and maintain facility lighting to prevent casting of light into adjacent native habitat (Measure BIO-22).
- Develop and implement, after consultation with FWS and file for Commission approval, a transmission line design plan that considers adequate separation of energized conductors, ground wires, and other metal hardware; adequate insulation; and any other measures necessary to protect raptors from electrocution hazards and design and construct raptor-friendly transmission lines in strict accordance with the industry standard guidelines set forth in Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 2006, by Avian Power Line Interaction Committee, Edison Electric Institute, and Raptor Research Foundation. After consultation with FWS, design measures for reducing potential for avian collision injuries, provide methods for surveying and reporting project-related avian mortality, incorporate a worker education plan pertaining to avian–power line interactions, and include procedures for managing nesting on power line structures.

- Conduct pre-construction surveys for the spadefoot toad in all areas of proposed construction activity not previously surveyed in 2009 or 2010, and implement the same protection measures proposed for the central project area.

Threatened and Endangered Species

- Implement the Desert Tortoise Clearance and Relocation/Translocation Plan to protect desert tortoise from potential effects related to construction activities.
- Following completion of final project design and interconnection plans, calculate project-related effects on Category I and Category III Desert Tortoise Habitat. Prepare and file for Commission approval a desert tortoise habitat compensation plan that identifies acres of disturbance and acreage and location of proposed compensation lands.
- Implement the Predator Monitoring and Control Plan. Amend the current Raven Monitoring and Control Plan to include baseline and post-construction monitoring methods for coyotes, wild dogs, and gulls and develop mitigation measures to be implemented if increases in population levels are detected, and develop a desert tortoise predator control plan, as the Park Service recommends. Include a survey schedule that includes initiation of post-construction surveys during years 1 through5, 7, and 10 following the initiation of reservoir filling.

Recreation Resources

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

Land Use

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

Aesthetic Resources

- Incorporate directional lighting, light hoods, low pressure sodium bulbs or LED lighting, and operational devices in final design to allow surface night-lighting in the central site to be turned on as needed for safety. Also, develop, after consultation with the Park Service, a night sky monitoring plan during the post-licensing design period (to represent baseline conditions) and during construction and a trial operational period (Measure AES-1). File the plan for Commission approval.

- Combine and organize staging areas and areas needed for equipment operation and material storage and assembly within construction lands to the extent feasible to minimize total footprint needed (Measure AES-2).
- For construction of the water pipeline, reduce, to the extent possible, side cast soils to reduce color contrast with the surrounding landscape. Backfill the pipeline disturbed zone and revegetate with native vegetation immediately following completion of pipeline construction (Measure AES-3).
- Employ visual mitigation in the design of the transmission line to minimize visual effects such as specifying materials with a dull finish and background appropriate colors (Measure AES-4).
- Use existing access roads and construction laydown areas to the extent feasible and revegetate with native vegetation within 3 months following completion of construction of the respective component (Measure AES-5).

Cultural Resources

- Implement the project's December 2009 Historic Properties Management Plan (HPMP).
- Consult with BLM, participating tribes, and the California State Historic Preservation Office (SHPO) to revise the December 2009 HPMP to include: (1) clarification in the HPMP's Overview and Executive Summary that the Eagle Mountain mine, Townsite, and associated railroad are potential historic properties; (2) requirements for annual reporting during construction and an annual HPMP Implementation Report; (3) a plan to address curation of recovered archaeological materials; (4) clarification of when cultural resources monitoring and which monitoring protocols would be required; (5) a requirement for consultation with Native American tribes regarding employee training and public interpretation programs; (6) a detailed discussion of the expanded area of potential effects (APE) alternatives, including revised APE maps; (7) a description of the sites documented by Schaefer (2010) and located within the expanded APE; (8) inclusion of a detailed plan and schedule for National Register of Historic Places evaluations, assessment of effects, and identification of measures to resolve adverse effects of project construction, operations, and maintenance on any of sites identified within the specific Commission staff's recommended transmission line corridor and substation location, including the documentation of appropriate consultation with the participating tribes, BLM, and the California SHPO; and (9) measures for handling newly discovered paleontological resources and the reporting of such

discoveries to BLM. The anticipated Programmatic Agreement would implement the HPMP.

Air Quality

- Periodically water or apply suitable surfactant for short-term stabilization of disturbed surface areas and rock and soil storage piles (Measure AQ-1).
- Prevent project-related trackout onto paved surfaces by using a variety of construction management strategies (Measure AQ-2).
- Stabilize graded site surfaces upon completion of grading when subsequent development is delayed or expected to be delayed by more than 30 days, except when precipitation dampens the disturbed surface (Measure AQ-3).
- Limit areas of active surface disturbance (such as grading) to no more than 15 acres per day (Measure AQ-4).
- Reduce non-essential earth-moving activities during windy conditions, and cease clearing, grading, earth-moving, or excavation activities if winds exceed 25 miles per hour averaged over a 1-hour duration (Measure AQ-5).
- Develop and implement a transportation management plan including ride sharing, shuttle transit, and other measures for employees to reduce vehicle trips (Measure AQ-6).
- Use electrical drops in place of temporary electrical generators, and substitute low- and zero emitting construction equipment and/or alternative fueled or catalyst equipped diesel construction equipment wherever economically feasible or if necessary to meet California Air Resources Board (CARB) or other applicable air quality standards (Measure AQ-8).
- Properly tune and maintain heavy-duty diesel trucks in accordance with manufacturers' specifications to ensure minimum emissions under normal operations (Measure AQ-10).
- Use 2002 model or newer construction equipment, where feasible or if necessary to meet CARB or other applicable air quality standards (Measure AQ-11).
- Retrofit older off-road construction equipment with appropriate emission control devices prior to onsite use, where feasible or if necessary to meet CARB or other applicable air quality standards (Measure AQ-12).
- In consultation with the National Park Service develop and implement a 2-year air monitoring study to determine possible effects of the project on air quality.

Noise

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

1.5 CONSULTATION HISTORY

Previous versions of this BA (filed with FERC in September 2009 and July 2010) described the applicant's proposed project. In December 2010, the Commission issued a draft EIS on the proposed project that served as its draft BA. The draft EIS included a staff recommended alternative, which incorporated an alternative transmission line route and additional mitigation measures. On December 23, 2010, the Commission issued a letter requesting formal consultation under section 7 of the Endangered Species Act (ESA). On January 31, 2011, FWS responded with a letter requesting additional information in order to initiate consultation. This final BA has been modified to exclusively address the staff recommended alternative and address questions presented in FWS' letter. Appendix D contains our responses to FWS' questions and notes where in this BA those issues are discussed in more detail.

2.0 PROJECT DESCRIPTION

2.1 PROJECT LOCATION AND FEATURES

The proposed project would be sited near the town of Desert Center, Riverside County, California (figure 1). The central project area (consisting of the upper reservoir, water conveyance system, powerhouse, lower reservoir, water treatment system, and miscellaneous facilities) would be located on the former Eagle Mountain Mine site, in adjacent sections of Townships 3 and 4 South, Range 14 and 15 East. A 500-kV double circuit transmission line, travelling southeast out of the central project area, would convey power to and from the proposed project through an interconnection collector substation located southeast of Desert Center. Water to initially fill the reservoirs and provide annual make-up water would be pumped from groundwater within the adjacent Chuckwalla Valley. Three new wells are to be installed and water would be conveyed to the hydropower plant via pipelines.

2.1.1 Central Project Area

The central project area would comprise 1,101.5 acres. It would 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 a total capacity of 20,000 acre-feet; (3) a lower reservoir with a total capacity of 21,900 acre-feet; (4) inlet/outlet structures; (5) water conveyance tunnels consisting of a 4,000-foot-long by 29-foot-diameter upper tunnel, 1,390-foot-long by 29-foot-diameter shaft, a 1,560-foot-long by 29-foot-diameter lower tunnel, four 500-foot-long by 15-foot-diameter penstocks leading to the powerhouse, and a 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 four Francis-type turbine units; (8) water supply facilities (9) reverse osmosis (RO) system and desalination area; (10) access roads; and (11) appurtenant facilities.

2.1.1.1 Upper Dams and Reservoir

The Central Pit of the Eagle Mountain Mine would be utilized for the Upper Reservoir. The bottom of the pit is at elevation 2,230 mean sea level (msl) and the existing low point of the rim is at elevation 2,380 msl. The active storage portion of the reservoir is planned between elevation 2,340 msl and elevation 2,485 msl. 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 elevation 2,380 msl and elevation 2,440 msl. To obtain the required volume of storage it would 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 would be constructed of roller-compacted concrete (RCC) with an upstream membrane liner and foundation grouting to control seepage. The crest elevation of the dams would be elevation 2,490 and the crest width would be 20 feet.

The south saddle dam would have a height of 120 feet and a crest length of 1,300 feet. The west saddle dam would have a height of 60 feet and a crest length of 1,100 feet. Dam construction would 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 would 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 would 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 CRA. 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 would 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 draft EIS. The draft EIS details a seepage mitigation program consisting of monitoring and pump-back recovery wells. This program would include an array of seepage recovery wells outside and down gradient of each of the reservoirs and groundwater monitoring to record groundwater levels, water quality, and production rates at the seepage wells. The seepage wells would ensure any seepage is maintained below the elevation of the landfill liner and would not raise water levels below the CRA. Eagle Crest would also monitor groundwater levels at an additional series of groundwater monitoring wells. Data would be collected quarterly for the first 4 years of the project and possibly extend to biannually or annually, depending on findings during the first 4 years.

An excavated approach channel to the inlet/outlet structure at the east end of the reservoir would have a bottom width of 100 feet and side slopes of 0.5 horizontal to 1.0 vertical. The approach channel would have an invert at elevation 2,287 and slope down to the tunnel invert at elevation 2,282. The inlet/outlet structure would 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 inlet/outlet structure would assist in spreading flow uniformly over the trashrack area in the pumping mode. The upper reservoir inlet/outlet structure would be equipped with a fixed-wheel gate for emergency closure and tunnel inspection. The inlet/outlet structure in the upper reservoir would be a reinforced concrete gravity structure founded on competent bedrock.

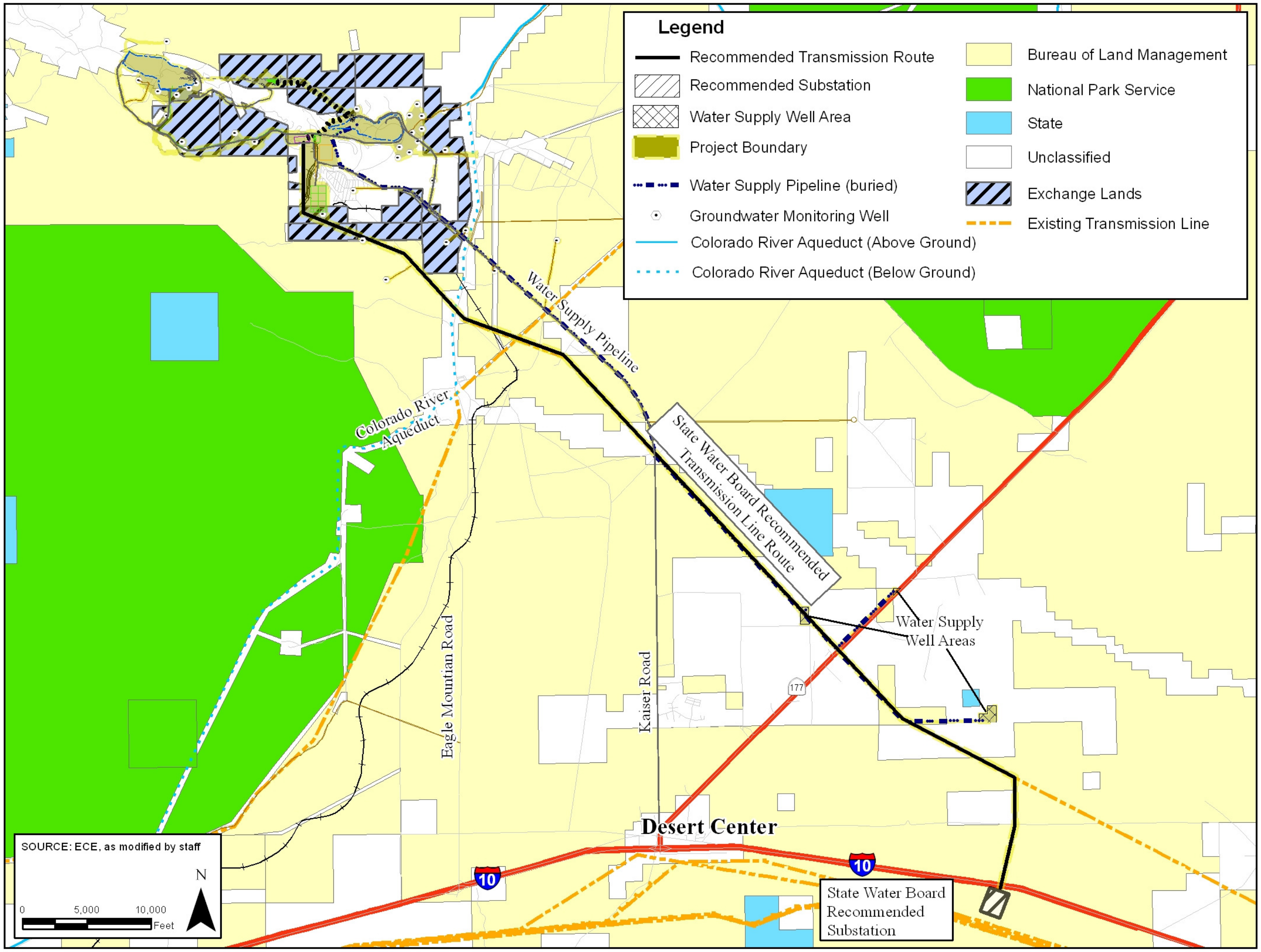


Figure 1. Regional project location showing project features and regional land ownership.

The upper reservoir area would 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 and prevent access to the upper reservoir.

Access to the dams and reservoir would be by improved roads and by new 30-feet-wide gravel roads constructed from the main paved road to the project features.

2.1.1.2 Lower Reservoir

The East Pit of the largely inactive Eagle Mountain Mine would form the lower reservoir for the project. The bottom of the pit is at elevation 740 msl, and the existing low point of the rim is at elevation 1,100 msl. The active portion of the reservoir is planned between elevations 925 and 1,092 msl. 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 could be contained within the pit; therefore, construction of dams would not be necessary to create the lower reservoir.

Seepage potential from the lower reservoir is more substantial than from the upper reservoir because the east end of the mine pit is in alluvial material. Therefore, the eastern end of the pit would 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 would 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. In addition, a seepage mitigation program consisting of monitoring and pump-back recovery wells would also be employed to ensure that seepage does not impact downstream waters or the CRA.

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

The majority of the lower reservoir area would 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. A section of the fence along the northeastern corner of the reservoir would be set back from the full pool elevation. This set back would provide access to drinking water for bighorn sheep and other animals when the lower reservoir is full.

Access to the dams and reservoir would be by improved roads and by new 30-feet-wide gravel roads constructed from the main paved road to the project features.

2.1.1.3 Conduits

A system of water conductor tunnels would convey water from the upper reservoir to the underground powerhouse and from the powerhouse to the lower reservoir in the generating mode. Flow would be reversed in the pumping mode of operation. From the upper reservoir inlet/outlet structure, an upper ("low head") pressure tunnel would 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 would extend 1,563 feet to a 35-foot-long penstock manifold; and four penstocks would extend about 500 feet to the turbine inlet valves at the powerhouse. From the powerhouse, the four individual tailrace tunnels would extend about 350 feet through a tailrace manifold, and the main tailrace tunnel would extend 6,635 feet from the manifold to the lower reservoir inlet/outlet structure.

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

Surge control facilities would be provided upstream and downstream from the powerhouse. The tailrace surge chamber would 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 would be 26 feet wide by 26 feet high and horseshoe shape, and the shaft would be 12 feet in diameter.

2.1.1.4 Powerhouse

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

2.1.1.5 Access Tunnel

Access to the underground powerhouse would be through the main access tunnel. This would be a vehicular tunnel that is 28 feet wide and 28 feet high. The tunnel portal would be south-east of the powerhouse. The invert elevation at the portal would be about 1,100 feet, and it would enter the powerhouse at elevation 808 feet. The length would be about 6,625 feet and the slope 4.4 percent. The tunnel would be shotcrete lined and would have a concrete roadway on the invert. Rockbolts or other rock support would be used as required where areas of weak or broken rock are encountered. The top portion of the tunnel would 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 reverse osmosis water treatment system would be required to remove certain constituents from the reservoirs. This facility would remove water from the upper reservoir and return treated water to the lower reservoir. Groundwater from wells in the Chuckwalla Basin would be used to supply water to the proposed pump storage hydroelectric project. If water monitoring indicates any changes in pH levels in the reservoir, Eagle Crest would retrofit the reverse osmosis system to also maintain pH. The design of the treatment facility comprises several pretreatment steps to ensure that the stored surface water is suitable for treatment by the RO process, which would provide for the bulk of the salt concentration. Treated water would be returned to the lower reservoir while the concentrated brine from the RO process would be directed to evaporation ponds. The treatment goal would 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 evaporation ponds. From the overall material balance, the total brine to be evaporated is about 170 gallons per minute (gpm) (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 would be about 8.3 acres in size, and each solidifying pond would be about 1.4 acres in size. Ponds would be covered with netting to prevent bird access and the RO facility would be fenced and gated to prevent the entry of unauthorized personnel and the public during construction and operation and for wildlife exclusion purposes to protect terrestrial wildlife from potential hazards. 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 would 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 inch per year. Salt removal would be expected to occur on the order of once every 10 years, at which time the pond liners would be inspected and replaced as needed.

2.1.1.7 Other Structures

A switchyard (project connection point) would be located about 4,500 feet south of the powerhouse. It would be located on a level site at an approximate elevation 1,430 feet. It would be 500 by 1,100 feet, with a gravel surface. This area would be surrounded by a security fence to prevent the entry of unauthorized personnel and the public during construction and operation and for wildlife exclusion purposes to protect terrestrial wildlife from potential hazards. A security and maintenance lighting system would be provided. It would also be designed to protect against bird electrocution.

This switchyard would 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 would run inside the length of the access tunnel to a shaft located near the lower reservoir inlet structure. Here the transmission lines would come up through the shaft to the ground surface. At the ground surface they would follow the upper edge of the lower reservoir as overhead transmission lines to the southwest, connecting to the switchyard. The overhead lines would terminate in the switchyard and be connected through protective breakers and associated switches to a double circuit 500-kV transmission line. The switchyard would contain all necessary disconnect switches, protective equipment and metering equipment. Transmission lines from the powerhouse to the switchyard, and from the switchyard to the substation would be constructed in a manner consistent with Avian Protection Plan Guidelines: A Joint Document prepared by the Edison Electric Institute's Avian Power Line Interaction Committee (APLIC) and FWS (2005), and APLIC's Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 2006 and Mitigating Bird Collisions with Power Lines: The State of the Art in 1994, or the most current editions of these documents at the time of construction.

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

While the primary powerhouse access would be through the main access tunnel described above, safety requires a second means of personnel egress from the underground facilities. This access shaft would be provided about 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 about 1,100 feet deep and 9 feet in diameter extending to the erection bay floor at elevation 808 feet. The tunnel section would be about 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 would be constructed to provide access to the upper reservoir dams, both inlet/outlet 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 would be paved with asphaltic concrete; the other roads would be gravel surfaced.

2.1.2 Site Access

The primary access road would be the existing Kaiser Road. No new road crossings of the CRA would be required. Access to central project area facilities would be in part by the roads that were developed for the mining operations.

2.1.3 Transmission Line

Power would be supplied to and delivered from the project by a double circuit 500-kV transmission line. Our recommended transmission line route would extend about 16.4 miles from the project switchyard to our recommended interconnection collector substation (Eastern Red Bluff Substation) southeast of Desert Center, for interconnection to the Devers-Palo Verde 500-kV line owned by SCE (see figure 1). The route would parallel the existing SCE 161-kV transmission line going southeast to a point just north of the recommended 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 the north side.

The new Red Bluff Substation would encompass an estimated total area of 74 acres. SCE filed an application with the California Public Utilities Commission for approval of the substation in November 2010. SCE expects to begin construction during the third quarter of 2011 and expects the substation to be operational in the third quarter of 2013 (SCE, 2011). The draft EIS for the Desert Sunlight Solar Project proposes mitigation for effects on desert tortoise habitat resulting from the development of this substation (BLM, 2010). These measures include a habitat compensation plan, desert tortoise translocation plan, and worker environmental awareness plan.

Following receipt of a project license, the Eagle Mountain Pumped Storage Hydroelectric Project would still require 2 years of final design engineering prior to construction. As such, the earliest construction of the project would begin is 2014, after the substation is anticipated to be fully operational. As such, we anticipate the construction of the substation and full compensation for any effects to desert tortoise would be as per the SCE schedule and BLM's mitigation measures. Therefore, we have not included the substation in the calculations of disturbance to native habitats for this project. However, during the 2 years of final design engineering, Eagle Crest would identify whether additional disturbance is necessary to connect the project to the new substation. Eagle Crest would compensate for any such disturbances as per the Northern and Eastern Colorado Desert Coordinated Management (NECO) Plan (BLM and California DFG, 2002). We expect that if any additional disturbance is necessary, it would be minimal (>5 acres).

The right-of-way (ROW) width for the transmission line generally would be about 200 feet. However, the ROW width could be reduced in specific locations to mitigate potential impacts on 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 400.5 acres, including stub roads. Access would be via the existing access road to the 161-kV line, with stub roads leading to the individual tower pads. The stub roads and tower footprints would occupy an additional 6.8 acres (see section 3.1.2, *Project Boundary*, for further information on acreage).

2.1.4 Water Supply and Conveyance Pipelines

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

The locations of the three groundwater wells are about 11 miles southeast of the project area (see figure 1). The groundwater supply well system would consist of the following main components:

- Three 2,000-gpm, 1,000-horsepower vertical turbine pumps
- 1.3 miles of 12-inch-diameter well field collection pipe
- 3.3 miles of 18-inch-diameter well field collection pipe
- 10.7 miles of 24-inch-diameter conveyance pipe

The total mileage of pipeline is estimated to equal 15.3 miles. The construction ROW width would be 60 feet, for a total of 55.6 acres of surface disturbance.

One well would have adequate capacity to replenish water lost to evaporation and seepage. A second well would be maintained as a backup water supply for the makeup water needs. The third well would not be needed for project purposes once the initial fill is completed.

2.2 PROJECT CONSTRUCTION

Eagle Crest estimates engineering design to require an additional 2 years from license issuance. Eagle Crest anticipates project construction to require 4 years. Eagle Crest filed a Technical Memorandum which described the construction schedule, manpower, and equipment needs of the project. The full text of this document is in section 12.3 of exhibit E of the final license application (Eagle Crest, 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.

A schedule of construction is described below.

2.2.1 First Year of Construction

General:

- Mobilize and construct temporary office, storage, maintenance and staging facilities (AG[1]).

- Construct and improve permanent and construction access roads (AG).

[1] AG = above-ground construction work

Water Conduits:

- Proceed and erect tunnel boring machine and start excavation of tailrace tunnel (AG).

Power Plant:

- Construct access tunnel portal and start excavation of access tunnel (BG[2]).

Upper Reservoir:

- Excavate approach channel to inlet/outlet works (AG).

Lower Reservoir:

- Start moving unstable tailings pile (AG).
- Start implementing seepage control measures (AG).

Switchyard:

- Start switchyard construction (AG).

Transmission Line:

- Start construction of transmission line foundations (AG).

2.2.1 Second Year of Construction

Upper Reservoir:

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

Lower Reservoir:

[2] BG = below ground construction work

- Complete moving unstable tailings pile (AG).
- Seepage control liner blanketing (AG).
- Construct inlet/outlet works (AG).
- Complete seepage control measures (AG).
- Install water pipeline from wells, pumping plant, and RO system (pipelines would be buried underground).
- Begin to fill lower reservoir.

Water Conduits:

- Complete tailrace tunnel, manifold and draft tube tunnels (BG).
- Move and erect tunnel boring machine and excavate upper pressure tunnel (BG).
- Excavate lower pressure tunnel, manifold and penstock tunnels (BG).
- Excavate pressure shaft (BG).
- Install steel tunnel linings (BG).

Power Plant (all below ground):

- 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 (all above ground):

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

Switchyard:

- Complete switchyard and install equipment (AG).

2.2.3 Third Year of Construction

Upper Reservoir:

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

Lower Reservoir:

- Continue filling lower reservoir.

Water Conduits (all below ground):

- 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 (all below ground):

- 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 RO system.
- Install mechanical and electrical equipment.

Transmission Line (all above ground):

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

2.2.4 Fourth Year of Construction

Power Plant (all below ground):

- 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 3-month intervals ending the beginning of April.
- Complete architectural work.

Transmission Line (all above ground):

- Test and energize high voltage transmission line.

Commercial Operation:

- After fourth year of construction.

2.3 PROJECT OPERATION

The basic mode of operation for the project would 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 California Independent System Operator for voltage regulation, and load following, and would be available for spinning reserves.[3]

The project reservoirs would be formed by filling two existing mining pits with water. The mining pits are empty and have not been actively mined for decades. There is an elevation difference between the reservoirs that would provide an average net head of 1,410 feet. The proposed energy storage volume would 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 would be 17,700 acre-feet. Tunnels would connect the two reservoirs to convey the water, and the generating equipment would be located in an underground powerhouse.

As a peaking, voltage regulation, and load-following facility, the plant would 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 United States an average annual capacity factor of 20 percent would be expected. However, the project has been sized to provide 18.5 hours of energy storage and could support a higher capacity factor. The annual energy production by the plant would 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 would 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.

---

[3] Spinning reserve is the on-line reserve capacity that is synchronized to the grid system and ready to meet electric demand within 10 minutes of a dispatch instruction by the Independent System Operator. Spinning reserve is needed to maintain system frequency stability during emergency operating conditions and unforeseen load swings.

3.0 AFFECTED ENVIRONMENT

3.1 PROJECT AREA HABITATS

3.1.1 General Project Area

The project would be located 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, about 3 to 5 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 about 54 degrees Fahrenheit (°F) (Turner and Brown, 1982). Ambient, summer temperatures are extreme, commonly reaching 110°F and above for long periods and averaging about 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 would extend from the edge of the Eagle Mountains into the adjacent Chuckwalla Valley, via a gently sloping bajada.[4] 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[5] is intermittently present along the bajada. Soils generally range from soft sand to coarse-sandy loams. Elevations of the bajada range from about 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 cobble drainages that carry periodic runoff to a regional

---

[4] A bajada is a broad slope of debris spread along the lower slopes of mountains by descending streams, usually found in arid or semiarid climates.

[5] Desert pavement is a surface that is covered with closely packed, interlocking angular or rounded rock fragments of pebble and cobble size, usually one or two fragments thick.

drainage. They are often incised, from one half to several yards deep, and vegetated along the banks by both shrubs and trees. By contrast, the numerous, shallow runnels are typically only 1 yard or less wide, 1 to a 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 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 central project area.)

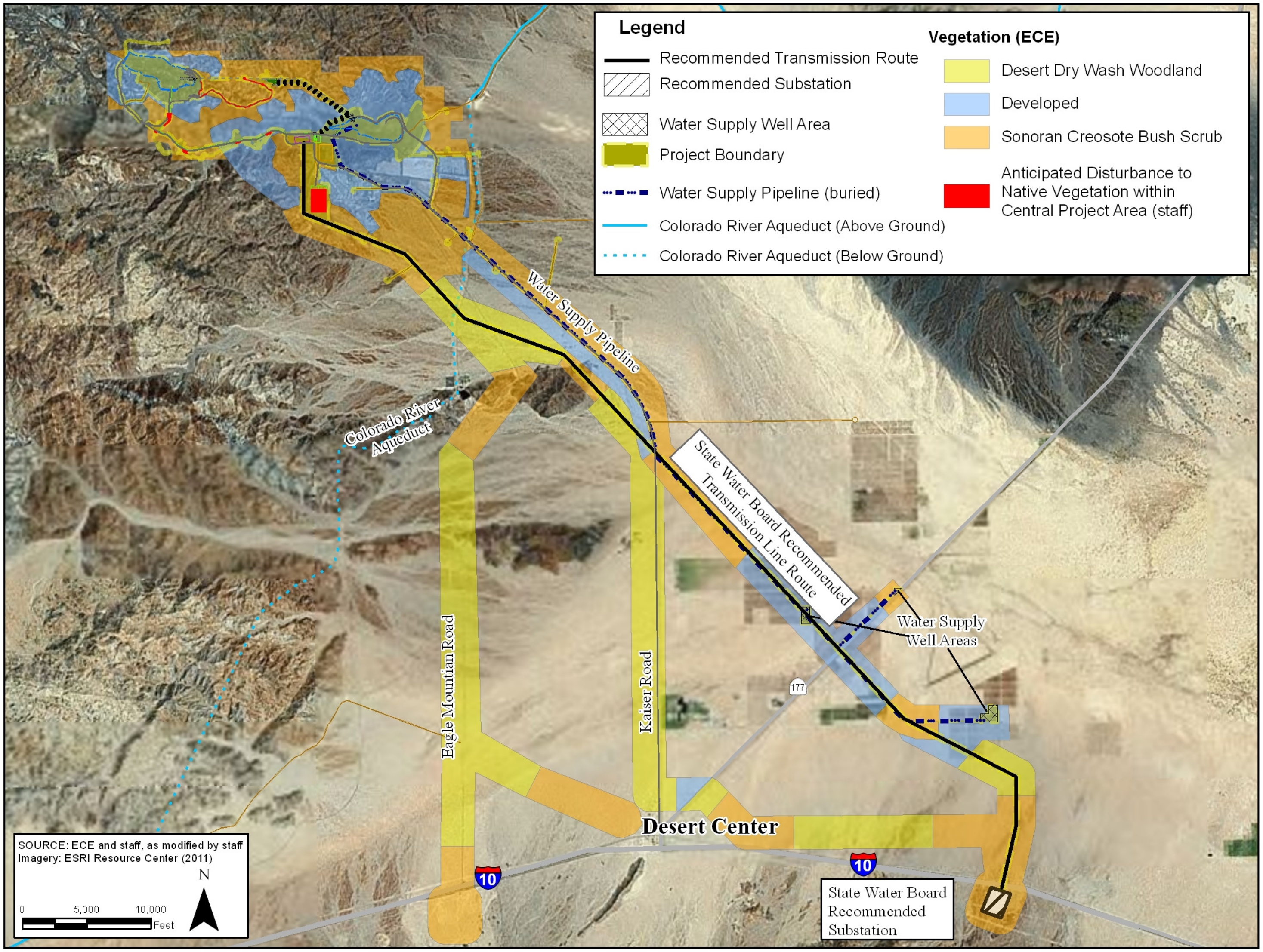


Figure 2. Vegetation in the project.

3.1.1.1 Wetlands, Seeps and Springs, and Artificial Impoundments

There are no perennial streams or natural wetlands in the project vicinity. Drainages in this part of Riverside and Imperial counties are generally limited to high-energy runoff via washes that are usually dry. As water from these runoff events quickly percolates into the surrounding soil, the establishment of wetland vegetation is precluded. The additional soil moisture during these brief periods is enough to allow the growth of aphyllous or microphyllous trees, but the lack of residual soil moisture and, to a lesser extent, the scouring action from the high-energy ephemeral flow, prohibits the growth of most species of plants.

Six seeps, springs, or water catchments were identified by the proposed NECO Plan (BLM and California DFG, 2002) in the immediate vicinity of the project, all on or near the Metropolitan Water District of Southern California (Metropolitan Water District) pumping facility (figure 3). Four of these, Buzzard Spring, Dengler Tank, Eagle Tank, and Cactus Spring, are outside the project boundary by at least 2 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 (Eagle Crest, 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 locate them (Devine and Douglas, 1996), and it is possible that they no longer exist or were incorrectly mapped. In the past, precipitation and runoff collected in the mine pits and a tamarisk (*Tamarix* sp.) grove grew in the East Pit (Kaiser and MRC, 1991). Such water pools were also known sources of water for bighorn sheep, which frequented the mine pits when water was available (Eagle Crest, 1994). Presumably other animals used this water source as well. During final engineering design a water source survey would determine the presence of any springs within the project's area of potential effects, their quality, and value for wildlife.

There are no artificial water impoundments along the transmission line and water pipeline routes. All possible wells in the project vicinity were assessed for the potential for water impoundment during 2008 surveys. Based on local topography, none of the final three well sites had potential for impoundment.

Onsite water sources plus nearby water sources currently provide a variety of water resources for ravens and coyotes and other native and non-native species. Within the Eagle Mountain Townsite, a few dwellings are still reportedly occupied by Kaiser employees. The Eagle Mountain School is in operation at the Townsite, serving the rural Chuckwalla Valley and local communities. The Townsite is serviced by public utilities, and a wastewater treatment plant is located southeast of the town. There is a 1.2-acre wastewater treatment pond that can be seen on aerials and is assumed to still support these human uses of the site. Photos of this pond, and other water sources in the project area, are found in appendix C. As one of the few easily accessible water sources in that area, it is highly likely to provide water for both coyotes and ravens. Seasonal water is likely to pool in the pits and on other hard, mined surfaces. NECO identified a developed tank along the northern edge of the central project area. Buzzard Spring, about 3 miles south of the central project area, has pooled water (Divine and Douglas, 1996). There is a 10-acre pond used by the Metropolitan Water District's Eagle Mountain Pumping Station, about 4 miles south of the central project area. The CRA has 8 acres of exposed water as close as 1.1 mile from the central project area and transmission corridor; however, access to the CRA by wildlife is likely to be limited by physical characteristics of the channel and fencing, although it is accessible to ravens and other birds. Two large ponds (17 acres) are also present within the community of Lake Tamarisk. These ponds are about 9.3 miles from the central project area and 2.3 miles from the transmission line route.

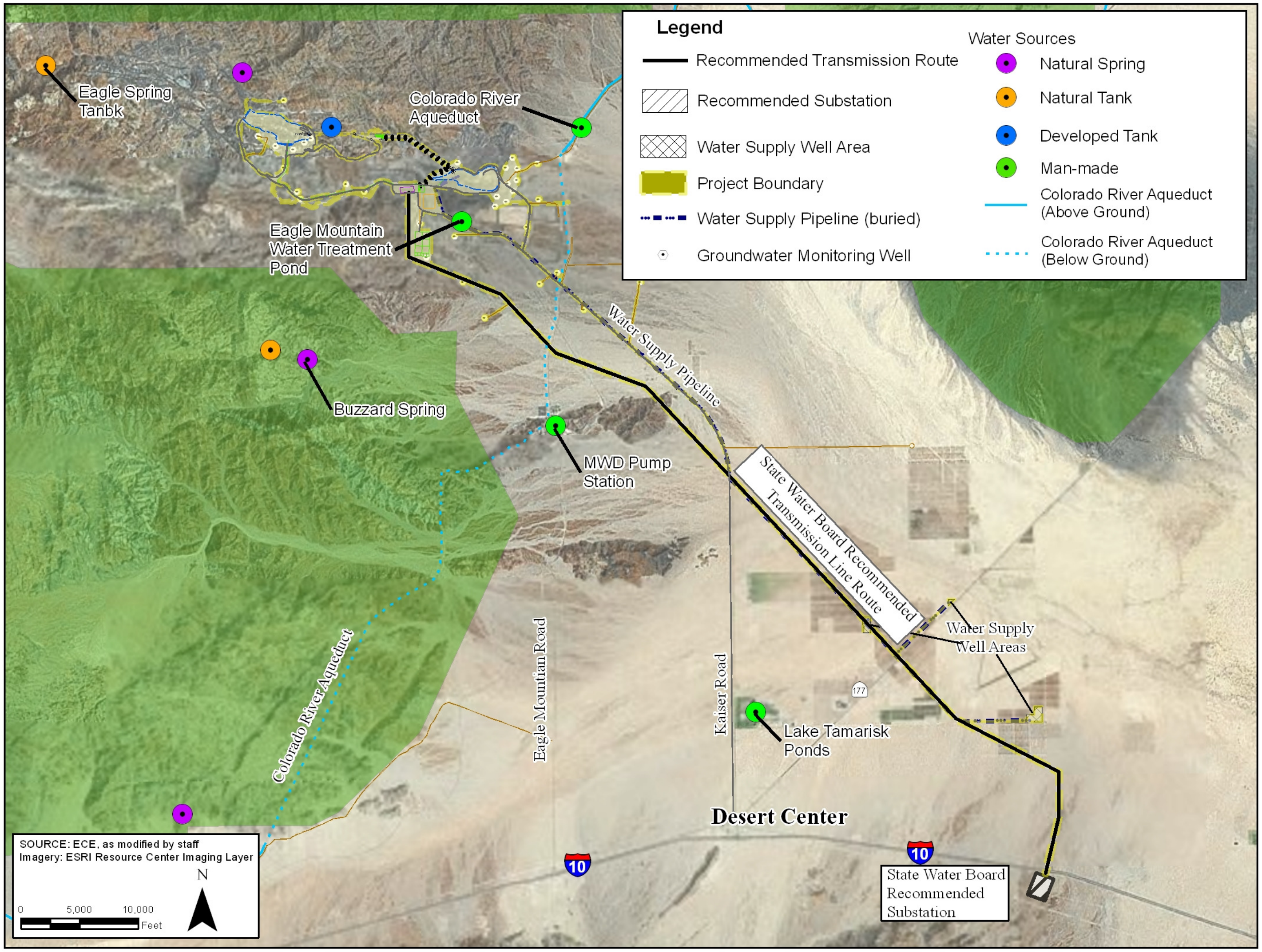


Figure 3. Natural springs and tanks in the project area.

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 – Saharan 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; Allen, 2002).

3.1.2 Project Boundary

3.1.2.1 Central Project Area

The central project area is located at the eastern 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 and aerial photography. A large volume of information on the central project area with respect to the desert tortoise is available in the public record from studies conducted for the development of a proposed landfill on the site. The existing information includes an EIS and Environmental Impact Report, a BA, a Biological Technical Report, and a BO prepared for the proposed Eagle Mountain Landfill (County of Riverside and BLM, 1996; RECON, 1992; FWS, 1993; and Circle Mountain Biological Consultants, 1998).

The central project area consists of mountainous, rocky terrain that has been disturbed extensively as a result of past mining activity (appendix H). The BA (RECON, 1992) and EIS (County of Riverside and BLM, 1996) for the Eagle Mountain Landfill 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 Townsite. 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.

Based on current aerial photos (2011), there appears to be small amounts of low or moderate quality habitat in the areas of the central project area where disturbance is likely to occur. Table 1 identifies anticipated effects on native habitats based on the current central project area configuration and analysis of current aerial photographs.

Table 1. Acreage of native habitats and developed areas, and potential surface disturbance on the Eagle Mountain Pumped Storage Project[a,b] (source: Eagle Crest 2011, as modified by staff)

Project Element	**Total Acreage (acres)**	**Sonoran Creosote Bush Scrub (acres)**	**Desert Dry Wash Woodland (acres)**	**Disturbed (acres)**
Central project area (acreage of reservoirs and constructed project features)	1,101.5	44.7	15.4	1,041.4
Reservoirs	354	0	0	354
Switchyard	12.3	0	0	12.3

Project Element	Total Acreage (acres)	Sonoran Creosote Bush Scrub (acres)	Desert Dry Wash Woodland (acres)	Disturbed (acres)
Reverse Osmosis Pumping Station	5.5	0	0	5.5
Staging and Storage Area	26.1	0	0	26.1
Desalination Area	56.4	38.0	10.4	8.0
Eagle Creek Channel Modifications	5	0	5	0
Construction Road	6.7	6.7	0	0
Additional grading, saddle dam construction, etc.	635.5	0	0	635.5
Transmission Line ROW	400.5 (16.4 miles)	205.6 (8.4 miles)	97.6 (4.0 miles)	97.3 (4.0 miles)
Tower Footprint plus Construction Area	5.4 (67 towers)	2.8 (34 towers)	1.3 (16 towers)	1.3 (16 towers)
Stub Roads	1.4	0.6	0.3	0.4
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%
Water Pipeline	55.6 (15.3 miles)	20.9[c] (8.1 miles)	0 (0 miles)	34.7[c] (7.2 miles)
Total Project Acreage	≥1,557.7	≥271.2	≥113.0	≥1,173.4
Total Acreage Disturbed	≥1,164	≥69.0	≥17.0	≥1,077.8

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

- Staff Recommended Transmission Line Route
  - 16.4-mile-long, 200-foot ROW

- Transmission Line Disturbance Acreage
    - ° About four towers per linear mile, with more in mountainous terrain (67 total)
    - ° The existing access road would be used, with stub roads to each tower. Stub roads are estimated to be 12 feet wide by 75 feet long.
    - ° Total tower footprint (40 by 40 feet) plus construction area is 3,600 square feet (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 would be on previously disturbed lands and/or overlapping with other project acreage.
- Water Pipeline and Wells
    - ° 15.3 mile 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 2,500 square feet (50 by 50 feet)

[b] All calculations of acreage on the central project area are estimates based upon GIS mapping of the constructed project features and reservoirs. These calculations include footprints as currently designed and our estimates for additional disturbance based on Eagle Crest's total estimated disturbance in the central project area, Eagle Crest's Sediment and Erosion Control Plan, and staff's anticipated channel modifications in the Eagle Creek wash. Actual disturbance areas would be calculated following surveys for desert tortoise and final engineering design for the project. These final calculations would be incorporated into final calculations for desert tortoise compensation lands.

[c] 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.

FWS issued the BO for the Eagle Mountain Landfill in 1992. A review of the mitigation measures in the BO confirmed that the Eagle Mountain Pumped Storage Project would not interfere with the implementation of mitigation measures required for the Eagle Mountain Landfill (see table 3.9-3 of the draft Environmental Impact Report for a complete list of mitigation measures in the landfill BO, and the effect of the pumped storage project on these mitigation measures).

The BO for the Eagle Mountain Landfill was reaffirmed by FWS twice after it was issued. In 1993, a proposal to designate critical habitat for desert tortoise (*Gopherus agassizii*) was issued, and BLM requested a formal conference with FWS regarding the proposed landfill project and its potential to impact proposed critical habitat. On September 20, 1993, FWS concluded that the original BO adequately addressed impacts on habitat that was proposed as critical habitat for the desert tortoise. FWS stated that the mitigation measures proposed by BLM, the project proponent, and the terms and conditions of the BO, adequately offset impacts on proposed critical habitat (letter from the Field Supervisor, Carlsbad Field Office, FWS to the California State Director, BLM dated September 30, 1993).

An EIS on the Eagle Mountain Landfill was issued in 1996. FWS submitted a comment letter on that EIS on September 30, 1996, wherein it re-affirmed the conclusions of the 1992 BO. This letter references the 1992 BO and reiterates the conclusion that the mitigation measures proposed by the BLM, the project proponent, and the terms and conditions of the BO adequately offset impacts on proposed critical habitat. The letter further states that "New survey information of desert tortoise in new areas in the project vicinity and the recent designation of critical habitat shall be investigated, but at present the Service sees no need to reinitiate consultation pursuant to section 7 of the Act" (letter from the Field Supervisor, Carlsbad office of FWS to the District Manager, California Desert District Office, BLM, dated September 30, 1996).

During preparation of this BA, we reviewed historical aerial photos of the central project area (dated 1997 and 1998) and compared vegetation patterns with those visible on current aerial photography (dated 2010). This analysis was conducted with a Geographical Information System (GIS). Figures comparing these data sets are provided in appendices E, F, and G. Based on this analysis, we conclude that there was no substantial change in vegetation patterns within the central project area between 1997/1998 and 2010. Both sets of photos show the presence of very low density shrub establishment within portions of the mine pits and tailing piles. Additionally, there does not appear to be any forage vegetation of sufficient quantity or quality that would attract desert tortoise from adjacent undisturbed habitat into the central project area. As such, consistent with FWS' BO and subsequent FWS statements relating to the proposed landfill, we conclude that the central project area provides minimal habitat for desert tortoise.

3.1.2.2 Recommended Project Transmission Line Route

The staff recommended transmission line route extends southeast on the bajada from the central project area (see figure 1). The northern 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 about 1 mile of the ROW is in developed land (i.e., disturbed by mining) and the remainder is in Sonoran Creosote Bush Scrub.

The vegetation community along the Kaiser Road portion of the transmission route is a sheeting Sonoran Creosote Bush Scrub. This route then parallels the existing, SCE 161-kV line, initially through about 2 miles of native Sonoran Creosote Bush Scrub and then through abandoned jojoba (*Simmondsia chinensis*) fields to State Route 177. A dirt access road is present along this portion of the route between Kaiser Road and State Route 177. From State Route 177, the route travels southeast along an existing dirt road along the SCE transmission line until the route turns south to meet the proposed Red Bluff Substation. East of State Route 177, habitats include abandoned jojoba agricultural fields, 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 the transmission line is estimated to be 205.6 and 97.6 acres, respectively (see table 1).

3.1.2.3 Water Pipeline

The water pipeline primarily runs along the same ROW as the staff recommended transmission line route (see figure 3). At State Route 177, the pipeline route splits, with one route travelling along State Route 177 (paved), mostly through agriculturally developed parcels, but also through about 0.3 mile of native Sonoran Creosote Bush Scrub. The other fork travels southeast along the transmission line and diverges through primarily developed land. The combined acreage of native Sonoran Creosote Bush Scrub disturbed by the water pipeline ROWs is 20.9 acres (see table 1).

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 Metropolitan Water District and Kaiser Eagle Mountain, LLC (Kaiser) (table 2). The rest are lands near the upper reservoir that are managed by BLM. There are 441 acres within the project boundary that are associated with a land exchange between Kaiser and BLM that is currently in litigation. The project's transmission line route is located on both public lands managed by the BLM and private land managed by individual private landowners. Exceptions include private lands within the central project area boundary owned by Kaiser, and a small crossing of land owned by the Metropolitan Water District as the route crosses the existing Metropolitan Water District 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 CRA before entering the central project area. Land ownership for the project boundary and surrounding area is shown on figure 1.

Table 2. Summary of land ownership within the project boundary (source: Eagle Crest 2011, as modified by staff)

Description	Project Boundary Acres[a]	Ownership Acres	Remarks
Total Project Boundary	2,527		
Private/Patented Lands[b]		1,867[b]	
Public Lands		660[b]	BLM-Administered Lands

[a] Includes all lands within the project boundary, including acres that would be not be disturbed.

[b] 441 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 BLM, a number of specific land uses do exist. These are described below and shown on figure 4.

Town of Eagle Mountain. The town of Eagle Mountain is a 460-acre Townsite owned by 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 employees. The Townsite is serviced by public utilities, and a wastewater treatment plant is located southeast of the town. The Eagle Mountain School is in operation at the Townsite, serving the rural Chuckwalla Valley and local communities.

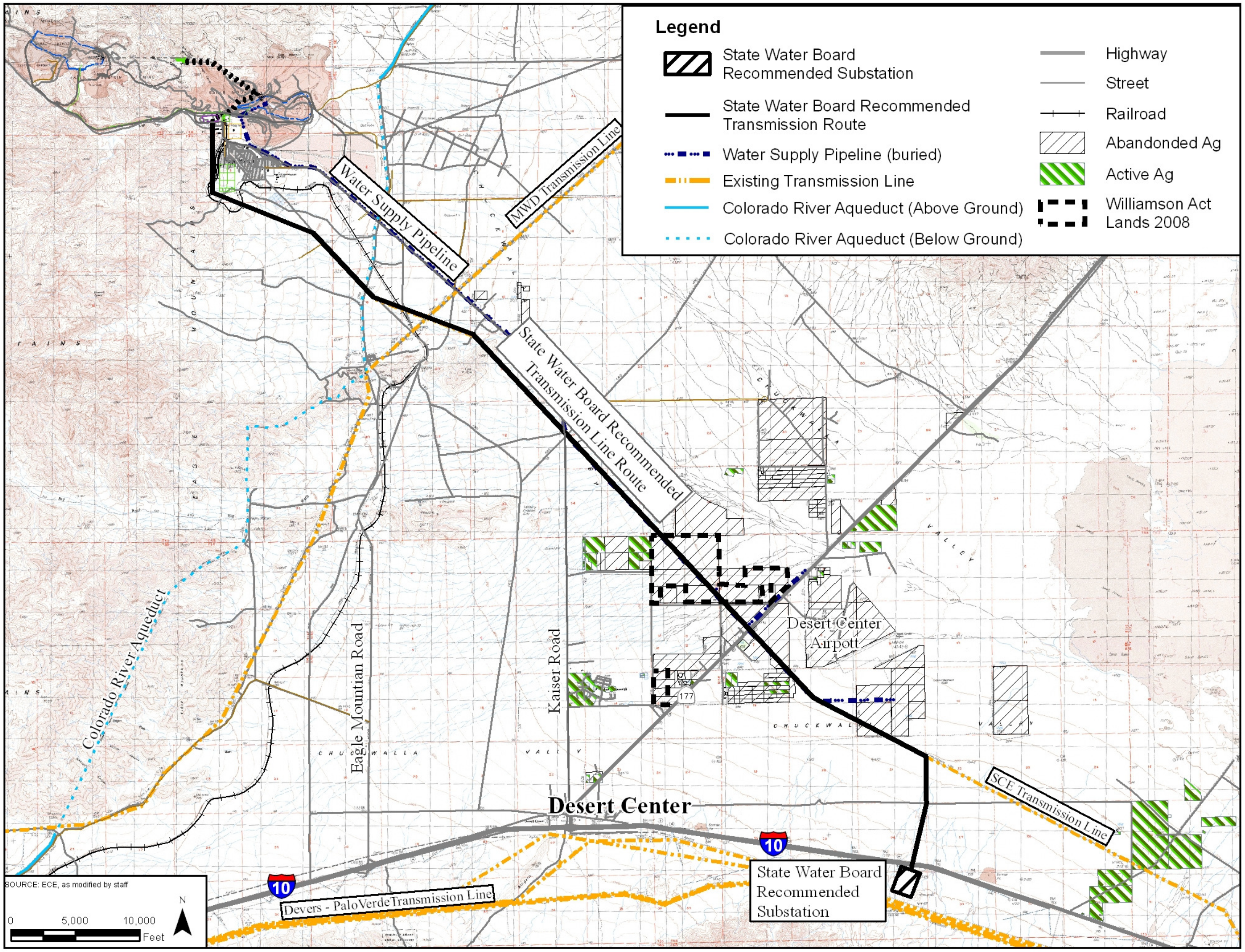


Figure 4. Land use in the project area.

Lake Tamarisk and Desert Center Communities. The small communities of Lake Tamarisk and Desert Center are located about 9 and 10 miles, respectively, southeast of the central project area along the Kaiser Road. Lake Tamarisk consists of about 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 I-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 and the Eagle Mountain Townsite are accessed by Kaiser Road and State Route 177which connect to I-10 at Desert Center.

Roads, Utilities, Airports, and Miscellaneous Facilities. The principal transportation network in the project vicinity includes I-10 and State Route 177. Local paved roads include the Kaiser and Eagle Mountain roads, and the I-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 I-10 to the Metropolitan Water District pumping station, and becomes a dirt road from the Metropolitan Water District pumping station turnoff to the Eagle Mountain Townsite. East of the Metropolitan Water District pumping plant, a small paved road follows the Metropolitan Water District aqueduct. Other transportation resources in the study area include unpaved roads and off-highway-vehicle trails. The Eagle Mountain Rail Line, which once serviced the Eagle Mountain Mine operation, also runs through the area from I-10 north to the central project area. This facility is proposed to be improved and re-opened as part of the proposed landfill project (see below).

Several existing transmission lines cross the study area. A 230-kV electrical transmission line (Metropolitan Water District line) crosses the Coxcomb Mountains from the northeast and continues to the Metropolitan Water District pumping station and then through the Eagle Mountains to the south. A 161-kV transmission line, owned by SCE, runs southeast from the Eagle Mountain Townsite to the community of Blythe located about 50 miles to the east. South of I-10, the 500-kV Devers-Palo Verde Transmission Line parallels I-10. Plans exist for additional transmission lines within the BLM-designated utility corridor that follows I-10. These include a second Devers-Palo Verde Transmission line (approved but not yet built) and a 230-kV 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 about 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 CRA, which is managed by Metropolitan Water District, lies about 1 mile south of the proposed lower reservoir within the central project area. The aqueduct runs in a northeast-to-southwest direction and is underground in the immediate project vicinity, transitioning to an open channel 1 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 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. About 994 acres within three areas are under California Land Conservation (Williamson) Act Contracts (see figure 4). 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. The act does not prohibit utility ROWs.

Irrigated crops grown in the area initially included jojoba, a seed crop, and asparagus. About 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. Currently inactive or abandoned cropland in the project vicinity totals about 5,200 acres. A small number of crop types currently in production in the area include jojoba, asparagus, citrus, dates, and palms. Based on a field verification of aerial photo information, Eagle Crest concludes that currently active cropland in the project vicinity is about 1,200 acres.

Joshua Tree National Park and Wilderness. Joshua Tree National Park (JTNP or Park) surrounds the central project area on three sides; the Park boundary is located about 2 to 3 miles from the central project area (see figure 4). JTNP encompasses nearly 792,000 acres of land of which about 700,000 acres have been designated Wilderness.

Eagle Mountain Mine and Proposed Landfill. As part of the iron ore mining process, Kaiser excavated four principal areas between 1948 and 1982 (CH_2M Hill, 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 about 1 to 2 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 has proposed to develop much of the area between the East Pit and the Central Pit as a landfill. Additionally, about 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 1990s but not all legal issues have been resolved. One component of the landfill proposal is an exchange of lands between Kaiser and BLM. The land exchange has been subject to litigation since 2005. In March 2011, the U.S. Supreme Court refused to hear Kaiser's appeal of the 9th District Court of Appeals decision to uphold invalidation of the land swap. 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 web site 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 4,245 acres of land.

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

4.0 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 were found in southern Baja California, Mexico and named *Xerobates lepidocephalus* (scaly-headed tortoise) (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 about elevation 4,000 feet (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 percent 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 about 109°F (Karl, 1992) to 113°F (Zimmerman et al., 1994). Above-ground activity was estimated at only 1.7 percent 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 to several days at 2 to 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 to 13.8 (range: 2 to 18) (Duda et al., 1999) and 11.7 (range: 4 to 23) (TRW, 1997b). Bulova et al. (1994) reported 9.1 burrows (range: 3 to 18) for only a 5-month period from June to October. An average of 4.8 new burrows may be constructed per year; more new burrows would 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 to 143.3 acres) for adult females and 111.6 acres (range: 10.4 to 487.8 acres) for males, in a 3-year study when tortoises were recaptured at least 50 times per year (TRW, 1999). By contrast, home ranges were substantially smaller in studies with sample sizes of fewer than 21 tortoises and/or short study length (e.g., 5 months for Connor et al., 1994): 18 to 26.4 acres (range: 2.0 to 84.5 acres) (7.3 to 10.7 hectare [ha]; range: 0.8 to 34.2 ha) for adult females in years of average or better forage levels and 19 to 65.2 acres (range: 9.1 to 108.9 acres) (7.7 to 26.4 ha; range: 3.7 to 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 to 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 millimeter (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 to 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 to 1.8 (Karl, 1998a; Mueller et al., 1998; Wallis et al., 1999).

4.1.4 Legal Status, Management, and Conservation

FWS emergency-listed the desert tortoise as endangered on August 4, 1989 (FWS, 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 (FWS, 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 ESA (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 (FWS, 1990 [55 FR 12178]). The emergency listing package for the desert tortoise identified population declines of at least 10 percent annually for the previous 6 years at eight sites in the western Mojave Desert (FWS, 1989 [54 FR 32326]). Concern that an upper respiratory disease, initially labeled as 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 (FWS, 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), FWS (1994b), Boarman (1999), Lovich and Bainbridge (1999) and Karl (2004a).

On February 8, 1994, FWS designated critical habitat for the Mojave population of the desert tortoise (FWS, 1994b), encompassing about 6,446,200 acres (2,608,741 ha). One CHU, the Chuckwalla CHU, intersects the project (figure 5) The 1994 Recovery Plan (FWS, 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, the Desert Wildlife Management Areas (DWMA) act as reserves in which recovery actions are implemented. The NECO Plan (BLM and California DFG, 2002) furthers this recovery goal by prescribing conservation and management measures for DWMAs. The Chuckwalla DWMA intersects the project (figure 5).

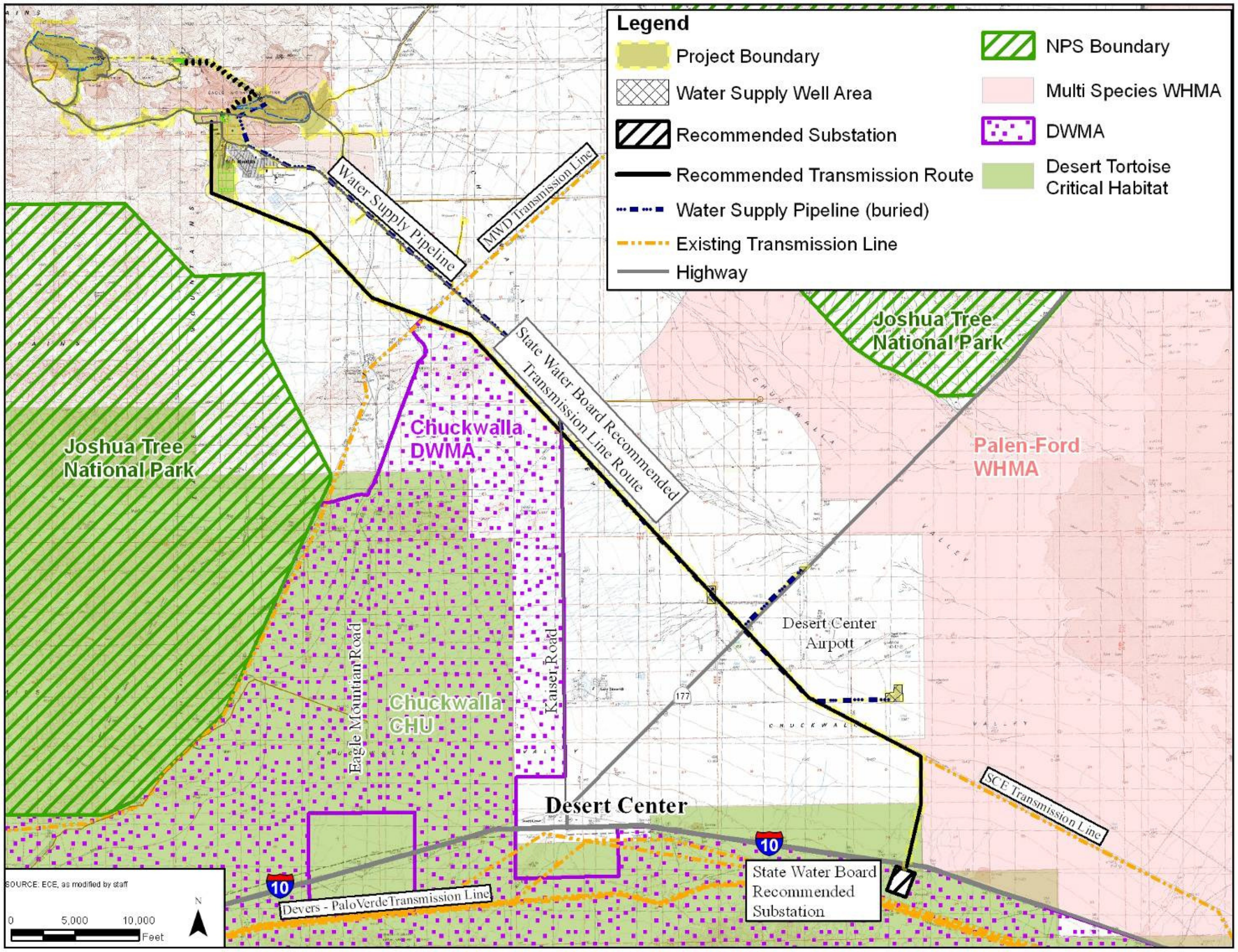


Figure 5. Desert tortoise critical habitat, Desert Wildlife Management Area, and Multi-Species Wildlife Habitat Management Area boundaries.

4.2 SURVEY METHODS

During March and early April 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 may 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 FWS 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; see figure 5.)

- 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 FWS "protocol" desert tortoise transects (FWS, 1992). Per those protocols, 100 percent 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 Road. There, the width was 600 feet, to accommodate uncertainty associated with the location of the First Solar transmission line route along Kaiser Road. 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 units. Every mile of ROW and ZOI transects were photographed.

FWS desert tortoise protocol requires surveys between March 25 to May 31. However, because tortoises are known to be active in the project area much earlier, FWS permitted Eagle Crest to begin tortoise surveys on March 18, 2009 (Engelhardt, 2009b).

For all years, Kaiser denied access to their properties for surveying. This exclusion included the project water pipeline ROW north of the Metropolitan Water District aqueduct and the transmission line ROW north of Universal Transverse Mercator 3745200N (North American Datum 83). As a result, onsite surveys of the mine pits that would form the reservoirs and other central project area features could not conducted. However, these lands were extensively surveyed during the section 7 ESA consultation for the proposed Eagle Mountain Landfill. The prior consultation concluded that the central project area 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 3 and figure 6. All data are presented for all surveys for purposes of a comprehensive analysis.

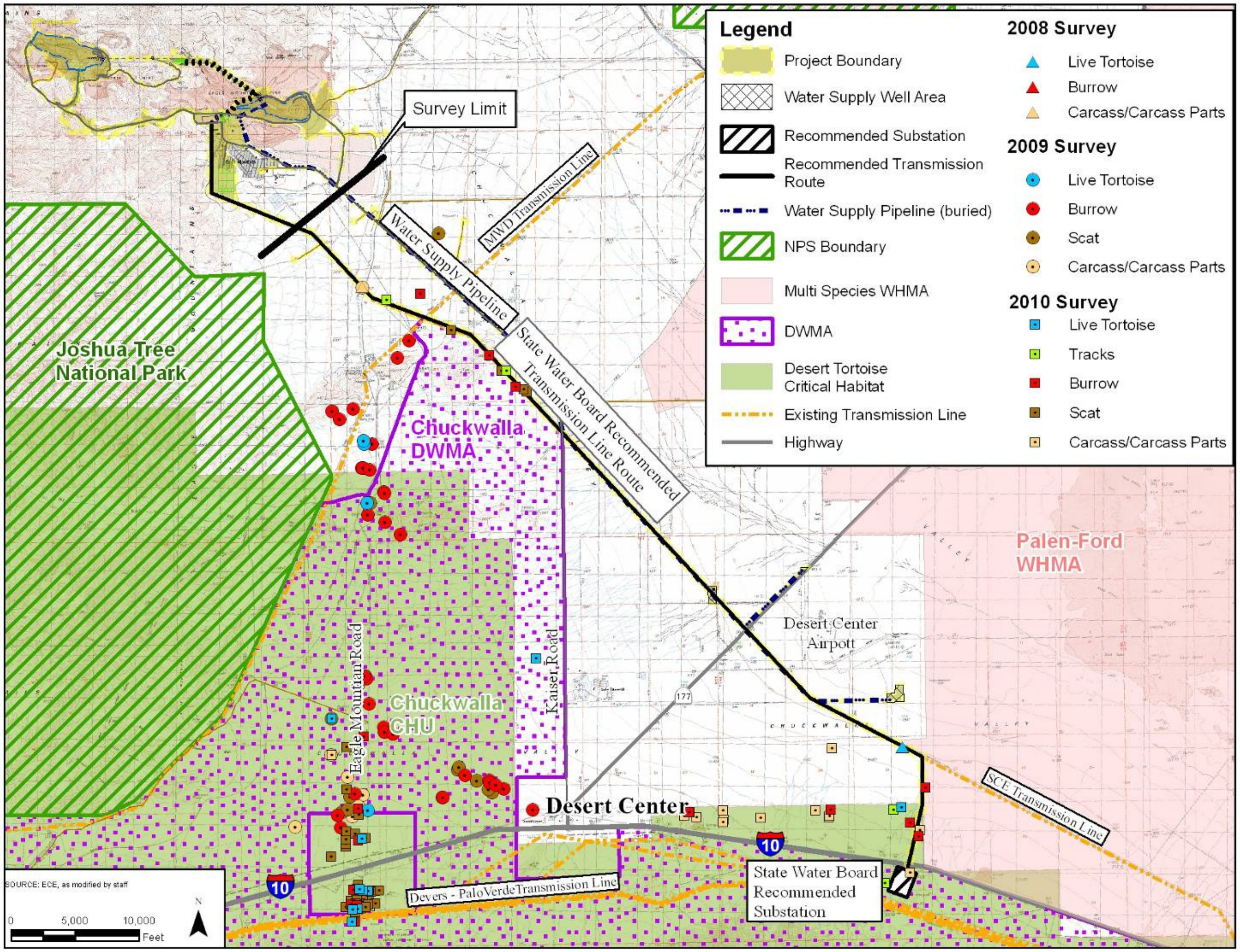


Figure 6. Results of 2008, 2009, and 2010 desert tortoise surveys.

Habitat for desert tortoise exists on all native habitats on the project (see figure 2, table 4, and table 5). There was relatively little sign on the staff recommended transmission line route. The staff recommended transmission line route is 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. Cumulatively over the 3 years of survey, there were two live tortoises, four sets of tracks, 10 burrows, 5 scat, and 6 carcass parts identified within the survey areas for the transmission route and substation.

On and in the buffer around the Eastern Red Bluff Substation, one set of tracks and two carcass parts were observed. This substation alternative has relatively 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.

There is also 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 Route 177or is in the Eagle Mountain Mine site. No tortoise sign was observed in 2010 on the water pipeline route east of Kaiser Road. Along Kaiser Road, surveys were only conducted in 2008 and 2010, but two burrows, one scat, and one carcass part were found (see figure 6 and table 3).

The staff recommended transmission line route overlaps 20.3 acres of the CHU, resulting in 0.4 acre of disturbance, and 1.6 acres in the DWMA, or 0.1 acre of disturbance for a total disturbance of 0.5 acre. While there are 282.1 acres of Category 3 desert tortoise habitat, of which 3.8 acres would be disturbed, the quality of that habitat is compromised by fragmentation due to abandoned agriculture.

The Eastern Red Bluff Substation Alternative is in both the DWMA and CHU, a total of 73.7 acres that overlap completely. However, discussed earlier, disturbance associated with the substation are part of the Desert Sunlight Solar Project and would be mitigated by BLM. No additional project-related disturbance is anticipated in this area.

Table 3. Eagle Mountain Pumped Storage Hydroelectric Project results of Spring 2008, 2009, and 2010 surveys for desert tortoise. All data for the recommended and all alternative routes are presented for a comprehensive analysis. (Only those 2008 observations that were in the area of the current project configuration are presented here due to relevance.) (source: Eagle Crest 2011, as modified by staff)

Sign Type[a]	Location[b]				Class or Age[c]	Size (mm)[d]	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	

Sign Type[a]	Location[b] Zone		Easting	Northing	Class or Age[c]	Size (mm)[d]	Comments
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 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	

Sign Type[a]	Location[b]			Class or Age[c]	Size (mm)[d]	Comments
	Zone	Easting	Northing			
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 (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

Sign Type[a]	Location[b] Zone		Easting	Northing	Class or Age[c]	Size (mm)[d]	Comments
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
Carcass/Carcass Parts	11	S	651932	3731348	> 4 years	> 200	Disarticulated adult

Sign Type[a]	Location[b]			Class or Age[c]	Size (mm)[d]	Comments
	Zone	Easting	Northing			
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 feet, 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	

Sign Type[a]	Location[b]				Class or Age[c]	Size (mm)[d]	Comments
	Zone		Easting	Northing			
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	
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 mm 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

Sign Type[a]	Location[b] Zone		Easting	Northing	Class or Age[c]	Size (mm)[d]	Comments
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

[a] Number in parentheses is number of sign.

[b] All coordinates are Universal Transverse Mercator North American Datum 83.

[c] 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

[d] 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. Acreage of desert tortoise habitat on the Eagle Mountain Pumped Storage Hydroelectric Project[a,b] (source: Eagle Crest 2011, as modified by staff)

Project Element	In DWMA	In Critical Habitat	In Category 3 Habitat	Total in Desert Tortoise Habitat[4]
Central project area (acreage of reservoirs and constructed Project features)	0	0	60.1	60.1
Desalination Area	0	0	**48.4**[2]	**48.4**
Roads	0	0	**6.7**[2]	**6.7**
Eagle Creek Channel Modifications	0	0	**5.0**[2]	**5.0**
Transmission Line ROW (acres)	1.6	20.3	282.1	304
Tower Footprint plus Construction Area	**0.1** acre (1 tower)	**0.3** acre (3 towers)	**3.8** acres (46 towers)	**4.2** acres (51 towers)
Stub Roads	**0.02**	**0.06**	**1.0**	**1.08**
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 Areas	0	0	0	0
Water Pipeline	**0**	**0**	**22.9**[3]	**22.9**[3]
Total Disturbed Project Acreage	**0.12**	**0.36**	**87.8**	**88.28**

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

- Transmission Line ROW
  - 16.4 miles long, 200-foot ROW
  - About four towers per linear mile, more in mountainous terrain (67 total)
  - The existing access road would be used, with stub roads to each tower. Stub roads are estimated to be 12 feet wide by 75 feet long.
  - Total tower footprint (40 by 40 feet) plus construction area is 3,600 square feet (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 would be on previously disturbed lands and/or overlapping with other project acreage.
- Water Pipeline and Wells
  - 15.3 mile 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 2,500 square feet (50 by 50 feet)

[b] All calculations of acreage on the central project area are estimates based upon GIS mapping.

[c] 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 5. Acreage of temporary and permanent disturbance in desert tortoise habitat on the Eagle Mountain Pumped Storage Hydroelectric Project[a] (source: Eagle Crest 2011, as modified by staff)

Project Element	In DWMA		In Critical Habitat		In Category 3 Habitat		Total in Desert Tortoise Habitat	
	Temp.	Perm.	Temp.	Perm.	Temp.	Perm.	Temp.	Perm.
Central project area[b]	0	0	0	0	0	60.1	0	60.1
Transmission Line[c]	0.1	0.02	0.3	0.06	3.8	1.0	4.2	1.1
Water Pipeline	0	0	0	0	22.9	0	22.9	0
Project Total	0.1	0.02	0.3	0.06	26.7	61.1	27.1	61.1

[a] Calculations are based on table 4.

[b] Calculations based on staff's anticipated areas of disturbance and review of aerial photography to determine areas of potential desert tortoise habitat.

[c] Tower pads are considered temporary disturbance; stub roads are considered permanent.

4.4 ESTIMATED TORTOISE DENSITY

4.4.1 Central Project Area

The BA for the proposed landfill concluded that the landfill did not extend into desert tortoise habitat. This conclusion was based on field surveys of the central project area with 69 person-days expended to document the presence and abundance of sensitive biological resources on the project site. There were only two areas where desert tortoise sign was found near the proposed landfill. The first was on a flat area south of the Eagle Mountain Townsite on a parcel of public lands in sections 2, 11, and 12 R14E T4S, where the existing Eagle Mountain Railroad crosses the boundary of Sections 2 and 11 (RECON, 1992). This area is south of, and would not be affected by, the proposed project. The second was to the north of the proposed lower reservoir in Section 25 R15E T3S, in another area that would not be affected by the proposed project. Based on the results of the field surveys, the landfill BA concluded that the landfill would have no direct construction impacts on desert tortoise in the Eagle Mountain Landfill site.

The BO for the landfill (FWS, 1993) also concurred that there would not be any impact on desert tortoise habitat as a result of construction associated with the landfill site in the central project area.

Based on comparisons between current aerial photos and aerial photos from 1997/1998 (see appendices C, F, and G for examples), there do not appear to be any changes in the amount or quality of habitat in the disturbed areas of the central project area since the 1992 BA and 1993 BO were written. To a great extent, conditions on the central project area are highly disturbed from past mining activities, and remain largely denuded of vegetation. However, the footprints of the Eagle Creek stream bed, areas adjacent to some access roads, and portions of the proposed footprint for the desalination area include previously undisturbed areas could provide habitat for desert tortoise. Based on current aerial photography and estimates of likely disturbance areas, we estimate 60.1 acres of surface disturbance would occur in areas potentially suitable for desert tortoise habitat. However, without access to conduct protocol surveys, it is not possible to definitely determine how many acres of tortoise habitat exist in the central project area (see table 4). Assuming tortoise density in these areas is similar to that estimated along the transmission line (discussed below), which is again a conservative estimate given the generally poor quality of habitat in the central project area, we estimate less than one tortoise would be disturbed by construction in the central project area (60.1 acres of habitat at 1.2 tortoises per square mile).

Therefore, while no tortoises are expected to occur on the central project area, there is a low likelihood that one or few tortoises may be present, either as transients or residents.

4.4.2 Transmission Line

Translating sign into a reliable tortoise density estimate is difficult. Furthermore, tortoise density is only one factor that enters into an estimate of incidental take, and may not be particularly meaningful for a linear project. A linear facility is a narrow strip that travels a long distance, often through a variety of habitat types and therefore a variety of tortoise densities. Tortoise density estimated for an entire linear project is therefore not very useful for mitigation planning. In terms of estimating incidental take, factors such as season of construction and presence of forage are more meaningful than mere density. For example, there is much less chance of a take when tortoises are underground (e.g., during winter) or if, even in spring or fall, there is little forage due to drought. In contrast, take can rise dramatically during summer or fall monsoons, especially if there has been little rain the previous winter and spring. A linear project, in particular, also has a high edge effect and can pass through a number of tortoise home ranges, whereas a non-linear project of the same acreage would intersect fewer home ranges, given the same tortoise density.

That said, two methods for estimating tortoise density along the transmission line ROW are offered here. FWS (1992) protocols were developed to identify tortoise presence, relative abundance (i.e., an apparent dearth or wealth of sign), and areas that would require more intensive monitoring during construction. But the 1992 protocols do not provide data for a reliable estimate of tortoise density. However, a very rough estimate of relative tortoise abundance can be made for the transmission line ROW from the number of burrows, 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 4 burrows were found in 8.6 miles of the native habitats intersected by the 200-foot ROW (not including the 2.8 miles of ROW on Kaiser property that were not surveyed). This translates into 12.3 burrows per square mile. Dividing by 10 burrows per tortoise yields an estimate of about one tortoise per square mile in areas intersected by the transmission line ROW, a very low density. (Note: counting non-native habitats in the total would result in a much lower tortoise density for the entire transmission line.) Assuming that the action area is about 2,000 feet wide (see section 7, *Action Area*, below), then about 5 tortoises might be affected by construction along the transmission line ROW (11.4 miles of native habitat by 2,000 feet wide, at 1.2 tortoises per square mile).

FWS has recently developed a new set of survey protocols (FWS 2010a) that were not available when Eagle Crest began surveys in 2009. However, FWS (2010a) surveys on linear projects are conducted in a nearly identical manner to those of FWS (1992) for linear projects. Further, FWS (2010a) provides a method for calculating density using live tortoises observed as the metric for that estimate. For the project, no tortoises were observed during the surveys in 2010 (i.e., the year that employed FWS (1992) method on the staff recommended transmission line route), although tortoise sign was observed. Therefore, according to the current FWS (2010a) protocols, only tortoise presence, and not density can be determined.

4.4.3 Water Pipeline

The same qualities that apply to estimating density or incidental take on transmission lines also apply to pipelines. For the proposed project, about 8.3 miles is co-located with the recommended transmission line route and was surveyed in 2010. The remainder was surveyed in 2009. Both surveys were conducted per FWS (1992) protocols. No tortoises were observed, although sign was observed along Kaiser Road. Based on the similarity of habitat, tortoise density along Kaiser Road is probably about the same as estimated for native habitats on the transmission route, about 1.2 tortoises per square mile. Using the current FWS protocols (2010a), only tortoise presence, and not density can be determined.

4.4.4 Historical Tortoise Densities

No other surveys in the project vicinity have provided reliable density estimates. Surveys in the late 1970s 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 about a 3-mile segment south of the Metropolitan Water District 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), 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 1970s 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 Metropolitan Water District Substation south; however, no estimates of tortoise density were made.

5.0 POTENTIAL PROJECT IMPACTS

Project issues and impacts on desert tortoises are analyzed in two phases: the construction phase; and the operation and maintenance phase. The potential project impacts discussed below include potential effects related to project features. The extent of these effects would be analyzed prior to the implementation of proposed mitigation. Section 6 describes these mitigation measures.

5.1 CONSTRUCTION

Construction activities associated with the project would 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. The Red Bluff Substation would be constructed by SCE.

Construction of the central project area facilities would include:

- Building of two 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 would 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 would 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.

5.1.1 Construction Effects on Desert Tortoise and Desert Tortoise Critical Habitat

Once the project is fully permitted and site access is obtained, final engineering design would commence. Design efforts are estimated to require 2 years, then the 4 year construction period would begin. While construction spans 4 years, construction of the linear facilities would be completed in under a year. Tortoise activity levels, which are affected by weather conditions, forage availability, and season are 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 would occur during high activity of desert tortoises.

In its license application and draft BA, Eagle Crest noted that all areas of disturbance within the central project area would occur in previously disturbed areas. However, after detailed review of current aerial photography and Eagle Crest's vegetation map, staff identified discrepancies between Eagle Crest's vegetation map and existing conditions. We found Eagle Crest's map to both classify previously undisturbed areas as disturbed, and disturbed areas as Sonoran Creosote Bush Scrub. Using GIS software, staff calculated a total of 60.1 acres of anticipated disturbance that based on 2011 aerial imagery are within previously undisturbed vegetation (see table 4 and figure 2). These areas include:

- undisturbed areas adjacent to existing roads;
- the normally dry Eagle Creek streambed; and
- southern portions of the proposed desalination area.

In some portions of the central project area, existing roads traverse lands that were not disturbed by mining activities. These lands could provide suitable habitat for desert tortoise. Tortoises are known to dig burrows into road berms 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 few tortoises might be directly affected by construction vehicles within the central project area (we estimate fewer than one).

Due to potential for the probable maximum flood flows in Eagle Creek to erode project roads or spill toward the Eagle Mountain town site, our recommended alternative would require that Eagle Crest evaluate the need for channel modifications to prevent damage to project features or other structures. Eagle Creek borders undisturbed tortoise habitat and there may be potential for tortoise to occur within the normally dry stream bed. However, we anticipate that most channel modifications would occur in areas where the channel banks are already disturbed by grading. As such there is a low likelihood that one or a few tortoises could be present in the Eagle Creek stream bed. If tortoises are present and channel modification is required, construction activities associated with channel modifications could affect desert tortoise.

Based on our review of 2010 aerial photography (see figure 2 and appendix G), most of the desalination area (48.3 acres) appears to consist of moderately disturbed hillsides and undisturbed desert wash habitat. While this area is separated from adjacent potential habitat by an existing road, there is potential that desert tortoise could occur within the proposed footprint of the reverse osmosis facility. If present, there could be direct effects of grading and construction of the desalination area on desert tortoise.

In its license application, Eagle Crest indicated 1,101.5 acres of disturbance would occur in the central project area. While we identified 60.1 acres of that disturbance would occur in previously undisturbed areas, we agree with Eagle Crest that the remaining 1,041.4 acres (or 95 percent) of disturbance in the central project area would occur on disturbed lands. As such, activities associated with the project reservoirs, powerhouse, tunnels, switch yard, surge tank, storage areas, and reverse osmosis facility would have minimal affect on desert tortoise.

These conclusions are consistent with the conclusion of the BA prepared for the Eagle Mountain Landfill (RECON, 1992), which concluded that the proposed landfill activities in the central project area would have minimal affect on desert tortoise habitat; rather, the majority of landfill effects would be associated with the railroad and transport of solid waste. 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, including the our recommended transmission line route and the proposed water pipeline, direct impacts from construction would include habitat loss and may include loss of individuals. Due to relatively low tortoise densities and intensive, continuous construction monitoring (see section 6, *Recommended Environmental Measures*), tortoise losses in the construction zones are expected to be absent to very low. Traffic during project construction would increase on Kaiser Road, Eagle Mountain Road and State Route 177for 4 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 20 burrows per year (Bulova et al., 1994, Duda et al., 1999), with one estimate of five new burrows in a year. We find 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 6, *Recommended Environmental Measures*) would attempt to identify special-resource burrows, which would be avoided if possible.

Surveys in 2010 identified carcass parts (two sightings) and tracks (one set) within the proposed location for the Eastern Red Bluff substation and its associated buffer area. Similarly, surveys conducted in association with the Desert Sunlight Solar Project identified 2 burrows and 1 scat in general proximity to the substation (BLM, 2010). As such, tortoise presence in this area is established, but there was insufficient data to determine density. Construction of the substations would require grading of existing habit. If present, these activities could directly affect desert tortoise.

Desert tortoise habitat loss on the linear facilities is expected to total 1.1 acres of permanent loss and 27.1 acres of temporary disturbance (see table 5). Loss of native habitat for the sole purpose of construction (as opposed to operation and 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 as demonstrated in the central project area. 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.

Functionally, the semi-permanent and permanent habitat 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. The largest permanent habitat loss for the project is for the substation, where the habitat quality is currently compromised by the proposed substation's location immediately adjacent to I-10. The negative effects of heavily traveled roads have been well documented both for desert tortoises and other wildlife (Nicholson, 1978; Karl, 1989; Boarman, 1994; LaRue, 1993; Marlow et al., 1997).

A total of 0.1 acre of designated desert tortoise critical habitat(Chuckwalla CHU) may be permanently disturbed, and 0.3 acre temporarily disturbed (see table 5). The Chuckwalla CHU totals 1,020,600 acres (FWS, 1994b), so the project would affect a negligible percent of the CHU.

No permanent disturbance and 0.1 acre of semi-permanent disturbance is expected to occur in the Chuckwalla DWMA. The Chuckwalla DWMA totals 820,077 acres (BLM and California DFG, 2002), so the project would affect less than 0.001 percent of the DWMA. The NECO Plan identifies a maximum of 1 percent surface disturbance limit in a DWMA.

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 measures 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 desalination area (48.3 acres) tortoises displaced due to construction would 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 (Eagle Crest, 2009). There would be no permanent impacts on plant growth that could affect desert tortoise forage or shelter.

5.1.2 Operation and Maintenance

Operation and maintenance activities associated with the project would primarily be restricted to the central project area, but would also include routine and unscheduled maintenance on the transmission line, pipeline, and wells. The following discussion summarizes the impacts on desert tortoises that may result from the presence and functioning of the project.

5.1.2.1 Direct, Onsite Effects

In general, the primary onsite impacts on desert tortoises from operation of the project are limited to loss of individuals that may move onto the central project area or linear facilities during utilities' maintenance.

Habitat loss was addressed in the section on construction impacts. Maintenance of towers and spur roads on the recommended transmission line route would perpetuate the vegetation loss of tower pads and roads. The 27.1 acres of temporarily disturbed habitat on the transmission line and water pipeline would be available to use by desert tortoises, but degraded due to slow regeneration of vegetation. This is expected to be functionally negligible for desert tortoise because it would exist as small patches of open space, 0.08 acre for each tower pad and an about 12-foot stub road width, dispersed through undisturbed habitat.

Based on the lack of desert tortoise habitat on the central project area, fencing the desalination area, the relatively small footprint of the recommended transmission line route, low project area tortoise densities, and infrequent maintenance activities, it is anticipated that losses of desert tortoises and tortoise resources from onsite project impacts would be minor to negligible. No impacts are anticipated from the presence of the water pipeline that would be buried.

Project wells would 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 would have no impact on plant root zones, and desert tortoise habitat, as the groundwater level is currently far below the root zone of plants.

5.1.2.2 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 would present neither physical barriers nor deterrents to movement, so they would not affect the normal movements of tortoise to achieve feeding, breeding, sheltering, dispersal or migration. The substation would present a small barrier to movement, but it is adjacent the frontage road and I-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 would 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, would 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; thereby increasing both abundance and distribution of those species.

Faunal community structure may be altered if predators are attracted to reservoirs due to available water, food, 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 reliably available water supply. Coyotes and wild dogs are other species that would likely prey on desert tortoises in the project area, especially in years when populations of other, more commonly consumed prey (especially rabbits) are depressed.

However, the Eagle Mountain Townsite and surrounding area currently have open water resources (e.g., water treatment plant pond, open water sections of the CRA, and ponds within the Lake Tamarisk residential community, see photos in appendix C). These resources are openly available to birds. Lake Tamarisk is also open to mammals and within a populated residential area, but the open water sections of the CRA and the Eagle Mountain Pumping station are fenced to exclude large mammals. The water treatment plant at the Eagle Mountain Townsite is also likely fenced. Similarly, the project reservoirs would provide access for birds, but would have fencing to restrict access to large terrestrial animals. However, periodic access would be available at the fence setback area of the lower reservoir to provide water access for bighorn sheep. Other terrestrial animals including coyotes and dogs would also have water access at this location. As such, we expect differential attractiveness between existing and project-related water sources to be minimal for birds and moderate for mammals.

There has been human occupation of the town of Eagle Mountain for decades. The Eagle Mountain Elementary School and associated offices in Eagle Mountain are currently in use, and provide potential sources of human food for predators in the central project area. In addition, perching, roosting, and nesting sites for ravens are plentiful under the existing condition of the project area.

Because of these existing, continuous subsidies, it is certain that ravens and coyotes already exist at the central project area. Because water is probably not currently a limiting resource, either in the central project area or in the Chuckwalla Valley, a simple increase in the quantity of water would not necessarily create an increase in the predator populations. While it is possible that ravens and/or coyotes may increase over baseline levels, this increase may not be either measurable or have a significant impact on local fauna.

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, about 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 sightings of birds tagged at a landfill were within the landfill (Mahringer, 1970 [in Boarman and Heinrich, 1999], with 94 percent within 4 miles of the landfill. Nesting ravens generally remain within 0.25 (Kristan and Boarman, 2003) to 0.35 mile 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). Ravens are also known to defend nest territories from other birds, including other ravens, usually to a distance up to 2 miles (FWS 2008). The new transmission line would be constructed adjacent to an existing line. While the new line would provide additional structures suitable for nesting, there would be no functional increase in raven territorial area because potential nesting territories are already present associated with the SCE 160-kV line. Therefore, the project would not provide new nesting resources.

While the Park tortoise population is well within flight distance for a raven, it is expected that the project would not provide new or enhanced resources over those already existing on the Kaiser site. A Predator Monitoring and Control Plan would be implemented as part of the project's environmental measures to ensure that predator increases due to the project, if any, would not cause a biologically significant impact on the local fauna. Additionally, several natural springs and tanks exist that provide water for ravens between the park and the project (see figure 3).

5.1.3 Cumulative Effects

Construction and operation of the pumped storage project, the Eagle Mountain Landfill, and multiple solar projects proposed in the Coachella Valley all have the potential to affect desert tortoise. These effects include both direct disturbance and removal of suitable habitat. Both the proposed project and the Eagle Mountain Landfill (if constructed; see *Land Use* in section 3.3.2) would occupy lands in the central project area. Construction and operation of these projects could disturb bighorn sheep by increasing noise and human presence in the area. Combined, these projects are expected to occupy 6,875 acres, 47 percent of which would be associated with the pumped storage project. Construction of the two projects is not expected to occur simultaneously, so there would not be cumulative effects of construction at one time. However, construction of both projects could result in prolonged increases in human presence and vehicular traffic in the project area. Both project also have potential to subsidize desert tortoise predators.

Construction activities are expected to involve about 75 trucks per month for the project and 1,500 trucks per month for the landfill. Eagle Crest does not propose to develop any new access roads or conduct any road improvements within the central project area. For the landfill, Kaiser would construct 6 miles of new, paved access roads, and widen an additional 6 miles of existing road. During operation, Eagle Crest expects to require 2 truck trips per day, while the landfill operations would require between 50 to 100 trucks per day depending on the age of the project. Eagle Crest's estimate of 75 trucks per month seems low for the amount of materials needed for the proposed project. However, even if this number is increased by a factor of 10, the contribution of the proposed project to total stress associated with construction noise would be small compared to that associated with construction of the landfill.

Both the proposed project and the Eagle Mountain Landfill would occupy lands in the central project area, and each project is expected to provide increased food or water availability to ravens. The proposed project would increase available drinking water associated with project reservoirs (254 acres) and nesting and perching habitat associated with the transmission line (16.4 miles). As discussed above, all of these resources are already present in the landscape surrounding the project, including power lines and water sources. If proposed solar facilities are constructed in the Coachella Valley, additional transmission lines would be constructed, providing additional nesting and perching habitat.

The Eagle Mountain Landfill would increase available food sources associated with the importation of waste to the central project area. The closest similar type of food subsidies for ravens is at the Desert Center Sanitary Landfill. The Eagle Mountain Landfill proposes multiple mitigation measures to prevent ravens from accessing waste. These measures would include hourly burial of waste deposits, removal of potential perching areas, and experimental treatments with additions of chemical deterrents. The landfill would also monitor raven populations. If both projects are constructed, the combined effects of increased food sources would likely create conditions suitable for expansion of the raven populations. While transmission lines and water sources are already present in the project vicinity, there is potential for the combination of water subsidies co-located with food subsidies to result in cumulative effects on raven populations. However, Eagle Crest's proposed measures to study effects of the project on ravens and other desert tortoise predators and implement control measures as needed would ensure the collective effects on ravens with the landfill project are not substantially greater than the effects of the proposed landfill and solar facilities alone.

On the Coachella Valley floor, there are currently 11 proposed solar developments, totaling about 123,600 (plus or minus 35,000) acres, under review. There is little certainty as to how many of these projects will be constructed. Similarly, it is not possible to ascertain the acreage of suitable desert tortoise habitat these projects would occupy. However, compared to the scale of these potential projects the effects of the project on desert tortoise habitat in the Coachella Valley (about 88.3 acres) is negligible.

Both the proposed project and the Desert Sunlight Solar Farm (BLM, 2010a) would require construction of new transmission lines to interconnect with the electric grid. The Desert Sunlight Solar Farm would construct the Red Bluff substation about 6 miles east of Desert Center along the I-10 corridor and construct a new 230-kV transmission line that would parallel the existing SCE 160-kV line. The staff recommended transmission line route for the project would use the same substation and transmission corridor for both the Eagle Mountain and Desert Sunlight Solar Farm projects, consistent with the California Public Utilities Commission environmentally preferred alternative for the Desert Sunlight Solar Farm (BLM, 2010a). This recommendation would reduce disturbance to terrestrial resources by eliminating the need for a second substation and would reduce effects on ravens by minimizing the addition of new transmission structures that would create favorable nesting habitat.

Eagle Crest's proposed monitoring and mitigation measures would ensure the project does not contribute to adverse cumulative effects on the desert tortoise. Co-locating project facilities with the Desert Sunlight Solar Farm, as the State Water board recommends, would also reduce cumulative effects on desert tortoise.

6.0 RECOMMENDED ENVIRONMENTAL MEASURES

6.1 SURVEYS ON THE CENTRAL PROJECT AREA

We recommend that Eagle Crest conduct sensitive species surveys on all areas for which access is currently denied. While it is anticipated that the analysis currently in this BA addresses those areas, it is our recommendation that any necessary modifications in protection measures would be developed in consultation with FWS. This recommendation is further described in the desert tortoise clearance and relocation/translocation plan.

6.2 MEASURES TO PROTECT DESERT TORTOISE

Measures discussed 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.

Several monitoring and/or control programs are identified here that would require further development through consultation and review with the resource agencies. As described in mitigation measure BIO-1, concurrent with final engineering design, Eagle Crest would prepare a comprehensive site-specific mitigation and monitoring program (MMP). We recommend that the MMP be implemented prior to any construction activities. Eagle Crest anticipates the final engineering design work to require 2 years before construction could start. Thus, there would be time for the Technical Advisory Team to consult and develop details of the site specific mitigation and monitoring program.

Eagle Crest filed mitigation measures for special-status wildlife and general biological resource protection. These measures would also assist in minimizing impacts on the desert tortoise. We determined several of these plans require additional measures to meet their objectives. Our recommended modifications to these plans are described below. Upon Commission approval, Eagle Crest would implement the following program and plans:

- Worker Environmental Awareness Program (WEAP), filed on October 27, 2009, as modified by staff
- Revegetation Plan, filed on October 27, 2009, as modified by staff
- Invasive Species Monitoring and Control Plan, filed on October 27, 2009, as modified by staff
- Desert Tortoise Clearance and Relocation/Translocation Plan, filed on March 14, 2011, as modified by staff

- Predator Control Plan, filed on March 11, 2011, as modified by staff

Descriptions of the WEAP, recommended plans, and other measures to protect desert tortoise are presented below. Our recommended modifications to the proposed plans are included in these descriptions.

BIO–1: Mitigation and Monitoring Program. We recommend that, concurrent with final engineering, Eagle Crest prepare a comprehensive site-specific MMP. The objective of the program would be to provide for a holistic mitigation and monitoring program that considers the project in its entirety, evaluates mitigation and monitoring needs at different stages of the project and for all resources, and identifies any potential issues associated with implementing various mitigation measures at the same time. Eagle Crest would prepare the program in consultation with a Technical Advisory Team composed of Eagle Crest and/or its consultants, including the project environmental coordinator, and staff from FWS, BLM, and California DFG. The MMP would include all conservation measures, plans, schedules, and permitting requirements for all phases of the project. Final engineering design work would commence with the issuance of the project license. Prior to any ground disturbing activities, Eagle Crest would submit the MMP to the Commission for approval.

As part of implementing protection measures, Eagle Crest would submit *quarterly* reports to the relevant resource agencies, including FWS, BLM and California DFG, to document the project activities, mitigation implemented and mitigation effectiveness, and provide recommendations as needed. Agencies would have a 30-day period to provide comment on the reports. Subsequently, Eagle Crest would revise the reports, and/or address agency comments and file the report with the Commission.

BIO–2: Designation of Desert Tortoise Staff. While we are not recommending Eagle Crest's proposed "Authorized Biologist" be included as a license requirement, we are recommending Eagle Crest designate and train staff (designated staff) to implement and oversee the biological compliance program. This person would possess sufficient desert tortoise knowledge and experience to handle and move tortoises appropriately and to approve specific monitors to handle tortoises, at their discretion. To meet these conditions, Eagle Crest's designated staff would have thorough and current knowledge of desert tortoise behavior, natural history, ecology, and physiology, and demonstrate the ability to safely and successfully conduct their required duties. The designated staff would monitor project activities within desert tortoise habitat and be responsible for locating desert tortoises and their sign (i.e., conduct clearance surveys). The designated staff would ensure proper implementation of protective measures, and make certain that the effects of the project on the desert tortoise and its habitat are minimized in accordance with the biological opinion or incidental take permit. All incidents of noncompliance in accordance with the biological opinion or permit would be recorded and reported.

Eagle Crest's designated staff would have the knowledge and experience to conduct any or all of the following, as needed:

- Locate, identify and report all forms of desert tortoise sign in accordance with approved protocols;
- Handle and temporarily hold desert tortoises;
- Move desert tortoises from harm's way when they enter project sites;
- Relocate/translocate desert tortoises prior to implementation of projects;
- Excavate burrows to locate desert tortoises;
- Reconstruct desert tortoise burrows;
- Unearth and relocate desert tortoise eggs;
- Approve individual monitors and their activities based on qualifications of the monitors;
- Directly supervise monitors during clearance surveys and train monitors in all aspects of protecting desert tortoises during implementation of projects;
- Be familiar with the project biological assessment and biological opinion or permit (copy in hand);
- Ensure proper implementation of protective measures;
- Record and report incidents of noncompliance in accordance with a biological opinion or permit; and
- Halt project activities per provisions of the biological opinion or permit.

BIO–3: Worker Environmental Awareness Program (WEAP). To ensure the project construction and operation are conducted within a framework of safe guarding environmentally sensitive resources, we recommend Eagle Crest implement the WEAP filed on October 27 2009 (included in Appendix I), as modified by staff. We modified this plan to specify that environmentally sensitive resources include desert tortoise, Coachella Valley milkvetch, and state special status species.

BIO–5: Minimize Surface Disturbance. During construction in native habitats, we recommend Eagle Crest limit all surface disturbances to the smallest area necessary to complete the construction. During the final design engineering, Eagle Crest would design all new spur roads and improvements to existing access roads to preserve existing desert wash topography and flow patterns.

BIO-8: Revegetation. We recommend Eagle Crest implement the Revegetation Plan filed October 27, 2009 (included in Appendix I), with staff modifications. We have modified the filed plan to include: 1) total acres of proposed disturbance, following development of the final construction plan; 2) stipulation that any hay, straw, or topsoil brought to the site be certified weed-free; 3) development of criteria to measure success and biological triggers for continuing or discontinuing revegetation activities; and 4) provisions for monthly irrigation of transplants for a two-year period. Following completion of consultation, Eagle Crest would file a revised version of the revegetation plan to the Commission for approval prior to any ground disturbing activities in native vegetation.

BIO-9: Invasive Species Monitoring and Control. To minimize the spread of invasive non-native vegetation, we recommend that Eagle Crest implement the Invasive Species Monitoring and Control Plan filed October 27, 2009 (included in Appendix I), with staff modifications. We have modified the plan to include: 1) consultation with the Technical Advisory Team to identify success criteria for invasive species control efforts and supplemental measures to be implemented in the event criteria are not met; 2) inclusion of any disturbance to soils that occur during project operation and maintenance, any seepages areas, and any areas adjacent to project related surface water in areas monitored for invasive species; 3) ensure that any activities related to this plan that occur in desert tortoise habitat follow the guidelines and procedures provided in the WEAP and Desert Tortoise Clearance and Relocation/Translocation Plan; and 4) monitor areas disturbed during construction annually for the first 5 years after construction; 5) monitor the entire project area on a 5 year recurrence interval, to be initiated in year 10 after construction is complete; 6) annually monitor project reservoirs or other areas where the normal operations create standing water or recurring soil disturbance.

The invasive species monitoring plan would be filed with the Commission for final approval prior to implementation.

In addition to the recommended measures above, to protect biological resources, we recommend several desert tortoise-specific measures. They include the following:

DT – 1: **Pre-construction Surveys and Clearance Surveys.** We recommend Eagle Crest remove all tortoises from harm's way during the construction period. Eagle Crest would conduct a series of surveys prior to construction to ensure that no tortoises are harmed during construction or trapped inside fenced areas. The Desert Tortoise Clearance and Relocation/Translocation Plan (**DT-4**) provides the details of all methods for achieving this measure.

DT –2: **Construction Monitoring Plan**. We recommend that no construction occurs in unfenced areas (see **DT-3, Desert Tortoise Exclusion Fencing**) on the linear facilities without designated staff being present. This includes both the construction and revegetation phase, and maintenance activities during the operations phase that require surface disturbance. The NECO Plan suggests that construction activities occur when tortoises are inactive – November 1 to March 15 – where possible. However, during other times of the year when construction or maintenance activities are required, Eagle Crest would ensure adequate monitoring is present to minimize take during the remainder of the year, when tortoise activity is higher.

All tortoises would be removed from harm's way. Eagle Crest would avoid active burrows and special-resource burrows, where possible. Where avoidance of any burrow is infeasible, Eagle Crest would first determine occupancy through the use of fiberoptics, probes, or mirrors. All burrows that could potentially host a tortoise would 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 would be removed from the construction area per the Desert Tortoise Clearance and Relocation/Translocation Plan.

Eagle Crest would close, temporarily fence, or cover pipeline trenches each day. Each day, the designated staff would inspect any open trenches at first light, midday, and at the end of each day to ensure tortoise safety.

If necessary, Eagle Crest would install temporary fencing 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 related activities must cease and the designated staff contacted. Eagle Crest would ensure that the tortoise receives prompt veterinary care by a qualified veterinarian. The designated staff would notify BLM, California DFG, and FWS immediately if a dead or injured desert tortoise is located. This would be followed by written notification within two days of the date of the finding or incident (if known) and must include: location of the tortoise, photographs, cause of death (if known), and other pertinent information.

If an injured animal recovers, the BLM, FWS, and California DFG would determine the final disposition of the animal. However, if efforts to keep the injured animal separate from other turtles and tortoises are successful during the tortoise's treatment, then it is recommended that it be released at or near its capture point to continue to contribute to the persistence of the local tortoise population.

If a tortoise is fatally injured or killed as a result of project-related activities Eagle Crest would submit it for necropsy as outlined in Berry (2001). Care would be taken by the designated staff in handling dead specimen(s) to preserve biological material in the best possible state.

Following site clearance, Eagle Crest's designated staff would prepare a report to document the clearance surveys, construction monitoring, the capture and release locations of all tortoises found, individual tortoise data, and other relevant data. Eagle Crest would submit this report to FWS, BLM, NPS, and California DFG for comment.

Following comment, Eagle Crest would revise the report and address any comments received. Eagle Crest would then file the report with the Commission.

DT –3: **Desert Tortoise Exclusion Fencing –** Details of the desert tortoise exclusion fence and its installation are provided in the Desert Tortoise Clearance and Relocation/Translocation Plan (appendix I). To summarize, any areas on the central project area that are determined through surveys to require fencing would be fenced with a permanent tortoise exclusion fence to keep adjacent tortoises from entering the site. The fencing type would be 1- by 2-inch vertical mesh galvanized fence material, extending at least 2 feet above the ground and buried at least 1 foot. Where burial is impossible, the mesh would 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. Eagle Crest would establish tortoise-proof gates at all site entry points. All fence construction would be monitored by the designated staff to ensure that no tortoises are harmed. Following installation, the fencing would be inspected monthly and during all major rainfall events for the life of the project license. Eagle Crest would repair any damage to the fencing immediately. If immediate repair is not possible, Eagle Crest would monitor the damaged area continuously until repairs are made. Parking and storage would occur within disturbed or previously fenced areas as outlined above. Where a fence may need to be discontinuous (between tailings piles for example), the fence ends would extend well up the slope of the tailings 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. If any alternative methods are identified, Eagle Crest would submit the alternative methods to FWS, BLM, NPS, and California DFG for review and comment. Eagle Crest would then submit a plan amendment, including responses to the comments, to the Commission for final approval prior to implementation.

DT –4: **Desert Tortoise Clearance and Relocation/Translocation Plan.** Per our recommendation, Eagle Crest would implement the Desert Tortoise Clearance and Relocation/Translocation Plan filed March 14, 2011, as modified. Our modifications to the plan to include: 1) maintenance of permanent fences for the term of the FERC license; 2) a description of potential relocation recipient sites; and 3) a statement that all injured tortoises will be taken to a qualified veterinarian. Our final plan is included in appendix I.

DT –5: **Predator Monitoring and Control Program.** Per our recommendation, Eagle Crest would implement the Predator Monitoring and Control plan filed on March 11, 2011, with our modifications. Specifically, we modified this plan to: 1) provide additional background on presence of coyotes and gulls; 2) recommend methods for coyote and feral dog baseline surveys; 3) recommend surveys for evidence of coyote or feral dog predation on desert tortoise; 4) recommend 2 years of baseline surveys, annual construction surveys, and post-construction surveys in years 1-5, 7, and 10 to commence the year reservoir filling is initiated; 5) recommended consultation with FWS, BLM, NPS, and California DFG if surveys indicate increased predator activity and desert tortoise predation. The final plan is included in appendix I.

DT –6: **Habitat Compensation.** Eagle Crest would compensate for disturbance to desert tortoise habitat through the purchase conservation of desert tortoise habitat in a manner consistent with the NECO Plan's compensation ratios and compensation land requirements. The NECO Plan states that all lands within a DWMA would be designated as Category 1 Desert Tortoise Habitat, with required compensation ratio of 5:1. All occupied lands outside a DWMA are considered Category 3 habitat, with a 1:1 compensation ratio. Critical habitat outside of DWMAs would also be compensated at 5:1, consistent with DWMA compensation.

The recommended project would disturb (permanent and semi-permanent disturbance) 0.1 acres of DWMA and 0.4 acre of critical habitat - a combined total of 0.5 acre - and 87.8 acres of Category 3 Habitat, not including the Red Bluff Substation. A minimum total compensation, then, would be 90.3 acres. Eagle Crest would acquire, protect and transfer title of no fewer than 90.3 acres of desert tortoise habitat lands and would also provide funding for the initial improvement and long-term maintenance and management of the acquired lands.

In addition, during the 2-year period of final project design, and prior to any ground disturbing activities, Eagle Crest would conduct protocol surveys of the central project area to conclusively determine density of desert tortoise in the area and revise, if necessary, calculations for acreage of desert tortoise habitat to be disturbed in the central project area. Following completion of these surveys, Eagle Crest would revise, if necessary, calculations for acreage of compensation lands to ensure all project related disturbance is accurately assessed following guidelines in the NECO Plan.

Lands associated with the Red Bluff Substation occur within desert tortoise critical habitat and require compensation for losses of desert tortoise habitat. Compensation for these losses is included in BLM's Draft EIS for the Desert Sunlight Solar Farm (BLM 2010). Based on information on SCE's website, SCE would own and operate the substation. As discussed earlier, SCE has filed an application with the California Public Utility Commission for approval of the substation. Following approval, SCE anticipates the substation to be fully operational in the third quarter of 2013 (SCE 2011), prior to completion of the proposed Eagle Mountain Pumped Storage Hydroelectric Project. As such, other than disturbances related to the transmission line, we do not anticipate any substantial disturbance associated with connecting the project to the Red Bluff Substation. However, if any surface disturbance is required, Eagle Crest would incorporate compensation for these disturbances into the total compensation agreement at a 5:1 ratio. 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:

Contribute to a larger block of lands that are currently protected, or which could feasibly be protected long-term by a public resource agency or a non-governmental organization dedicated to habitat preservation. In part, the compensation lands may provide a buffer for a larger block of good habitat.

Connected to known, occupied lands through occupied corridors or corridors that are of sufficient habitat quality to be occupied. Preferably, the existing population on the occupied lands would represent a large population that is stable, recovering, or likely to recover.

Provide native habitat that is as good or better than the habitat being impacted by the project. Preferably, the lands would be either currently occupied or would likely be occupied once they are protected from anthropogenic impacts and/or otherwise enhanced.

Have inherently moderate to good habitat that would naturally and ultimately regenerate when current disturbances are removed.

Parcels should not be subject to such intensive recreational, grazing, or other uses that habitat recovery is rendered unlikely or lengthy. Nor should those invasive species that are likely to jeopardize habitat recovery (e.g., Saharan mustard [*Brassica tournefortii*]) be present in uncontrollable numbers, either on or immediately adjacent to the parcels under consideration.

Eagle Crest would submit a formal acquisition proposal to FWS, BLM, and California DFG describing the parcel(s) intended for purchase and initial protection and enhancement measures. This acquisition proposal would discuss the suitability of the proposed parcel(s) as compensation lands for desert tortoise in relation to the criteria listed above. The agencies would provide comment on the plan, which would then be submitted to the Commission for final approval. Following Commission approval, Eagle Crest would acquire the compensation lands or a conservation easement over the lands.

DT –7: **Operations and Maintenance.** Eagle Crest would allow tortoises observed during routine maintenance activities to voluntarily move out of harm's way. Eagle Crest would require biological monitoring, per mitigation DT-2 for any transmission line repair activities that would result in surface disturbance. Where a tortoise must be moved, Eagle Crest would implement measures outlined in the Desert Tortoise Clearance and Relocation/Translocation Plan.

6.3 MITIGATION MEASURES BY PROJECT COMPONENT

The following section presents a list of the mitigation measures that would be implemented to avoid or minimize impacts on the desert tortoise for each project component. This section also presents potential effects of these measures on desert tortoise.

6.3.1 Central Project Area

Surface disturbing construction in the central project area would include development of the upper and lower reservoirs, road grading, staging and storage areas, reverse osmosis system and desalination areas, switchyard, surge tank, and potential modifications to the Eagle Creek stream channel. Project operation would include maintenance of surface water, road traffic, and human presence. All though the central project area is known to contain little, if any, desert tortoise habitat, Eagle Crest would implement the following measures to minimize potential effects to this species:

- BIO–1; Mitigation and Monitoring Program and Reporting.
- BIO–2; Designation of Desert Tortoise Staff
- BIO–3; Worker Environmental Awareness Program
- BIO–5; Minimize Surface Disturbance
- BIO-8; Revegetation
- BIO-9; Invasive Species Monitoring and Control
- DT – 1; Pre-construction Surveys and Clearance Surveys
- DT –2; Construction Monitoring
- DT –3; Desert Tortoise Exclusion Fencing
- DT –4; Desert Tortoise Clearance and Relocation/Translocation Plan
- DT –5; Predator Monitoring and Control Program
- DT –6; Habitat Compensation
- DT –7; Operations and Maintenance

These measures are described in more detail above and in appendix H. All activities associated with mitigation measures within desert tortoise habitat would occur following procedures identified in the WEAP and Desert Tortoise Clearance and Relocation/Translocation Plan. As such, all grading, fence construction, planting, weed control, and other similar activities would occur under the guidance of the designated staff and following protocols to minimize effects on desert tortoise. However, these activities could include take of desert tortoise because any moving or translocation of this species, even when done under the most ideal conditions, would necessitate the harassment, and capture of desert tortoise. As detailed in appendix H, mitigation measures that would occur within desert tortoise habitat contain additional provision for agency coordination and site specific assessments of tortoise presence in the area. For example prior to implementation of any weed control measures, 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 would be used only when evaluation of the situation concludes herbicide use is appropriate and the most effective treatment. Chemical label instructions would be followed and all restrictions heeded.

6.3.2 Water Pipeline and Groundwater Wells

Construction of the water pipeline and associated wells would require grading, trenching, and drilling within desert tortoise habitat. These activities would temporarily affect 22.9 acres of Class III habitat. Maintenance of the water pipeline would include occasional vehicle traffic along the pipeline access road. Eagle Crest would implement the following measures to minimize potential impacts on desert tortoise:

- BIO–1; Mitigation and Monitoring Program.
- BIO–2; Designation of Desert Tortoise Staff
- BIO–3; Worker Environmental Awareness Program
- BIO–5; Minimize Surface Disturbance
- BIO–8; Revegetation
- BIO–9; Invasive Species Monitoring and Control
- DT–1; Pre-construction Surveys and Clearance Surveys
- DT–2; Construction Monitoring
- DT–3; Desert Tortoise Exclusion Fencing
- DT–4; Desert Tortoise Clearance and Relocation/Translocation Plan
- DT–5; Predator Monitoring and Control Program
- DT–6; Habitat Compensation
- DT–7; Operations and Maintenance

As stated for the central project area, all grading, fence construction, planting, weed control, and other similar activities within desert tortoise habitat would occur under the guidance of the designated staff and following protocols to minimize effects on desert tortoise. However, these activities could include take of desert tortoise because any moving or translocation of this species, even when done under the most ideal conditions, would necessitate the harassment, and capture of desert tortoise. These activities would occur in areas where estimated tortoise density is 1.2 tortoises/square mile.

6.3.3 Transmission Line

Construction of the project transmission line would include grading for development of laydown areas, pulling sites, and structure footprints. There is also potential for weed management and revegetation activities in this location. Operation of the line would include occasional vehicle traffic along the access road and spur roads. Operation could also provide nesting and perching habitat for ravens and other desert tortoise predators. Eagle Crest would implement the following measures to minimize potential impacts on desert tortoise:

- BIO–1; Mitigation and Monitoring Program
- BIO–2; Designation of Desert Tortoise Staff
- BIO–3; Worker Environmental Awareness Program
- BIO–5; Minimize Surface Disturbance
- BIO–8; Revegetation
- BIO–9; Invasive Species Monitoring and Control
- DT– ; Pre-construction Surveys and Clearance Surveys
- DT–2; Construction Monitoring
- DT–3; Desert Tortoise Exclusion Fencing
- DT–4; Desert Tortoise Clearance and Relocation/Translocation Plan
- DT–5; Predator Monitoring and Control Program
- DT–6; Habitat Compensation
- DT–7; Operations and Maintenance

Again, all grading, fence construction, planting, weed control, and other similar activities within desert tortoise habitat would occur under the guidance of the designated staff and following protocols to minimize effects on desert tortoise. However, these activities could include take of desert tortoise because any moving or translocation of this species, even when done under the most ideal conditions, would necessitate the harassment, and capture of desert tortoise. The transmission line would temporarily affect 0.1 acre of DWMA, 0.3 acre of the CHU, and 3.8 acres of Class III habitat. Permanent affects would occur on 0.02 acre of DWMA, 0.06 acre of CHU, and 1.0 acre of Class III habitat. Estimated tortoise density is 1.2 tortoises/square mile in these locations.

7.0 ACTION AREA

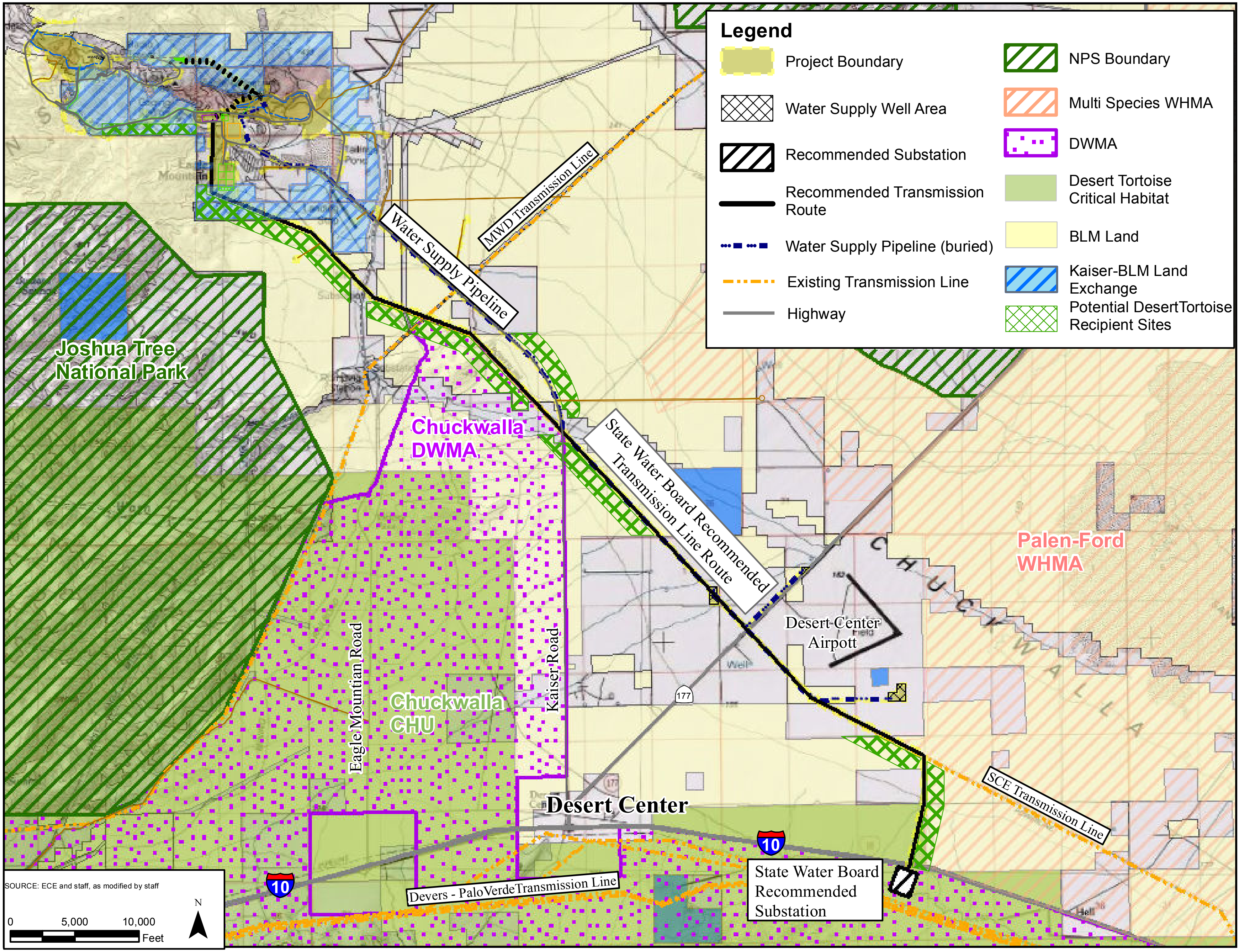
The action area includes all areas in which tortoises may be directly and indirectly affected by project activities. The action area thus includes not only the project footprint, but some extended area beyond the footprint in which effects on tortoises could reasonably be concluded. Determination of this extended area is both difficult and open to interpretation. A reasonable process is first to identify all project activities that might affect tortoises and then to make a reasonable evaluation of *likely* effects in the context of baseline tortoise populations and existing impacts. Extremes on the continuum of possibilities generally should be eliminated unless a particular, even if unlikely, project activity could result in grave consequences (e.g., death, elimination of recruitment).

For the project, impacts and mitigation identified in section 4, above, identify that tortoise impacts largely would occur during construction. Most center on avoiding tortoises or moving them a short distance from harm's way. Impacts during operations are anticipated to be primarily indirect and minor to negligible, based largely on the current conditions on the project and immediate vicinity. Examples include (1) high current levels of surface disturbance and lack of tortoise habitat on and surrounding the central project area and (2) currently subsidized predator (raven and coyote, primarily) populations in the project vicinity communities (town of Eagle Mountain, Lake Tamarisk, Desert Center). Following implementation of the protective measures identified in section 5, above, it is likely that all impacts would be eliminated or minimized to the point of non-significance.

Based on the above analysis, the extended area beyond the project footprint within which tortoises can reasonably be assumed to be affected is likely to diminish within a few hundred meters of the transmission line; there is probably no effect beyond the project footprint in the central project area. By contrast, the substation is in native habitat and would represent a loss of use, as well as a barrier to movement. Any tortoise whose home range intersects the substation could be affected. Based on the average diameter of a male and female tortoise's home range (2,480 and 1,550 feet, respectively [see section 4.1.3, *Activity Patterns and Home Range*, above), the action area for the substation portion of the project is estimated to include both the substation and a 1,980-foot buffer in all native habitats around the substation.

As described further in the Desert Tortoise Clearance and Relocation/ Translocation Plan, tortoises encountered within the central project area would be moved to a Translocation Site. Because there is not likely to be any native habitat immediately adjacent to the central project area that would be suitable for housing tortoises, Eagle Crest would construct pens in the Translocation Site. The Translocation Site would serve tortoises translocated from the central project area. Following desert tortoise surveys within the central project area to estimate local tortoise density, the location of this site would be determined in consultation with FWS, California DFG, and BLM.

Along the linear facilities (transmission line and water pipeline) tortoises would be moved to recipient sites located on BLM lands, between 300 and 1640 feet from the ROW centerline, and continuous with adjacent occupied habitat. These areas total 1,906 acres (7.7 square kilometer) and are depicted on figure 7 and in the Desert Tortoise Clearance and Relocation/Translocation Plan. These areas are within the ROW ZOI areas surveyed in 2009 and 2010 following FWS protocols. Results of these surveys indicate that existing desert tortoise density within these recipient sites is 1.2 tortoises/square mile (0.5 per square kilometer), or an existing population of 4 tortoises within the identified recipient areas. The most recent estimates from FWS' range-wide sampling program in 2007, 2008, 2009, and 2010a are 5.0 to 5.9 tortoises/square kilometer for the eastern portion of the Colorado Desert Recovery Unit (FWS, 2009b, 2010b and c). FWS recommends projected density after translocation at the recipient sites (residents plus translocated juvenile, subadult, and adult individuals) should not exceed 130% of the mean density detected in the respective desert tortoise recovery unit. This would translate into a maximum allowable density in the Translocation Area of about 7 tortoises/km^2, or 54 tortoises within the 1,906 acre recipient sites, including both resident tortoises and translocated tortoises. As such these recipient sites are suitable for receiving the estimated 5 tortoises that would be encountered along the transmission line and water pipeline.



Legend
Project Boundary
Water Supply Well Area
Recommended Substation
Recommended Transmission Route
Water Supply Pipeline (buried)
Existing Transmission Line
Highway
NPS Boundary
Multi Species WHMA
DWMA
Desert Tortoise Critical Habitat
BLM Land
Kaiser-BLM Land Exchange
Potential DesertTortoise Recipient Sites
Joshua Tree National Park
Water Supply Pipeline
MWD Transmission Line
Chuckwalla DWMA
State Water Board Recommended Transmission Line Route
Palen-Ford WHMA
Desert Center Airpott
Eagle Mountain Road
Kaiser Road
Chuckwalla CHU
Desert Center
SCE Transmission Line
State Water Board Recommended Substation
Devers - PaloVerdeTransmission Line
10
177
SOURCE: ECE and staff, as modified by staff
0 5,000 10,000 Feet
N

8.0 DETERMINATION OF EFFECT

8.1 DESERT TORTOISE

Desert tortoise may be adversely affected by project construction, particularly along the recommended transmission corridor.

8.2 CRITICAL HABITAT

The project would result in the alteration of 0.36 acre of desert tortoise critical habitat. Additionally, there is limited potential that additional disturbance could be required to connect the proposed project to the Red Bluff substation. Eagle Crest would determine the need for such disturbance during the final design engineering phase of the project. If additional disturbance is required, Eagle Crest would amend its desert tortoise compensation plan to include 5:1 lands for any additional disturbance to desert tortoise critical habitat for acres disturbed in association with the electrical grid interconnect.

9.0 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. 2001. (Revised 2003.) Salvaging injured, recently dead, ill, and dying wild, free-roaming desert tortoises (*Gopherus agassizii*). Protocol prepared at the request of the U.S. Fish and Wildlife Service and the California Department of Fish and Game.

--- and L.L. Nicholson. 1984. The distribution and density of desert tortoise populations in California in the 1970s. 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.

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

---. 2007. National Environmental Policy Handbook. Manual 1790. 182 pp.

--- and California Department of Fish and Game. 2002. Proposed northern and eastern Colorado Desert Coordinated Management Plan. Final Environmental Impact Statement. Two volumes.

--- 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.

---. 2010. Draft Environmental Impact Statement and Draft Plan Amendment to the California Desert Conservation Area plan for the Proposed Desert Sunlight Solar Farm Project. Palm Springs – South Coast Field Office. Palm Springs, CA. August 2010.

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., 1994. Effectiveness of fences and culverts for protecting desert tortoises along California State Highway 58: summary of the 1993 field season. Draft. Unpub. rept. to the California Energy Commission. Contract No. 700-90-015, Phase 3, Task 3-3. 23 pp. plus appendices.

---. 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.

--- 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 Native Plant Society. 2011. Inventory of rare and endangered plants (online edition, v8-01a). Available online at http://cnps.web.aplus.net/cgi-bin/inv/inventory.cgi. Accessed online 12 February 2011. Sacramento, California.

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

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

Consortium of California Herbaria. 2011. Available online at http://ucjepsberkeley.edu/consortium. Accessed online 12 February 2011. Berkeley, California.

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. 1994. Eagle Mountain Pumped Storage Project, application for license for a major unconstructed project (FERC No. 11080-00).

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.

Eagle Crest Energy Company. 2011. Eagle Mountain Pumped Storage Project Biological Assessment – Second Revision. Submitted to the Federal Energy Regulatory Commission, February 28, 2011.

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.

FWS (U.S. Fish and Wildlife Service). 1989. Proposed rule: endangered and threatened wildlife and plants; desert tortoise. FR 54(197):42270-42278.

---. 1990. Final rule: determination of the threatened status for the Mojave population of the desert tortoise. FR 55(63):12178-12191.

---. 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

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

---. 1994a. Desert tortoise (Mojave population) recovery plan. Portland, Oregon. 73 pp plus appendices.

---. 1994b. Final rule: determination of critical habitat for the Mojave population of the desert tortoise. FR 59 (26):5820-5866.

---. 2008. Environmental assessment to implement a Desert Tortoise Recovery Plan task: reduce common raven predation on the desert tortoise. 156 pp.

---. 2009. Desert Tortoise Field Manual. Available online at http://www.fws.gov/ventura/speciesinfo/protocols_guidelines/docs/dt .

---. 2010a. Preparing for any action that may occur within the range of the Mojave desert tortoise (*Gopherus agassizii*). 2010 Field Season. Available at: http://www.fws.gov/ventura/speciesinfo/protocols_guidelines/ . 18 pp.

---. 2010b. Translocation of desert tortoises (Mojave Population) from project sites: plan development guidance. August 2010. Unpub. document. 11 pp.

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 production 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.

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.

---. Investigations of the desert tortoise at the California Department of Health Services' proposed low-level radioactive waste facility site in Ward Valley, California. Unpub. rept. submitted to U.S. Ecology and Ecological Research Services. 116 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 the Environmental Planning Group, 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 the Environmental Planning Group, 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.

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.

LaRue, E.L. 1993. Distribution of desert tortoise sign adjacent to Highway 395, San Bernardino County, California. Draft. Unpub. rept. from Tierra Madre Consultants to Gratten, Gersick, Karp, and Miller, Sacramento, CA. 17 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.

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.

Marlow, R. W., K. von Seckendorff Hoff, and P. Brussard. 1997. Management of wild tortoise populations is complicated by escape or release of captives. Pp. 479-480 in J. van Abbema (ed.), Proceedings: Conservation, Restoration, and Management of Tortoises and Turtles – an International Conference. Joint publ. of the New York Turtle and Tortoise Society and the WCS Turtle Recovery Program.

Medica, P.A., R.B. Bury, and F. B. Turner. 1975. Growth of the desert tortoise (*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.

Nicholson, L.L. 1978. The effects of roads on desert tortoise populations. Proceedings of the 1978 Desert Tortoise Council Symposium.127-129 pp.

O'Connor, M. P., L. C. Zimmerman, D. E. Ruby, S. J. Bulova, and J. R. Spotila. et al. 1994. Home 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 species 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.

SCE (Southern California Edison). 2011. Transmission Projects – Projects By County: Red Bluff Substation Project. Available on line at http://www.sce.com/PowerandEnvironment/Transmission/CurrentProjects/redbluff/default.htm. Accessed March 17, 2011.

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.

---. 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.

---. 1999. Egg production by Movement patterns of desert tortoises at Yucca Mountain, Nevada. Report Unpubl. rept. to U.S. Department of Energy, Yucca Mountain Site Characterization Office, North Las Vegas, NV. Contract Document 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 desert scrub. *In* D.E. Brown, ed., Biotic. Communities of the American Southwest-United States and Mexico. Desert Plants 4(1-4): 181-221.

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.

Appendix A- Project Biological Mitigation Measures

The following table summarizes the mitigation measures that were proposed for terrestrial resources in general, and threatened and endangered species specifically in the Applicant's Final License Application. These measures are elaborated and a full list of mitigation measures for the Project in the Final License Application (ECE 2009). The FERC Staff Recommended Alternative described in the DEIS includes some additional enhancements to these mitigation measures, as described in Section 1.4.

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 would 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 would 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 would 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 would 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 would be restricted to the smallest area necessary to complete the construction.	**Construction**	**Contractor**
Terrestrial Resources	BIO-6	**Pre-construction Surveys: Plants.** Preconstruction surveys would 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 would be consulted for direction regarding disposal of plants protected by the CDNPA.	**Construction**	**Contractor**
Terrestrial Resources	BIO-8	**Revegetation.** A revegetation plan would 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 would be developed prior to construction.	**Construction**	**Contractor**
Terrestrial Resources	BIO-10	**Couch's Spadefoot.** Surveys for couch's spadefoot habitat would be conducted, and habitats avoided if possible.	**Pre-construction and construction**	**Applicant (pre-construction)**

Resource Area	Measure number	Summary of Mitigation Measure	Timing of Compliance	Responsibility/ Implementation
				and Contractor (during construction)
Terrestrial Resources	BIO-11	**Breeding Bird Surveys and Avoidance.** Surveys would be completed in all potential nesting sites for active bird nests, for construction activities scheduled between February 15 and July 30. Nest sites would 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 would 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 would 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 would determine if construction buffers would be required during the nesting season.	**Pre-construction**	**Applicant**
Terrestrial Resources	BIO-16	**Pre-construction Surveys: Mammals.** Prior to construction, surveys would be conducted for burrows for badger or kit fox. Active burrows and all fox natal dens would be avoided, where possible. Where avoidance is infeasible, occupancy of burrows would be determined and occupants would be encouraged to leave their burrows. All burrows from which badgers or foxes have been removed would 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 would be completed in the Central Project Area. Based on the results of these surveys, a mitigation plan would be developed to avoid roosting and foraging impacts to resident bats, minimize that disturbance or, as an inescapable measure, evict bats.	**Pre-construction and construction**	**Applicant (pre-construction) and Contractor (during construction)**
Terrestrial	BIO-18	**Fencing.** A security fence would be constructed around	**Construction and**	**Applicant**

Resource Area	Measure number	Summary of Mitigation Measure	Timing of Compliance	Responsibility/ Implementation
Resources		portions of the Central Project Area to exclude larger terrestrial wildlife from entering Project areas that could pose a hazard to these species.	**operation**	**(operation) and Contractor (during construction)**
Terrestrial Resources	BIO-19	**Construction and Operations**. Construction and maintenance activities would 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 would only take place during daylight hours.	**Construction**	**Contractor**
Terrestrial Resources	BIO-21	**Construction.** Pipeline trenches would be closed, temporarily fenced, or covered each day. Any open trenches would 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 would 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 would be obtained, which would identify the condition and location of all state jurisdictional waters, impacts, and mitigation measures. Mitigation would 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 would be removed from harm's way during the construction period.	**Pre-construction and 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 would occur without biological monitors.	**Construction and operation**	**Applicant (operation) and Contractor (during**

Resource Area	Measure number	Summary of Mitigation Measure	Timing of Compliance	Responsibility/ Implementation
				construction)
Threatened and Endangered Species	DT-3	**Exclusion Fencing –** The substation and other hazardous areas would 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 Clearance and Relocation/Translocation Plan.** Tortoises removed would be transported to another part of their home range. Any tortoise found in the Central Project Area would 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	**Predator Monitoring and Control Program.** Mitigation to reduce or eliminate the opportunity for raven, gull, coyote, and wild dog proliferation would include activity desert tortoise predation monitoring.	**Construction and operation**	**Applicant (operation) and Contractor (during construction)**
Threatened and Endangered Species	DT-6	**Habitat Compensation.** Total compensation would be approximately 90.3 acres.	**Design and operation**	**Applicant**
Threatened and Endangered Species	DT-7	**Operations and Maintenance.** Tortoises observed during routine maintenance activities would 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
	A. polycarpa	Allscale

Taxon	Scientific Name	Common Name
	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 Wouldow
	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
	D. serrata var. *californica*	California Ditaxis

Taxon	Scientific Name	Common Name
	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
	Langloisia setosissima punctata	Spotted Sunbonnet

Taxon	Scientific Name	Common Name
	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
	Physalis crassifolia	Ground-cherry
	Plantago ovata	Plantago
	Pleuraphis rigida	Big Galleta

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

Appendix C – Recent project area photography

Photo 1. View of East Pit, location for the proposed lower reservoir. Note lack of vegetation, and large tailings piles in the foreground. *The existing Eagle Mountain water treatment pond is visible is the lower left corner of the photo. Photo taken in 2008.*

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 taken in 2008.

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. *Photo taken in 2008.*

Photo 4. Close up view of the upper reservoir, note existing disturbed conditions. *Photo taken in 2008.*

Photo 5. View of the tailings piles east of Lower Reservoir, note lack of vegetation development in contrast to undisturbed vegetation in foreground. Photo taken in 2011.

Photo 6. Photo of 13 acre pond within the Lake Tamarisk community. Photo taken in 2011.

Photo 7. Photo of 13 Eagle Mountain water treatment facility. Photo taken in 2008.

Photo 8. Photo of open air segment of the Colorado River Aqueduct. Photo taken in 2007.

Photo 9. Photo of the Colorado River Aqueduct pumping station (1 of 2). Photo taken in 2007.

Photo 10. Photo of the Colorado River Aqueduct pumping station (2 of 2). Photo taken in 2007.

Appendix D – Documentation of consultation

On September 17, 2007, Eagle Crest 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 (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 Eagle Crest seek the assistance of a biologist familiar with the habitat conditions and associated species in the project area. Eagle Crest 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 (BA).

In October 2007, Eagle Crest representatives held a pre-scoping meeting with representatives of the FWS to gather more information about desert tortoise and the FWS concerns regarding the proposed Project. On January 10, 2008, the FWS made a written request (via e-mail) that hard copies of all pertinent publications and public notices be sent to Pete Sorenson at the FWS Carlsbad office. Eagle Crest 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, Eagle Crest 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 Federal Energy Regulatory Commission (FERC or Commission) to the FWS, the FERC designated Eagle Crest as the non-federal representative for ESA informal consultation and required that Eagle Crest develop a draft BA.

Since being designated as the non-federal representative for ESA informal consultation, Eagle Crest 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 FWS Carlsbad office , a teleconference held March 5, 2009, and e-mail correspondence throughout the consultation period. Most recently, Eagle Crest requested advice from the FWS regarding the format for preparation of the biological assessment. The FWS responded to this request by e-mail July 24, 2009.

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

On December 23, 2010, we submitted a request to initiate formal consultation with the U.S. Fish and Wildlife Service and provided you with our draft environmental impact statement that served as our Biological Assessment for the proposed project. On January 31, 2011, FWS requested additional information before initiating formal consultation for the project. Specifically, the letter presented 11 issues for which additional information was needed necessary to prepare a Biological Opinion (BO).

Below we provide a summary of our responses to each of your 11 additional information needs and citations for where the detailed responses are included in our final BA.

1) Clearly define the action area of the proposed project; the action area should include areas targeted for desert tortoise translocation (i.e., recipient and control sites, if necessary).

The Action Area includes all areas in which tortoises may be directly and indirectly affected by Project activities. Potential recipient sites for tortoises encountered during construction of the transmission line and water pipeline are depicted on figure 6 of the Desert Tortoise Clearance and Relocation/Translocation Plan, and figure 7 of the final BA. Please see section 7 – Action Area; pages 7-1 – 7-2 in the final BA and the Desert Tortoise Clearance and Relocation/ Translocation Plan (appendix I, of the final BA) for a full discussion on the action area and recipient sites.

2) Describe how each project component may either directly or indirectly affect desert tortoise.

Within the central project area, there is little or no desert tortoise habitat and effects are expected to be low. Direct effects to desert tortoise could include vehicular collisions, habitat disturbance, or disturbance to individual tortoises. Indirect effects include potential habitat modification associated with introduction of invasive weeds, and increases in predators associated with increased surface water availability. Along the transmission line, water pipeline, and wells, desert tortoise habitat is more prevalent. Direct and indirect effects on desert tortoise along these linear components of the proposed project would be similar to those of the central project area.

Details on the effects of the construction and operation of the proposed project were addressed in section 3.3.4.2 (pages 123 – 130) of the BA/DEIS. We have further modified our recommendation from the BA/DEIS as incorporated in the attached final BA. Please see section 5.1.1.1 – *Construction Effects on Desert Tortoise and Desert Tortoise Critical Habitat*; pages 5-2 – 5-5; and section 5.1.2 *Operation and Maintenance*; pages 5-5 – 5-6 of the final BA for additional information.

3) Quantify the number of desert tortoises that may be affected based on the Service's pre-project survey protocol. For the central project area, please provide additional support for the assumption that this area does not currently support any desert tortoise. Given that the mine site (i.e., the central project area) has been inactive for 25 years, there is some possibility that desert tortoises may have reoccupied some portions of the site, especially those areas that remain undisturbed or where natural regeneration of native vegetation has occurred.

Desert tortoise density within the central project area is unknown as the land owner has not granted access for surveys. However, we conservatively assume that tortoise density in this area could be as high as the densities observed along the projects linear facilities. Eagle Crest's surveys along the transmission line and water pipeline estimate desert tortoise density as 1.2 tortoises per square mile. Please see section 4.4 – *Estimated Tortoise Density*; pages 4-15 – 4-18 in the final BA for a full discussion.

4) Quantify the total number of acres to be impacted under the proposed action by each project component and vegetation type (i.e., proposed water line, transmission lines and tower pads, access roads, and other project features) with an explanation as to how these acres were calculated and ensure that these are consistent throughout the document.

A quantitative description of vegetation types within the proposed project were presented in table 9 (page 82) of the BA/DEIS; this table was amended with text on page 101 to quantify acres by vegetation type for the staff recommended transmission line and compare these effects with the proposed project. However, we note that for reasons discussed in section 2.1.3 – *Transmission Line* (page 2-8 of the final BA), we have removed the footprint of the substation and substation associated mitigation measures from the project. Subsequently, acreages of vegetation types and associated disturbance were revised based our analysis for the transmission line and water pipeline and a review of aerial photography for the central project area in the final BA. Please see section 3.1.2 – *Project Boundary*; table 3.1; and section 4.3 – *Survey Results*; tables 4-2 and 4-3 on pages 4-14 and 4-15 of the final BA for vegetation acreages associated with each project component and additional assumptions and calculations.

During the afternoon DEIS Public Comment meeting on February 3, 2011, FWS staff noted that it needs additional information about the current habitat conditions of the mine pits and their potential to support desert tortoise. As such, they suggested we provide an analysis of aerial imagery or other published research that would provide a logical, reasoned approach to support our desert tortoise density estimates for the central project area. As suggested, we have provided a comparison between aerial photography of the central project area from 1997/98, and 2010 (please See Appendices F and G of the final BA). The photographs show that there has been little, if any, change in the quantity or quality of desert tortoise habitat in this area since 1997. Additionally, we provide simulated 3D aerial views of the project overlaid on 2011 imagery (Appendix H of the final BA). Based on this data, we conclude that the current conditions are not substantially different than the conditions that existed when FWS reaffirmed its original BO for the Eagle Mountain Landfill in 1996.

5) Clearly describe all measures that will be implemented to avoid or minimize impacts to the desert tortoise for each project component, including desert tortoise translocation, and their effects on the species. For instance, implementation of the weed management plan may include the use of herbicides or mechanical removal of weeds, which may impact desert tortoise.

We summarized our recommended mitigation measures in section 5.1 (pages 237 – 247) of the BA/DEIS. In general, mitigation activities with potential to occur in desert tortoise habitat, including revegetation and weed control, would occur following protocols set forth in our recommended Worker Environmental Awareness Program and the Desert Tortoise Clearance and Relocation/Translocation Plan. The protocols include clearance surveys, agency coordination, and reporting. Full descriptions of the proposed mitigation plans are presented in Appendix I of the final BA. Additional mitigation measures, including pre-construction surveys, clearance surveys, monitoring, exclusion fencing, and habitat compensation are described in section 6.2 – *Mitigation*

Measures to Protect Desert Tortoise (pages 6-1 – 6-12 of the final BA). A discussion of mitigation measures associated with each project component is presented in section 6.3 – *Mitigation measures by Project Component*; pages 6-12 – 6-15 of the final BA.

6) Data from the 2010 desert tortoise surveys should be incorporated in the document either directly or by reference to the consultant's survey report.

While the BA/DEIS summarizes the results of the 2008 and 2009 surveys, results of the 2010 surveys were inadvertently omitted. Section 4.3 – *Survey Results* of the attached final BA includes all survey results including the 2010 results; please see table 4-1 on pages 4-9 – 4-13 and figure 6 of the final BA for this information.

7) Identify the number of acres affected under the proposed action for which land acquisition is proposed and identify where and when the acquisition would occur. Currently, the document states that 160 acres of compensation lands would be purchased under Eagle Crest's alternative; however, the acreages under the FERC staff alternative (i.e., the proposed action) need to be clarified.

We addressed the calculation of compensation lands and identified the need to revise these calculations following final project design in section *3.3.4.2* (page 127) of the BA/DEIS. However, we have revised the estimated acreage in the final BA for reasons discussed in section 2.1.3 – *Transmission Line* (page 2-8 of the final BA). We now find the recommended project would affect 0.5 acre of Category I habitat (5:1 compensation ratio) and 87.8 acres of Category III habitat (1:1 compensation ratio). As such, Eagle Crest would acquire a minimum of 90.3 acres of compensation land. Please see section 6 – *Proposed Mitigation Measures*; pages 6-10 – 6-11 of the final BA for more detail.

8) Please clarify whether all "permanent" avoidance and minimization measures will be implemented as described for the life of the FERC license (e.g., monthly monitoring of the tortoise exclusion fence around the substation and as needed in the central project area as described under the effects of construction).

We discussed the applicant's proposed permanent tortoise exclusion fencing in section 3.3.4.2 (page 125) of the BA/DEIS. In section 6 – *Proposed Mitigation Measures*; page 6-8 of the final BA, we clarify that 'permanent' is intended to mean for the term of the license. However, we note that for reasons discussed in section 2.1.3 – *Transmission Line;*, page 2-8 of the final BA) we have removed the footprint of the substation and substation associated mitigation measures from the Project.

9) Explain how appropriate baseline information can be gathered on potential desert tortoise predators after construction has begun so that we can assure these effects of the project are fully addressed as suggested.

In the BA/DEIS, we inadvertently stated these surveys would occur during construction. However, our intent was that baseline surveys would occur before any project-related ground disturbing activities. Please see section 6 – *Proposed Mitigation Measures;* page 6-10, of the final BA where we clarify that baseline surveys would occur prior to ground disturbing activities.

10) Provide a more detailed comparison of existing versus project related water sources such that the differential attractiveness of these water sources to potential desert tortoise predators can be more thoroughly assessed.

We noted the locations of existing sources of surface water in section 3.3.3 (page 84) of the BA/DEIS. Existing water sources include the Colorado River Aqueduct, the pond associated with the Colorado River Aqueduct Pumping Station, Eagle Mountain water treatment pond, ponds in the Lake Tamarisk community, and natural springs and tanks in the Eagle Mountains. Additionally, there have been periods in the past when water has collected in the bottom of the mine pits. These watered periods were of sufficient duration and contained sufficient water for tamarisk to establish, although these plants are no longer present (see 2010 and 2011 aerial photos in Appendices F and H).

The mine pits are a known water source for bighorn sheep and likely provide water for desert tortoise predators during those periods as well. As such, while the project would create water sources in the central project area, water in this location is not without precedent. Therefore, we conclude that there is limited differential attractiveness to desert tortoise predators between the existing and project-related water sources. Please see section 5 – *Potential Project Impacts*; pages 5-7; and Appendix C of the final BA for additional information including photographs of the existing water sources.

11) Please clarify who will be responsible for making the determination and how determination will be made that an injured tortoise "is expected to survive" and thus warrants being taken to a qualified veterinarian.

We concur with Interior's recommendation in its February 28, 2011 comment letter on the draft EIS that all injured tortoises be taken to a qualified veterinarian. We clarify this recommendation in final BA, Appendix I –*Desert Tortoise Clearance and Relocation/Translocation Plan*.

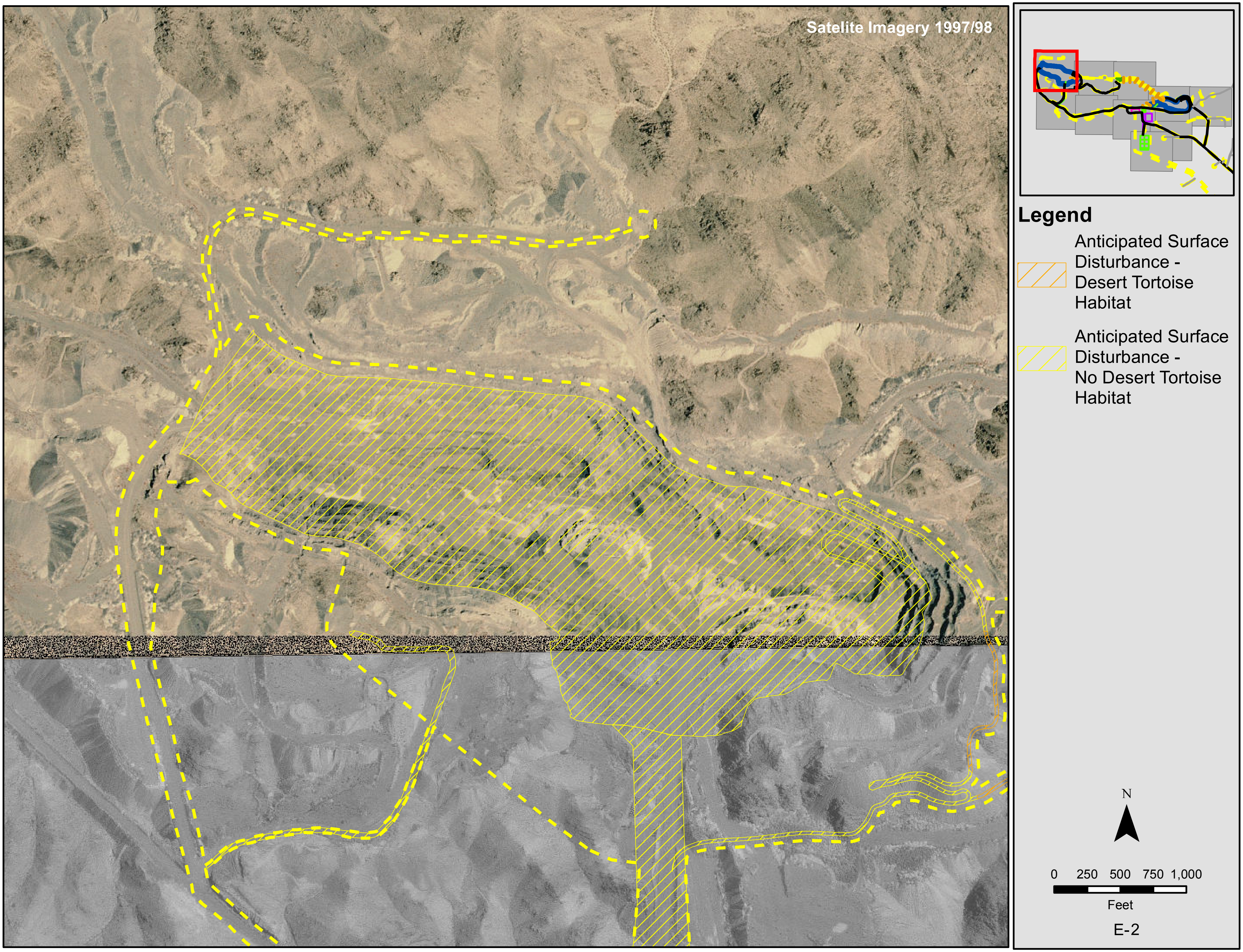
In summary, our final BA: (1) provides detailed descriptions of the project action area; (2) provides a description of the potential for each project component to affect desert tortoise; (3) quantifies tortoise density in different areas within the project and provides additional evidence for these conclusions associated with the central project area; (4) quantifies acreages of affected habitats; (5) fully describes mitigation measures associated with each project component; (6) incorporates the results of the 2010 desert tortoise surveys; (7) shows calculations for compensation lands; (8) clarifies the term of "permanent" mitigation measures; (9) details methods for conducting baseline desert tortoise predator surveys; (10) provides a more detailed comparison of existing versus project related water sources and a differential attractiveness assessment; and (11) clarifies the decision making responsibility under the Desert Tortoise Clearance and Relocation/Translocation Plan, including who would decide when veterinary assistance is warranted.

In addition, your letter requests that the various technical appendices provided in the July 2010 California Water Quality Control Board's draft environmental impact report be attached to our pending final EIS and incorporated into the proposed action. We have incorporated the following plans and reports as Appendix I of the final BA and recommend that the plans and the Worker Environmental Awareness Program be implemented in the event the Commission issues a license for the proposed project:

1) Revegetation Plan
2) Invasive Species Monitoring and Control Plan[1]
3) Desert Tortoise Clearance and Relocation/Translocation Plan
4) Desert Tortoise Predator Monitoring and Control Plan
5) Worker Environmental Awareness Program
6) Bighorn Sheep Report
7) Phase I Golden Eagle Aerial Surveys

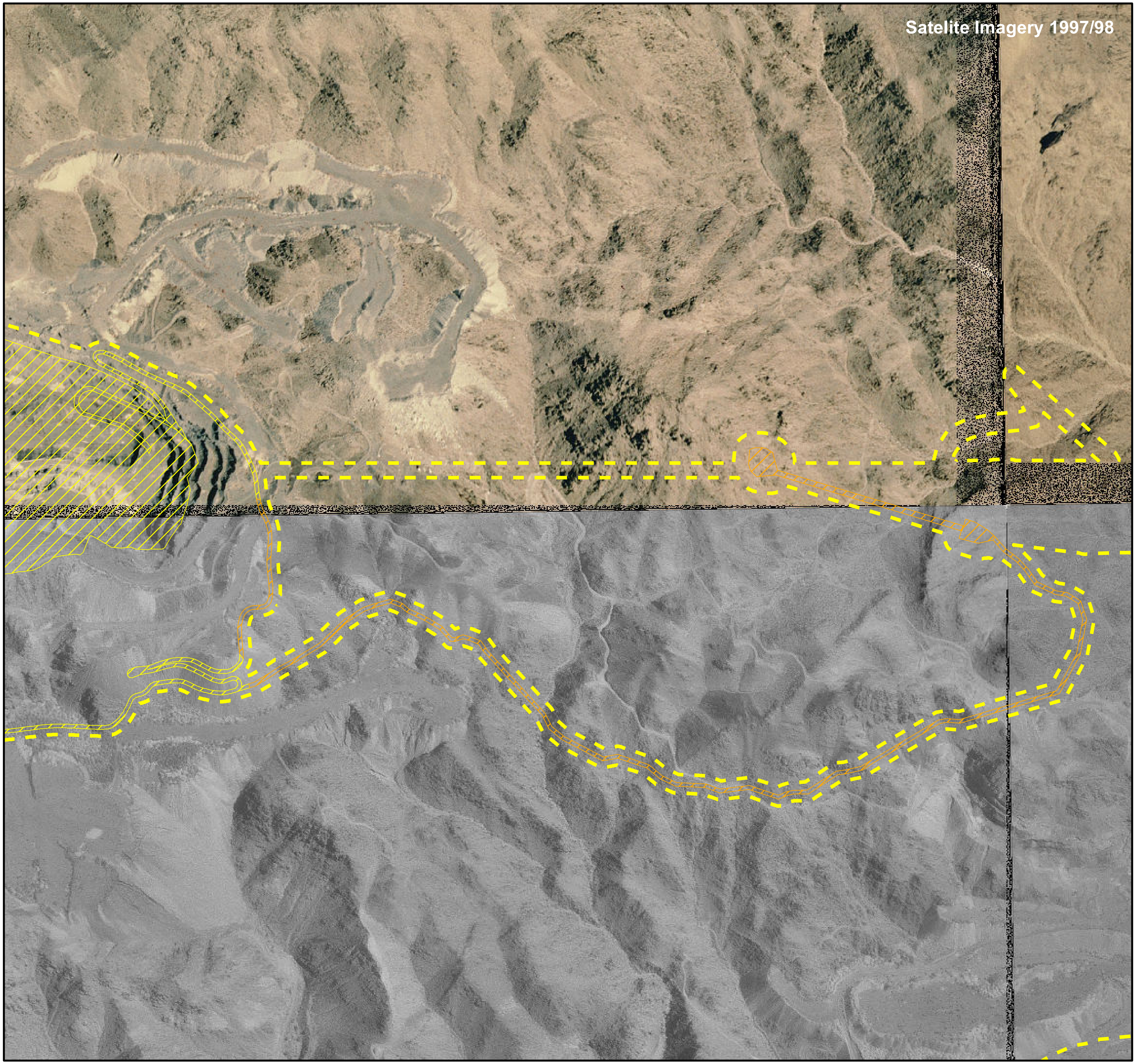
[1] To be revised as specified in the final BA (see section 1.4 *FERC Staff Recommended Alternative*, page 1-11)

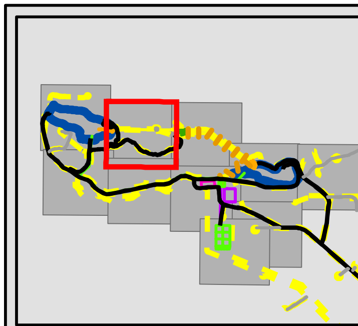
Appendix E – Mapbook of Central Project Area (1997/1998)



Satelite Imagery 1997/98
Legend
Anticipated Surface Disturbance - Desert Tortoise Habitat
Anticipated Surface Disturbance - No Desert Tortoise Habitat
N
0 250 500 750 1,000
Feet

E-2





Legend

Anticipated Surface Disturbance - Desert Tortoise Habitat

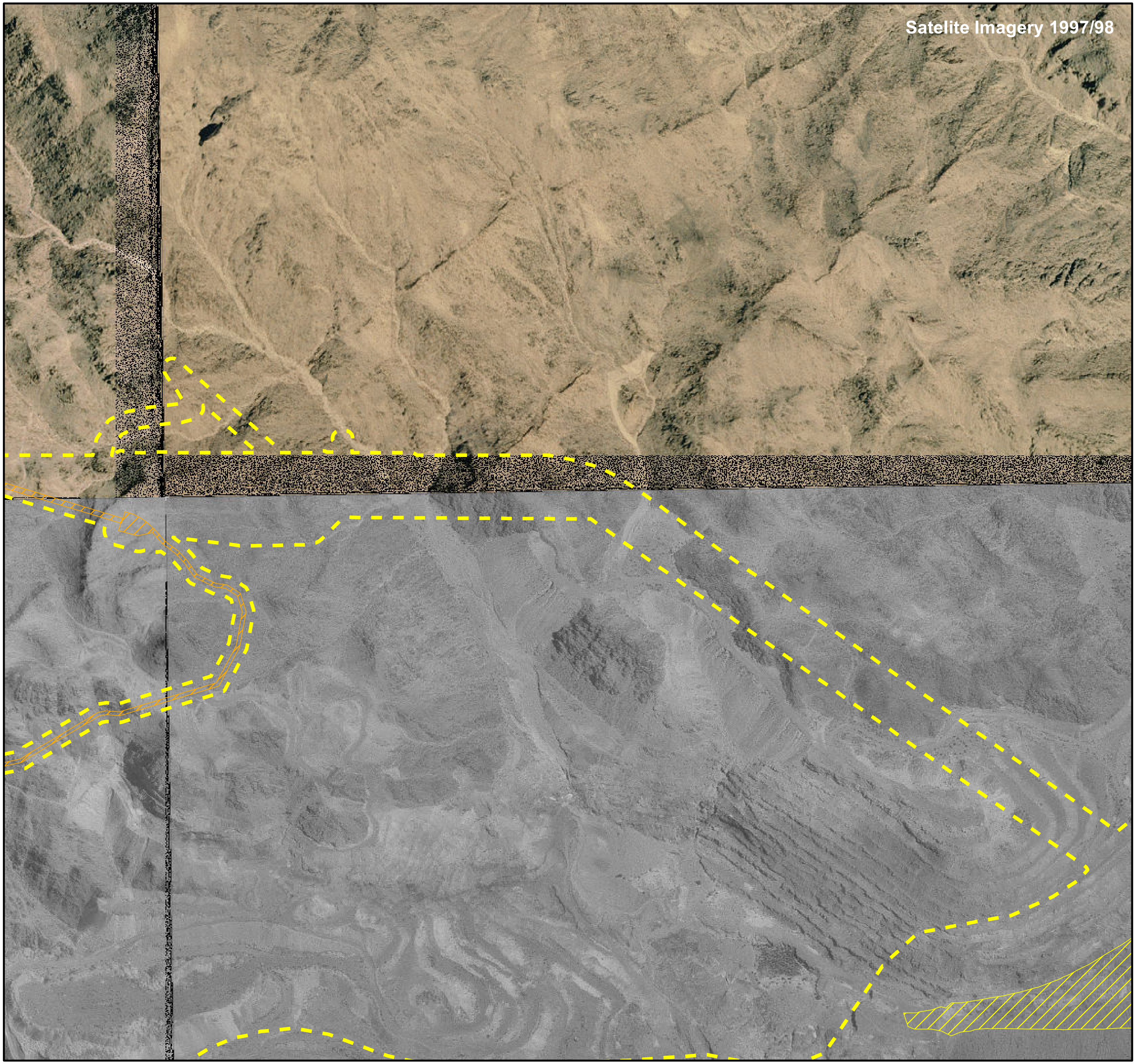
Anticipated Surface Disturbance - No Desert Tortoise Habitat

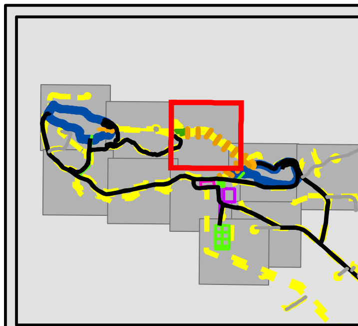
N

0 250 500 750 1,000

Feet

E-3

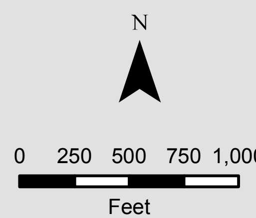




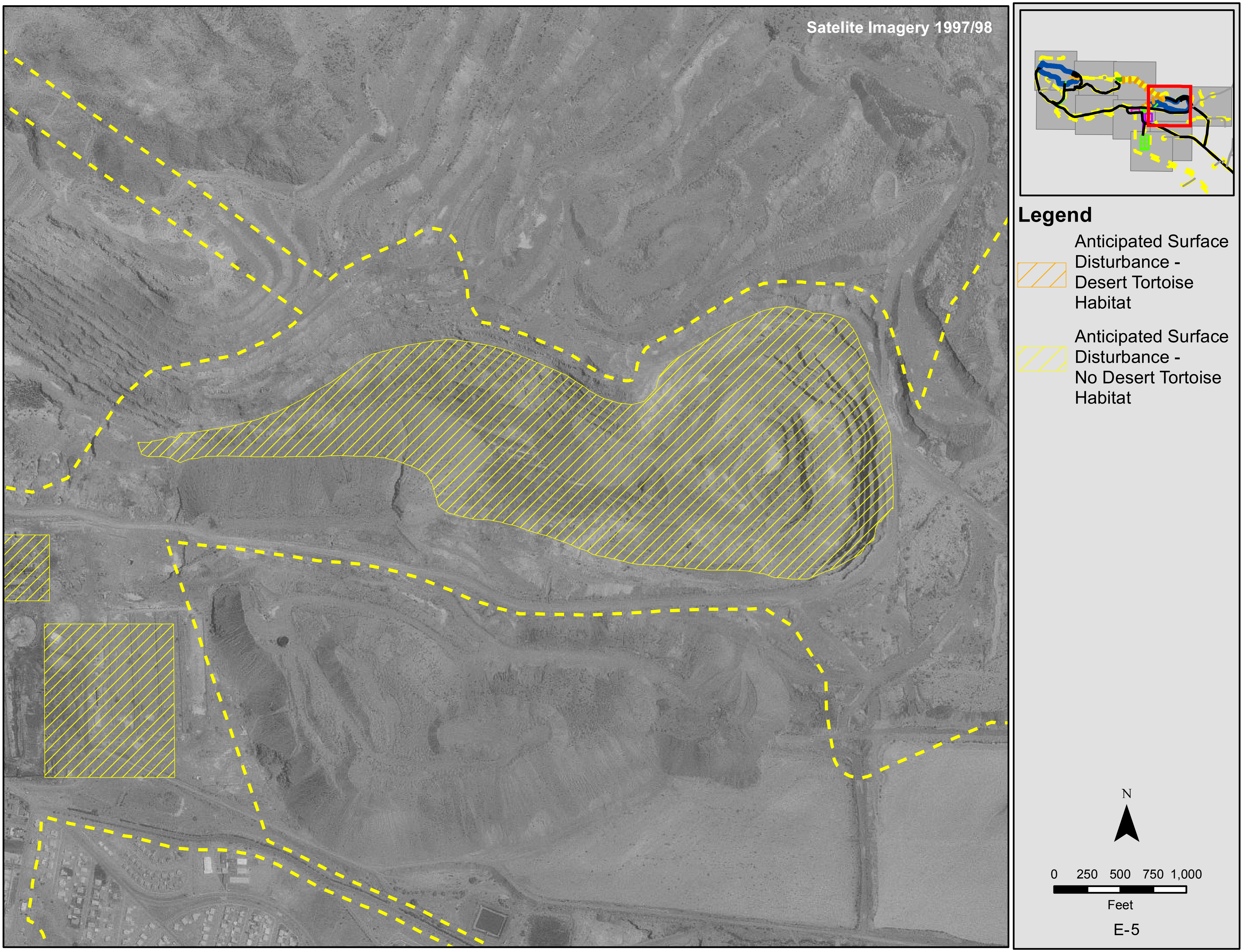
Legend

Anticipated Surface Disturbance - Desert Tortoise Habitat

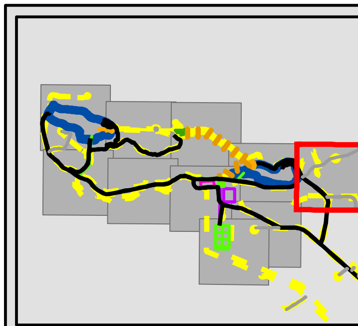
Anticipated Surface Disturbance - No Desert Tortoise Habitat



E-4


Satelite Imagery 1997/98
Legend
Anticipated Surface Disturbance - Desert Tortoise Habitat
Anticipated Surface Disturbance - No Desert Tortoise Habitat
N
0 250 500 750 1,000
Feet

E-5



Legend

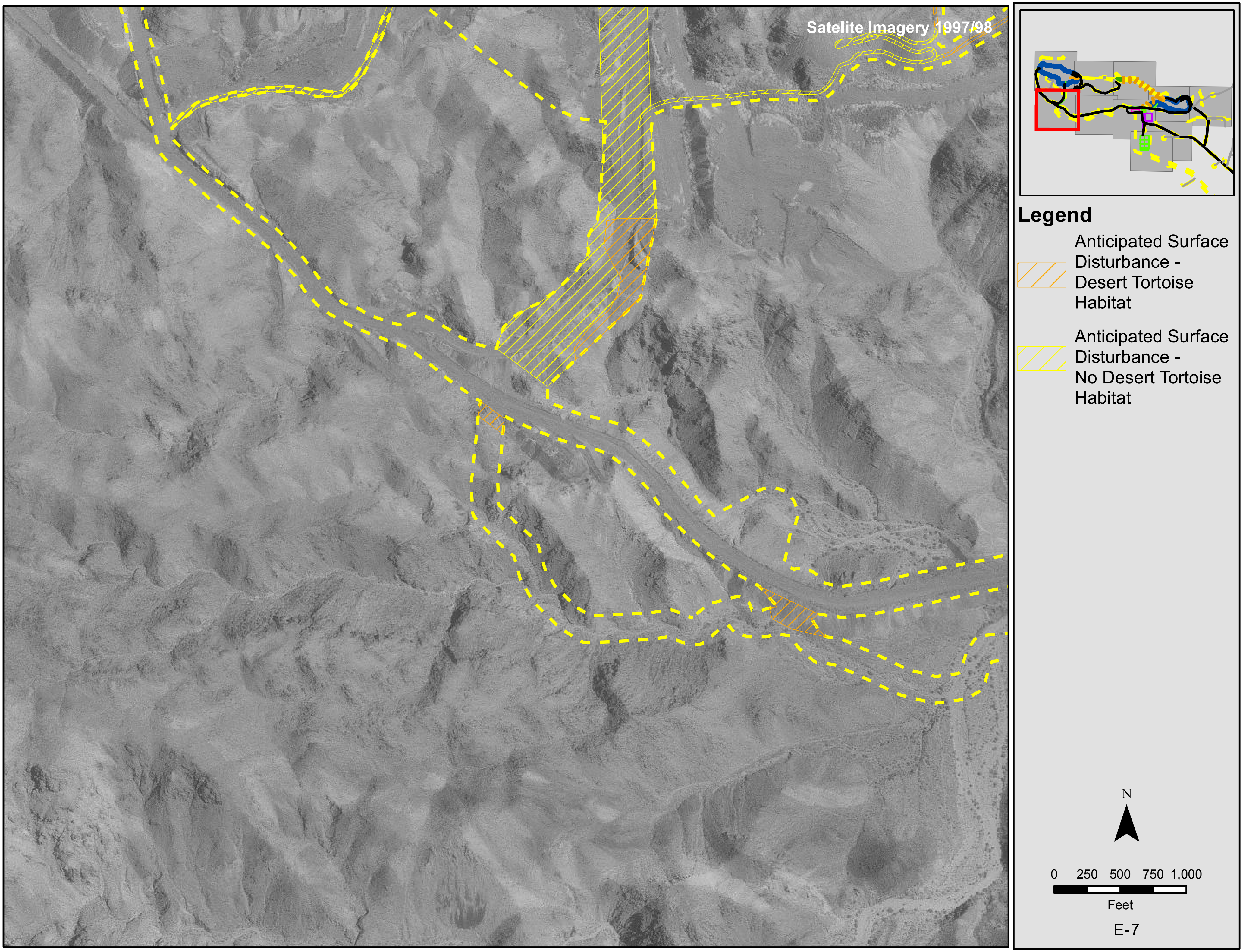
	Anticipated Surface Disturbance - Desert Tortoise Habitat
	Anticipated Surface Disturbance - No Desert Tortoise Habitat

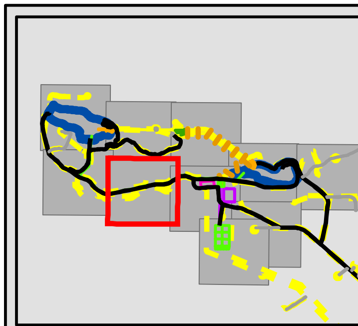
N

0 250 500 750 1,000

Feet

E-6


Satelite Imagery 1997/98
Legend
Anticipated Surface Disturbance - Desert Tortoise Habitat
Anticipated Surface Disturbance - No Desert Tortoise Habitat
N
0 250 500 750 1,000
Feet
E-7



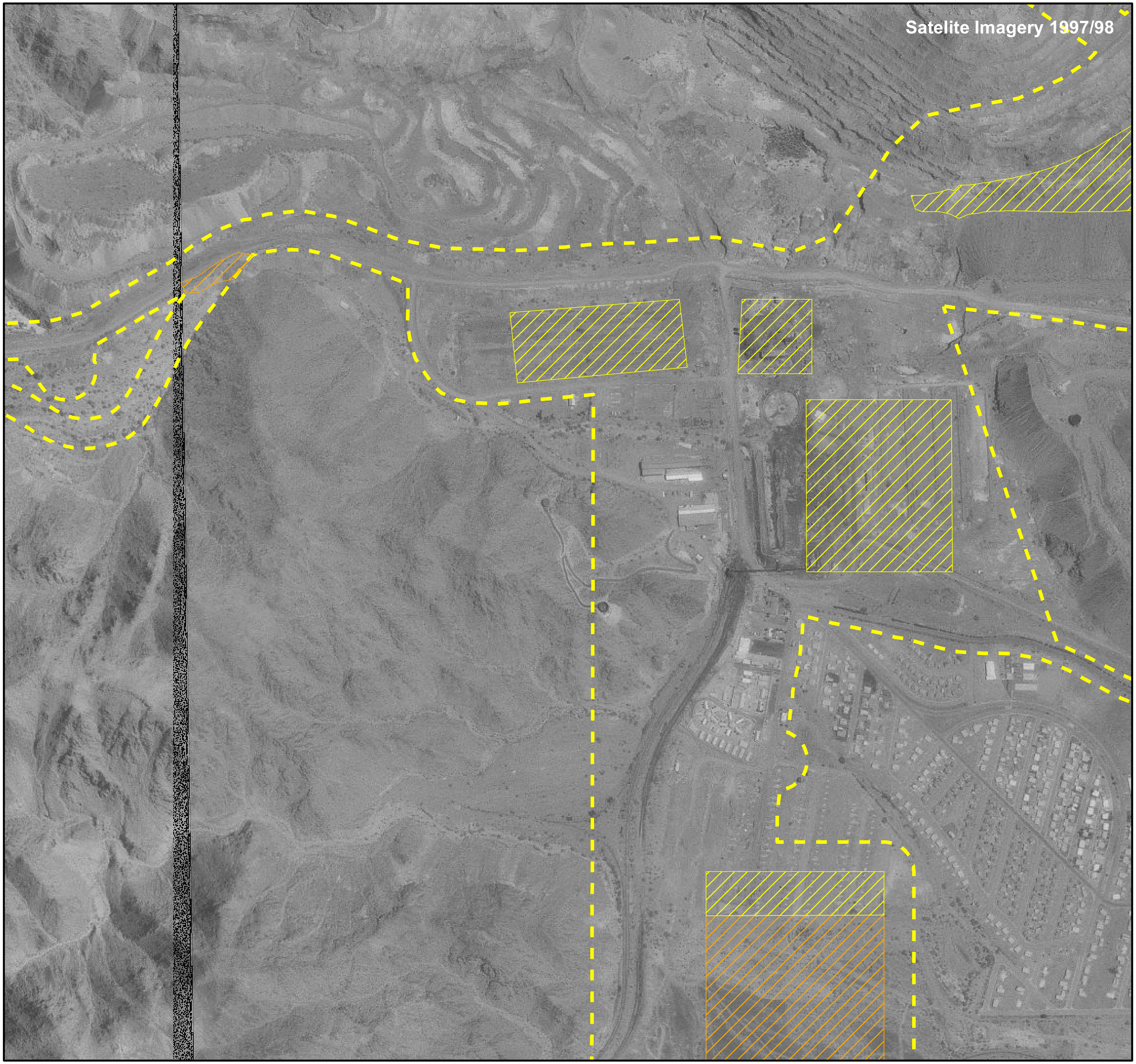
Legend

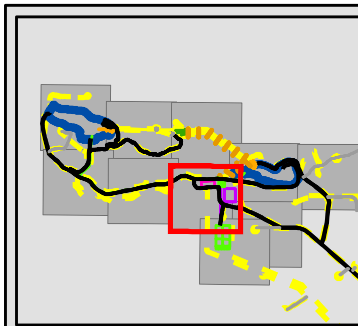
- Anticipated Surface Disturbance - Desert Tortoise Habitat
- Anticipated Surface Disturbance - No Desert Tortoise Habitat

N

0 250 500 750 1,000
Feet

E-8

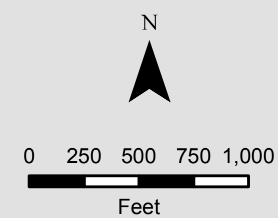




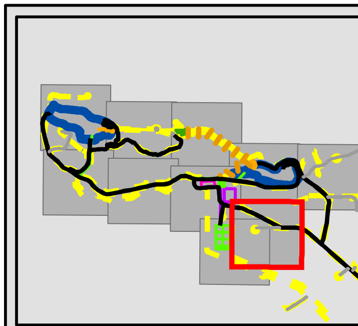
Legend

Anticipated Surface Disturbance - Desert Tortoise Habitat

Anticipated Surface Disturbance - No Desert Tortoise Habitat



E-9



Legend

Anticipated Surface Disturbance - Desert Tortoise Habitat

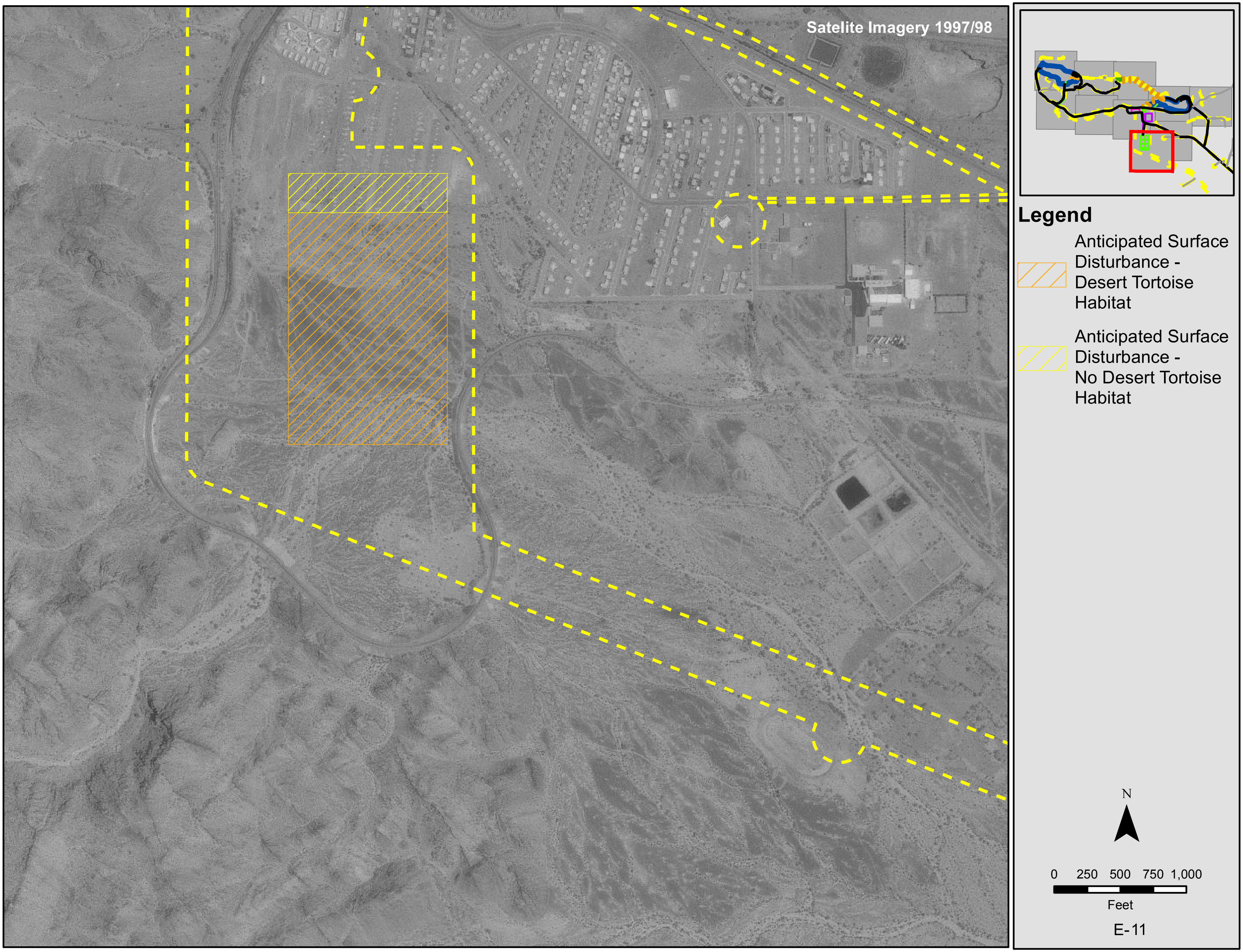
Anticipated Surface Disturbance - No Desert Tortoise Habitat

N

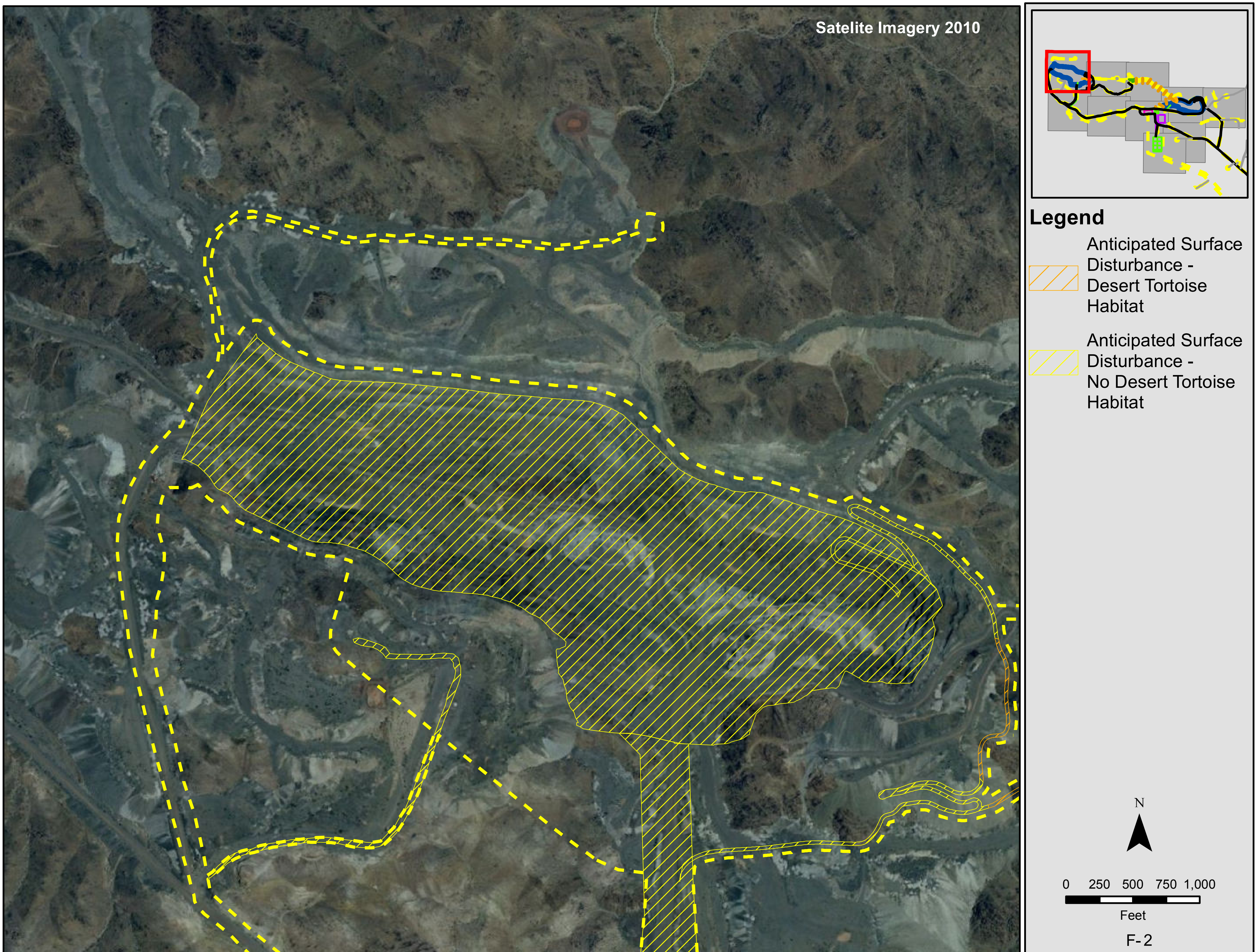
0 250 500 750 1,000

Feet

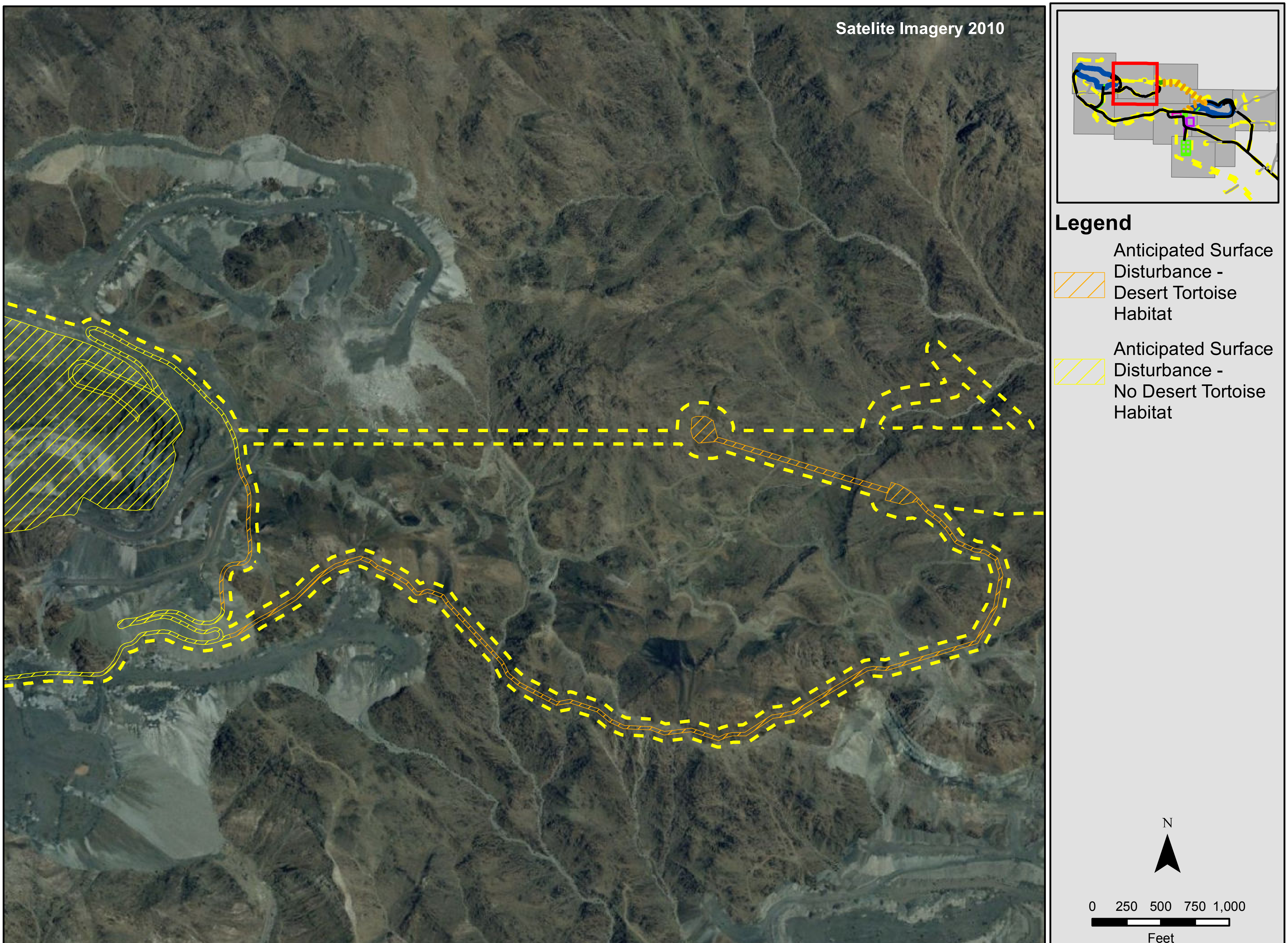
E-10


Satelite Imagery 1997/98
Legend
Anticipated Surface Disturbance - Desert Tortoise Habitat
Anticipated Surface Disturbance - No Desert Tortoise Habitat
N
0 250 500 750 1,000
Feet

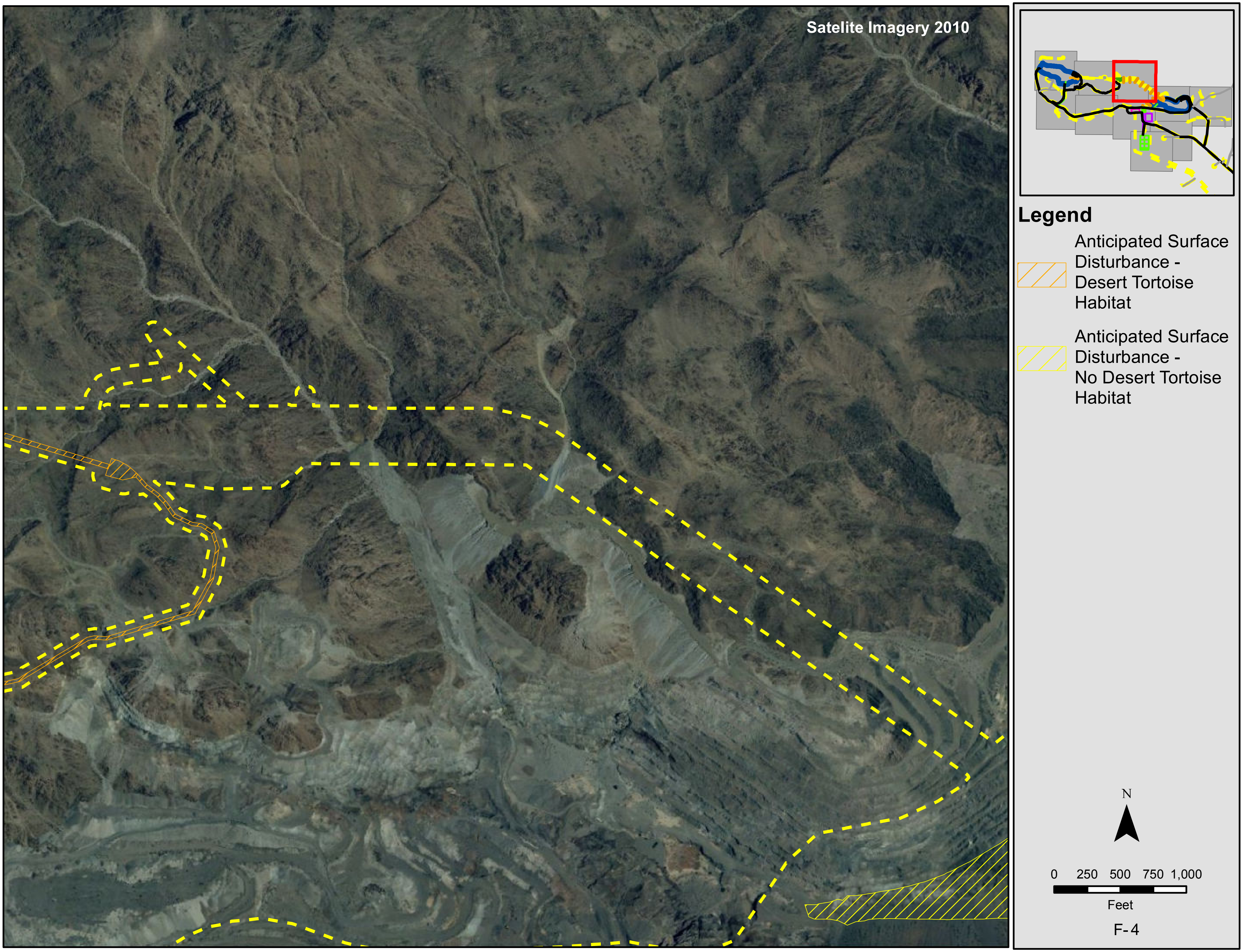
Appendix F – Mapbook of Central Project Area (2010)


Satelite Imagery 2010
Legend
Anticipated Surface Disturbance - Desert Tortoise Habitat
Anticipated Surface Disturbance - No Desert Tortoise Habitat
N
0 250 500 750 1,000
Feet

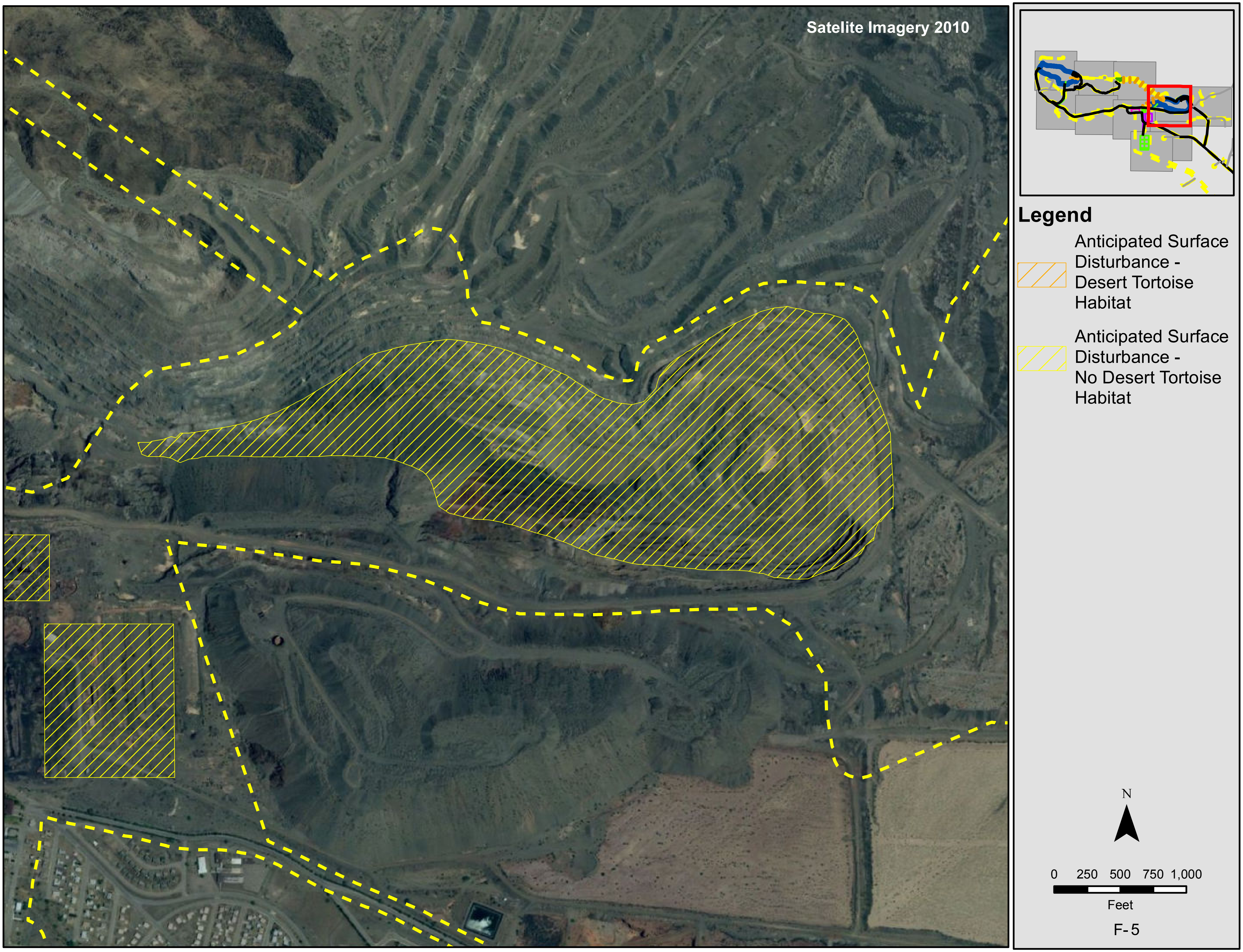
F- 2


Satelite Imagery 2010
Legend
Anticipated Surface Disturbance - Desert Tortoise Habitat
Anticipated Surface Disturbance - No Desert Tortoise Habitat
N
0 250 500 750 1,000
Feet

F- 3

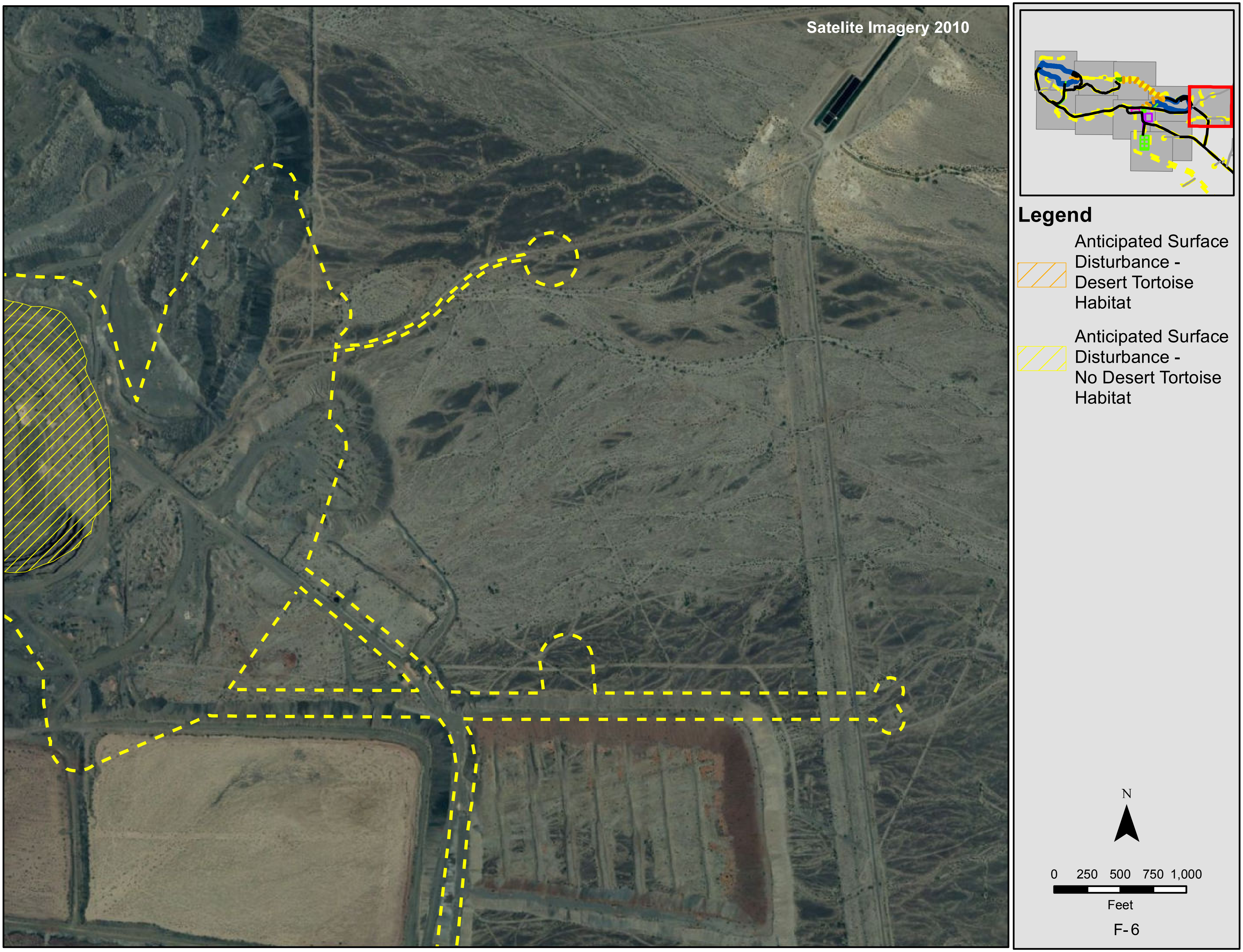


Satelite Imagery 2010
Legend
Anticipated Surface Disturbance - Desert Tortoise Habitat
Anticipated Surface Disturbance - No Desert Tortoise Habitat
N
0 250 500 750 1,000
Feet
F-4



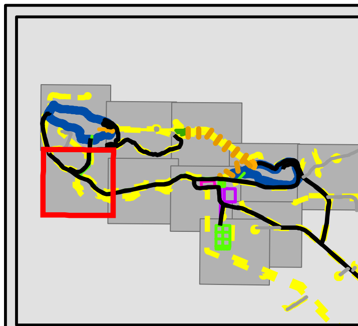
Satelite Imagery 2010
Legend
Anticipated Surface Disturbance - Desert Tortoise Habitat
Anticipated Surface Disturbance - No Desert Tortoise Habitat
N
0 250 500 750 1,000
Feet

F- 5



Satelite Imagery 2010
Legend
Anticipated Surface Disturbance - Desert Tortoise Habitat
Anticipated Surface Disturbance - No Desert Tortoise Habitat
N
0 250 500 750 1,000
Feet

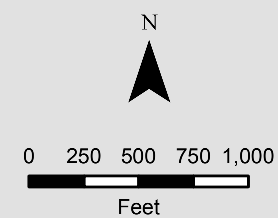
F- 6



Legend

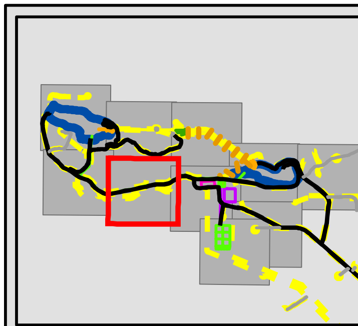
Anticipated Surface Disturbance - Desert Tortoise Habitat

Anticipated Surface Disturbance - No Desert Tortoise Habitat



F- 7

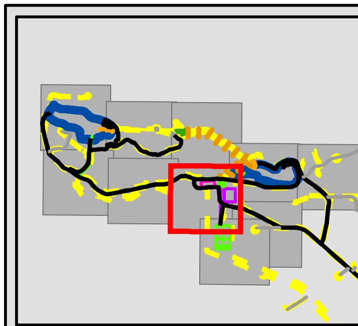

Satelite Imagery 2010



Legend

Anticipated Surface Disturbance - Desert Tortoise Habitat
Anticipated Surface Disturbance - No Desert Tortoise Habitat
N
0 250 500 750 1,000
Feet

F- 8



Legend

Anticipated Surface Disturbance - Desert Tortoise Habitat

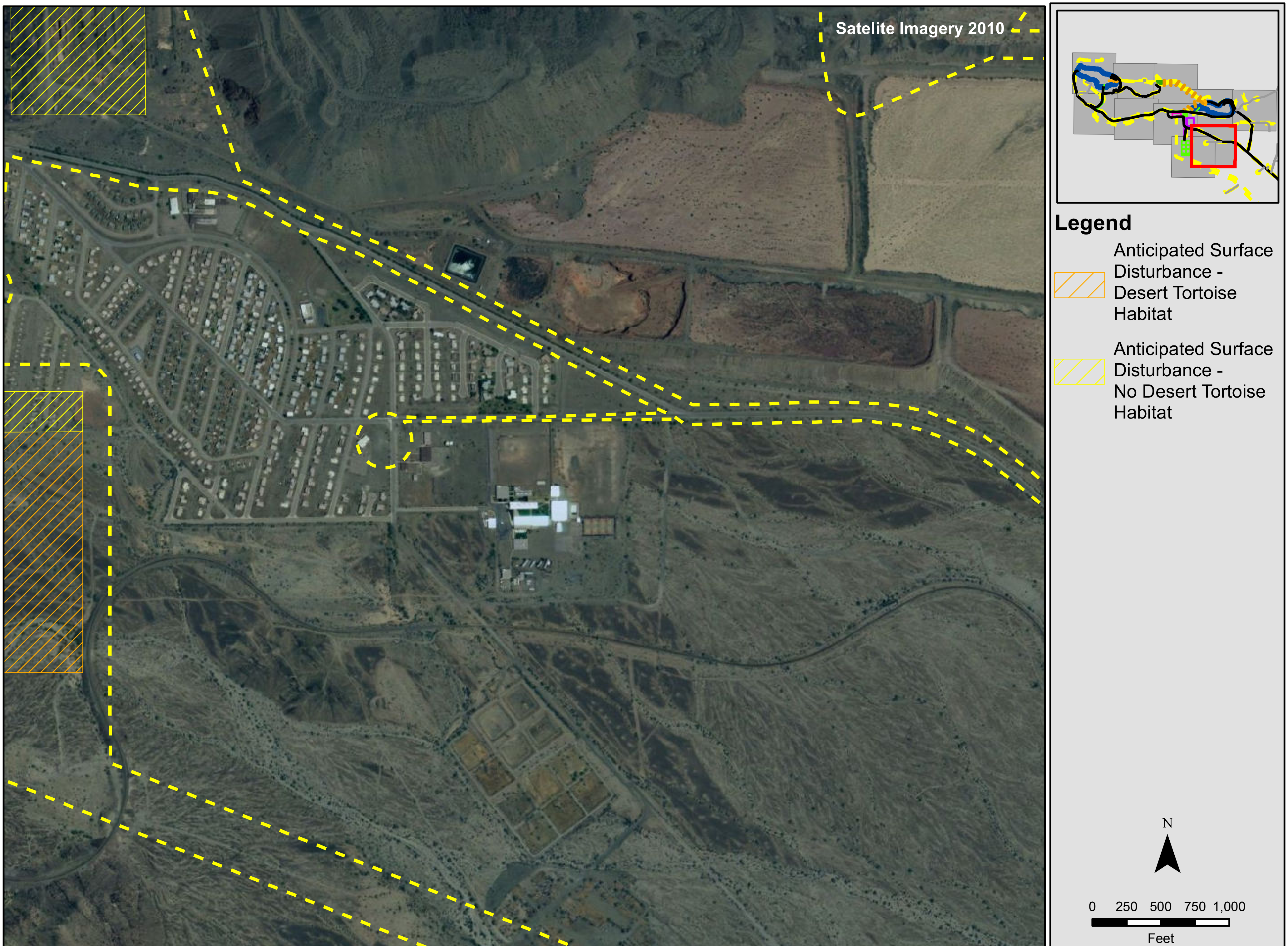
Anticipated Surface Disturbance - No Desert Tortoise Habitat

N

0 250 500 750 1,000

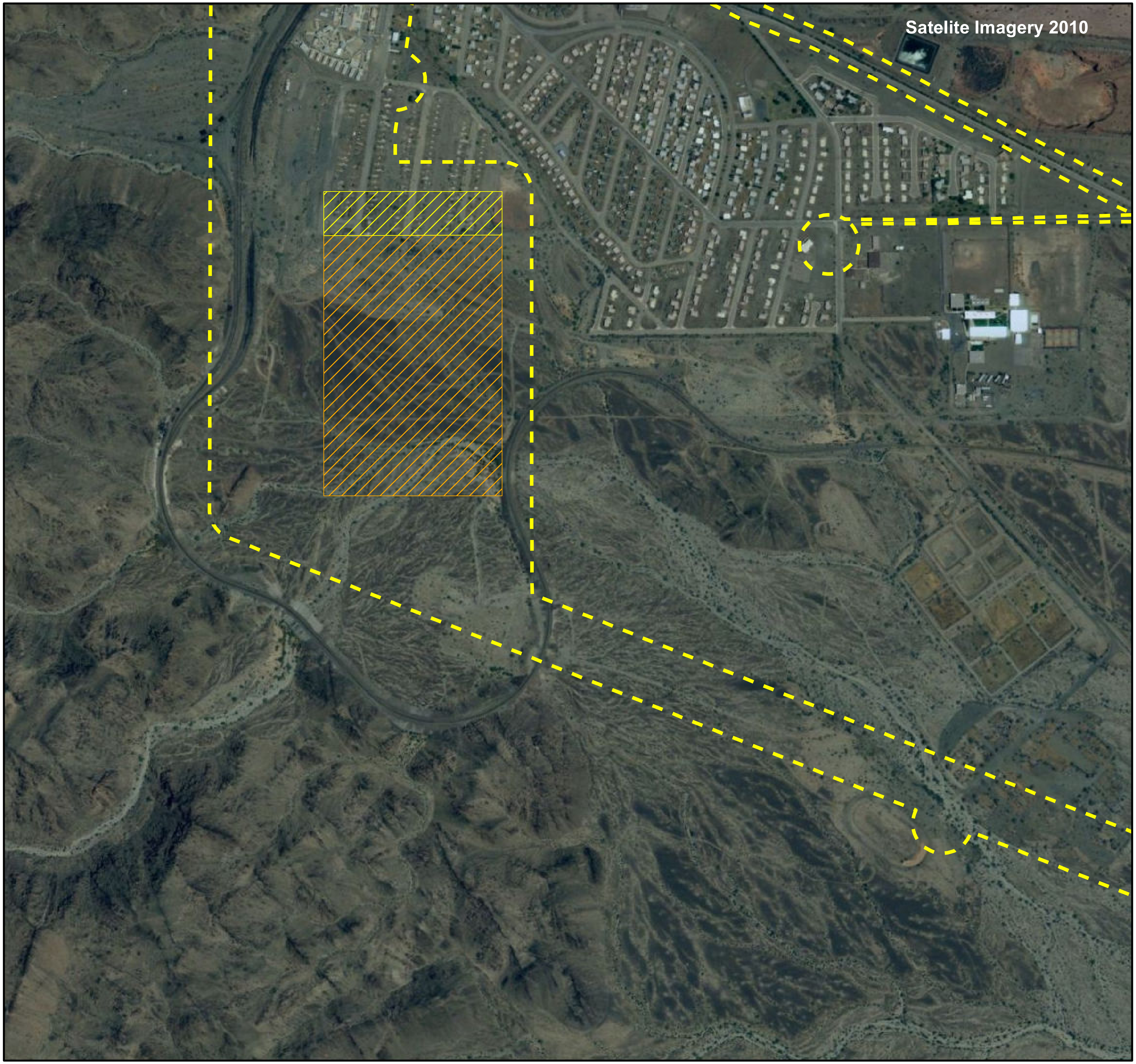
Feet

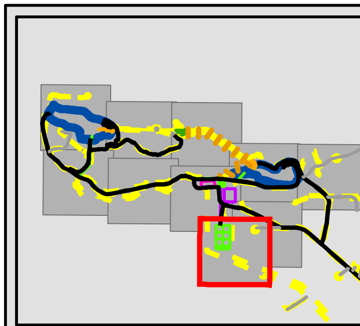
F- 9



Satelite Imagery 2010
Legend
Anticipated Surface Disturbance - Desert Tortoise Habitat
Anticipated Surface Disturbance - No Desert Tortoise Habitat
N
0 250 500 750 1,000
Feet

F- 10





Legend

- Anticipated Surface Disturbance - Desert Tortoise Habitat
- Anticipated Surface Disturbance - No Desert Tortoise Habitat

N

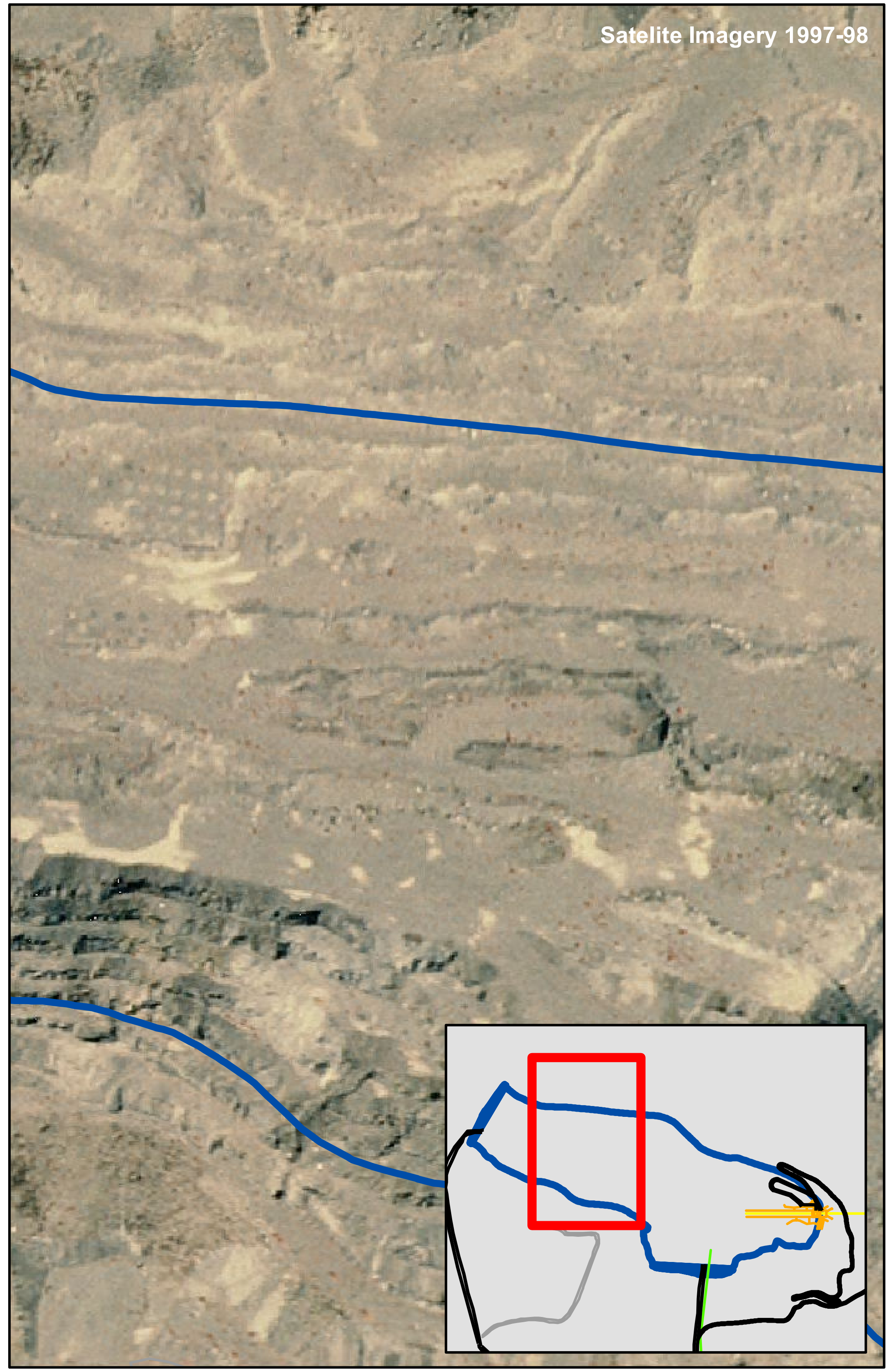
0 250 500 750 1,000

Feet

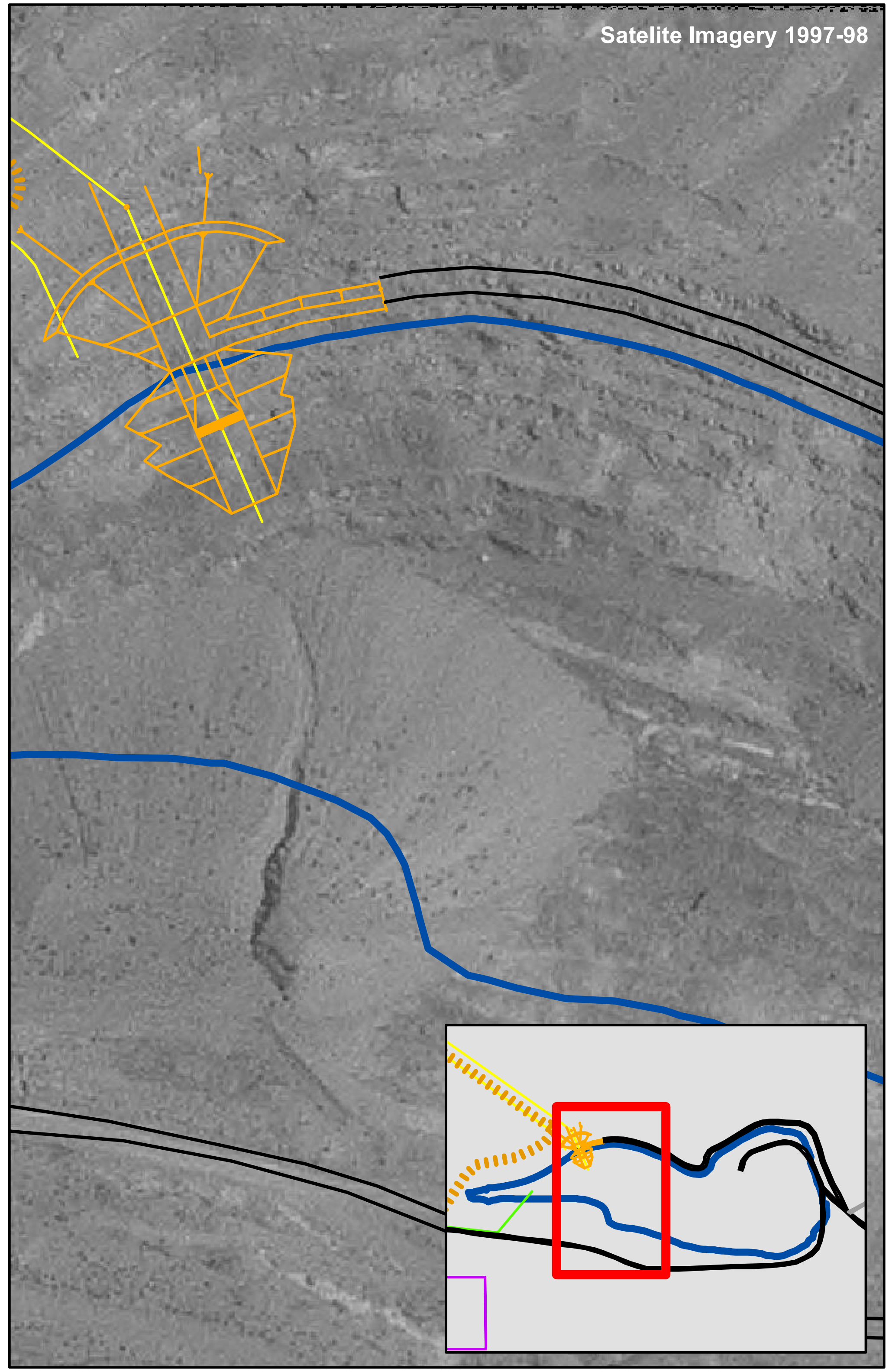
F- 11

Appendix G – Side by Side Comparison of 2010 and 1997-98 Aerial Photos

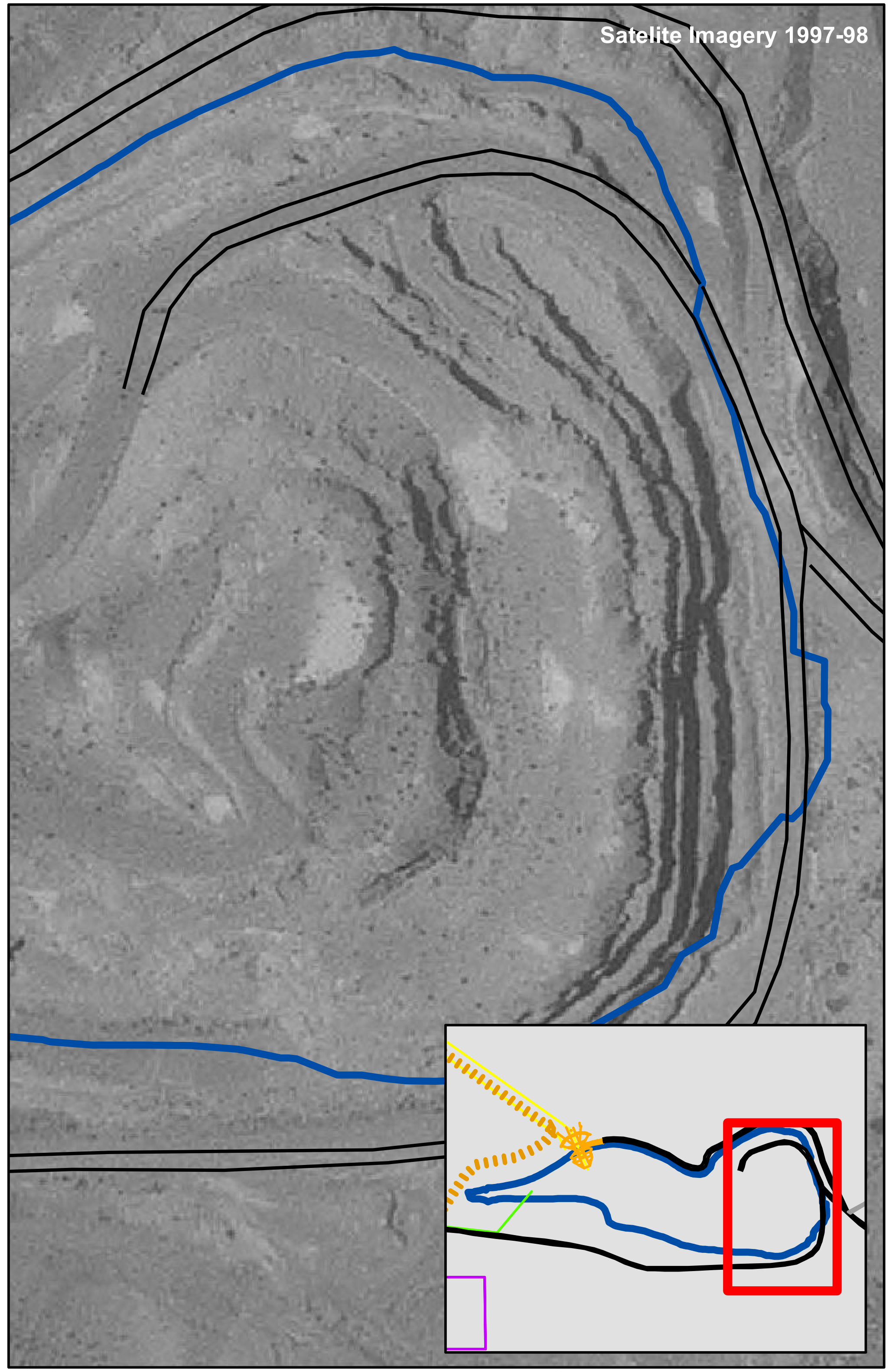

Satelite Imagery 2010

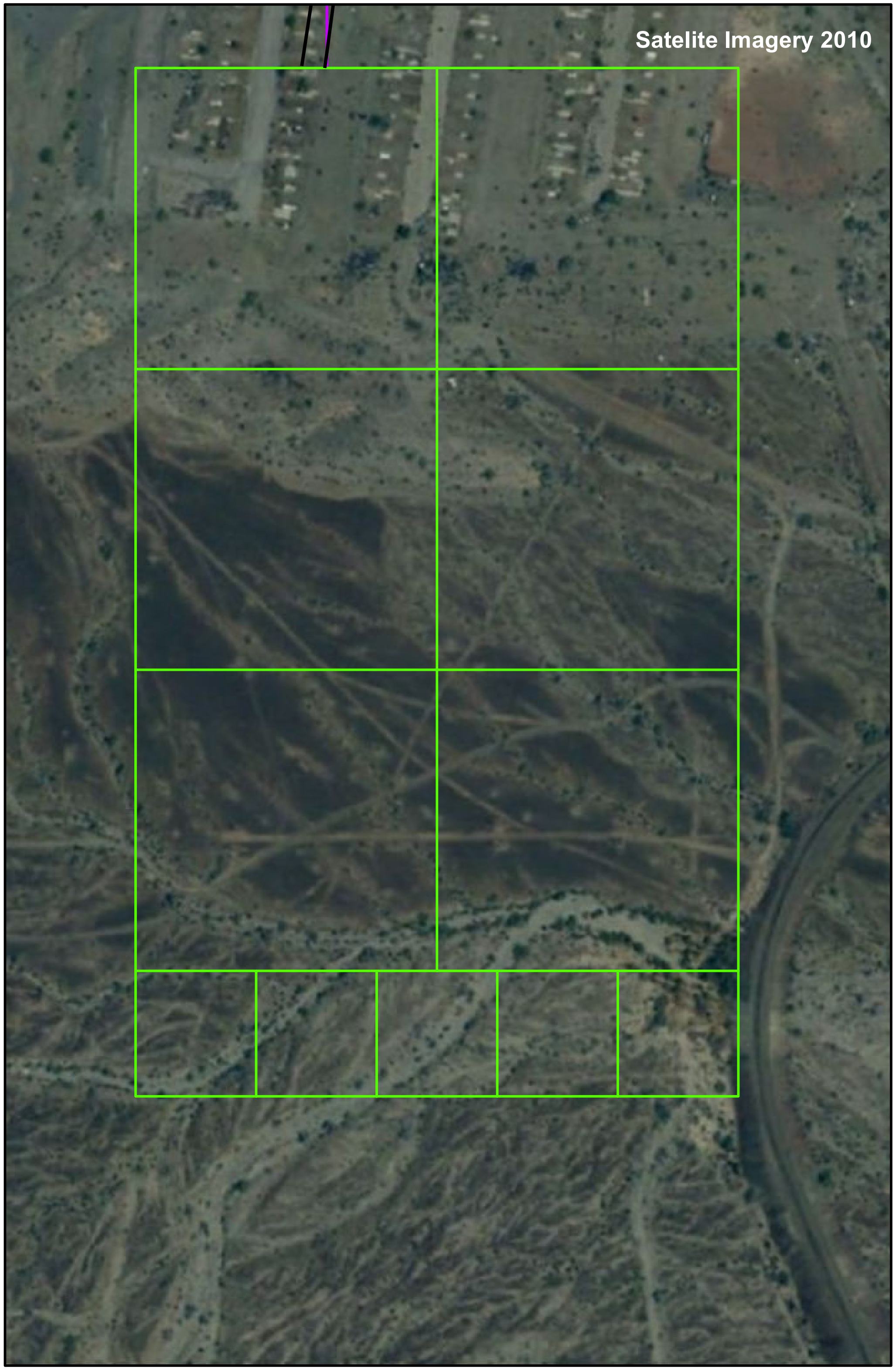

Satelite Imagery 1997-98

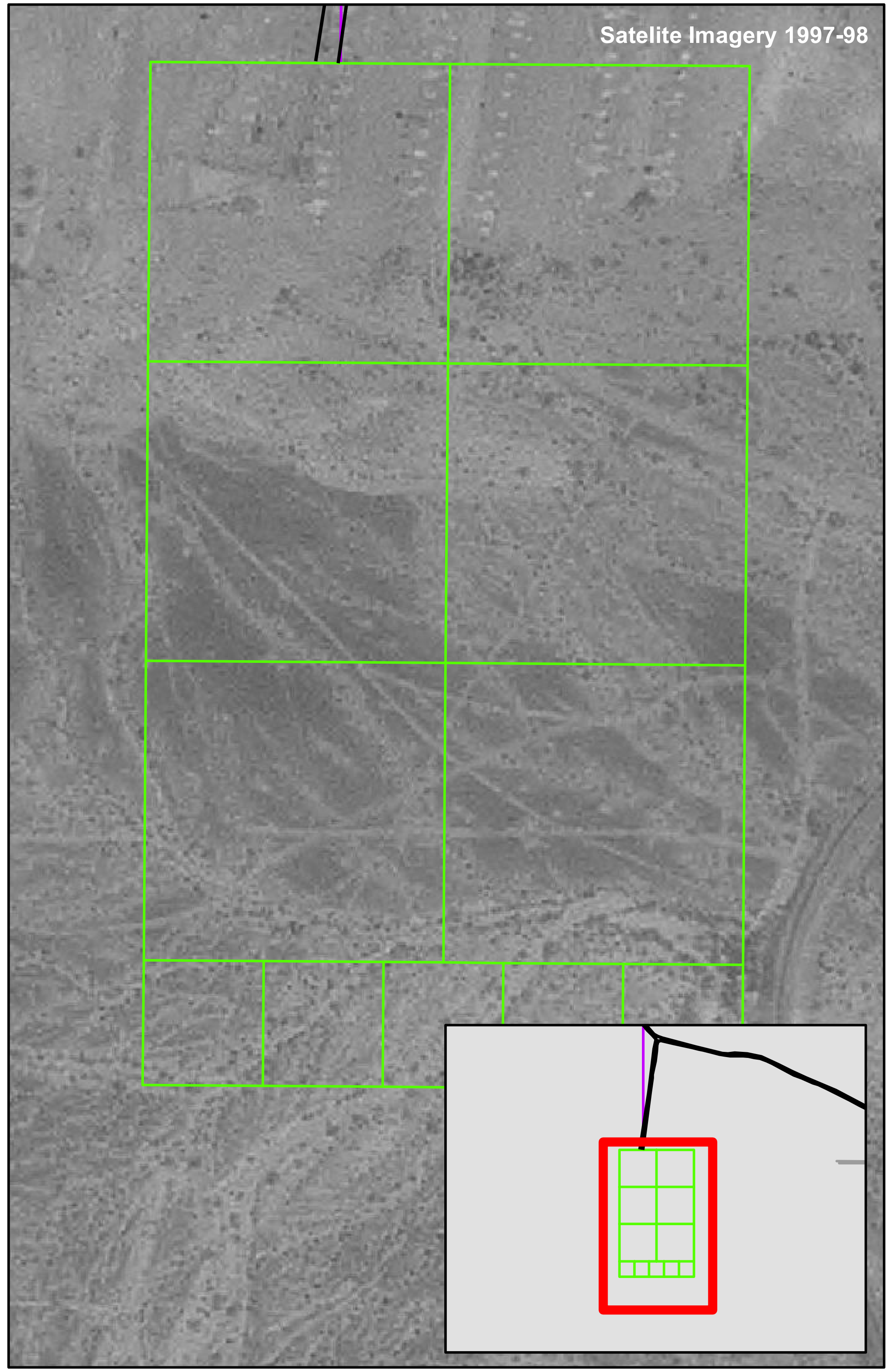

Satelite Imagery 2010


Satelite Imagery 1997-98

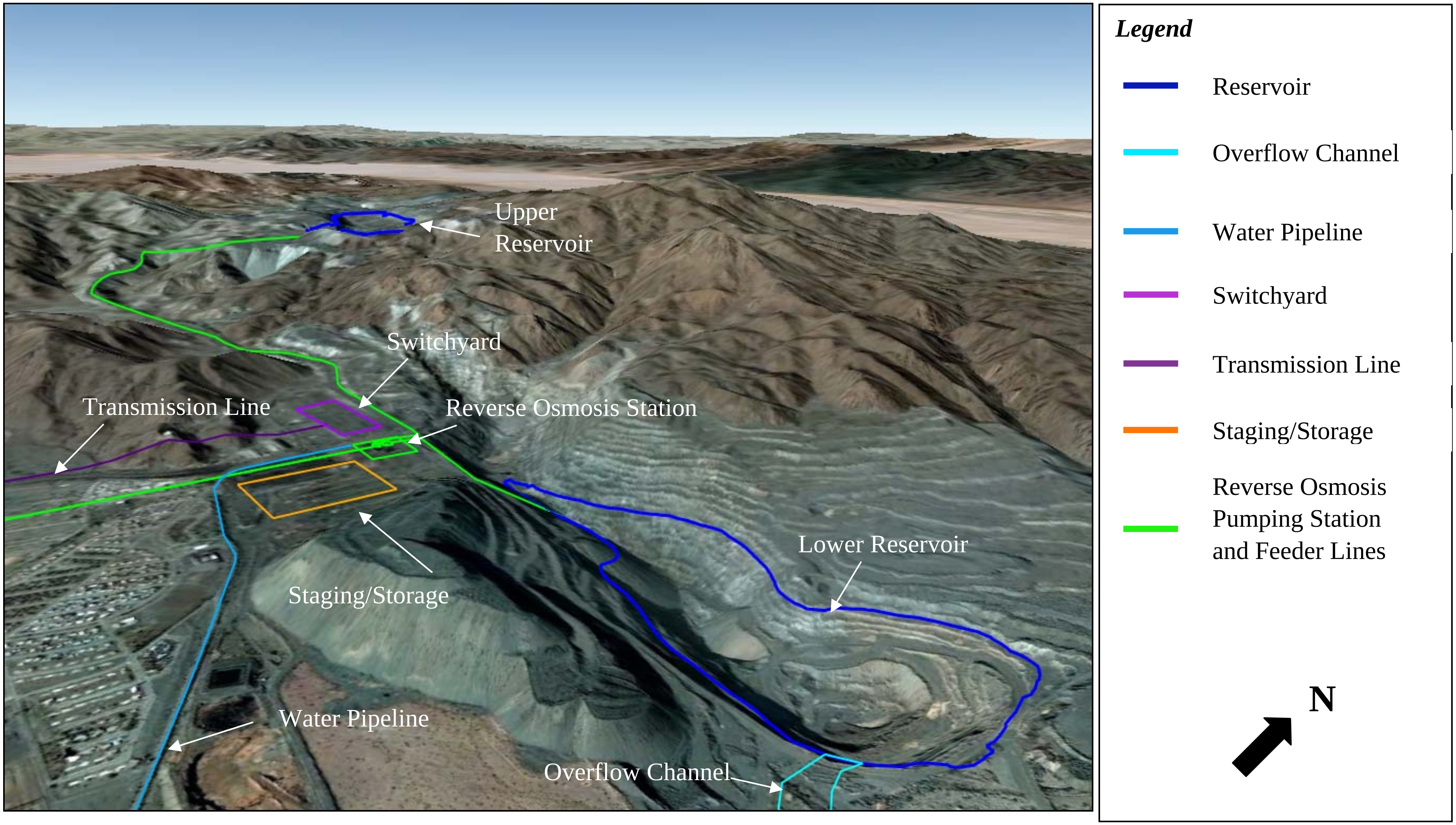

Satelite Imagery 2010


Satelite Imagery 1997-98

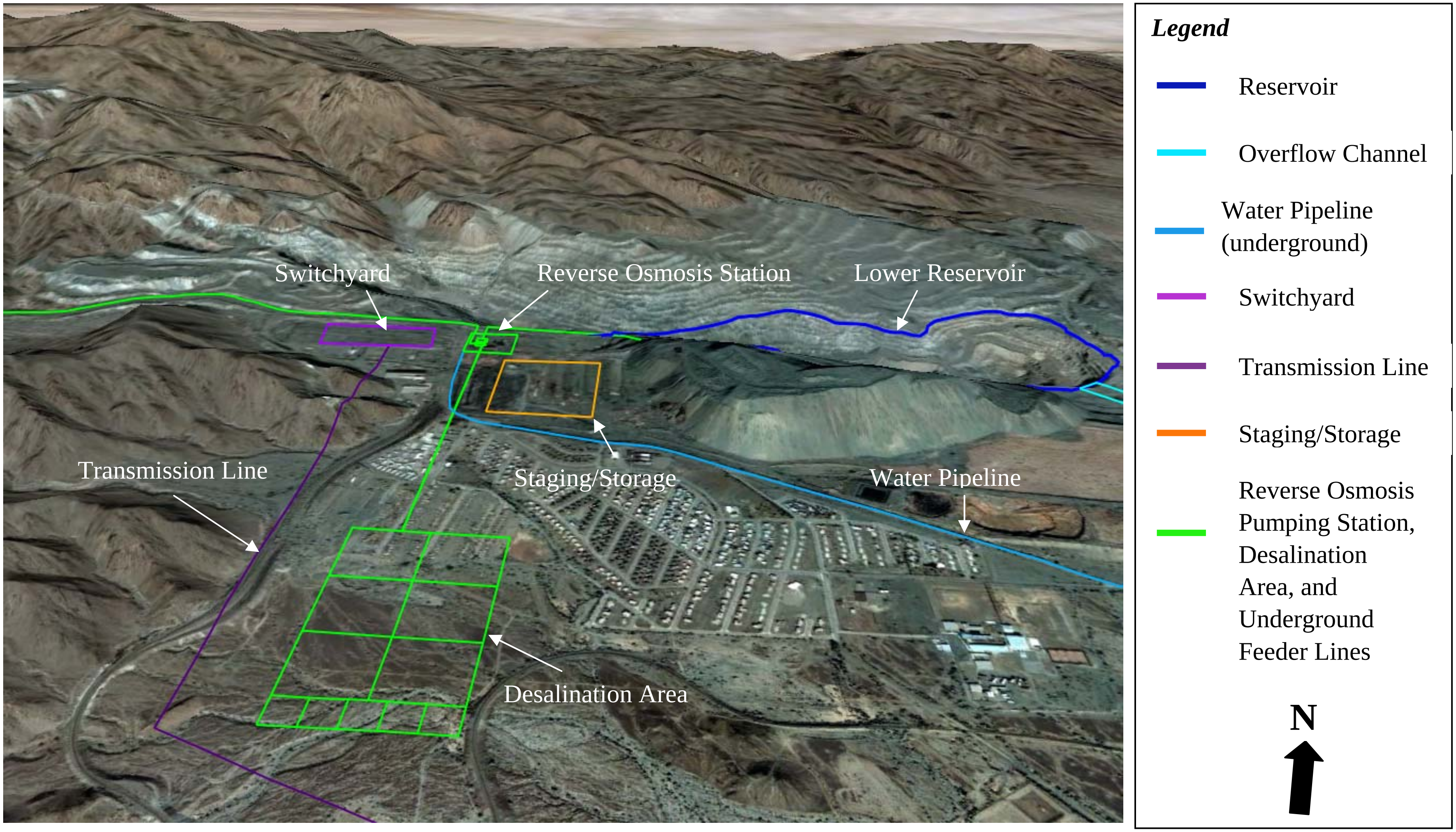

Satelite Imagery 2010


Satelite Imagery 1997-98

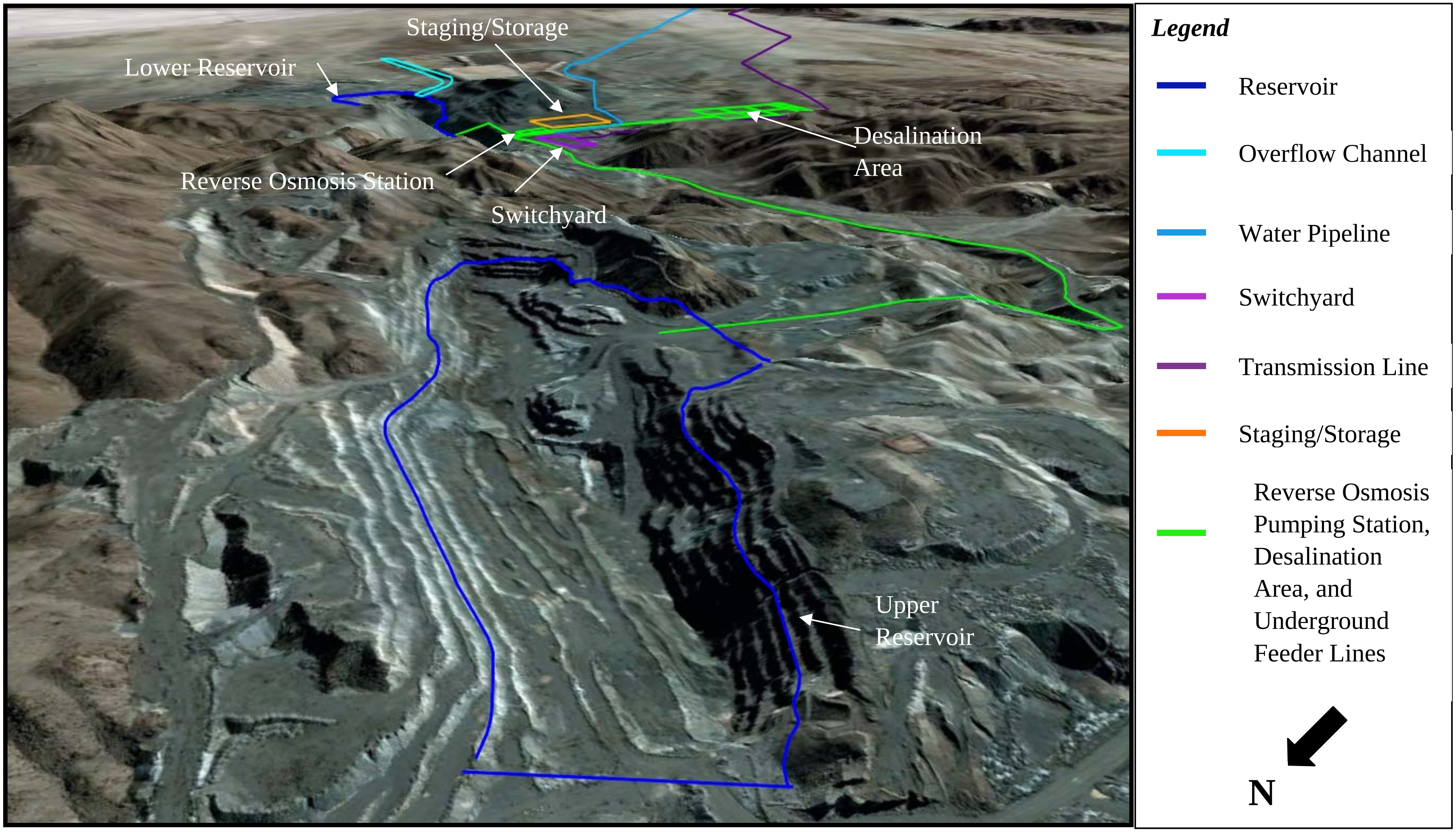
Appendix H – Simulated Aerial Views of Central Project Area



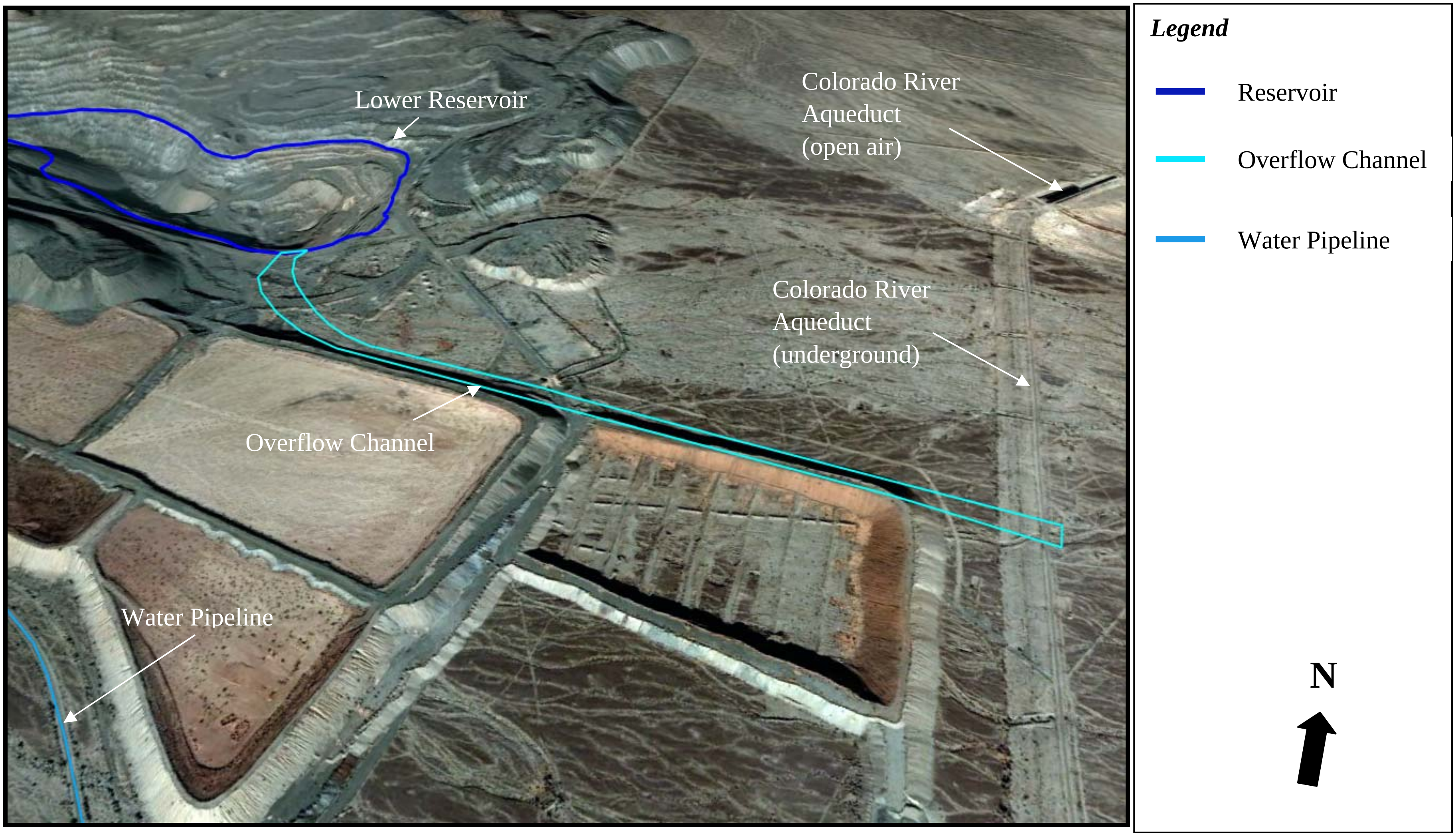
H-1. Simulated view of project area from approximately 1300 feet, facing northwest (Source: Project Plan from ECE, aerial imagery and 3D simulation from Google Earth, 2011 imagery, as modified by staff)



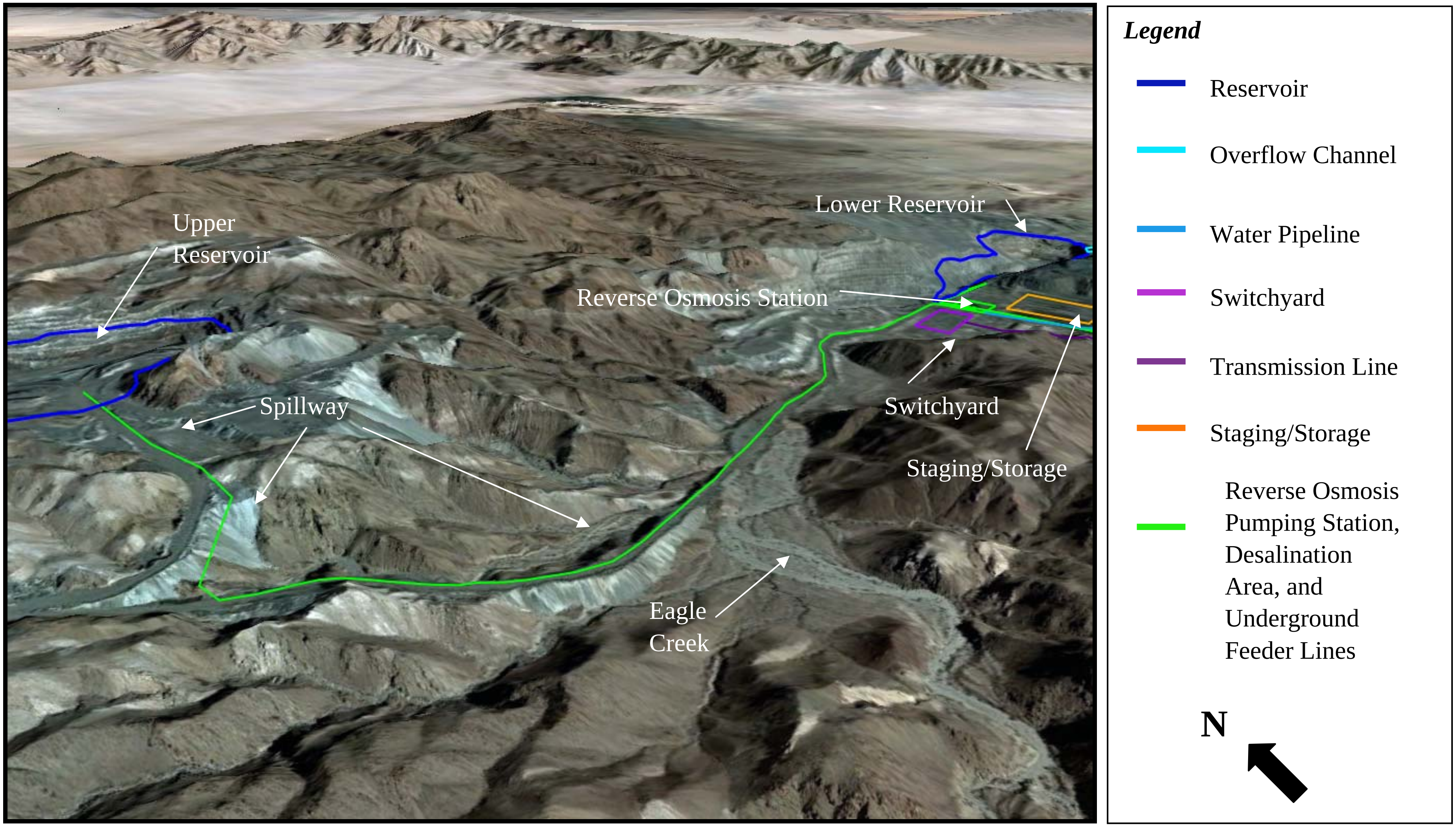
H-2. Simulated view of project area from approximately 1300 feet, facing north (Source: Project Plan from ECE, aerial imagery and 3D simulation from Google Earth, 2011 imagery, as modified by staff)



H-3. Simulated view of project area from approximately 800 feet, facing southeast (Source: Project Plan from ECE, aerial imagery and 3D simulation from Google Earth, 2011 imagery, as modified by staff)



H-4. Simulated view the Lower Reservoir and overflow channel from approximately 1200 feet, facing north (Source: Project Plan from ECE, aerial imagery and 3D simulation from Google Earth, 2011 imagery, as modified by staff)



H-5. Simulated view the Lower Reservoir and overflow channel from approximately 1000 feet, facing north (Source: Project Plan from ECE, aerial imagery and 3D simulation from Google Earth, 2011 imagery, as modified by staff)

Appendix I – Proposed Plans and Technical Reports

Revegetation Plan

Invasive Species Monitoring and Control Plan

Desert Tortoise Clearance and Relocation/Translocation Plan (Staff revised)

Desert Tortoise Predator Monitoring and Control Plan (Staff revised)

Worker Environmental Awareness Program

Bighorn Sheep Report

Phase I Golden Eagle Aerial Survey Report

Eagle Mountain Pumped Storage
FERC Project No. 13123

REVEGETATION PLAN

TABLE OF CONTENTS

FIGURES

TABLES

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.

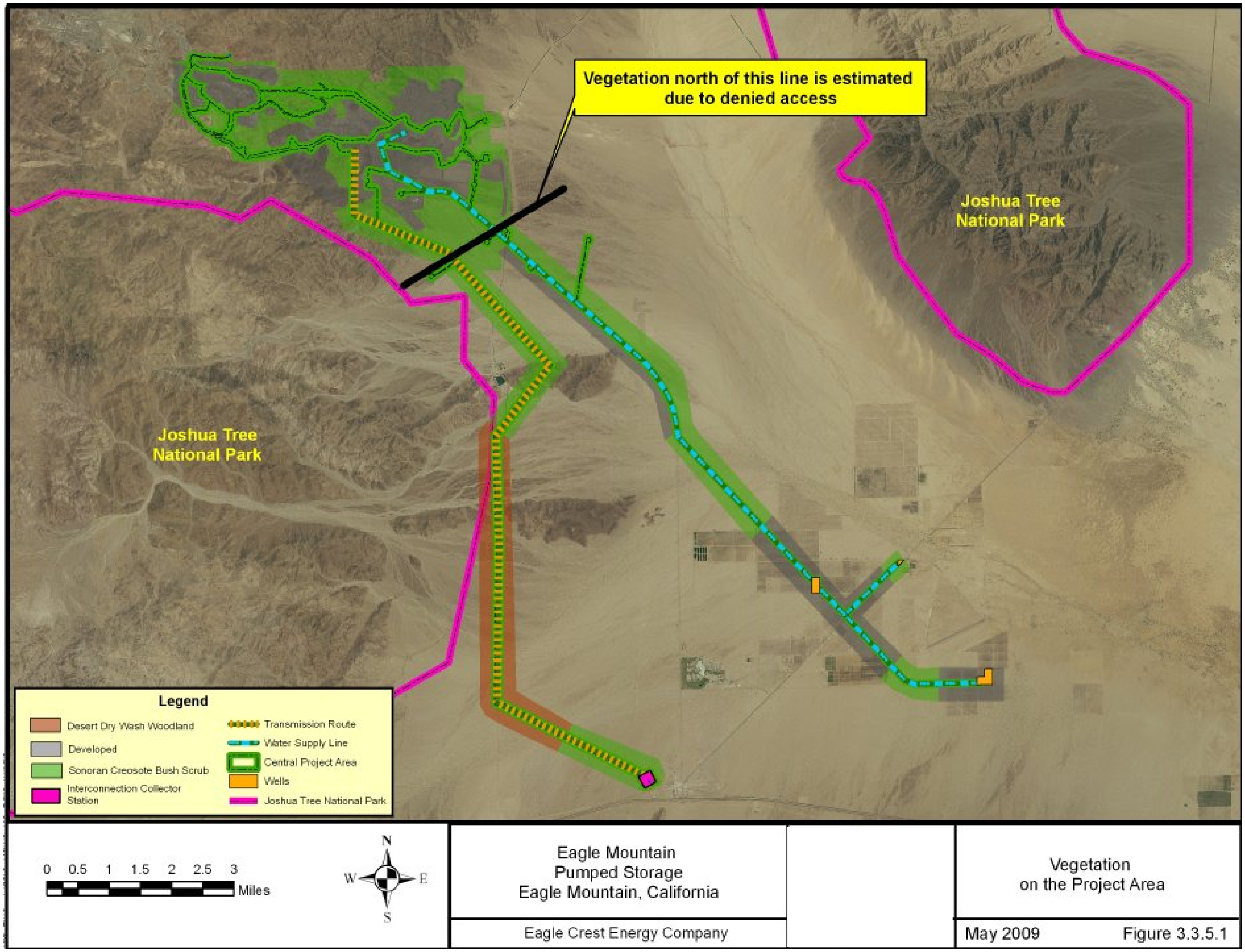


Figure 1: Vegetation of the Project Area

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.

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**

.

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™

Eagle Mountain Pumped Storage
FERC Project No. 13123

Invasive Species Monitoring and Control Plan

TABLE OF CONTENTS

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.

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.

EAGLE MOUNTAIN
PUMPED STORAGE PROJECT

DESERT TORTOISE CLEARANCE
AND
RELOCATION/TRANSLOCATION PLAN

March 2011

*With staff modifications in **bold italics***

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Abbreviations and Acronyms

°C	degrees Celsius
°F	degrees Fahrenheit
BA	Biological Assessment
BLM	U.S. Bureau of Land Management
BO	biological opinion
CDFG	California Department of Fish and Game
DTCC	Desert Tortoise Conservation Center
DWMA	Desert Wildlife Management Area
ECE	Eagle Crest Energy Company
EMPSP	Eagle Mountain Pumped Storage Project
ft	feet
FERC	Federal Energy Regulatory Commission
Genesis Solar	Genesis Solar, LLC
GPS	Global Positioning System
ha	hectares
I-10	Interstate 10
km	kilometer
km^2	square kilometer
m	meter
mm	millimeter
MW	megawatt
Plan	Relocation/Translocation Plan
Project	Eagle Mountain Pumped Storage Project
ROW	right-of-way
USFWS	U.S. Fish and Wildlife Service
ZOI	zone-of-influence

1.0 **Background**

1.1 Project Description and Setting

Eagle Crest Energy Company (ECE) proposes to develop the 1300 MW Eagle Mountain Pumped Storage Hydroelectric Project (Project) at the inactive Kaiser Mine site near the town of Desert Center, Riverside County, California. The Federal Energy Regulatory Commission (FERC or Commission) is the federal licensing agency for the Project, the details of which can be found in the draft Biological Assessment (BA) (ECE 2011) and Environmental Impact Statement (FERC 2010).

In summary, the 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 Project footprint (Figure 1) includes:

- The 1,101.5-acre hydropower plant or Central Project Area (CPA), which will include: (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 (I/O) structures; (5) water conveyance tunnels consisting of a 4,000-foot-long by 29-foot-diameter upper tunnel, 1,390-foot-long by 29-foot-diameter shaft, a 1,560-foot-long by 29-foot-diameter lower tunnel, four 500-foot-long by 15-foot-diameter penstocks leading to the powerhouse, and a 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 four Francis-type turbine units; (8) water supply facilities including a reverse osmosis (RO) system; (9) access roads; and (10) appurtenant facilities.
- A double circuit, 500 kV transmission line extending along the FERC recommended alternative and existing Southern California Edison (SCE) 161-kv transmission line, approximately 16.4 miles from the Project switchyard to the FERC recommended new Interconnection Collector Substation (Eastern Red Bluff Substation) southeast of Desert Center, for interconnection to the Devers-Palo Verde 500-kV line owned by SCE. The total right-of-way (ROW) area required for permanent and temporary disturbance, based on a width of 200 feet, is 400.5 acres, including stub roads; at least 97.6 acres will be on lands previously developed for agriculture. Access will be via the existing access road to the 161-kv line, with stub roads leading to the individual tower pads. The new Eastern Red Bluff Substation will require an estimated total area of 74 acres.
- A 15.3-mile long water pipeline connecting the CPA to three groundwater wells approximately 11 miles southeast of the CPA. The pipeline route lies along Kaiser Road, SCE's 161-kv line, Highway 177, or other existing development for its entire length. The construction ROW will be 60 feet, for a total of 55.6 acres of temporary surface disturbance, at least 34.7 acres of which will be on lands previously developed.

The CPA consists of mountainous, rocky terrain that has been disturbed extensively as a result of past mining activity (Figure 2). The Kaiser Landfill BA (RECON 1992) and EIS (County of Riverside and U.S. Bureau of Land Management [BLM] 1996) for the Eagle Mountain Landfill and Recycling Center identified Sonoran Creosote Bush Scrub in the CPA, surrounding a substantial area heavily disturbed by prior iron ore mining activities and the related townsite. 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. 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 CPA since the 1992 BA was written. Therefore, based on CPA configuration, ***minimal*** native habitats should be affected on the CPA.

The linear features for the EMPSP (water pipeline and transmission line) extend from the CPA, at the edge of the Eagle Mountains, into the adjacent Chuckwalla Valley, via a gently sloping bajada. 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). 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.

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 a 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.

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.

While the majority of surrounding lands are undeveloped, public lands managed by the BLM, a number of specific land uses exist in the Project vicinity (Figure 4). These include the largely vacant town of Eagle Mountain, a 460-acre townsite on Kaiser property adjacent to the CPA that still operates the Eagle Mountain School, serving the rural Chuckwalla Valley and local communities. The small communities of Lake Tamarisk and Desert Center are located approximately nine and ten miles southeast of the CPA along the Kaiser Road. Other small developments in the Project vicinity include the Metropolitan Water District (MWD) pumping plant and Colorado River Aqueduct, two small airports, a small disposal site west of Lake Tamarisk, and several small gravel pits. While irrigated crops, especially jojoba, formerly were farmed on approximately 5000 acres, only approximately 1200 acres remain in agricultural production, mostly for jojoba, asparagus, citrus, dates, and palms.

The principal transportation network in the Project vicinity includes I-10 and SR-177, local paved roads and dirt roads. The abandoned Eagle Mountain Rail Line, which once serviced the Kaiser Iron Ore Mine operation, runs through the area from I-10 north to the CPA. Several existing transmission lines cross the Project vicinity

Joshua Tree National Park (JTNP or Park) surrounds the CPA on three sides; the Park boundary is located about 2 to 3 miles from the CPA (Figure 3-4). JTNP encompasses nearly 792,000 acres of land of which approximately 700,000 acres have been designated Wilderness.

1.2 Desert Tortoise Occurrence in the Project Area

Comprehensive surveys were conducted in March and early April of 2008, 2009, and 2010. The results and details of all surveys can be found in ECE (2011). All Project alternatives were surveyed one or more years, except where they crossed Kaiser property. For all years, Kaiser denied access to their properties for surveying. This exclusion included the CPA, the Project water pipeline ROW north of the MWD aqueduct and the transmission line ROW north of Universal Transverse Mercator 3745200N (North American Datum 83).

Habitat for desert tortoise exists on all native habitats on the Project (Figure 5). Relatively little sign was observed on the FERC Staff Recommended Transmission Alternative. Cumulatively over the 3 years of survey, there were five scat, two burrows and two sets of tracks west of SR-177, all west of Kaiser Road, and one tortoise, three burrows and one carcass part east of SR-177, in the native habitat north of I-10. The EMPSP draft BA (ECE 2011) estimated tortoise density on the transmission ROW at 1.2 tortoises per square mile. On and in the buffer around the Eastern Red Bluff Substation, one set of tracks and two carcass parts were observed. This substation alternative has relatively 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.

There is also 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 SR-177 or is in the Eagle Mountain Mine site. No tortoise sign was observed in 2010 on the water pipeline route east of Kaiser Road. Along Kaiser Road, surveys were only conducted in 2008 and 2010, but two burrows one scat and one carcass part were found. Based on the similarity of habitat, tortoise density along Kaiser Road is probably approximately the same as estimated for native habitats on the transmission route, approximately 1.2 tortoises per square mile (ECE 2011).

On the CPA, ***the project is expected to disturb about 60 acres of potential desert tortoise habitat; however, these areas are generally bordered by areas disturbed by mining***. No tortoises are expected to occur, although there is a low likelihood that one or few tortoises may be present, either as transients or residents. Conditions on the CPA are highly disturbed from past mining activities, and remain denuded of vegetation. Based on aerial photographs, there do not appear to be any changes in the amount or quality of habitat in the disturbed areas of the CPA since the 1992 Kaiser Landfill BA (RECON 1992) and 1993 BO (U.S. Fish and Wildlife Service [USFWS] 1993) were written; both of those documents concluded that there is no tortoise habitat in the area that overlaps the CPA.

2.0 **Purpose and Structure of the Plan**

The purpose of this Relocation/Translocation Plan (Plan) is to provide direction for the removal of tortoises from harm's way on the Project during all Project activities. A draft Plan was submitted to FERC, BLM, USFWS, California Department of Fish and Game (CDFG) in September 2009. The current version of the Plan incorporates newer written guidance from USFWS (2009a and 2010a), as well as newer verbal guidance from USFWS, BLM, and CDFG. Because USFWS is in the process of analyzing desert tortoise translocation in general, relevant newer guidance will be incorporated into this Plan as it become available.

It should also be noted that this is an adaptive plan – i.e., while the likely scenario related to desert tortoise translocation is identified, all potential contingencies that could happen are also addressed in the unlikely event that they do happen.

Biologically, translocation refers to moving an animal outside its home range. For desert tortoises, males generally have been shown to have larger home ranges than females in studies of sufficient duration and sample size (O'Connor et al. 1994; TRW 1999a), approximately 111.6 acres (range: 10.4–487.8 acres) (45.2 hectares [ha]; range: 4.2–197.5 ha) for adult males and 43.5 acres (range: 4.7–143.3 acres) (17.6 ha; range: 1.9–58.0 ha) for adult females. These areas result in home range diameters of 2,482 feet (ft) (752 meters [m]) for males and 1,554 ft (470 m) for females. Studies of shorter duration or with a smaller sample size found smaller home ranges (e.g., Burge 1977, Barrett 1990, O'Connor et al. 1994, Duda et al., 1999). Home ranges for both genders (Duda et al, 1999) and for males, only, in one study (TRW 1999a), decreased significantly in drought years.

Current terminology regarding translocation is in flux. For clarity in this Plan, then, the following terms, which are biologically defensible and consistent with the USFWS 2009 *Desert Tortoise Field Manual*, will be used:

- Relocation – Moving a tortoise a short distance (up to 500 m) out of harm's way to a point within that tortoise's home range.
- Translocation – Moving a tortoise out of harm's way to a point distant from the tortoise's home range, over 500 m.

The structure of this Plan is first to describe general procedures applicable to all tortoise relocations/translocations: data collected on all tortoises; tortoise transportation; authorized handlers; and reporting. The Plan then addresses desert tortoise clearance and translocation during various Project phases, from site perimeter fencing through construction, restoration activities following construction, operations, and Project decommissioning. All avoidance, protection, and minimization measures that are identified in other Project documents for other biological and cultural resources will be implemented in concert with this Plan.

3.0 **Procedures Applicable to All Relocations and Translocations**

3.1 Data Gathered on Relocated and Translocated Tortoises

Each captured tortoise will be processed at capture, prior to relocation or translocation. The gender, carapace length, width along the widest area between and inclusive of Marginals 5 and 6, height at the third vertebral, distinguishing morphology, clinical signs of disease, capture site location and description, and the amount of void, if any, will be recorded. In addition, the tortoise will be photographed and drawn. All release site locations will also be recorded at relocation/translocation, along with their descriptions. All tortoise handling will be accomplished by techniques outlined in the USFWS (2009a: Sections 7.6-7.8) and including the most recent disease prevention techniques (e.g., Wendland et al. 2009). Each tortoise will be assigned an individual number, with a number series to be provided by USFWS. Marking techniques will be ***consistent with those recommended*** by USFWS, but temporary marks using very small epoxy numbers (e.g., clear epoxy over a small, indelible number on a correction fluid [Wite-Out©] background) on a costal or interior marginal area that receives little to no abrasion are suggested, with a Project-specific identifier. Such numbers will last for several years, which will facilitate identifying specific tortoises if they are subsequently observed during Project maintenance or other activities, included repeated observations during construction (e.g., on unfenced linear facilities).

3.2 Transmitters

Where needed for monitoring relocated or translocated tortoises, transmitters will be affixed to the tortoises. Holohil R1-2B transmitters (24 mm wide by 11 mm thick; 14.9 g; www.holohil.com) will be epoxied onto a carapace scute using five-minute gel epoxy. For males, transmitters will be affixed to the fifth vertebral; for females, transmitters will be affixed to the anterior carapace in the most appropriate location for the animal's shell shape that will preclude interference with righting. The transmitter antenna will be fed through a plastic sheath with a diameter slightly greater than the antenna. This sheath will be epoxied low on the carapace, just above the marginal scutes, and split at the scute seams (growth areas) to preclude distortion of the tortoise's shell during growth. This technique permits the antenna to remain protected from abrasion, but move freely, thereby not affecting tortoise growth. Juvenile tortoises will be similarly equipped but with smaller transmitters, appropriate for their mass and size (<10 percent of the tortoise's mass). Because the antenna sheath is tightly curved on a very small tortoise, potentially constricting antenna movement with subsequent growth distortion, much more of the antenna will remain free on small tortoises.

3.3 Tortoise Transportation and Holding

Tortoises that only need to be moved a few hundred feet will be hand-carried to the release site. Each tortoise that is hand-carried will be kept upright and the handler, wearing disposable examination gloves (one pair per tortoise) will move the tortoise as quickly and smoothly as possible. Tortoises that must be moved further from the capture site will be placed in individual, sterilized tubs with taped, sterilized lids or single-use cardboard boxes with lids. During transport by vehicle, the tortoise tub will be kept shaded and the tub will be placed on a well-padded surface that is not over a heated portion of the vehicle floor. These measures are consistent with USFWS (2009a: Section 7.10).

Should a tortoise void or defecate between capture and release, it will be thoroughly rinsed to remove potential attracting odors to predators. Then, it will be hydrated in one of three ways: epicoelomically, nasal/orally, or by soaking in a shallow tub of water[1]. The tortoise's mass following this procedure will be recorded.

3.4 Handling Temperatures

Handling will adhere to USFWS (2010a) handling guidelines, which state that tortoises can only be handled when air temperatures, measured at 2 inches (5 centimeters) above the ground (shaded bulb), are not expected to exceed 95 degrees Fahrenheit (°F) (35 degrees Celsius [°C]) during the handling session. If the air temperature exceeds 95°F during handling or processing, desert tortoises will be kept shaded in an environment where the ambient air temperatures do not exceed 91°F (32.7°C) and air temperature does not exceed 95°F. The desert tortoise will not be released until air temperature at the release site declines to 95°F.

Tortoises must go underground to escape surface heat at ground surface temperatures of 109°F (43°C) (Karl 1992) to 113°F (45°C) (Zimmerman et al., 1994). Because surface temperatures can easily exceed 109°F when air temperatures at two inches are still below 95°F, the more conservative temperature will govern all tortoise handling described in this Plan, to minimize harm to tortoises. In other words, tortoises will not be handled if ground surface temperatures exceed 109°F even if air temperatures are less than 95°F.

USFWS (2009a and 2010a) has not provided guidance relative to handling temperatures for tortoises found during cold temperatures (e.g., less than approximately 50°F [10°C]) except as they relate to moving the tortoise. This is addressed in the relevant sections below on relocation and translocation.

3.5 Authorized Handlers

Eagle Crest would designate and train staff (designated staff) to implement and oversee the biological compliance program. This person would possess sufficient desert tortoise knowledge and experience to handle and move tortoises appropriately and to approve specific monitors to handle tortoises, at their discretion. To meet these conditions, Eagle Crest's designated staff would have thorough and current knowledge of desert tortoise behavior, natural history, ecology, and physiology, and demonstrate the ability to safely and successfully conduct their required duties. The designated staff would monitor project activities within desert tortoise habitat and be responsible for locating desert tortoises and their sign (i.e., conduct clearance surveys). The designated staff would ensure proper implementation of protective measures, and make certain that the effects of the project on the desert tortoise and its habitat are minimized in accordance with the biological opinion or incidental take permit. All incidents of

[1] These three methods were approved by the Desert Tortoise Recovery Office and the San Diego Zoo, working in concert with the Desert Tortoise Conservation Center, on 9 March 2011.

noncompliance in accordance with the biological opinion or permit would be recorded and reported.

Eagle Crest's designated staff would have the knowledge and experience to conduct any or all of the following, as needed:

- ***Locate, identify and report all forms of desert tortoise sign in accordance with approved protocols;***
- ***Handle and temporarily hold desert tortoises;***
- ***Move desert tortoises from harm's way when they enter project sites;***
- ***Relocate/translocate desert tortoises prior to implementation of projects;***
- ***Excavate burrows to locate desert tortoises;***
- ***Reconstruct desert tortoise burrows;***
- ***Unearth and relocate desert tortoise eggs;***
- ***Approve individual monitors and their activities based on qualifications of the monitors;***
- ***Directly supervise monitors during clearance surveys and train monitors in all aspects of protecting desert tortoises during implementation of projects;***
- ***Be familiar with the project biological assessment and biological opinion or permit (copy in hand);***
- ***Ensure proper implementation of protective measures;***
- ***Record and report incidents of noncompliance in accordance with a biological opinion or permit; and***
- ***Halt project activities per provisions of the biological opinion or permit.***

3.6 Tortoise Exclusion Fencing

Specific desert tortoise exclusion fencing needs are discussed in the relevant sections below that describe construction of the CPA perimeter fences (Section 4.1), and utilities' construction (Section 4.3). General requirements for fencing are described here.

Desert tortoise exclusion fencing will be used to keep tortoises from entering the CPA, Eastern Red Bluff Substation, and construction areas on the utility lines, as needed in place of or in addition to biological monitoring. (See each relevant section below for discussion of fencing requirements.) Tortoise exclusion fence will be constructed per USFWS (2009a) guidelines.

Permanent exclusion fence material will consist of galvanized one-inch by two-inch vertical wire mesh fence, extending at least two feet above the ground and buried at least one foot. Tortoise-proof gates will be established at all site entry points, to remain closed except during entry by vehicles. If shown to be effective and not potentially injurious to tortoises, tortoise "cattle guards" may be installed instead of or in addition to gates.***These fences will be maintained for the term of the FERC license.***

Temporary fencing will follow guidelines and materials for permanent fencing except in very temporary situations, when silt fencing may be used. Rebar may replace t-stakes or chain link poles for temporary fencing. In both cases, supporting stakes will be sufficiently spaced (e.g., ≤8 ft for wire mesh; ≤5 ft for silt fencing) to maintain fence integrity. On the CPA, where burial is impossible, the mesh will be bent at a right angle toward the outside of the fence, at or below ground level, with the bent portion anchored by stakes and further held down by rocks and soil to prevent tortoises from digging under the fence. Outside the CPA, fencing may be buried if it will not create a biologically significant disturbance; alternatively, it may be bent outward at the ground level, with the bent portion tacked or held down by rocks and soil.

All permanent exclusion fencing will be inspected monthly and during all major rainfall events; temporary fencing will be inspected at least weekly. Any damage to the fencing will be repaired immediately. If it cannot be repaired immediately, any gaps that are open to tortoise habitat will be continuously monitored until the gap can be repaired, to ensure that a tortoise has not entered the site through the gap.

3.7 Injured or Dead Tortoises

Any tortoise injured or killed during any Project activity, including post-translocation monitoring, will be reported by phone to USFWS, CDFG, BLM, and FERC no later than noon on the first business day following the discovery of the injured/killed tortoise; a follow-up written report will be e-mailed or faxed within 48 hours. Prior to any desert tortoise monitoring or surveys, the ***Eagle Crest designated staff*** will contact CDFG for the name of a veterinarian or wildlife rehabilitation clinic, for use in the event of an emergency. If a tortoise is injured, the tortoise will be taken immediately to one of these facilities if the ***designated staff*** determines that veterinary care is warranted. If the ***designated staff*** is uncertain, then he/she can discuss this with the contact biologist at the USFWS and CDFG immediately upon discovery of the injured tortoise, or simply take the tortoise to the ***identified*** veterinarian. If a tortoise is killed, it will be salvaged for necropsy.

4.0 Clearance and Relocation/Translocation During Specific Project Phases

For the EMPSP, moving tortoises to protect them is most likely only to occur during construction on some portions of the utilities (transmission line and water pipeline). There is a low possibility of moving tortoises from the Eastern Red Bluff Substation site but no tortoises are expected on the CPA.

However, tortoise relocation/translocation may occur during Project construction, including initial perimeter fence construction on the CPA and Eastern Red Bluff Substation, CPA and substation tortoise clearance surveys, utilities' construction, revegetation of temporarily disturbed areas, or initial grading on the CPA. Project operations and decommissioning may also necessitate tortoise relocation/translocation.

Based on the survey results, it is anticipated that no or very few desert tortoises would require removal from the CPA during any Project phase. Depending on weather conditions during the construction period, one or more tortoises may need to be removed from harm's way (relocated) during construction of the utilities and revegetation of temporarily disturbed areas. No translocation (i.e., moving a tortoise outside its home range) is anticipated for any phase of the EMPSP.

For the reader's ease in locating information in this section, the organization largely follows the order of Project construction:

Perimeter fencing around the Central Project Area	Section 4.1
Pre-construction clearance of the Central Project Area	Section 4.2
Construction activities in unfenced habitats, specifically for the utilities and revegetation of temporarily disturbed habitat –	Section 4.3
Operations	Section 4.4

The Eastern Red Bluff Substation is proposed to be constructed by SCE for interconnection of several proposed energy projects, including the Desert Sunlight Solar Project and this proposed Project. The Desert Tortoise Translocation Plan developed for the Desert Sunlight Project addresses translocation of desert tortoises in the Eastern Red Bluff Substation (Ironwood Consulting, Inc. 2010). Eagle Crest Energy Company proposes to collaborate with SCE, Desert Sunlight Holdings, LLC (the developers of the Desert Sunlight Solar Project), and other solar projects in the translocation of desert tortoises from the substation site under the requirements of the desert tortoise translocation plan for that site, when that plan is approved.

4.1 Central Project Area Perimeter Fencing

Once the CPA can be accessed, surveys will be conducted in the CPA to determine the presence of desert tortoise of any available habitat. If there is any suggestion that tortoises could be present in the construction area or along routes used by construction personnel on the Kaiser property to reach the CPA, 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. The purpose of the exclusion fence is to keep tortoises in habitat adjacent to the CPA from entering this part of the Project during all Project phases. Surveys will also determine the placement and configuration of fences. For instance, where a fence may need to be discontinuous between tailings piles, the fence ends will extend well up the slope of the tailings 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, once the site can be evaluated. Temporary fencing may be used to exclude tortoises from the CPA until the permanent fence is installed, to facilitate site grading, as needed.

4.1.1 Surveys and Monitoring during Fence Construction

For areas of native or regrown habitat in the CPA, biologists will survey the staked fenceline for all desert tortoise burrows and tortoises, within 24 hours prior to fence installation, covering a swath of at least 90 ft centered on the fenceline, using 15-ft-wide transects. Tortoise burrows will be mapped using Global Positioning System (GPS), and the size and occupancy recorded; if not occupied, indications of how recently the burrow was used will be recorded. Flagging will not be likely to attract poaching in the CPA, so those burrows also will be flagged. Burrows will be avoided if at all possible. Assuming that temporary fencing is installed prior to permanent fencing, it will be routed around an occupied burrow or any burrow that is too deep and/or tortuous to fully determine occupancy (e.g., a kit fox den), to exclude the burrow from the CPA if at all possible. In the unlikely event that a burrow must be destroyed for fencing to occur, then it will be examined for occupancy by tortoises and other wildlife and carefully excavated with hand tools, using standardized techniques ***consistent with those recommended*** by USFWS (2009a). Any desert tortoises will be removed as described below in Section 4.1.2, Tortoise Relocation Methods During Fence Construction.

All fence construction in native or regrown habitat, or wherever it is determined that tortoises could be present, will be monitored by ***Eagle Crest designated staff*** to ensure that no desert tortoises are harmed. The level of monitoring will depend on the specific fencing activity and proximity of crews, but at least one ***of Eagle Crest's designated staff*** will accompany each separate construction crew (or possibly more than one crew if and only if fencing activities and proximity of crews would permit thorough and successful monitoring), such that no driving, trenching, fence pulling, or any surface disturbing activities will occur without the immediate presence of a ***Eagle Crest designated staff***. Maps of burrows from the pre-construction survey will be provided to all ***Eagle Crest designated staff*** to assist in protecting tortoises. Such maps will also be potentially useful for relocating tortoises.

Following the onset of the tortoise activity season, or if exclusion fencing is installed when tortoises are known to be active (for example, if unusually warm weather occurs before fencing is completed), then all installed exclusion fence will be checked at least twice a day for the first week to ensure that no tortoise is fence-walking inside or outside the fence, attempting to gain access to the other side of the fence. If inside the fence, the tortoise will be relocated outside of the fence, as identified below. A tortoise fence-walking outside the fence will be monitored continuously until the tortoise uses a suitable burrow outside the fence.

4.1.2 Tortoise Relocation Methods during Fence Construction

Because tortoise densities are likely to be non-existent on the CPA, every attempt will be made to minimize handling tortoises during the perimeter fence construction and following, and during CPA clearance. This will minimize take as well as all activities associated with relocated tortoises, such as intensive surveys in the Translocation Area for resident diseased tortoises (see Section 4.1.4 below), quarantining tortoises (Section 4.2.2), and a long-term, follow-up monitoring effort (Section 4.1.5). Fence gaps and erection of temporary fencing will be used to "encourage" a tortoise to return to the outside of the fence. For instance, if an active tortoise is observed inside the Project boundary, construction and equipment can be temporarily moved to another section of the fence, a large gap can be left in the fence nearest the tortoise and a temporary (e.g., silt) fence can be quickly constructed from the gap edges well around the tortoise so that it moves through this channel to the outside of the Project. Following exit from Project boundary, the tortoise would then be immediately monitored as identified below in Section 4.1.4, Post-Release Monitoring.

4.1.2.1 Tortoises Found During the Active Season

Any tortoise that must be moved during perimeter fencing will be transmittered and relocated immediately outside the construction zone, but onto either BLM land (with BLM permission) or Project land. Release points will be as close as possible to the capture point, to keep tortoises within their home range, but will always be on or immediately adjacent to suitable habitat. Specific release points cannot be identified at this time without knowing where tortoises are.

Generally, tortoises will be placed in the shade of a shrub or, if known, in the entrance of that tortoise's burrow (but see below in the event that ambient temperatures are high). The most recent USFWS guidance (USFWS 2010a) states that all "perimeter fence" tortoises must be moved to the interior of the Project site. Because there is likely to be no tortoise habitat in the CPA, all tortoises found during fence construction that must be moved will be placed outside of the Project boundary rather than inside.

All tortoises relocated from harm's way during perimeter fencing will be transmittered as described in Section 3.2, above. The exception will be tortoises who are brumating (≈hibernating) in burrows during winter (see below for a discussion of handling tortoises outside of USFWS temperature guidelines).

USFWS guidance (2009a and 2010a) regarding translocation temperatures states that translocation occur when air temperatures at 2 inches (5 centimeters) above the ground, are not forecasted to exceed 90°F (32°C) within three hours of release and 95°F (35°C) within one week of release; additionally, daily low temperatures should not be cooler than 50°F (10°C). Because fence construction can occur during any time of the year, when air and ground temperatures will exceed lethal levels or may be lower than 50°F during some winter days and evenings, contingencies must be in place in the event that a tortoise must be relocated if it cannot be avoided. The following options to protect tortoises address potential contingencies during periods of high temperatures. (Note, however, that no tortoise would be moved when temperatures exceeded 95°F air temperature or 109°F ground temperature.) A summary of these activities is found in Table 1.

- *If a tortoise is found under a shrub*, a temporary fence can be erected to keep the tortoise from entering the construction zone. The fence will be flagged to ensure avoidance. Fencing will be 1 by 2-inch mesh or other, adequate temporary fencing (e.g., silt fencing can be used for very short-term needs). If practical, the fence would be removed later in the day (or several days later if needed to protect the tortoise) when the tortoise could be safely moved or allowed to move away from the construction area of its own accord. The tortoise would not be transmittered unless the ***Eagle Crest designated staff*** determines that keeping track of the tortoise via telemetry would increase the tortoise's safety.

  If the ***Eagle Crest designated staff*** determines that leaving the tortoise under a shrub would potentially result in overexposure to high temperatures and no burrow is known for that tortoise, construction in that area will halt and all personnel will depart so that the tortoise is not disturbed in its pursuit of a burrow. Construction can be resumed later in the day when air temperature has dropped below 95°F. Less preferably, the tortoise can be collected in a sterile, covered tub, held in a climate-controlled location, transmittered, and released the same day in early evening, when air temperature has dropped below 95°F or the following morning. All boxed tortoises would be checked several times until release, to ensure their safety. All released tortoises would be followed until they found a suitable burrow.

Table 1. Alternatives for relocating or translocating tortoises found during periods of ambient temperatures outside the USFWS (2009a, 2010a) translocation guidelines. (Note that in all cases, no tortoises will be handled during air temperatures at 2 inches above the ground that exceed 95°F or ground surface temperatures that exceed 109°F.)

<table>
<tr><th rowspan="3">Project Phase</th><th rowspan="3">Project Activities</th><th colspan="3">Alternatives for Relocation or Translocation[1]</th></tr>
<tr><th colspan="2">During Periods of High Temperatures</th><th rowspan="2">During Winter[2]</th></tr>
<tr><th>Tortoise Found Under Shrub</th><th>Tortoise Found In Burrow</th></tr>
<tr><td rowspan="2">Construction</td><td>Construction of CPA perimeter fence, and linear facilities; revegetation activities</td><td>• Relocate to known burrow; monitor
• Erect temporary fence between tortoise and construction; monitor; remove fence when appropriate
• Temporarily move construction to another area
• Collect and hold in climate-controlled facility; release in evening or the following morning; monitor</td><td>• Erect temporary fence between tortoise and construction; monitor; remove fence when appropriate
• If cannot be avoided, collect and hold in climate-controlled facility; release late afternoon/early evening or following morning; monitor</td><td>• If cannot be avoided, place tortoise in artificial burrow, temporarily block in and monitor; remove block at two weeks (or earlier depending on the weather) and monitor
• If tortoise fails to find suitable winter burrow and will not use artificial burrow, hold in climate-controlled facility, in the dark at temperatures simulating burrow temperatures, until seasonal temperatures warm and tortoises are active; release within 100 ft of capture burrow; monitor</td></tr>
<tr><td>Grading of CPA</td><td>• Capture and hold in climate-controlled facility, contact USFWS , CDFG, and BLM for direction</td><td>• Capture and hold in climate-controlled facility, contact USFWS, CDFG, and BLM for direction</td><td>Not applicable</td></tr>
<tr><td rowspan="2">Operations</td><td>CPA</td><td>• Capture and hold in climate-controlled facility, contact USFWS , CDFG, and BLM for direction</td><td>• Capture and hold in climate-controlled facility, contact USFWS, CDFG, and BLM for direction</td><td>Not applicable</td></tr>
<tr><td>Access road, utilities maintenance</td><td>• Allow tortoise to proceed out of area unimpeded; monitor
• Relocate to known burrow; monitor
• Erect temporary fence between tortoise and construction; monitor; remove fence when appropriate
• Temporarily move construction to another area
• Collect and hold in climate-controlled facility; release in evening or the following morning; monitor</td><td>• Erect temporary fence between tortoise and construction; monitor; remove fence when appropriate
• Collect and hold in climate-controlled facility; release late afternoon/early evening or following morning; monitor</td><td>• If cannot be avoided, place tortoise in artificial burrow, temporarily block in and monitor; remove block at two weeks (or earlier depending on the weather) and monitor
• If tortoise fails to find suitable winter burrow and will not use artificial burrow, hold in climate-controlled facility, in the dark at temperatures simulating burrow temperatures, until seasonal temperatures warm and tortoises are active; release within 100 ft of capture burrow; monitor</td></tr>
</table>

Project Phase	Project Activities	Alternatives for Relocation or Translocation[1]		
		During Periods of High Temperatures		During Winter[2]
		Tortoise Found Under Shrub	Tortoise Found In Burrow	
Decommissioning	CPA decommissioning and site restoration, outside fenced areas	• Relocate to known burrow; monitor • Erect temporary fence between tortoise and construction; monitor; remove fence when appropriate • Temporarily move construction to another area • Collect and hold in climate-controlled facility; release in evening or the following morning; monitor	• Erect temporary fence between tortoise and construction; monitor; remove fence when appropriate • If cannot be avoided, collect and hold in climate-controlled facility; release late afternoon/early evening or following morning; monitor	• If cannot be avoided, place tortoise in artificial burrow, temporarily block in and monitor; remove block at two weeks (or earlier depending on the weather) and monitor • If tortoise fails to find suitable winter burrow and will not use artificial burrow, hold in climate-controlled facility, in the dark at temperatures simulating burrow temperatures, until seasonal temperatures warm and tortoises are active; release within 100 ft of capture burrow; monitor

1 See the text for the details of each alternative.

2 Winter is defined as the period when tortoises are brumating, approximately 15 November to 15 March.

- At the ***Eagle Crest designated staff***'s discretion, if this tortoise's burrow is known, the tortoise can be placed at that burrow and watched until it enters the burrow. *If a tortoise is in a burrow that cannot be avoided by construction activities*, then the tortoise will be collected in a sterile, covered tub, held in a climate-controlled location (e.g., Project office) until early evening, when air temperature has dropped below 95°F. At that time, the transmittered tortoise will be released outside the CPA within a few feet of the point of collection. It will be followed until it finds a suitable burrow or night falls. (If this exercise occurs in the morning, the threshold will be air temperatures exceeding 95°F or ground temperatures exceeding 109°F.) If no suitable burrow has been found, then the tortoise will again be tracked the morning until it finds a suitable burrow or the threshold temperature has been reached. If the latter occurs, the tortoise will again be collected and the process repeated that evening. Because a tortoise uses many burrows and is being relocated only a short distance within its home range, where other refuges are known to the tortoise, it is anticipated that the tortoise would locate a suitable burrow quickly.

4.1.2.2 Tortoises Found During Winter

If fencing occurs during winter when tortoises are inactive (approximately 15 November to 15 March in the Project area), tortoises found in burrows will be avoided, and the burrow fenced with high visibility fencing (if this would not attract poaching) and mapped on construction drawings; a biological monitor will continually monitor the burrow and fence while construction is proceeding in the immediate area of the burrow, to ensure tortoise safety (Table 1). The high visibility fencing will be removed once all danger of construction is past. A brumating tortoise will not be removed from its burrow for the sole purpose of transmittering it.

If a tortoise in a burrow that cannot be avoided[2] and tortoises are still in brumation, then an artificial burrow that replicates the capture burrow (i.e., location relative to a shrub, direction, length) will be constructed as nearby as possible outside the Project fence and in an area where construction has finished (i.e., the tortoise will not be disturbed). All burrows that cannot be avoided will be completely excavated using standardized techniques approved by USFWS (2009a) and the Desert Tortoise Council (1994). The tortoise will be captured at night, affixed with a transmitter and placed in the artificial burrow along with soil and scat from the capture burrow. The tortoise will be blocked into the burrow for two weeks (unless the weather warms, in which case the barriers will be removed), at which time the blocks will be removed and the tortoise continually monitored to ensure that it either remains in the burrow or finds another suitable burrow. If the tortoise fails to find a burrow in several days, and the nighttime air temperatures fall below approximately 50°F, then it will be captured and held in a climate-controlled, dark, quiet, and safe location (e.g., room in Project office) at an air temperature equivalent to the air temperature one meter inside a natural burrow, until seasonal temperatures warm and tortoises are observed to be active in the area. At that point, it will be released within 100 ft of its capture burrow and monitored as described in Section 4.1.4, Post-Release Tortoise Monitoring, below.

Any tortoise found aboveground during winter is highly likely to be near its burrow, except during extended periods of warm weather. Tortoises will not be touched if at all possible and

[2] This could occur where the permanent fence was the first and only perimeter fence constructed.

various options will be explored to ensure that the tortoise has a safe, adequate winter burrow, but is encouraged to leave the CPA on its own. For instance, if a tortoise is found inside the CPA during perimeter fencing, and its apparent burrow is outside, construction and equipment can be temporarily moved to another section of the fence and a large gap left in the fence nearest the tortoise. The tortoise would be monitored continuously until it occupies that burrow or another burrow outside the Project boundary, at which time the fence gap would be closed. If, for any reason, the ***Eagle Crest designated staff*** feels that the burrow chosen by the tortoise is unlikely to be its actual, winter burrow, the fence gap will not be closed and the tortoise will be monitored continuously until it is safely sequestered in an adequate winter burrow. (This might occur, for instance, if the tortoise has merely taken temporary refuge in this other burrow.) If this or any tortoise's winter burrow is within a few hundred feet inside the fence, a channel of temporary fencing can be constructed around the burrow to the fence gap, with the gap left open so that the tortoise can move outside of the Project once the weather warms. If a tortoise's winter burrow is found to be too far inside the CPA to feasibly create a channel to a fence gap, then the tortoise will be transmittered for relocation/translocation in spring and left *in situ* inside the site.

4.1.3 Health Considerations

Visual health assessments will be conducted on all tortoises relocated during CPA fencing by an ***Eagle Crest designated staff.*** The most recent written guidance from USFWS (2010a) is that tortoises that are translocated >500m will be subject to blood sampling, while those relocated <500 m will not be blood-tested. Furthermore, no tortoises with clinical signs of mycoplasmosis may be relocated. Schumacher et al. (1997) observed that clinical signs had a high statistical correlation with positive serology (i.e., exposure to *Mycoplasma agassizii*). A mucous nasal discharge was the clinical sign that was the most reliable predictor (93 percent of tortoises with a mucous nasal discharge were seropositive), although it could be caused by pathogens other than *M. agassizii*. Furthermore, a purulent nasal discharge was the only clinical sign that was relatively objective; other clinical signs were far more subjective, were potentially present for other reasons, and reduced the statistical predictability of positive serology. For the EMPSP, a purulent nasal discharge will be the threshold to identify a diseased tortoise, unless and until USFWS mandate that other specific clinical signs be used to identify mycoplasmosis.

For tortoises from which blood samples are taken, blood samples (no more than 2 cubic centimeter) will be collected via standardized techniques of brachial or subcarapacial venipuncture (University of Florida, Department of Pathobiology, no date) to test for the presence of antibodies to *M. agassizii*, *M. testudineum* and other pathogens. Whole blood will be centrifuged and the plasma packaged on ice and sent overnight express freight to the University of Florida Mycoplasma Research Lab for analysis via enzyme-linked immunosorbent assay (ELISA). USFWS (2010a) has determined that blood sampling on translocated tortoises cannot be collected until 15 May. If this should change, then tortoises will be sampled as early as permitted. Only experienced persons who have been previously permitted to conduct this work on desert tortoises will be permitted to collect the samples.

Desert tortoises that have clinical signs of disease or are seropositive will undergo additional blood testing and if determined to be infectious, will be either (1) sent to the Desert Tortoise Conservation Center (DTCC) or other agency-identified facility where they will undergo further assessment, treatment, and/or necropsy (USFWS 2010a), or (2) undergo further evaluation by USFWS to determine their disposition. If sent to the DTCC or other approved facility, ECE will provide a flat fee of $9,000 for each desert tortoise sent to the DTCC commensurate with the cost to provide housing, care, treatment, and other services for five years ($3,000 for Year 1, $1,500 for Years 2 to 5) (USFWS 2010a).

All desert tortoises determined to be infectious or unhealthy may undergo additional blood testing and if still determined to be infectious will be sent to the Desert Tortoise Conservation Center (DTCC) or other agency-approved facility where they will undergo further assessment, treatment, and/or necropsy. ECE will provide funding commensurate with the cost to provide housing, care, treatment, and other services, as required by USFWS. Another option may be to quarantine such tortoises in the quarantine pens for further evaluation.

Directives regarding disease testing and algorithms for translocation decisions are currently in a state of development at USFWS. Most recently, the USFWS has stated that all tortoises moved from a site likely will be blood-tested, no matter how far they are moved (R. Averill-Murray, Desert Tortoise Recovery Office, pers. comm. to A. Karl). Furthermore, a new algorithm that examines specific clinical signs, rather than antibody status, may be used to determine if a tortoise may be translocated. So, before tortoises are translocated or relocated from the EMPSP, the most current procedures from USFWS will be incorporated into the program.

4.1.4 Post-Release Tortoise Monitoring

While tortoises moved a short distance (< 500 m) from construction activities along the perimeter fence would be assumed to be within their home range and familiar with burrow locations, they would receive immediate post-release monitoring. This may be especially critical for juvenile tortoises, which are highly subject to depredation. Any tortoise moved will be watched for at least one hour to determine if it is behaving safely (e.g., seeking shade or a burrow) or if it is likely to try and re-enter the construction area. Because each relocated tortoise will have a transmitter, it will also be located via telemetry for the next two days during tortoise activity temperatures to ensure that the tortoise is not fence-walking and is using burrows.

As described above in Section 4.1.3, Tortoise Relocation Methods during Fence Construction, any tortoise moved in the evening during a period when daily air temperatures exceed 95°F (late April through early October) will be followed until it either finds a suitable burrow or night falls. (If this exercise occurs in the morning, the threshold will be air temperatures exceeding 95°F by which a tortoise must find a suitable burrow.) If it has not found a suitable burrow, the tortoise would be again tracked in the morning until it finds a suitable burrow or the threshold temperature has been reached. If the latter occurs, the tortoise will again be collected, held in a climate-controlled environment and the process repeated that evening. Because tortoises use many burrows, it is anticipated that the tortoise would locate a suitable burrow quickly.

USFWS (2010a) recommends a five-year monitoring program for translocatees, including tortoises removed from the perimeter fence. Further, USFWS has determined that resident and control study cohorts are required unless fewer than five translocatees/relocatees are moved. Because it is likely that no tortoises will be moved during perimeter fence construction for the CPA, alternative monitoring programs will be explored with USFWS, CDFG, BLM and FERC. One alternative would be to combine efforts with a local, much larger, solar project effort.

Unless a modified monitoring program is approved by USFWS, CDFG, BLM, and FERC, the following minimum elements will be basic procedures for the monitoring program, per USFWS (2010a):

- Tortoises will be located by telemetry according to the schedule identified in USFWS (2010a) guidelines. Each time the tortoise is located, the behavior, location (UTM), and burrow description (if any) will be recorded.

- Survival and general health will be monitored through body condition indices (mass to volume ratios), clinical signs of disease, serology, and inspection for injuries. Any time a tortoise is handled, it will be examined for clinical signs of disease. Formal health assessments will be conducted during April (following brumation), July (following oviposition), and October (prior to brumation). At these times, body condition (mass to volume ratio) also will be measured (mass, carapace length, width at Marginal 5 or 6, height).

- Blood samples will be taken and analyzed annually, in July or October. ***Eagle Crest designated staff*** will conduct the assessments and tissue sampling. While blood samples may not be required of tortoises moved <500 m during relocation, blood will be sampled shortly after relocation[3] in order to provide baseline data.

- Sampling frequency and techniques for disease analysis will be updated as necessary during the study, based on the newest disease information from this and other studies. This may include tests for other pathogens (e.g. *Mycoplasma.* spp., herpesvirus, iridovirus) as their importance and evaluation techniques become validated for desert tortoises. Data will be recorded on a data sheet similar to that in Appendix 1, with an additional health assessment data sheet to be provided by USFWS.

- Any health problems observed (*e.g.*, rapid declines in body condition, perceived outbreaks of disease, mortality events) will be reported to the USFWS, CDFG and BLM such that appropriate actions can be taken in a timely manner.

- Transmitters will be changed as necessary.

Per USFWS (2010a) guidelines, triggers for implementation of adaptive management will be developed through coordination with USFWS, CDFG and BLM. ECE may also request a re-evaluation of the tortoise monitoring program after two years of monitoring have been completed, depending on results.

[3] USFWS (2010a) requires that blood sampling be conducted no sooner than 15 May, "based on activity of the immune system." More recent communications from USFWS have identified that blood samples may be taken after tortoises have been active at least two weeks following brumation (K. Fields, Desert Tortoise Recovery Office, pers. comm.. to A. Karl).

4.1.5 Nest Relocation

Any nests found between November 1 and April 15 are unlikely to be viable and will not be moved; hatching is typically completed by October. In the event that nests are found between April 15 and October 31 and must be moved (e.g., for construction of linear facilities), the nests will be moved. Eggs will be inspected to determine if they are viable and, if so, will be moved to an identical microsite (e.g., cover, plant species, soil type, substrate, aspect) on the approved Recipient Site (see Section 4.2.2 Designated Recipient (Translocation) Site and Translocation Area, below) using standard techniques (e.g., USFWS 2009a). Translocated nests will be fenced with open-mesh fencing (e.g. 2-inch wide mesh) that will permit hatchlings to escape but prevent depredation by canids that might be attracted to the new nests by human scent. Open-mesh fencing or avian netting also will be installed on the roof of the nest enclosure to prevent predator entry. Nests will be monitored from a 30-ft distance once a month until late November, at which time they will be excavated for examination. If possible, hatchlings will be weighed, measured, photographed, described and marked.

4.2 Central Project Area Construction

4.2.1 Clearance Surveys

Upon receiving access to the CPA, a reconnaissance survey will be conducted to determine the presence of desert tortoise of any available habitat. If there is any suggestion that tortoises could be present in the construction area or along routes used by construction personnel, 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

A clearance survey for tortoises will be conducted inside the completed perimeter CPA tortoise fence in any potential tortoise habitat. Clearance surveys will coincide with heightened tortoise activity to maximize the probability of finding all tortoises. The USFWS guidelines (USFWS 2010a) state that heightened tortoise activity occurs in April, but this timing is for Mojave Desert tortoises, not Colorado Desert tortoises in the region of the Project. Tortoises in the Project vicinity become active in early to mid-March, coincident with elevated temperatures (A. Karl, 2011, e-mail to T. Engelhard) and maximum forage biomass; in fact, most forage is dried by 1 April. Data were provided to USFWS in March 2009 (A. Karl, 2009, e-mail to T. Engelhard) demonstrating this, prompting USFWS to permit desert tortoise presence-absence surveys in Chuckwalla Valley beginning 15 March (T. Englehard, e-mail to A. Karl, 18 March 2009). Clearance beginning by mid-March is also necessary to translocate tortoises during appropriate temperatures. Tortoises must be relocated or translocated from the CPA at least one week before daily, midday temperatures are expected to exceed 95°F (35°C) air temperature (at 2 inches) or 108°F (42°C) ground surface temperature (see discussion in Section 4.1.3 Tortoise Relocation Methods during Fence Construction, above) whichever is lower. The rationale is that tortoises must find or dig new refuges in the potentially unfamiliar translocation area, prior to the onset of lethal daily temperatures.

Per USFWS (2010a) guidelines, a minimum of three, 100 percent coverage clearance passes will be completed. For the CPA to be deemed cleared of tortoises, no additional tortoises may be found on the two, final, consecutive clearance passes. If a tortoise is found on one of these passes, two clean passes (i.e., no new tortoises) must follow before the CPA can be declared to be cleared of tortoises.

Clearance transects will be 15 ft wide. Transects narrower than 15 ft wide will be used if dictated by dense shrub vegetation or where visibility is otherwise compromised. On each subsequent pass, an attempt will be made to view all shrubs and the terrain from as many angles as possible. To achieve this, transects programmed into GPS units will be either perpendicular, parallel but offset, and/or approached from the opposite direction on each subsequent pass (Karl and Resource Design Technology, Inc., 2007).

All tortoise sign will be mapped and evaluated (e.g., type, age, size) during all passes, and all scat collected. During subsequent passes, areas where fresh scat is found will prompt concentrated searches. After the second pass, concentrated searches will be conducted in all areas where recent sign is concentrated, unless a tortoise has been found in that area. If this concentrated search occurs after two clean passes, no additional clearance surveys of the CPA will be required if a tortoise is found during this additional search.

No burrows will be collapsed until the third pass, by which time it is assumed that all tortoises probably will have been relocated from the CPA. (Fresh burrows used by other wildlife, including badgers or foxes, will not be collapsed until occupants have been removed via active or passive techniques ***consistent with those recommended by*** CDFG.) While clearance is planned to occur when ambient temperatures are safe for translocating tortoises, ambient temperatures may rise unexpectedly during the second pass such that tortoises or other wildlife might be trapped in the open if its burrow has been excavated and collapsed during the search effort. To assist the identification of currently used burrows, all burrows will be inspected and assessed for occupation or recent use by tortoises during the first two passes, gated with small sticks along the entrance to detect future use, mapped and flagged. On the third pass, burrows will be excavated using standardized techniques ***consistent with those recommended by*** USFWS (2009a). During excavation, attention will be given to potential tortoise nests (see Section 4.2.6 Nest Relocation, below).

Once all tortoises have been translocated from the CPA, heavy equipment will be allowed to enter the site to conduct construction activities. However, the Project ***Eagle Crest designated staff*** staff(s) will be continuously available during the construction period to remove any tortoises overlooked during the clearance surveys.

4.2.2 Designated Translocation Site and Translocation Area

The following discussion for the CPA is probably moot, since there is a nearly negligible chance of finding a tortoise there. However, the discussion is provided in the unlikely event that a tortoise must be relocated or translocated from the site.

For the CPA, the surrounding area is generally highly degraded and it is fully possible that there is no suitable habitat immediately outside the perimeter fence. Suitable habitat is not merely a patch of habitat, but one of sufficient size that is connected to a large, continuous block of occupied or occupiable tortoise habitat such that the tortoise population there is self-sustaining and not disjunct from other populations in the region. If suitable habitat exists, and a tortoise is found inside the CPA within 500 m, then it will be relocated immediately outside the perimeter fence to that area. If suitable habitat does not exist, then the tortoise would need to be translocated >500 m to a designated Translocation (Recipient) Site.

USFWS (2010a) has mandated that any tortoise moved >500 m be quarantined onsite or offsite until the serology lab report is obtained in mid to late May. (Note: This directive is likely to change such that only tortoises that are clinically ill may be quarantined until USFWS evaluates the practicality of translocating the tortoise and all asymptomatic tortoises, regardless of serology, may be translocated without quarantining [R. Averilll-Murray, pers. comm.. to A. Karl]. Because of the current state of flux in this procedure, the discussion below is written based on the USFWS (2010a) guidance.

For the CPA, there is not likely to be any native habitat that would be suitable for housing tortoises. Pens therefore would be constructed in the Translocation Site. The Translocation Site would serve tortoises translocated from the CPA. The location of this site will be determined in consultation with the USFWS, CDFG, and BLM, but may include the following alternatives:

4.2.3 Collaboration with other energy developments (e.g., First Solar) in the area

4.2.4 Establish a Translocation Site on Kaiser's BLM-exchange lands (Figure 1). There is ample continuous habitat there that is well outside of Kaiser planned landfill activities and within 1.5 kilometers of the CPA. Pens could probably be reasonably protected from vandalism because of the remote location and Kaiser security.

The actual Translocation Site constitutes the release area and pen sites for tortoises moved >500 m. The Translocation Site plus surrounding area to 6.5 km (per USFWS 2010a) collectively would be considered the Translocation Area. Both options above would need to address the following considerations:

- Acclimation by translocatees from the CPA would be facilitated by site familiarity.
- The translocation area is within the same population as the CPA, so genetic, morphological and behavioral integrity would be maintained.
- There is minimal anthropogenic use of the area and it is protected by its immediate proximity to JTNP.
- The Translocation Area is part of a broad expanse of occupied tortoise habitat, sufficient to accommodate a few translocated tortoises. Tortoise populations are currently well below carrying capacity throughout their documented range, including the western Mojave Desert, due to a long-term drought and other factors (Karl 2004 and 2010b, McLuckie et al. 2006, Boarman et al. 2008). Based on the pattern of range-wide and local declines, it is likely that tortoise densities in the Project vicinity have similarly declined, so long-term carrying capacity would not be exceeded by the addition of a few tortoises. USFWS (2010a) has estimated that adult tortoise density in any Translocation Area should not exceed 130% of the current density in the recovery unit within which the translocation occurs. The most recent estimates from USFWS' range-wide sampling program in 2007, 2008, 2009, and 2010a are 5.0 to 5.9 tortoises/km^2 for the eastern portion of the Colorado Desert Recovery Unit (USFWS 2009b, 2010b and c). This would translate into a maximum allowable density in the Translocation Area (130% of 3.1-4.7)) of approximately 7 tortoises/km^2, including both resident tortoises and translocated tortoises. During surveys of the Translocation Area to determine the health

status of the resident population (see Section 4.2.4, Health Considerations, below), the current tortoise density in the Translocation Area will be determined. Assuming it is lower than 7 tortoises/km^2, the number of tortoises that can be translocated into the Translocation Area can be calculated. If the current Translocation Area density is already >7 tortoises/km^2, then USFWS will be contacted to determine the number of tortoises that can be translocated.

The Translocation Site pens will be sufficiently large to support each tortoise pending disease testing results. Each will be a minimum of 165 by 165 ft (50 by 50 m), thereby providing adequate forage and sufficient habitat for a tortoise to find and/or construct adequate cover sites. (If necessary, supplemental food and water may be supplied to tortoises if they are required to remain in the pens longer than the activity season in which they were collected. In this event, ECE will submit a husbandry plan to USFWS, CDFG, BLM, and FERC, for their approval, which will detail how the penned tortoises will be cared for and monitored, including providing supplemental water and food, if necessary.) Two artificial burrows, each at least 4 ft (1.2 m) long, will be constructed for each tortoise, using a gas-powered auger or shovel/plywood, per USFWS (2009a) guidance. Pens will be constructed using 1 by 2 inch tortoise-proof fencing, installed as identified in Section 4.1, CPA Fencing and Temporary Fencing, above. They will be double-walled separated by a minimum of 100 m so that tortoises will not be crowded once the fences are removed (if tortoises are seronegative) and tortoises fully released. All pens will be surveyed prior to and following their construction to ensure that no resident tortoises inhabit the pen.

Juvenile enclosures will be a minimum of 20 ft in diameter, extending to 50 ft or more, as necessary, depending on the number of tortoises found. (Morafka et al. [1997] successfully penned juvenile tortoises at the rate of 62-123 tortoises per acre [152-305 animals per hectare].) All will be made predator-proof by using 5-ft-tall “Non-Climb”, 2 by 4 inch vertical mesh fencing for the walls, buried at least 1 ft and with avian netting over the top.

All pen fences and penned tortoises will be monitored as described in Section 4.2.5, Post-Release Tortoise Monitoring, below.

4.2.5 Translocation Methods

All tortoises relocated or translocated will be measured, weighed, assessed for health, and affixed with a transmitter at the time of initial capture, and transported as described in detail in Section 3.0, Procedures Applicable to All Relocations and Translocations, above. Transmittered tortoises are anticipated to remain in the site until the second clearance pass is completed. During that time, they will be located daily the first week after transmittering and weekly thereafter until relocation or translocation from the CPA.

All tortoises will be relocated or translocated at least one week before daily, midday temperatures are expected to exceed 95°F (35°C) air temperature (at 2 inches) or 109°F (43°C) ground surface temperature, whichever is lower. This is expected to occur following the second clearance pass. No tortoise will be moved when air temperatures are expected to exceed 90°F (32°C) within three hours of release (USFWS 2010a). Moving tortoises from the CPA to the Translocation Site following the second clearance pass in March will ensure that tortoises are only moved once, well prior to lethal temperatures. Because blood samples must be collected on tortoises moved >500 m, possibly on all tortoises, and blood sampling potentially cannot occur prior to 15 May (USFWS 2010a)[3], if tortoises were left on the CPA until blood samples could be collected, then the spring translocation temperature window would be missed. If lab results are negative for exposure to *M. agassizii*, then the pen fence simply will be removed, thereby passively releasing the tortoise.

USFWS (2010a) guidance is that all translocated tortoises be rehydrated within 12 hours prior to release, via USFWS (2009a) methods. Currently, USFWS is planning to rehydrate only those tortoises that void during the translocation process (K. Field, pers. comm. to A. Karl).

All tortoises moved <500 m (1650 ft) will be placed in the shade of a shrub or at the entrance to a known burrow for that tortoise, and monitored as described in Section 4.2.5 Post-Release Tortoise Monitoring, below.

For any tortoise found further inside the CPA than 500 m, an evaluation will be made to determine if the tortoise is merely a transient or has a home range that is mostly or largely inside the CPA. Following an examination of the available habitat, the tortoise either will be monitored visually or transmittered and monitored daily for one week to determine if it typically lives that far inside the CPA or if the observed location was outside its core use area. If its burrows or core use areas are closer to the perimeter fence than 500 m, or outside the fence (i.e., the tortoise fencewalks), it will be relocated as identified above for tortoises moved < 500 m.

Any tortoise translocated >500 m will be placed in an individual quarantine pen in the relevant Translocation Site (see above), under a shrub or near an artificial burrow.

Juvenile tortoises, especially those under 4.4 inches (110 mm) in length, are highly subject to depredation by canids, badgers, and ravens, and require special consideration for successful translocation. Little is known about juvenile tortoise movements. Based on two studies of hatchling and/or juvenile tortoises, the mean distance translocatees moved in approximately one month was 521-723 ft (158-219 m; Hazard and Morafka 2002). For non-translocated hatchlings, the distance between nests and first-year hibernacula was 304-350 ft (92-106 m; TRW 1999b). Based on these values, as well as other data reported in these studies, a juvenile tortoise moved farther than 330 ft (100 m) may be outside its recent or familiar use area. For the CPA clearance, if juvenile tortoises are moved within 330 ft of the capture location, where they may have site familiarity, they will be released under a shrub and monitored initially as described in Section 4.2.5 Post-Release Tortoise Monitoring, below. For distances >330 ft, they will be moved to the Translocation Site into a predator-proof juvenile enclosure (see Section 4.2.2 Designated Translocation Site and Translocation Area, above. Juvenile tortoises will remain in their pens until disease test results are received (see Section 4.2.4, Health Considerations, below). Seronegative and clinically healthy tortoises will be passively released via escape holes opened in the lower edge of the pen (e.g., Morafka et al. 1997). Modifications to the design and process may occur in response to predator interest in the enclosure or juvenile tortoise behavior in the enclosure, incorporating new and relevant head-starting techniques such as those used at Twenty-nine Palms Marine Corps Air Ground Combat Center.

For the period of time that tortoises are in the pens, pen fences and the penned tortoises will be checked twice daily for the first two weeks, or until fence-walking (should it occur) ceases, whichever is longest. Until serology reports are obtained, the penned tortoises will be checked daily.

This Plan recognizes that a tortoise may be found during site grading or routine fence monitoring, after the tortoise clearance. This may occur at ambient temperatures that are higher than the USFWS translocation guidelines or in winter. In such cases, the disposition of the tortoise will be determined by the ***Eagle Crest designated staff***, in consultation with USFWS, CDFG and BLM. In any case, the tortoise will be captured, secured in an individual, sterilized box and temporarily placed in a quiet, climate-controlled environment (e.g., the onsite Project office) until the agencies reply. Depending on temperatures and other factors, it is possible that the tortoise could be affixed with a transmitter and relocated outside the CPA or translocated into the Recipient Site the same day, when temperatures subside (or the following morning for juvenile tortoises), and monitored to ensure its safety. Options are provided in Table 1. If the tortoise would likely be harmed or die, it will be held in captivity at a location approved by USFWS, CDFG and BLM, away from other tortoises, to be released into the Recipient Site during the next available window. Other options will also be investigated. The goal of the translocation is to keep the tortoise in the population, in order to promote recovery.

4.2.6 Health Considerations

Visual health assessments, blood and other tissue sampling, and translocation options will proceed as outlined in Section 4.1.3, Health Considerations, above.

USFWS (2010a) has determined that no tortoise will be relocated or within 1.5 km (0.9 mi) of a diseased resident tortoise if tortoises are relocated <500 m or within 6.5 km (4 mi) of a seropositive or diseased resident tortoise if tortoises are translocated >500 m. This directive only applies to tortoises moved during CPA fence construction or site clearance surveys; it does not apply to tortoises relocated along the utility lines. Based on survey results during the first clearance pass, ECE would conduct surveys for resident tortoises during the second clearance pass if tortoises are anticipated to require relocation or translocation from either the CPA. Surveys would provide full coverage (100 percent) surveys within 1.5 km of the release point for each tortoise to be relocated or 6.5 km of the Translocation Site, if tortoises will be translocated. These survey limits and intensity may be altered through discussion with USFWS, CDFG, and BLM depending on the number of animals translocated and data from other surveys in the area.

Any resident tortoise will be processed (weighed, measured, described, photographed) and marked with an epoxy number for future identification. Health assessments will be conducted on all residents. If any tortoises from the CPA will be moved more than 500 m, any resident tortoise within 6.5 km of the Translocation Site will be transmittered so that its blood can be sampled at the earliest date approved by USFWS. All transmittered residents will be located the first day following the transmitter attachment, every other day for two weeks to determine the tortoise's use area (for ease of future monitoring), and then according to the USFWS (2010a) schedule. If a resident tortoise has clinical disease signs or is seropositive following lab testing, the release site for relocated tortoises that is within 1.5 km of the diseased or seropositive tortoise will be shifted to be outside the 1.5-km range. For tortoises moved >500 m, the Translocation Site would again be shifted to be outside the 6.5 km limit. (Note: Due to the logistical difficulty inherent in this process, USFWS is currently undergoing a modification of this procedure, which looks more at a threshold of disease prevalence in the resident and translocated population, rather than the disease status of a single resident tortoise [R. Averill-Murray, pers. comm. to A. Karl].)

4.2.7 Post-Release Tortoise Monitoring

All relocated or translocated tortoises will receive immediate post-release monitoring. Each will be located via telemetry for the first two days following release, during tortoise activity temperatures to ensure that the tortoise is not fence-walking or otherwise compromised.

Tortoises in quarantine pens will be checked twice daily for the first two weeks, or until fence-walking (should it occur) ceases, whichever is longest. Following this, all tortoises sequestered in pens will be monitored daily. All pen fences, including juvenile pens, will be monitored at least once daily to ensure that they remain intact. No additional food or water would be provided to quarantined tortoises because of the large pen size, which will provide ample natural cover and food for an extended period.

All relocated or translocated tortoises will become part of the five-year monitoring study, as described for Project Area Perimeter Fencing in Section 4.1.4, Post-Release Tortoise Monitoring, above.

4.2.8 Nest Relocation

Nest relocation and monitoring during CPA clearance will follow the same procedures as outlined in Section 4.1.5 Nest Relocation, above.

4.3 Linear Facilities Construction and Post-Construction Revegetation of Temporarily Disturbed Areas

Construction of the transmission line and water pipeline, plus revegetation of temporarily disturbed areas following construction, will occur in unfenced, native habitat. Tortoise protection measures, including but not limited to pre-construction surveys, construction monitoring, and relocation, will be identical to those for construction of the perimeter fence (Section 4.1 CPA Fencing, above), with the exception that no tortoises would be transmittered or included in a long-term monitoring program.

These measures will apply to any work conducted in unfenced tortoise habitat.

Temporary fencing may be installed as needed along linear facilities at the ***Eagle Crest designated staff 's*** discretion, to optimize tortoise protection in place of or in addition to having ***designated staff on site.*** Temporary fencing will follow guidelines and materials for permanent fencing except in very temporary situations, when silt fencing may be used. In both cases, supporting stakes will be sufficiently spaced to maintain fence integrity

4.3.1 . Designated Translocation Site and Translocation Area

Following construction, land use surrounding the transmission line, water pipeline and substation is expected to be compatible with desert tortoise occurrence. However, Figure 6

depicts potential recipient sites for tortoises that need to be temporarily relocated during construction. These recipient areas are all between 300 and 1640 feet from the utility ROW or central project area, occur on BLM land, are contiguous with occupied habitat, and are either within 2010 survey areas, so existing density can be estimated, or would be surveyed once access to the central project area is permitted. In total, these areas are larger than the anticipated disturbance within desert tortoise habitat associated with these project features. The recipient sites are within 40 kilometers from the project and there are no barriers to movement between them. Habitat within the recipient sites is similar to habitat that would be disturbed during construction of the transmission line, water pipeline, and substation.

Results of the 2009 and 2010 protocol surveys along the transmission and line, water pipeline indicate that existing desert tortoise density within these recipient sites is 1.2 tortoises per square mile (0.5 per square kilometer), or an existing population of about 4 tortoises within the identified recipient areas. The most recent estimates from FWS' range-wide sampling program in 2007, 2008, 2009, and 2010a are 5.0 to 5.9 tortoises/km^2 for the eastern portion of the Colorado Desert Recovery Unit (USFWS 2009b, 2010b and c). This would translate into a maximum allowable density in the Translocation Area of approximately 7 tortoises/km^2, or 54 tortoises within the 1,906 acre potential recipient sites, including both resident tortoises and translocated tortoises. As such these recipient sites are suitable for receiving the estimated 5 tortoises that would be encountered along the transmission line and water pipeline.

4.4 Operations Phase

Tortoises observed on the utility corridors during routine maintenance activities or along the main access road by personnel leaving or entering the Project Site will not be disturbed or handled and will be allowed to move away of their own accord. Any routine maintenance or emergency/unexpected repairs that require surface disturbance or heavy equipment will require the same protection measures described for CPA fence construction (see Section 4.1.3 Tortoise Relocation Methods during Fence Construction, above) and linear facilities construction.

Because the reservoirs and roads in the CPA will be entirely devoid of vegetation following surface grading, (except for small, landscaped areas at the offices) there will be no areas where a tortoise could reside onsite. Therefore, any tortoise found during Project operations likely will have entered the CPA through a gate or breach in the fence. It is likely, although not impossible, that any tortoise found during Project operations would not yet have constructed a burrow and would have entered the site only recently. Any such tortoise will be relocated, under supervision of the ***Eagle Crest designated staff***, to the nearest suitable, safe habitat outside the fence onto BLM land adjacent to the CPA (pending approval from BLM). Because any tortoise found inside the CPA is likely to be a transient, it is anticipated that the tortoise would seek a familiar burrow when released outside the CPA. All tortoises will be placed in the deep shade of a large shrub and monitored as described for tortoises moved during CPA fencing (Section 4.1.4 Post-Release Tortoise Monitoring, above) and linear facilities construction.

In the event that surface temperatures are in excess of USFWS translocation temperatures, the tortoise will be secured in an individual, sterilized box and placed in a quiet, climate-controlled environment (e.g., the onsite Project office). Under supervision of the ***Eagle Crest designated***

staff , the tortoise will be released in the late afternoon/early evening of the same day, when ambient temperatures subside. Juvenile tortoises will be released in the early morning to minimize depredation. All boxed tortoises or tortoises affixed with transmitters will be monitored periodically during the day and following release, to ensure their safety, according to Section 4.2.5 Post-Release Tortoise Monitoring, above.

It would be highly unlikely for a tortoise to be discovered wintering in a burrow on the site. However, if such an inactive tortoise were found, it would be handled and removed from the site as specified for wintering tortoises in Section 4.1.3 Tortoise Relocation Methods during Fence Construction, above.

5.0 **Reporting**

A report will be provided to FERC by the lead ***Eagle Crest designated staff*** within 30 days following the initiation of relocation/translocation activities. This report will document which Plan items have been implemented and a summary of all modifications made during that implementation.

In addition, summary reports will be prepared by the ***Eagle Crest designated staff*** in charge of relocation/translocation following fencing and again after initial site clearance to document the surveys, the capture and release locations of all desert tortoises found, immediate post-release monitoring, individual tortoise data, and other relevant data. These reports will be submitted to FERC, USFWS, CDFG and BLM. Annual reports that document similar data, collected during all monitoring activities, will be submitted to FERC, USFWS, BLM and CDFG.

For the post-relocation monitoring study, an annual report will be submitted to FERC, USFWS, CDFG and BLM to document activities and analyze preliminary results. A comprehensive report will be conducted at the end of the monitoring program. Interim contact will be made (e.g., via e-mail or letter reports) if important findings could assist the resource agencies in desert tortoise recovery.

6.0 Funding

ECE will provide adequate funds to complete all work as described.

7.0 **Literature Cited**

Averill-Murray, R. 2011. Personal communication to the DTCC Health Assessment Training Group, 9 March 2011.

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

Berry, K.H. and L.L. Nicholson. 1984. The distribution and density of desert tortoise populations in California in the 1970's. Chapter 5 *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

Boarman, W.I. 1994. Effectiveness of fences and culverts for protecting desert tortoises along California State Highway 58: summary of the 1993 field season. Draft. Unpub. rept. to the California Energy Commission. Contract No. 700-90-015, Phase 3, Task 3-3. 23 pp. plus appendices.

---, W.B. Kristan, III, and A.P. Woodman. 2008. Neither here nor there: current status of Sonoran desert tortoise populations in Arizona. Paper presented at the 2008 Desert Tortoise Council Symposium, Las Vegas, NV.

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

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.

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. 2011. Eagle Mountain Pumped Storage Project, FERC Project Number 13123, Biological Assessment, Second Revision. Submitted to FERC. 109 pp.

Federal Energy Regulatory Commission. 2010. Draft Environmental Impact Statement from Hydropower License. Eagle Mountain Pumped Storage Hydrolelectric Project – FERC Project No. 13121-002, California. Office of Energy Projects, Division of Hydropower Licensing, Washington, D.C. 312 pp.

Field, K. 2011. Personal communication to the DTCC Health Assessment Training Group, 9 March 2011.

Hazard, L.C. and D.J. Morafka. 2002. Comparative dispersion of neonate and headstarted juvenile desert tortoises (*Gopherus agassizii*): a preliminary assessment of age effects. Chelonian Conserv. Biol. 4(2):406-409.

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

Ironwood Consulting Inc. 2010 and R. Woodard. Desert Tortoise Translocation Plan, Desert Sunlight Solar Farm Project, Case File Number CACA-48649. Riverside County, California. Prepared for Desert Sunlight Holdings, LLC.

Karl, A.E. 1989. Investigations of the desert tortoise at the California Department of Health Services' proposed low-level radioactive waste facility site in Ward Valley, California. Unpub. rept. submitted to US Ecology and Ecological Research Services. 116 pp.

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

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

---. 2009. E-mail to T. Engelhard, USFWS Carlsbad Field Office. heliophile@mindspring.com. 24 February 2009.

---. 2011. E-mail to T. Engelhard, USFWS Carlsbad Field Office. heliophile@mindspring.com. 4 January 2011.

--- and Resource Design Technology, Inc. 2007 Mesquite Regional Landfill. Initial desert tortoise clearance-October 2005. Submitted to the Los Angeles County Sanitation Districts, Whittier, CA. 28 pp plus attachments.

LaRue, E.L. 1993. Distribution of desert tortoise sign adjacent to Highway 395, San Bernardino County, California. Draft. Unpub. rept. from Tierra Madre Consultants to Gratten, Gersick, Karp, and Miller, Sacramento, CA. 17 pp.

Marlow, R.W., K. von Seckendorff Hoff, and P. Brussard. 1997. Management of wild tortoise populations is complicated by escape or release of captives. Pp. 479-480 *in* J. van Abbema (ed.), Proceedings: Conservation, Restoration, and Management of Tortoises and Turtles – an International Conference. Joint publ. of the New York Turtle and Tortoise Society and the WCS Turtle Recovery Program.

McLuckie, A.M., M.R.M. Bennion, R.A. Fridell, and R. Radant. Status of the desert tortoise in the Red Cliffs Desert Reserve. Paper presented at the 2006 Desert Tortoise Council Symposium, Las Vegas, NV.

Morafka, D.J., K.H. Berry, and E.K. Spangenberg. 1997. Predator-proof field enclosures for enhancing hatching success and survivorship of juvenile tortoises: a critical evaluation. Pp. 147-165 *in* the New York Turtle and Tortoise Society, Proceedings: Conservation, Restoration, and Management of Tortoises and Turtles – an International Conference.

Nicholson, L.L. 1978. The effects of roads on desert tortoise populations. Pp. 127-129 *in* M. Trotter (ed.) Proceedings of the 1978 Desert Tortoise Council Symposium.

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.

Orr, W. 2009. Personal communication. Paleontologist, Dept. of Geology, Univ. of Oregon, Eugene, OR. rr_bll@yahoo.com. May 15.

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

Rosen, P.C., P.A. Holm, and E.B. Wirt. 2007. Studies of drought and highway effects on tortoises at Organ Pipe Cactus national Monument, Arizona. Paper presented at the 2007 Desert Tortoise Council Symposium, Las Vegas, NV.

Schumacher, I.M., M.B. Brown, E.R. Jacobson, B.R. Collins, and P.A. Klein. 1997. Detection of antibodies to a pathogenic Mycoplasma in desert tortoises (*Gopherus agassizii*) with upper respiratory tract disease. J. Clin. Microbiol. 31(6):1454-1460.

TRW Environmental Safety Systems, Inc. 1999a. 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.

---. 1999b. Cover use and movement patterns of hatchling 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. B00000000-01717-5705-00073. 11 pp.

United States Bureau of Land Management (BLM). 2010a. Genesis Solar Energy Project Biological Assessment. 51 pp.

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

---. 2009a. Desert Tortoise Field Manual. Available online at http://www.fws.gov/ventura/speciesinfo/protocols_guidelines/docs/dt.

---. 2009b. Range-wide monitoring of the Mojave Population of the desert tortoise: 2007 annual report. Desert Tortoise Recovery Office, Reno, NV.

---. 2010a. Translocation of desert tortoises (Mojave Population) from project sites: plan development guidance. August 2010a. Unpub. document. 11 pp.

---. 2010b. Draft range-wide monitoring of the Mojave Population of the desert tortoise: 2008 and 2009 reporting. Desert Tortoise Recovery Office, Reno, NV. 67 pp.

---. 2010c. Draft range-wide monitoring of the Mojave Population of the desert tortoise: 2010 annual report. Desert Tortoise Recovery Office, Reno, NV. 51 pp.

University of Florida, Department of Pathobiology. No date. Serologic test for tortoise exposure to *Mycoplasma*. Unpub. doc. 5 pp.

Wendland, L, H. Balbach, M. Brown, J. Diemer Berish, R. Littell, and M. Clark. 2009. Handbook on gopher tortoise (*Gopherus polyphemus*). U.S. Army Corps of Engineers, ERDC/CERL. TR-09-1. 81 pp.

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

Attachment A

Sample Desert Tortoise Data Form

(Note: While some health data are included on this form, this is not the detailed data form that will be used for health assessments.)

LIVE TORTOISE DATA FORM

HYUNDAI MOTOR AMERICA TEST TRACK PROJECT
CALIFORNIA CITY, KERN COUNTY, CALIFORNIA

OBSERVER Eli Bernstein
PROCESSOR Karl
DATE 10-18-03
TIME (pst) FOUND ~1600 on 10/17
START PROC. ~~0903~~ 0837 found / ~~1003~~ retr. from burrow
FINISH PROC. ~~1119~~ 1019
T_a 22.7 °C T_{gs} 23.9 °C WIND 0-1 mph $T_{4.5cm}$ 22.9
PPT/CC 90% cirrostratus

TORTOISE # H-08
TRANSMITTER: TYPE 140L # 87159
DATA LOGGER # NONE
CAPTURE LOCATION:
GENERAL LOCATION NE ¼ of S16
UTM: E 0404614 N 3878932
RELEASE LOCATION:
GENERAL LOCATION
UTM: E N

BEHAVIOR (check one, elaborate as necessary):
IN BURROW, ~~FACE IN~~ @ end (~167cm)
IN BURROW, FACE OUT
ENTERING BURROW
RUNWAY, EXITING
BASKING
TRAVELLING when found on 10/17
UNDER SHRUB IN SHADE
UNDER SHRUB, FACE INTO STEM
OTHER T-P out

GENDER ♀
If unknown, check the following indicators and elaborate:
TAIL LENGTH PYGAL
ABDOMINALS
ANALS WIDTH OF FOREFOOT
CHIN GLANDS
MASS (g): INITIAL 3790 FINAL (w/transmitter) 3815
VOID: URINE? SCAT VISCOSITY
COLOR PPT
TOTAL MASS OF EXCRETA (g)

DISEASE INDICATIONS (elaborate as necessary; grade severity of *abnormal conditions*: (1) mild; (2) moderate; (3) severe)
BEAK/NARES (answer all):
GREEN NO DRY ✓ OCCLUDED NO
NASAL EXUDATE NO
SEROUS
NON-SEROUS(severity, color, quality)

CAKED DIRT ON BEAK/FORELIMBS NO
EXUDATE ON FORELIMBS NO
BREATHING (ck all that apply; describe/grade abn. cond):
CLEAR ✓ WHISTLING
OBSTRUCTED
EYES (ck all that apply; describe/grade abn. cond.):
CLEAR, BRIGHT ✓ MOIST LIDS NO
SWOLLEN OR SUNKEN NO
DISCHARGE NO
CONJUNCTIVITIS NO
CHIN GLANDS DRAINING? NO
ORAL CAVITY (ck all that apply; describe/grade abn. cond):
COLOR Pale pink
LESIONS NO
ODOR NO
ATTITUDE (check all that apply)
STRONG ✓ ACTIVE
QUIET, WITHDRAWN ✓
RELAXED LETHARGIC,WEAK
SHELL (ck all that apply; describe/grade abn. cond.):
NORMAL ABNORMALLY SCALEY Sl. scaley along midline & ant. m1,2, nuchal
LESIONS TO BONE/~~BLOODY~~ Loss of keratin in small "divots" - may be lesions. Bone shows along humeral + pectoral seams +
EXTERNAL PARASITES (answer all that apply)
NONE ✓ TYPE #
LOCATION

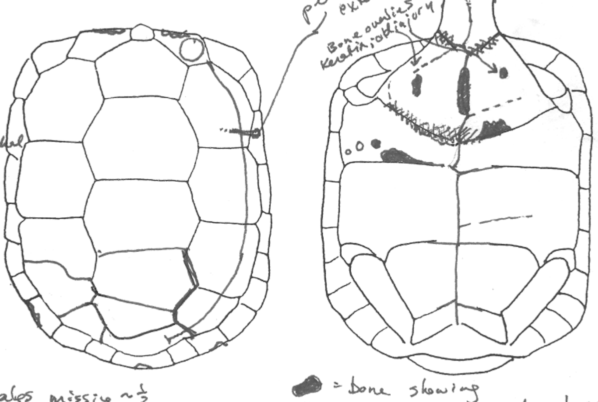
MEASUREMENTS (mm):
MCL 280 PLN 247.5 HT 110
WIDTH M7/8 (seam) 214 GW 222 @ PM 6
WIDTH M6 (mid) if GW is not M5, M6, or M7 X

SHELL WEAR CLASS 6
SUPER- or SUB-NUMERY MARGINALS? NO, but xtra ver
NUMBER OF GROWTH RINGS Can't count
GENERAL TORTOISE SHAPE (check one): □ ◯ ✓ △

PHOTO: ROLL ~~#~~ 1 FRAMES 17 - Plastron 18 - Ant. plastron 19 - foo L. h
~~20~~ - C
21 - C w/transmitter
22 - " " "
23 - "

DIAGRAM TRAUMA AND ANOMALIES:

old injury prob. puncture; damage extends into RC1
R gular old-chipped @ top
Bone overlies keratin; old injury



these seams are deep; appear to have some keratin loss. Ant. margs 1+2 + nuchal also seem abnormally scaley (1-2)

Both front legs medial surfaces have experienced some loss of scales, esp. L. Prob. chewing.

Scales missing ~⅓ plantar surface L hind foot

● = bone showing
▩ = deep; some keratin loss
- - - - = deep crease (cut?)

Eagle Mountain Pumped Storage
FERC Project No. 13123

Predator Monitoring and Control Plan

With staff modification in ***bold italics***

Revised March 2011

TABLE OF CONTENTS

1.0 Introduction

In October 2009, Eagle Crest Energy Company prepared a Draft Raven Monitoring and Control Plan for the Eagle Mountain Pumped Storage Project. That Plan was prepared in accordance with an information request from the Federal Energy Regulatory Commission (FERC) as a part of the licensing proceeding for the Eagle Mountain Project[1]. The Draft Raven Monitoring and Control Plan was prepared in consultation with the U.S. Fish and Wildlife Service (FWS), Bureau of Land Management (BLM), and California Department of Fish and Game (California DFG). In December 2010, FERC issued a Draft Environmental Impact Statement (DEIS) on the proposed Project. The DEIS included a FERC Staff Recommended Alternative, which included a recommended mitigation measure to modify the Draft Raven Monitoring and Control Plan to include:

- Pre-construction baseline surveys and post-construction monitoring methods for coyotes, wild dogs, and gulls
- Mitigation measures to be implemented if increases in population levels are detected following construction
- A monitoring schedule that would begin the second year after project completion
- Surveys to be conducted once every 5 years

In addition, the FERC sent a request to the U.S. Fish and Wildlife Service (FWS) on December 23, 2010, requesting the initiation of formal consultation on potential Project impacts to federally listed threatened and endangered species. The FWS replied with a request for additional information[2]. In the letter, the FWS requested clarification if the technical appendices from the Draft Environmental Impact Report prepared by the State Water Resources Control Board are to be considered as part of the Project description under the DEIS. The FWS commented that these documents describe the

---

[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.

[2] Letter from Kennon A. Corey, Assistant Field Supervisor, U.S. Fish and Wildlife Service to Timothy J. Welch, Chief, West Branch, Division of Hydropower Licensing, Federal Energy Regulatory Commission, January 31, 2011

conservation and monitoring measures proposed by Eagle Crest Energy to minimize impacts to sensitive biological resources. Some of these measures may affect desert tortoise and should be addressed accordingly.

In response to the recommended modifications to the Draft Raven Monitoring and Control Plan in the FERC DEIS, and the request for additional information from the FWS, Eagle Crest Energy modified the October 2009 Draft Raven Monitoring and Control Plan. As requested by the FERC, this plan has been modified to be a Predator Monitoring and Control Plan (PMCP), and described measures to protect desert tortoise from all the potential predators in the Project area. In addition, the plan has been updated to reflect the current guidance on raven control from the FWS.

Following review of ECE's revised plan, Commission staff found the plan did not provide sufficient detail to describe proposed survey methods for coyotes and feral dogs or gulls. Staff made revisions to the plan to provide additional detail in these areas. Staff additions ensure the surveys are conducted in an appropriate manner and would collect adequate data to identify increased presence of tortoise predators in the project area.

The PMCP was developed to reduce the opportunity for predator proliferation and describes the monitoring and control of the predator population in the Project area. Additional components of the PMCP are to reduce Project resource subsidies for predators and to evaluate the effects of common ravens (*Corvus corax*), coyote (*Canis latrans*), gulls (*Larus sp.*), and feral dogs in the Project area on the federally and state threatened desert tortoise (*Gopherus agassizii*).

This PMCP is considered a living document and may be subject to revision based upon on-going environmental assessment with resource management agencies. However, any such modifications will first require Commission approval in the form of a plan amendment. The PMCP 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 the FWS, California DFG, National Park Service [NPS], and BLM).

2.0 Conditions of Concern

2.1 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. In addition, tortoises are present in low densities in the area of the linear features of the proposed Project (the Project's proposed transmission line and buried water pipeline). 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*). Other potential predator species include coyote, feral dogs, and gulls.

Existing attractants for tortoise predators on the Project site include open water sources, human occupation, and roads. Existing water sources in the Project area include a water treatment pond on the Central Project Area, the open water portions of the Colorado River Aqueduct (CRA), ponds at Lake Tamarisk, and the Eagle Mountain Pump Station (which is part of the CRA system). The mine pits are also known to have collected rain water, resulting in temporary development of tamarisk stands and providing watering sites for local mammals including bighorn sheep. In addition, there has been human occupation of the Town of Eagle Mountain for many years. At present, the school at Eagle Mountain is operational, and there are several offices in use. The communities of Lake Tamarisk and Desert Center have year round residents. There are also residences scattered throughout the Chuckwalla Valley and employee housing at the Eagle Mountain Pump Station. The roads in the Project area (Interstate 10, State Route 177, Kaiser Road and Eagle Mountain Road) potentially attract ravens because they may provide food from litter and road kill. With existing buildings and transmission lines, perching, roosting, and nesting sites for ravens are plentiful under the existing conditions of the Project area.

Ravens and coyotes were detected during field surveys of the Project area in 2008 and 2009 (Final License Application Exhibit E, Appendix B). Biological surveys conducted for the nearby Desert Sunlight Solar Farm Project also noted coyote and raven presence in the Project area, with 192 individual ravens tallied (Ironwood 2010). Ravens and raven nests were also noted on existing power lines and trees during helicopter surveys of the Chuckwalla Valley and surrounding mountains during golden eagle surveys conducted in April and May 2010. This survey noted two active nests just northeast of the proposed Desert Sunlight Project (Ironwood 2010). ***Neither project reported the presence of gulls or feral dogs.***

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 and other predators to the area. Ultimately, the increased predation on young [and possibly adult] tortoises by common ravens and other predators may reduce recruitment into breeding populations.

However, because of the baseline condition of continuous subsidies, it is likely that predators already exist in 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 PMCP will be implemented as part of the Project's environmental measures to ensure that predator increases due to the Project, if any, will not cause a biologically significant impact to the local fauna.

2.2 Purpose and Objective

The purpose of this PMCP is to identify the conditions of concern specific to the Eagle Mountain Pumped Storage Project area that may attract the common raven, coyote, gulls and feral dogs and to define a monitoring and control plan that will: 1) monitor predator 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 PMCP include:

- Identify the conditions of concern specific to the Project that may attract predators to the area
- Identify how the Project will use project design features (PDF) and mitigation measures (MM) to manage the conditions of concern
- Document the effectiveness of predator management and control measures.
- Specify how, when, and what other measures will be selected and implemented if the monitoring suggests the need for additional controls
- Define triggers for modification of management and control measures using adaptive management principles

2.3 Conditions of Concern

There are five basic conditions of concern that have the potential into increase predators in the Project area and that have been identified for the Eagle Mountain Pumped Storage Project, as listed below.

2.3.1 Water from reservoirs and evaporation ponds

The Project includes two reservoirs located in the existing Central and Eastern mine pits on the Central Project Area. In addition, evaporation ponds will be constructed for the reverse osmosis water treatment system. The reservoirs and evaporation 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]; 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).

Home ranges for coyote are widely variable, but generally on the order of 10-100 square kilometers (3.8 – 38 square miles) (Riverside County 2011). Mortality analysis of desert tortoise indicated that coyotes occasionally prey on this species. Juvenile and female tortoises were most susceptible to such predation and these events were more likely to occur on desert flats than in adjacent, rockier foothills (Esque et. al. 2010). While the authors speculated that such predation is most likely when other more common coyote prey species are less abundant, such as times of drought, attracting coyotes to the project area or subsidizing population growth could result in increased tortoise predation.

2.3.2 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. Most raven predation on prey species is thought to take place during the spring, most likely by breeding birds that have been shown to spend most of their time foraging within 1,300 feet of their nests (Kristan and Boarman 2003). Therefore, structures that facilitate nesting in areas where ravens could not otherwise nest may pose a danger to nearby prey populations.

2.3.3 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

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

suppression activities has the potential to attract ravens; although not expected, potentially resulting in increased predation by raven on the desert tortoise.

2.3.4 Construction/operation waste management

Ravens are considered scavengers that obtain a high percentage of their diet from human subsidies such as food brought onsite by employees, landfills, dumpsters behind restaurants and grocery stores, open garbage drums and plastic bags placed on the curb for garbage pickup, and road kills. The construction and operation phases of the Project will result in increased food and waste generation; therefore, improper waste management could attract ravens to the Project area potentially resulting in increased predation on raven prey species.

Other species, such as gulls and feral dogs, are also scavengers who may take advantage of increased food sources from the Project.

2.3.5 Raven food sources from soil disturbance

During construction, disturbance of the soil and/or vegetation will occur from heavy equipment operation. This disturbance will result in the "unearthing" and exposure of natural food sources for ravens such as rodents and insects. Ravens could be attracted to the soil disturbance areas to prey upon unearthed, injured, and dead animals.

3.0 Management Practices

This section specifies PDFs and MMs that Eagle Crest Energy Company will either implement or has incorporated in the Project design to accomplish the objectives of this Plan. The PDFs include standard design elements known to effectively reduce the attraction of birds to similar Project components. The five basic conditions of concern identified are addressed separately for the construction and operation phase of the Project. ***Eagle Crest designated staff*** with expertise identifying common raven nests and tortoise remains (e.g., carcass, shell, and bone fragments) will be responsible for implementing raven management and control measures throughout Project construction and operation.

3.1 Regional Raven Management and Monitoring Program

To reduce raven populations in the California desert, the FWS, in conjunction with several cooperating agencies and local partners has developed a comprehensive, Regional Raven Management and Monitoring Program (Program) in the California Desert Conservation Area to address the regional, significant threat that increased numbers of ravens pose to desert tortoise recovery efforts (FWS 2010). As part of this Program, cooperating agencies and local partners will integrate federal, state, and local management plans and develop a major public outreach and education program as identified and evaluated in the FWS *Environmental Assessment to Implement a Desert Tortoise Recovery Plan Task: Reduce Common Raven Predation on the Desert Tortoise* (FWS 2008). In order to integrate monitoring and management, the FWS 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 FWS 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 desert tortoise populations. The vehicle for this program is a Memorandum of Understanding between the Project owner, California DFG, and FWS.

The Project PMCP may include this in-lieu fee if it is determined that ravens may increase over current levels due to the Project.

3.2 Construction

Construction phase impacts are considered more temporary in nature than operational impacts and therefore require temporary management practices to avoid or minimize the potential of attracting desert tortoise predators to the Project area.

3.2.1 Evaporation ponds

Prior to netting and becoming operational, the evaporation ponds may temporarily collect rainwater during the construction phase, which could serve as an attractant to ravens. Ponding during construction is expected to be minimal and temporary, given the xeric conditions in the Project area. The evaporation pond will be non-operational and un-netted for only a short duration during this phase; however, if ravens are observed congregating in the evaporation pond as a result of temporary ponding from rain water, consistent monitoring and hazing will be employed to deter raven use.

Hazing techniques employed would include visual and/or auditory devices designed to scare birds and reduce the attractiveness of an area. Potential methods might be air or gas cannons, human flushing, bio-acoustic deterrents, and/or flags and streamers to create an integrated system of negative stimuli. Because many birds, especially ravens, quickly habituate to a static program, this technique would be more effective during construction since the type, timing, and location of deployed techniques would be changed frequently to accommodate construction patterns (Bishop et al. 2003). If ravens are observed establishing communal roots or otherwise congregating in significant numbers (>5) at the evaporation ponds, a hazing program would be designed by ***Eagle Crest designated staff in consultation with FWS. The hazing program would be filed with the Commission for final approval.***

3.2.2 Raven perching, roosting, and nesting sites

Construction activities may create temporary perch or roost sites (and rarely, nest sites) for ravens by introducing equipment or materials to the landscape that provide suitable sites for ravens. Monitoring will evaluate the presence of ravens during construction. If ravens are regularly observed perching, roosting, or nesting on building materials, equipment, waste piles, or other construction debris, measures will be taken to change the quality or location of these materials to discourage their use. Measures may include installation of either visual deterrents or physical bird deterrents such as bird spikes or similar products. Alternatively, hazing may be used since the presence of these construction related features will be relatively short-term.

3.2.3 Ponding water

The application rates of water for dust suppression activities will be limited to minimize ponding. The application rate will consider soil infiltration and evaporation rates. ***Eagle Crest designated staff*** will patrol areas daily to ensure water does not puddle for long periods (more than 1 hour) and make recommendations for reduced water application rates where necessary. The fill station(s) will be designed to adequately drain water to prevent ponding.

3.2.4 Predator food sources from soil disturbance and road kill

During construction activities, specifically grading, there is a potential for animals to be unearthed, providing a food subsidy for scavengers and thereby potentially attracting ravens, ***gulls, coyotes, or dogs***. Although this will be a temporary food source, primarily occurring during initial site grubbing and grading, the Project owner will limit soil disturbance areas and stabilize disturbed areas which will reduce the attractiveness of disturbed soils ***for these predators***.

Ravens are well known for scavenging road killed animals, which are often abundant along roads and highways in the desert region (Boarman and Heinrich 1999,). Road kill provides a food source for ravens, which facilitates increased raven nesting near roads and highways in areas that might otherwise offer little food (Kristan et al. 2004). Enforced speed limits of 25 miles per hour on dirt roads will minimize road kills during construction. In addition, road kills along the proposed Project access road will be patrolled daily and cleared by ***Eagle Crest designated staff***. These measures are also expected to limit food subsidies for coyotes, dogs, and gulls.

3.2.5 Human good and waste management

A trash abatement program will be established during the construction phase of the Project. Trash and food items will be contained in closed, secured containers on the Project and removed daily to reduce the attractiveness to scavengers. In addition, the Worker Environmental Awareness Program will assist in ensuring that no trash is available that might attract scavengers to the Project area.

3.3 Operations

Operational impacts are considered ongoing and require management practices to avoid or minimize the potential to attract ravens to the Project area. No significant soil disturbance is anticipated during operation or maintenance that could result in food sources becoming exposed; therefore, this condition of concern is not addressed in this section. In addition, dust control should not be needed once construction is complete, therefore ponded water from dust suppression is not a condition of concern addressed in this section.

3.3.1 Evaporation ponds

Because the ponds need to remain uncovered to maximize evaporation rates, nets will be installed over the ponds prior to operations (i.e., any discharge into ponds). Evaporation ponds will be managed to minimize their attractiveness and access to birds. This consists of making resources provided by the ponds less available (i.e., habitat modification) and netting the ponds to prevent access by birds. Nets will be designed to exclude ravens and other wildlife from drinking or landing on the water of the ponds. ***Designated Eagle Crest Energy staff*** will be responsible for monitoring the evaporation ponds, reporting on the relative success of the netting, and providing recommendations for future improvements.

3.3.2 Raven perching, roosting, and nesting sites

The Project's transmission line may create perches, roost sites, and nest sites for ravens. Physical bird deterrents such as bird spikes and auditory and visual deterrents will be used to reduce raven perching, roosting, and nesting during operations. Nest removal may occur if ravens are confirmed nesting in Project components.

3.3.3 Human food and waste management

The trash abatement program, developed for the construction phase, will also include operational measures that will be implemented for the term of the Project license. These will include items such as requiring that trash and food items be contained in closed, secured containers and removed daily, if necessary, to reduce the attractiveness to scavengers such as ravens. The on-site Environmental Manager will continue to ensure that these practices are enforced and make recommendations for improvements where applicable.

4.0 Monitoring Practices

The monitoring effort for the Eagle Mountain Pumped Storage Project will address Project-specific impacts and will focus monitoring and management activity on the areas and facilities directly under the control of the Project owner, since a regional monitoring and management program is beyond the capacity of a single entity to implement. Semi-quantitative and qualitative monitoring will be implemented to assess the effectiveness of the mitigation program and to determine the need for implementing additional control measures.

4.1 Predator Population Baseline

4.1.1 Ravens and Gulls

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. Each survey will consist of systematically searching the immediate Project area and within 3,281 feet (1 kilometer) 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 98 foot (30 meter) 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. Pre-construction surveys will occur during both years of final project engineering design such that two post-nesting seasons are surveyed prior to ground disturbance.

During pre-construction avian monitoring, incidental sightings of other predators such as coyotes, gulls, and feral dogs, will also be recorded.

4.1.2 Coyotes and Feral Dogs

During the two years of final design engineering, Eagle Crest Energy would conduct surveys to collect baseline data on activity levels of coyote and feral dogs. The survey area would include areas within a 100 square kilometer (5.6 km or 3.5 mi. radius) area centered on the future location of fence set back at the lower reservoir. This area would provide coyotes and other mammals access to drinking water. Other sources of water are available in the area, and have previously been available in the

mine pits, so the addition of this water source is expected to have a minimal affect on coyote activity; however, if the project does influence coyotes it is most likely to be in this area.

In the Fort Irwin tortoise translocation area, coyote predation on tortoises were more frequent in desert bajadas[4] than in the adjacent foothills (Esque et. al.). As such Eagle Crest Energy's survey efforts will be concentrated in the Central Project Area and desert flats located to the east of the project reservoirs. Survey methods will include placement of baited track plates and/or motion sensor cameras similar to medium sized carnivore sampling methods provided in Zielinski and Kucera (1997) or Manley et. al. (2006). Sampling will occur at a minimum of 10 sampling stations with a minimum of 1km spacing between stations. Additionally, motion sensor cameras will be deployed to cover the location of future water access location on the lower reservoir. Sampling stations will be surveyed for ten consecutive days with data collection occurring every other day. If tracks are present, the plate will be cleaned, resooted or reinked, rebaited, and replaced. During the two-year period of final design engineering, ECE would conduct four such 10-day surveys, with two surveys each year and a minimum of 2 months between surveys.

Data collected each night will include presence or absence of canine (dog or coyote) tracks on the track plates. Over the course of the 10-day survey period, each plate will be scored with the number of nights with tracks (i.e. 0-5). This data will be analyzed over the course of the monitoring study, using a T-test, to determine increases or decreases of coyote/dog activity in the project area.

In addition, ECE would conduct transect surveys along Eagle Creek and desert flats within 3.5mi east of the lower reservoir to record evidence of coyote or dog predation on desert tortoise. These pedestrian surveys would achieve 50% visual coverage of the desert flats within 3.5 miles of the lower reservoir. Evidence would include tortoise carcasses with teeth marks or claw scratches, coyote or dog scat with visual evidence of tortoise, or evidence of canine-excavated tortoise burrows. All tortoise carcasses, excavated burrows, and canine scat would be photo-documented. ECE would conduct one such survey during each year of the two-year final design engineering period.

These data will be analyzed by normalizing the count of predation sign on each transect based on transect length. Differences in the mean number of predation counts across transects will then be compared across surveys using a t-test.

As such, each "canine predation survey" would include two 10-day track plate/motion sensor camera surveys, with minimum 1 month between survey periods, and 1 pedestrian survey for evidence of canine tortoise predation.

---

[4] *A bajada is a broad slope of debris spread along the lower slopes of mountains by descending streams, usually found in arid or semiarid climates.*

4.2 Construction Phase

4.2.1 Ravens and Gulls

To identify potential increases in raven activity, ***Eagle Crest designated staff*** will conduct monthly point count surveys of the Project Disturbance Area. In addition, during the raven breeding season, nest surveys will be conducted bi-weekly (every 2 weeks). Monthly and bi-weekly surveys will be conducted throughout the entire construction period.

To the extent practical, monitoring will be conducted at the same point count locations for both the construction and operation phases. The survey area will include areas of temporary disturbances associated with waste disposal areas, erected structures, staging areas where large equipment or material may be stored, evaporation ponds, and any area where water is applied to control dust and erosion or where there are recent surface disturbances.

Data recorded for each raven observed will include raven activity (categorized as flying, perched, or on the ground); type of perch (if applicable); and the general location of the bird within the Project Disturbance Area. Any nesting locations will be recorded and unoccupied nests will be reported to ***Eagle Crest designated staff*** for removal. In addition to weekly surveys, ***Eagle Crest designated staff*** will record incidental observations of raven occurrences and behavior on daily construction monitoring logs to supplement data collected during point count surveys.

4.2.2 Coyotes and Dogs

During each year of the construction period ECE would conduct one canine predation survey, as defined above.

4.3 Operation Phase

To identify potential increases in predator activity during operation of the Project, ***Eagle Crest designated staff*** will implement a monitoring program which will begin the first year reservoir filling begins. Subsequent surveys would occur in years 2, 3, 4, 5, 7, and 10 following initiation of reservoir filling. Following this survey period, if data do not indicate a significant increase in predator activity and desert tortoise predation, monitoring would be discontinued. During survey years, raven and gull monitoring would occur monthly, except during raven breeding season when monitoring will be bi-weekly. Each sampling year would also include one canine predation survey.

The designees will be trained by ***Eagle Crest designated staff*** during the first six surveys to ensure appropriate data collection. At least three of the six surveys will be during the raven breeding season surveys (see below). ***Eagle Crest designated staff*** will determine if the designee is sufficiently trained after six surveys. If the designee is replaced at any time during operations, the Project owner will ensure their replacement is properly trained. ***Eagle Crest designated staff*** will also review the data and discuss the monitoring results with the designee each quarter to ensure that monitoring objectives are being achieved.

4.3.1 Predator monitoring

4.3.1.1 Monthly Raven Surveys

Eagle Crest designated staff or designee will conduct monthly surveys for predator activity at pre-designated locations throughout the Project area during seasons outside of the raven breeding season. Exact locations of point count surveys will be determined based on agency input. An area with a radius of about a half mile (800 meters) around each point will be surveyed. The survey point will be associated with Project components including transmission poles and lines, and support structures, as well as evaporation ponds and waste disposal facilities. The point count locations will be located on areas and facilities directly under the control of Project owner, but the survey area may extend beyond the Project boundary.

A 10 minute sampling session observing and listening for ravens will occur at each survey location. The surveyor will record the number of ravens and will document the behavior of the raven (e.g., perched, flying, on the ground, nesting), perch type (if applicable), and distance and direction from the survey location. Additional data collected will include the survey start/stop time, and weather (including temperature, average wind speed, and percent cloud cover). Point counts will not be conducted when weather conditions may affect raven behavior, specifically when wind or rain interferes with audible detection; rain interferes with visual detection; or when the temperature is above 95 degrees Fahrenheit.

During monthly raven surveys, the presence and activity of other predators will also be noted.

4.3.1.2 Breeding Season Raven Surveys

Eagle Crest designated staff or designee will conduct bi-weekly breeding season surveys, starting at the beginning of the typical breeding season (mid-February) and continue to the end of June, to identify raven nests and evidence of desert tortoise predation at raven nests (Boarman 2002, 2003).

Surveys will be conducted by vehicle when possible and on foot when necessary. Native trees, landscape trees, utility poles, and other structures will be searched for nests. UTM coordinates (in North American Datum [NAD] 83), as well as nesting substrate and current breeding status (if detectable), will be recorded for each nest located. Once data have been collected, ***Eagle Crest designated staff*** or designee will determine if the nest is unoccupied (i.e., no eggs in the nest or nestlings have fledged), in which case the nest will be removed by ***Eagle Crest designated staff*** or the on-site environmental manager.

During bi-monthly raven surveys, the presence and activity of other predators will also be noted.

In the event that a common raven is documented initiating a new nesting attempt during the surveys, ***Eagle Crest designated staff*** will conduct follow up visits to that nest in the subsequent months to establish whether or not the pair is bringing tortoises back to the nest. ***Eagle Crest designated staff*** will evaluate whether the designee is qualified to conduct these follow-up nest surveys. If the designee is not deemed qualified, then ***Eagle Crest designated staff*** will conduct the follow-up surveys. ***Eagle Crest designated staff*** or designee will search a 98 foot (30 meter) radius surrounding each nest or perch site for evidence of desert tortoise predation. All depredated desert tortoise will be photographed, a UTM coordinate collected (in NAD 83), and the length measured (or estimated). In addition, each desert tortoise will be marked to avoid duplication of data recording on subsequent surveys. Throughout the survey period, if tortoise remains are found below an active nest, ***Eagle Crest designated staff*** or qualified on-site environmental manager will document the remains and verify the nesting status of the common ravens (e.g., incubating, feeding nestlings), herein referred to as offending ravens, and notify the FWS and California DFG verbally (via phone call) and in writing (via e-mail or fax) within 24 hours of documenting the remains. Upon being notified, the FWS will contact the Common Raven Management Working Group which will coordinate immediate removal of the offending common raven(s). The Project owner will establish a Cooperative Service Agreement with the U.S. Department of Agriculture's Animal and Plant Health Inspection Service (USDA/APHIS) allowing for FWS to conduct the removal efforts of offending common raven(s) within the Project area, where feasible. The Project Owner will be responsible for expenses attributed to removal of offending ravens nesting on Project facilities.

4.3.1.3 Evaporation Pond Monitoring

The netted evaporation ponds will be monitored to verify that the netting remains intact, is fulfilling its function in excluding birds and other wildlife from the ponds, and does not pose an entanglement threat to birds and other wildlife. ***Eagle Crest designated staff*** or designee will be responsible for monitoring the evaporation ponds, reporting on the relative success of the netting, and providing recommendations for future improvements.

Monitoring will be conducted by ***Eagle Crest designated staff*** or designee experienced with bird identification and survey techniques. Each survey will consist of the surveyor walking the perimeter of each evaporation pond a minimum of three times in a single day. To provide an accurate assessment of bird and wildlife use of the ponds during all seasons and times of day, surveys will be conducted a minimum of 2 hours following sunrise (i.e., dawn), 1 hour mid-day (i.e., 1100 to 1300), and 2 hours preceding sunset (i.e., dusk). The surveyor will record observations on the designated reporting form.

Eagle Crest designated staff will report any bird or other wildlife deaths or entanglements within 2 days of the discovery to the California DFG and FWS.

4.4 Reporting

Predator monitoring summary reports will be prepared after each survey year to document survey results and data analyses. Each report will include recommendations for mitigation in accordance with identified triggers and the conditions identified below.

If management objectives of the PMCP are not being met, actions may need to be modified. ***Eagle Crest designated staff*** and Technical Advisory Team will meet within 1 year of completion of each PMCP survey to discuss progress and submit a report of the findings to the FERC.

4.5 Adaptive Management

Implementation of the PMCP 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, the measures 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 PMCP, ***Eagle Crest***

designated staff and Technical Advisory Team will consult with applicable resource agencies to determine the best course of action and file, for Commission approval, a plan amendment.

If monitoring data show a potential increase in coyote/dog activity and associated desert tortoise predation, ECE will consult with FWS and California DFG to determine whether control measures are needed for these predators. If monitoring data shows a potential increase in raven roosting or nesting behavior within the Project site or immediate area, several additional measures may be implemented to minimize the attractiveness of the Project site to this species, including facilities to discourage roosting or nesting on Project-related structures. These measures are discussed below.

4.6 Discourage Roosting

If long-term monitoring data show an increase in roosting by common ravens, Eagle Crest Energy will implement measures to discourage roosting using one or more of the following methods:

- Bird spikes installed on top of potential perches designed to prevent birds from gaining a foothold on the perch because of their porcupine design
- Repellent coils installed on top of potential perches to deter birds from gaining footholds because of their destabilizing coil design
- Bird control wire designed so that a line or grid of variable height posts is interconnected by a wire. This creates a confusing landing area in the same spirit as trip wires used for unsuspecting people
- Bird netting
- Electric shock deterrents with low voltage pulses

4.7 Discourage Nesting

If long-term monitoring data show an increase in nesting by common ravens, measures to discourage nesting will be implemented, using one or more of the methods described above for discouraging roosting. Inactive raven nests discovered during the monitoring efforts will be dismantled and passive nest deterrents would be installed to inhibit future nest building at the site. In the event that an active nest is found, it will be monitored closely throughout the season by a biological monitor to determine number of fledglings and status of development. As soon as it is determined that the nest is no longer active, it would be removed and passive deterrents installed.

4.8 Removal of Problem Ravens

Non-lethal deterrents previously described will be the first course of action. However, ravens may adapt quickly to avoid passive deterrents. If problem ravens are proven to be an active threat to resident desert tortoises then they could be subjected to lethal removal in coordination with the BLM, FWS, and California DFG. Because ravens and their active nests are protected under the Migratory Bird Treaty Act (MBTA) they cannot be indiscriminately killed, harmed, trapped, or harassed. Any management action would need to be coordinated with and possibly carried out by the BLM, FWS, and California DFG.

5.0 Documentation of Consultation

On August 3, 2009, Eagle Crest Energy Company sent letters to the resource agencies notifying them of the 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 Eagle Crest Energy Company sent letters to the BLM, FWS, NPS, and California DFG requesting their assistance in reviewing and developing draft monitoring and control plans for the following terrestrial resource areas:

- Revegetation Plan
- Weed Control Plan
- Desert Tortoise (Gopherus agassizii) Translocation or Removal Plan
- Raven Monitoring and Control Plan
- 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 California DFG attended the meeting. The BLM and FWS notified Eagle Crest Energy Company 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 Eagle Crest Energy Company, 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 Eagle Crest Energy Company 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. Eagle Crest Energy Company 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 (California DFG, FWS, 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 e-mail 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 Eagle Crest Energy Company received comments from the NPS on the Draft 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.

Eagle Crest Energy Company filed the response to FERC's request for additional information on October 26, 2009. Appendix D of the response to the FERC additional information request includes a contact register and copies of correspondence with the land managing agencies.

FERC published a Draft Environmental Impact Statement (DEIS) on the proposed Project on December 23, 2010. The comment period on the DEIS closed on February 28, 2011. This Plan has been revised in response to recommendations included in the FERC Staff-recommended alternative described in the DEIS.

6.0Literature Cited

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

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 Web site at: http://www.dmg.gov/documents/EA_Raven_Final_FWS_033108.pdf

Esque, Todd C., Ken E. Nussear, K. Kristina Drake, Andrew D. Walde, Kristin H. Berry, Roy C. Averill-Murray, A. Peter Woodman, William I. Boarman, Phil A. Medica, Jeremy Mack, Jill S. Heaton. 2010. Effects of subsidized predators, resource variability, and human population density on desert tortoise populations in the Mojave Desert, USA. Endangered Species Research Vol. 12: 167–177, 2010. Available on line at: http://www.int-res.com/articles/esr2010/12/n012p167.pdf; accessed March 14, 2011

Ironwood Consulting Inc. 2010. Common Raven Management Plan Desert Sunlight Solar Farm Project, BLM Case File Number CACA-48649. Riverside County, CA. Prepared for Desert Sunlight Holdings, LLC. Oakland, CA. Prepared by Ironwood Consulting, Inc. Redlands, CA.

Manley, P.N.; Van Horne, B.; Roth, J.K.; Zielinski, W.J.; McKenzie, M.M.; Weller, T.J.; Weckerly, F.W.; Vojta, C. 2006. Multiple species inventory and monitoring technical guide. Gen. Tech. Rep. WO-73. Washington, DC: U.S. Department of Agriculture, Forest Service, Washington Office. 204 p.

Riverside County. 2011. Western Riverside County Multiple Species Habitat Conservation Plan: Vol II. – MSHCP Reference Document. Retrieved March 16, 2011 from the Riverside County Environmental Programs Web site at: http://www.rctlma.org/mshcp/volume2/mammals.html

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

Zielinski and Kucera (1995) American marten, fisher, lynx, and wolverine: survey methods for their detection. Gen. Tech. Rep. PSW-GTR-157. Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture; 163. Available online at: http://www.fs.fed.us/psw/publications/documents/psw_gtr157/psw_gtr157.pdf

Eagle Mountain Pumped Storage
FERC Project No. 13123

Worker Environmental Awareness Program

TABLE OF CONTENTS

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:

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 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).

Eagle Crest
Energy Company

One El Paseo West Building
74-199 El Paseo, Suite 204
Palm Desert, CA 92260

Tel: (760) 346-4900
Fax: (760) 346-4911

www.EagleCrestEnergy.com

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

TABLE OF CONTENTS

FIGURE

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.

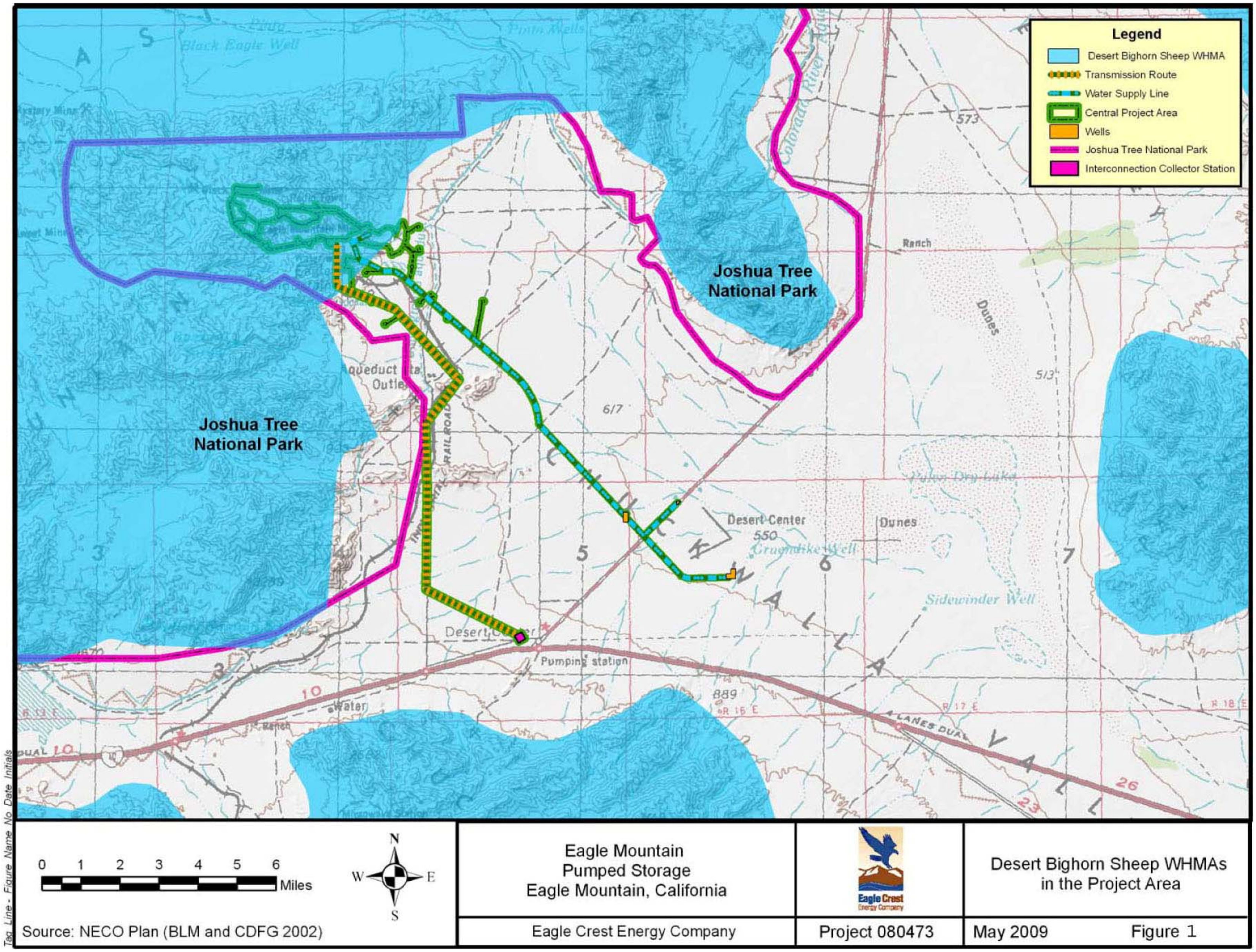
BASELINE CONDITIONS BIGHORN SHEEP

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
Pumping station
Dunes
Sidewinder Well
Ranch
0 1 2 3 4 5 6 Miles
N
S
E
W
Source: NECO Plan (BLM and CDFG 2002)
Eagle Mountain
Pumped Storage
Eagle Mountain, California
Eagle Crest Energy Company
Eagle Crest
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.

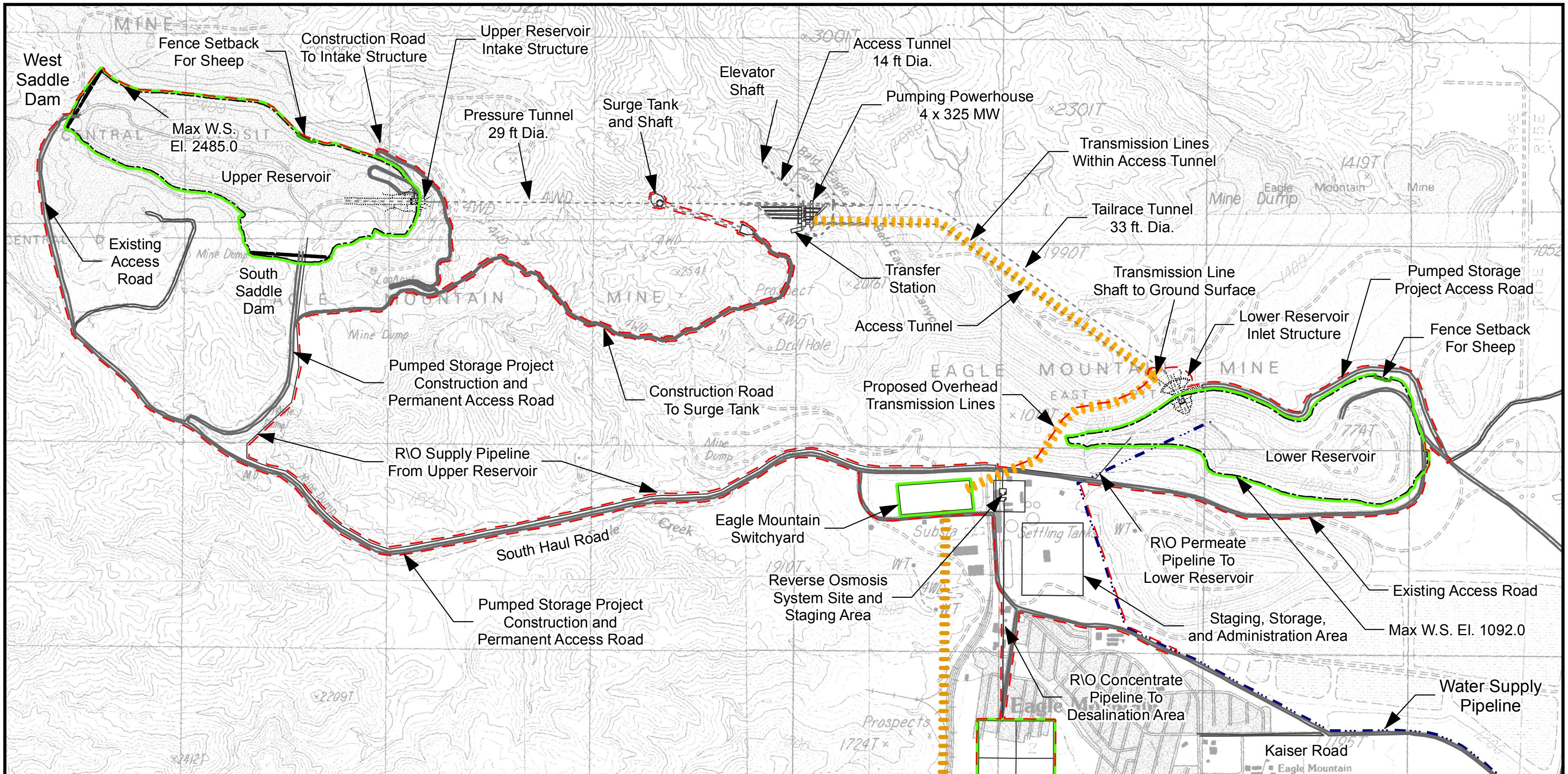
Other Project Facilities

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.



Legend

- Temporary -- Tortoise Exclusion Fencing (During Construction Only)
- Permanent-- 8'-10' Chain Link Exclusion Fencing with Tortoise-Proof Mesh
- Setback in Permanent Exclusion Fencing, allows Bighorn Sheep water access
- Water Supply Line
- Transmission Line

0 2,500 5,000 Feet

N E S W

Eagle Mountain Pumped Storage
Eagle Mountain, California

Eagle Crest Energy Company

Eagle Crest Energy Company

Project 080475

WILDLIFE EXCLUSION FENCING

October 2009

Figure 3.3.6-4

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

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.

Phase 1

Golden Eagle Aerial Surveys for Eagle Mountain Pumped Storage Project in the Mojave Desert Region, California

---

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

TABLE OF CONTENTS

LIST OF FIGURES AND TABLES

APPENDICES

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 26^{th}, April 2^{nd}, and April 3^{rd}, 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.

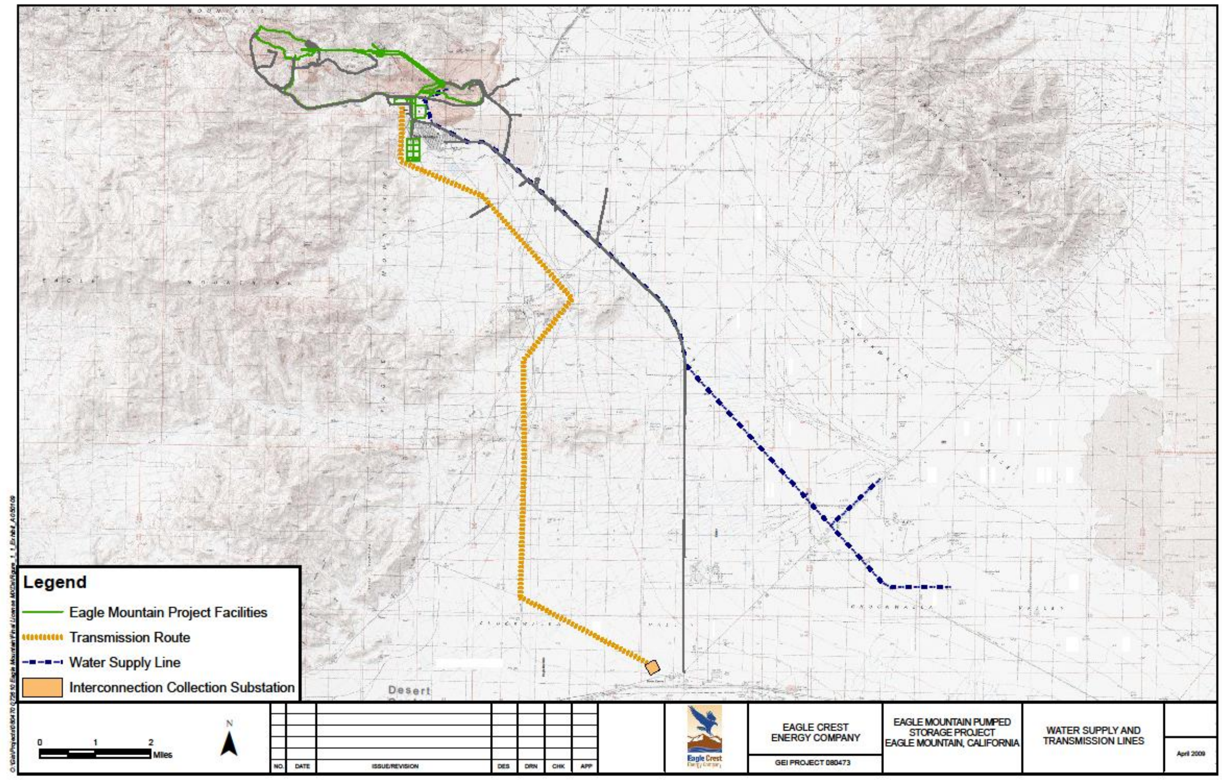


Figure 2. Location Map provided by Eagle Crest Energy Company.

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.

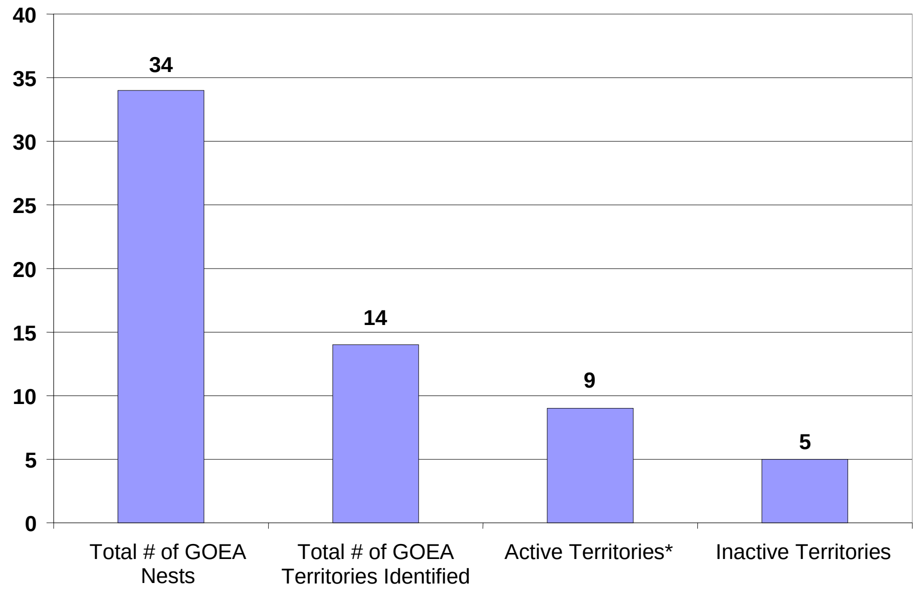
RESULTS

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.



*includes "active" as well as "possibly active" territories

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

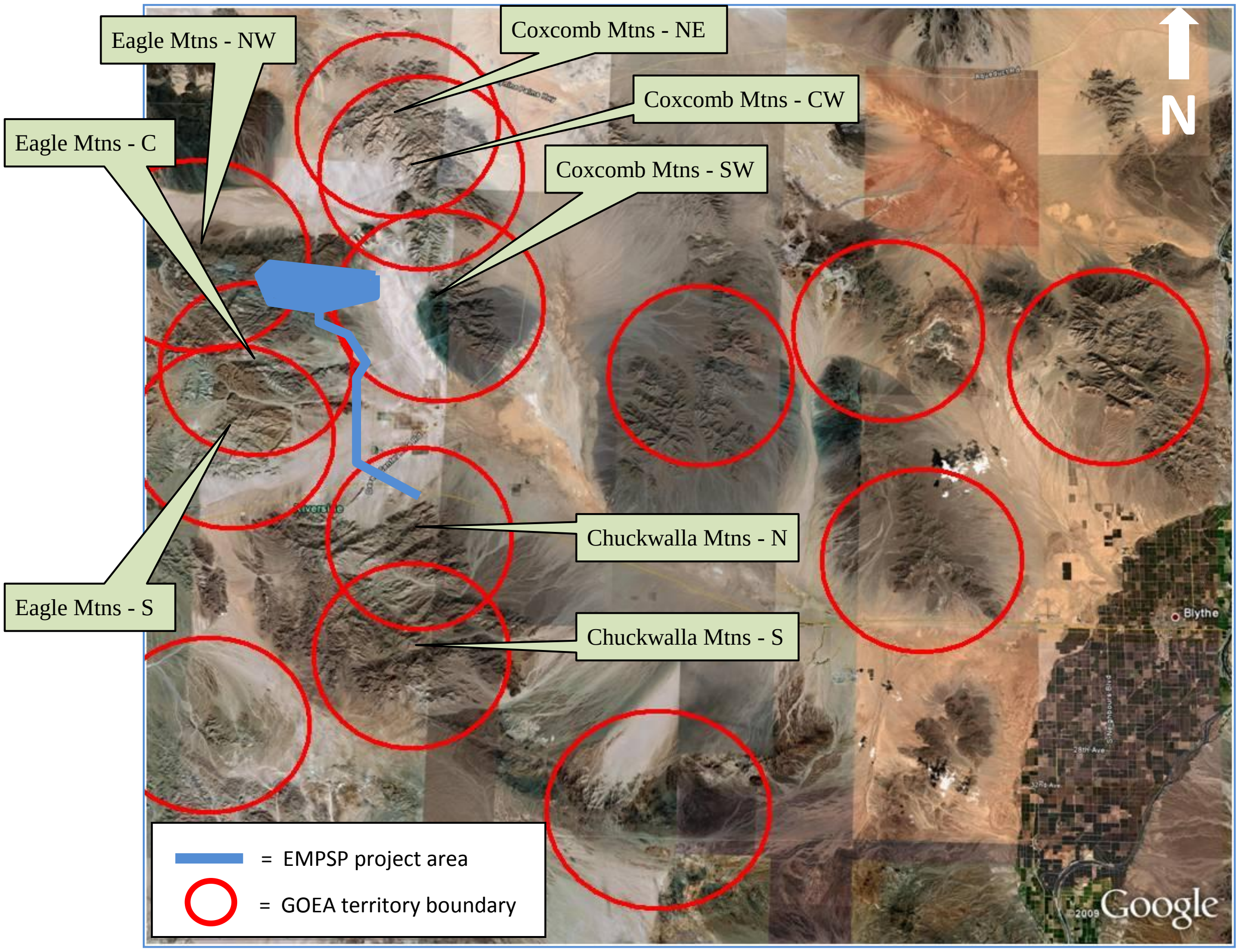


Figure 4. Overview map of all GOEA territories, with an approximate 5-mile GOEA territory radius, surrounding the Eagle Mountain Pumped Storage Project area in the Mojave Desert Region.

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

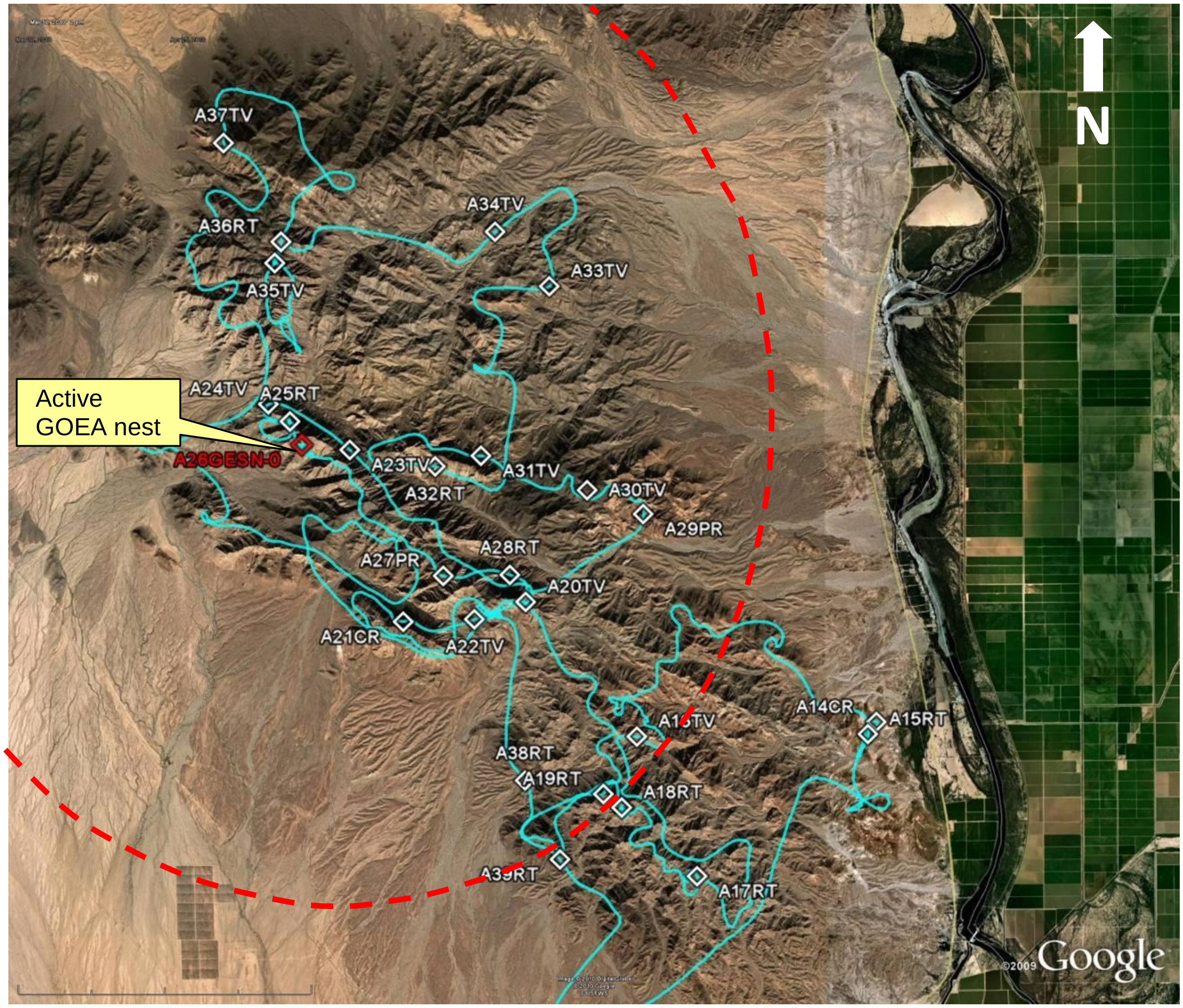


Figure 6. Big Maria Mountains, active territory. All waypoints for species and nests observed, the helicopter flight path, and an approximate 5-mile GOEA territory radius are provided.

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

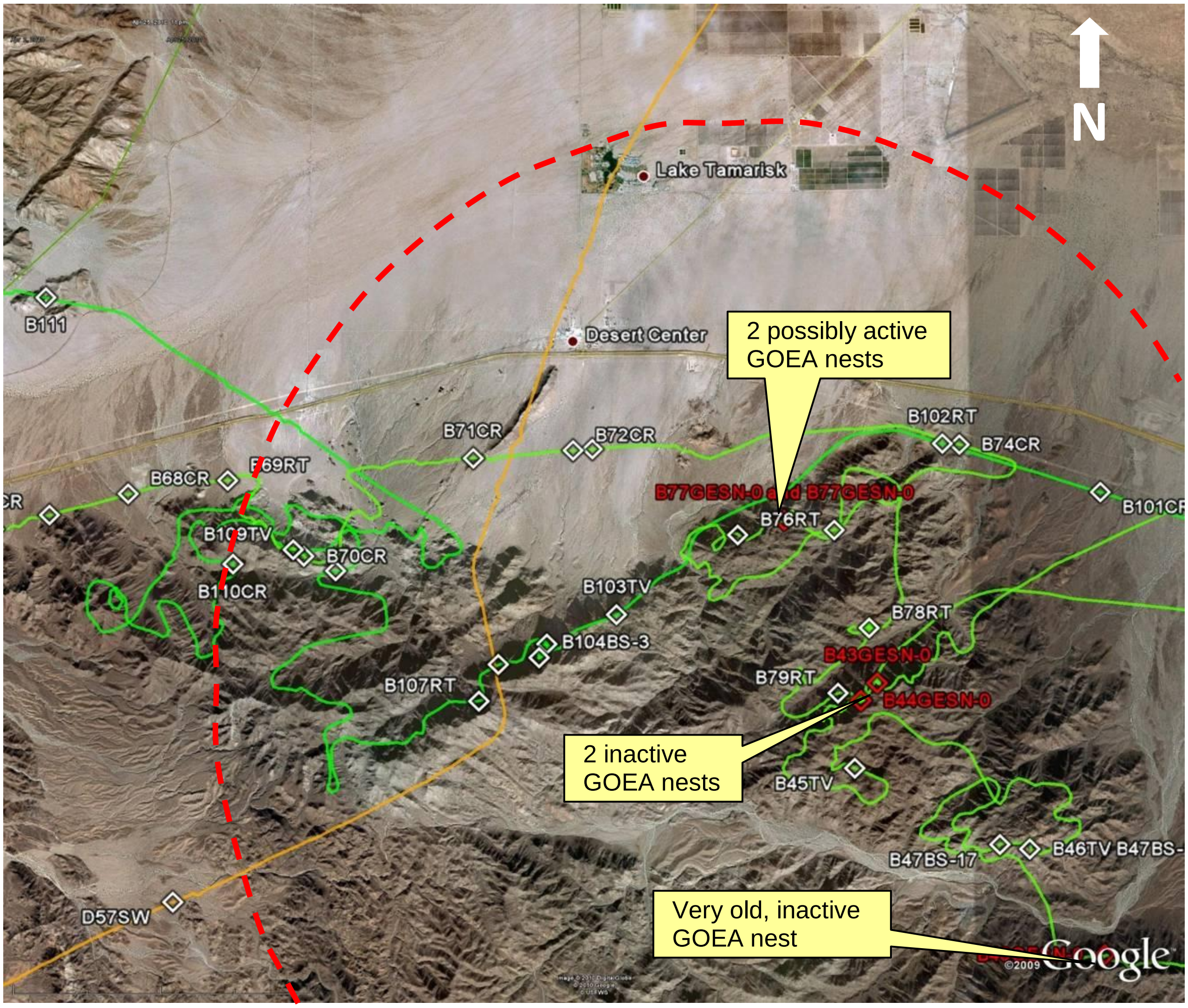


Figure 7. Chuckwalla Mountains - North, possibly active territory. All waypoints for species and nests observed, the helicopter flight path, and an approximate 5-mile GOEA territory radius are provided.

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

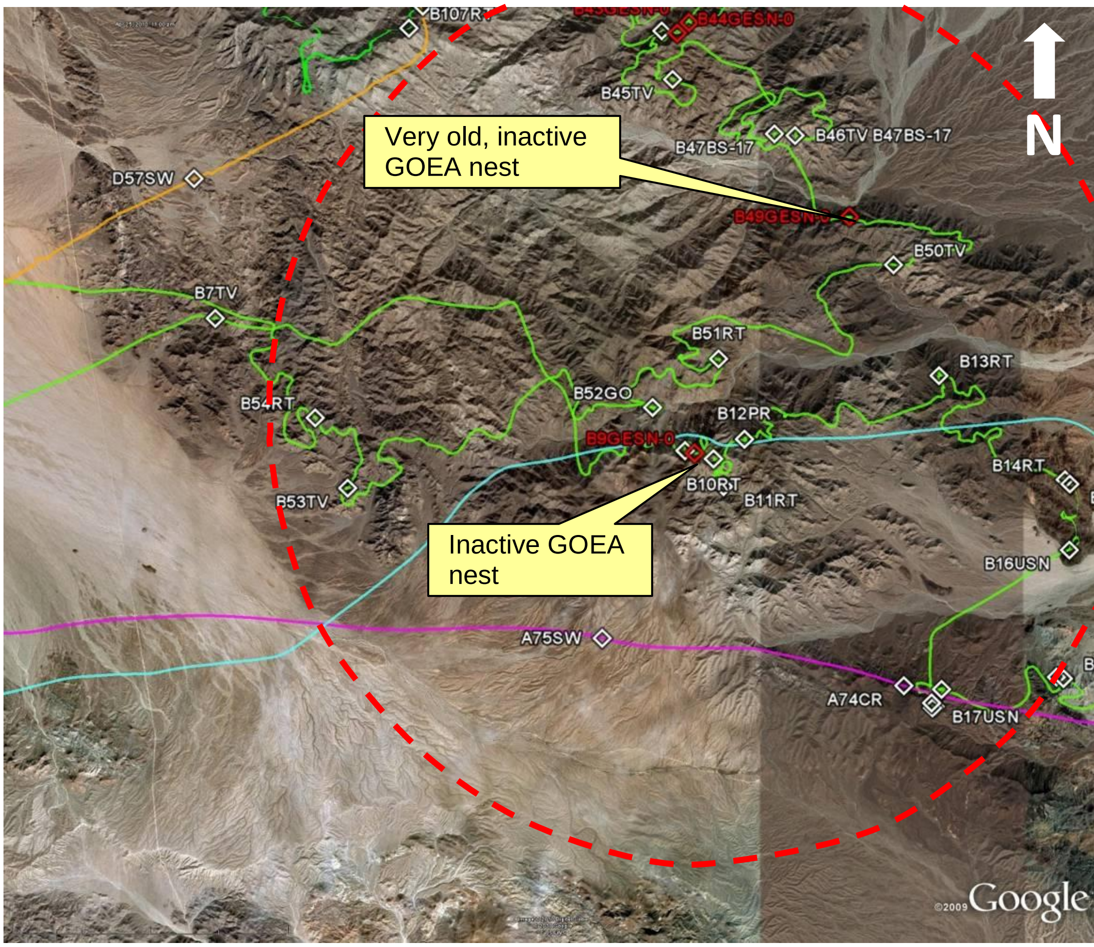


Figure 8. Chuckwalla Mountains - South, inactive territory. All waypoints for species and nests observed, the helicopter flight paths, and an approximate 5-mile GOEA territory radius are provided.

An inactive GOEA nest (B49GESN-0). Poor condition, very old nest.

Chocolate Mountains - North
(just south of designated survey area)

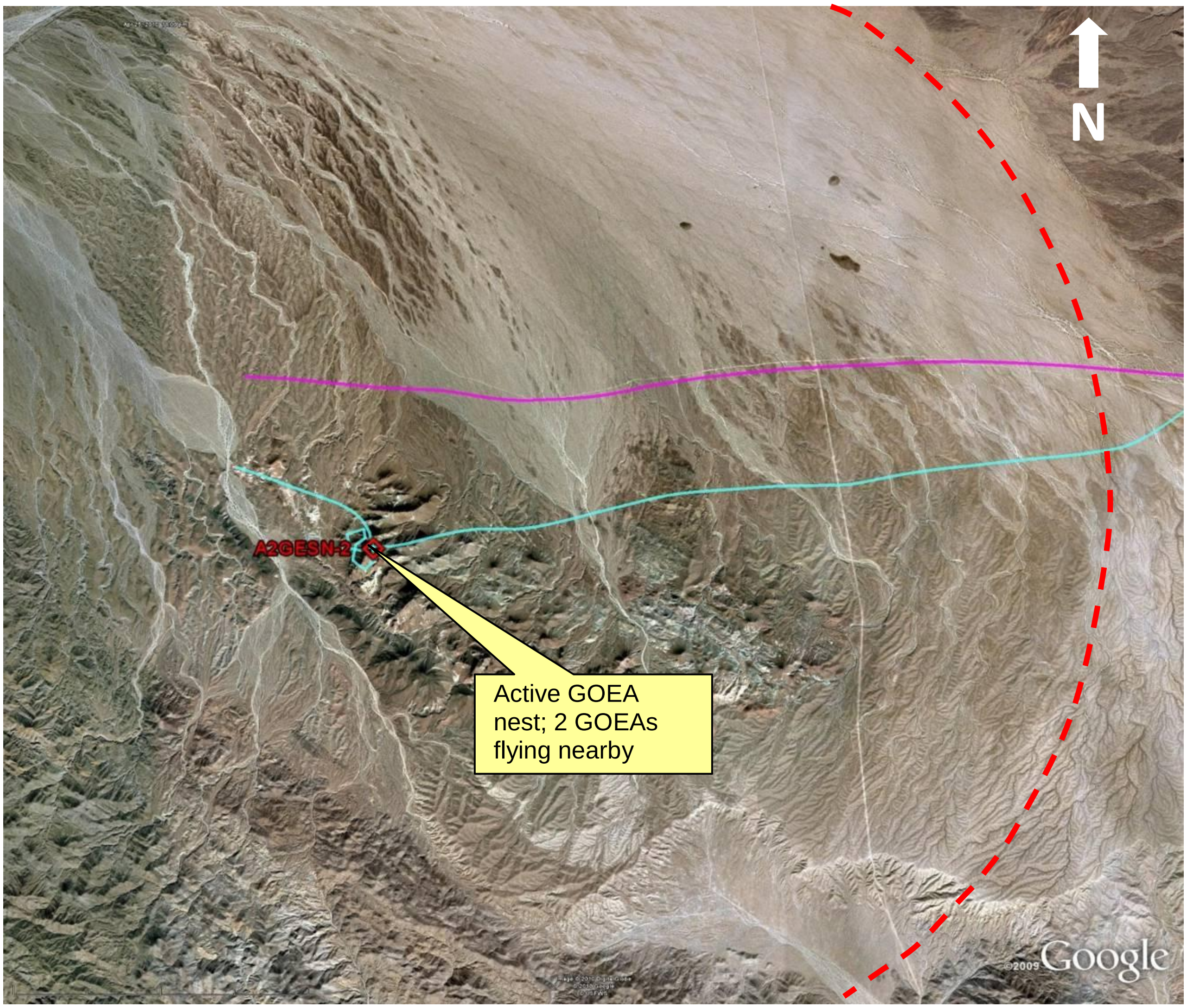


Figure 9. Chocolate Mountains - North, active territory. All waypoints for species and nests observed, the helicopter flight paths, and an approximate 5-mile GOEA territory radius are provided. Two GOEAs were observed flying near the nest site; one adult and one 2 to 3 year-old sub-adult. This territory is outside of the required survey boundaries but is included since GOEAs were found during the flights.

Chuckwalla Valley

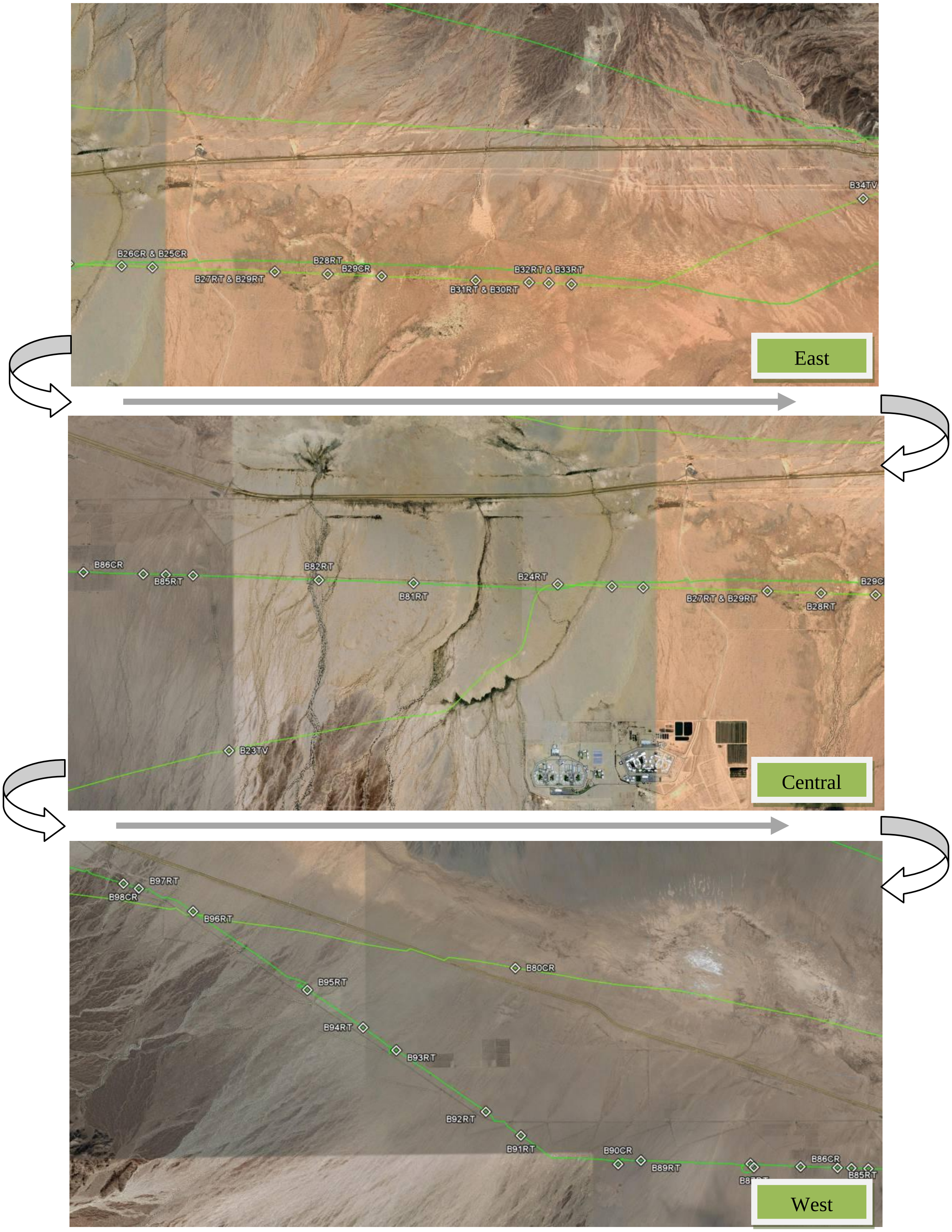


Figure 10. Chuckwalla Valley. All waypoints for species and nests observed, the helicopter flight path are provided. No GOEA nests were observed in this area.

Coxcomb Mountains - Northeast

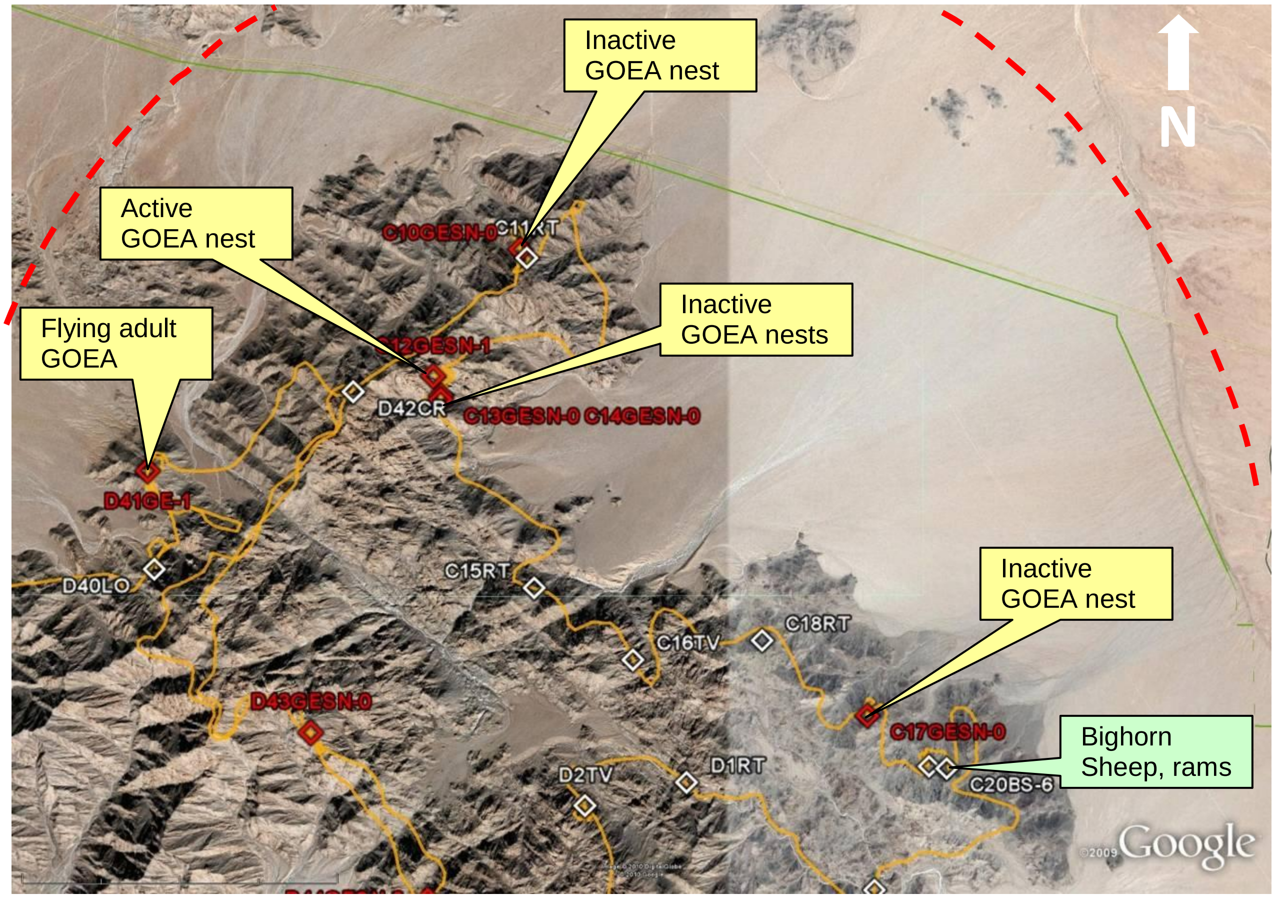


Figure 11. Coxcomb Mountains - Northeast, active territory. All waypoints for species and nests observed, the helicopter flight paths, and an approximate 5-mile GOEA territory radius are provided.

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

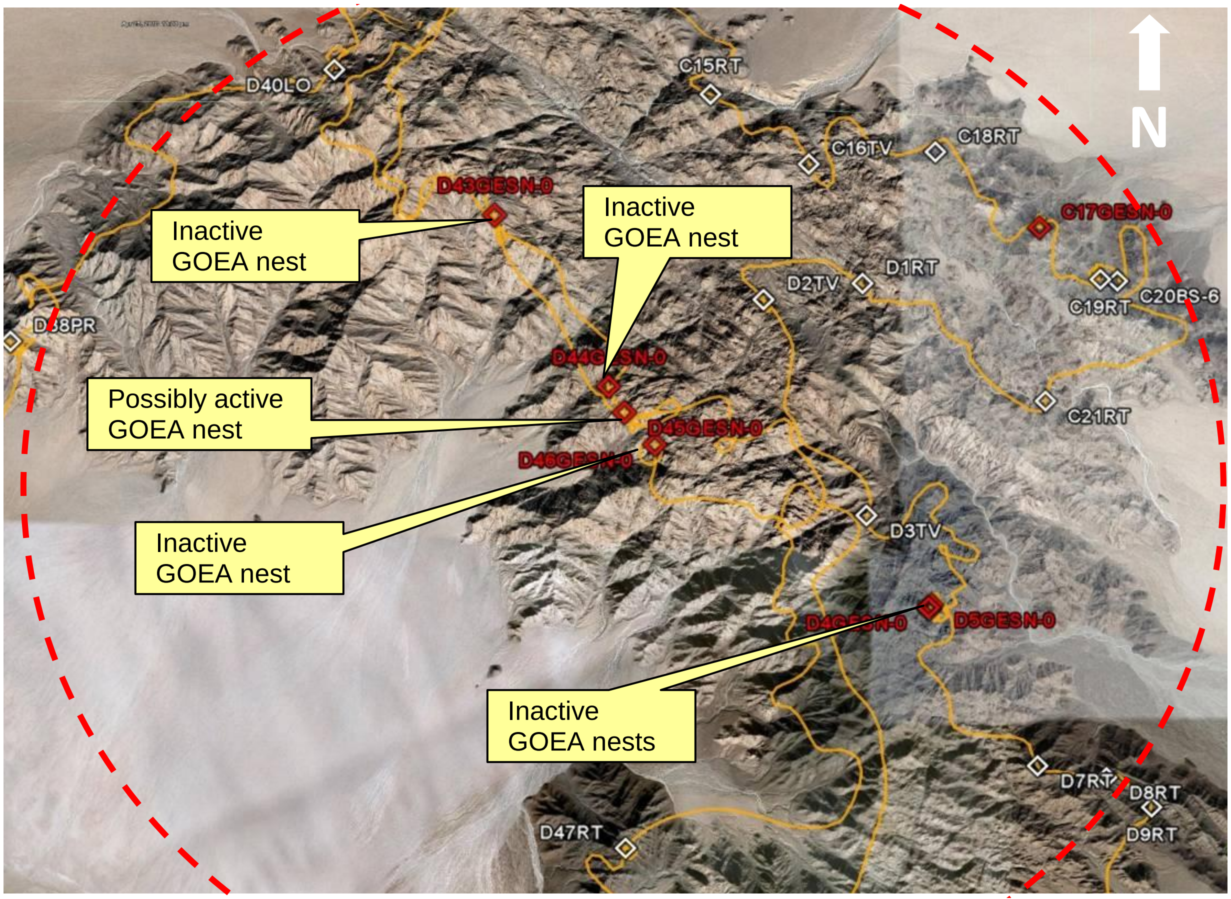


Figure 12. Coxcomb Mountains – Central West, possibly active territory. All waypoints for species and nests observed, the helicopter flight path, and the USFWS recommended 5-mile GOEA territory radius are provided.

Coxcomb Mountains – Central West

An inactive GOEA nest (D46GESN-0); fair condition.

A possibly active GOEA nest (D45GESN-0); good condition.

Coxcomb Mountains - Southwest

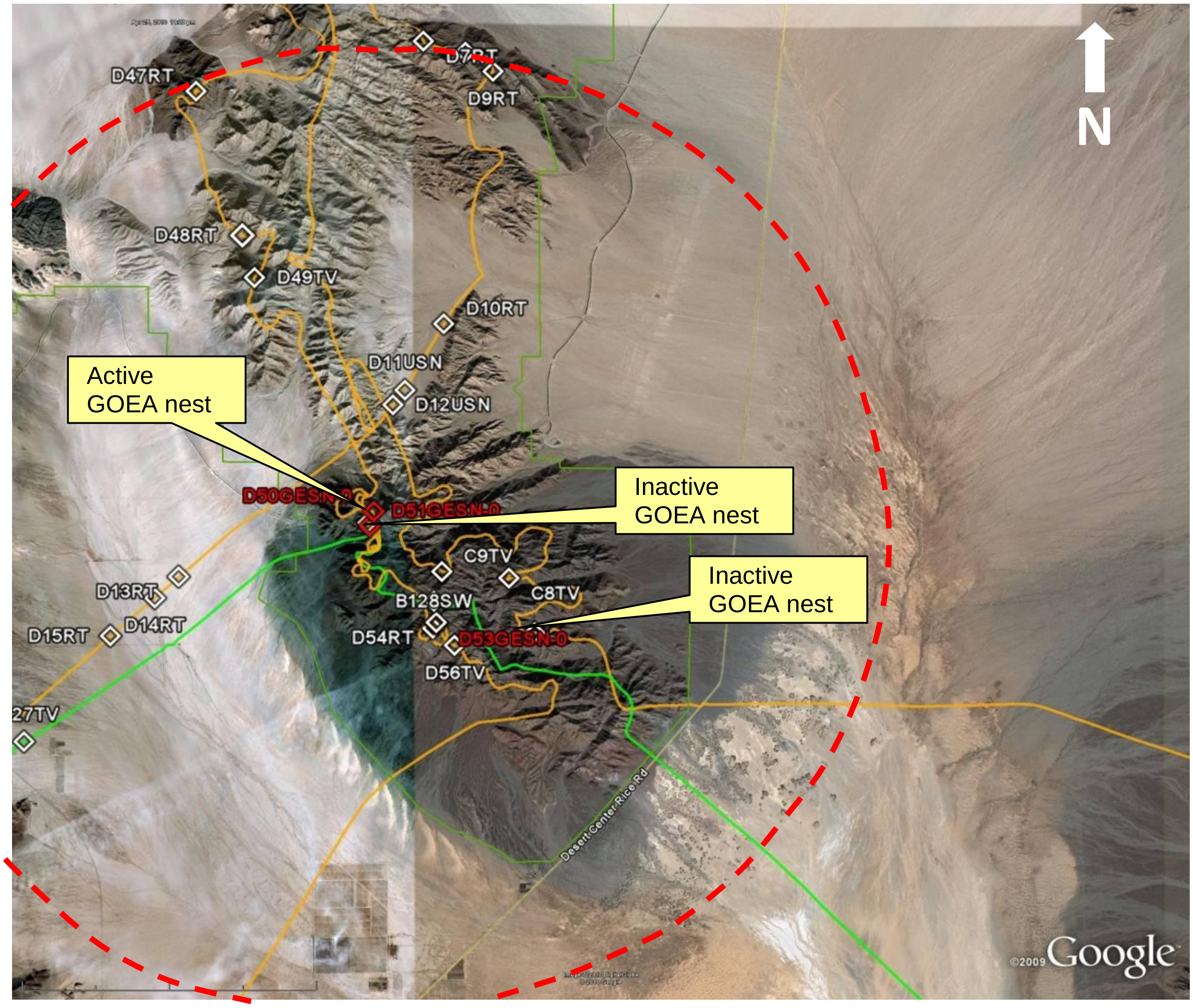


Figure 13. Coxcomb Mountains - Southwest, active territory. All waypoints for species and nests observed, the helicopter flight paths, and an approximate 5-mile GOEA territory radius are provided..

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

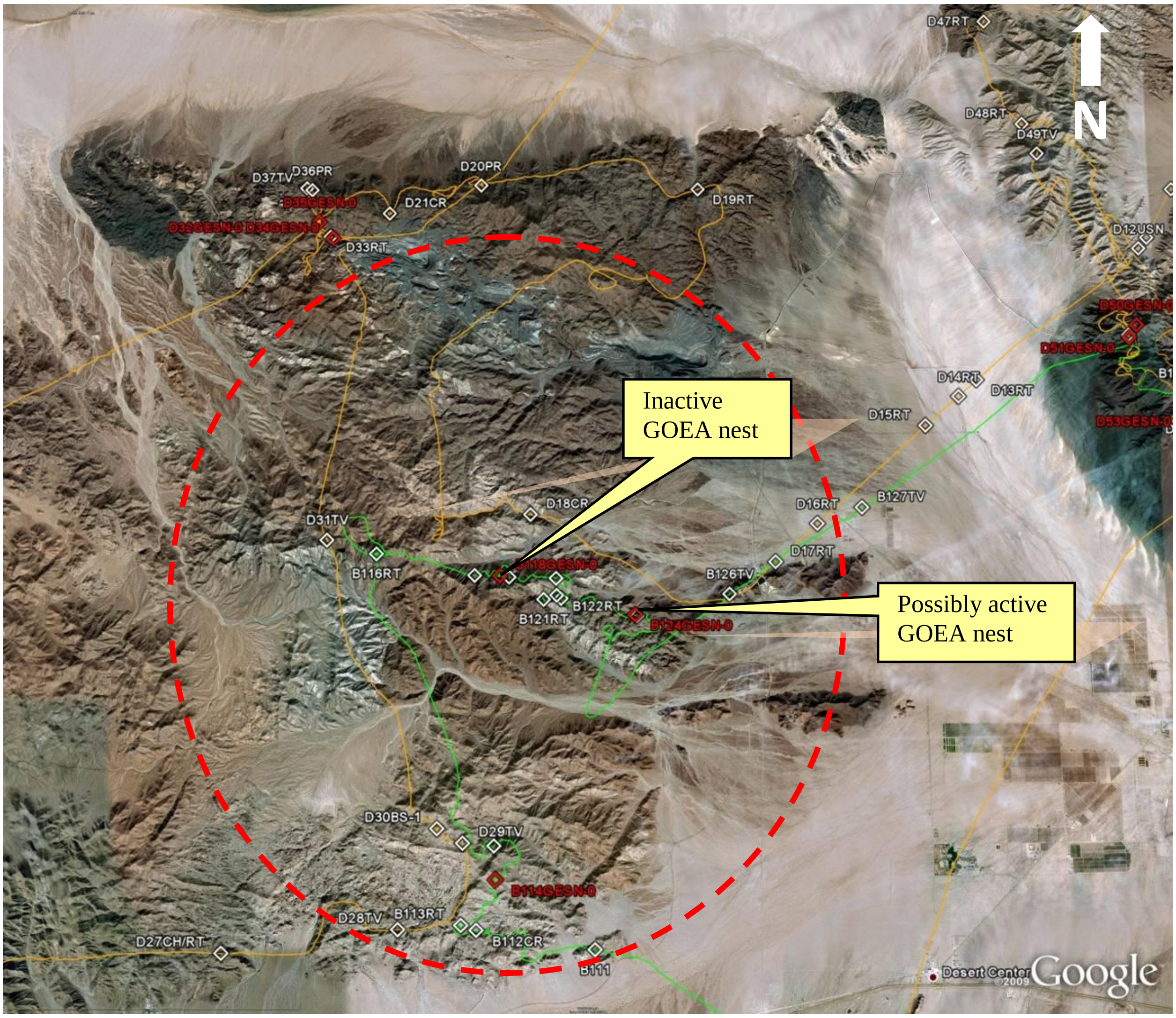


Figure 15. Eagle Mountain - Central, active territory. All waypoints for species and nests observed, the helicopter flight paths, and an approximate 5-mile GOEA territory radius are provided.

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

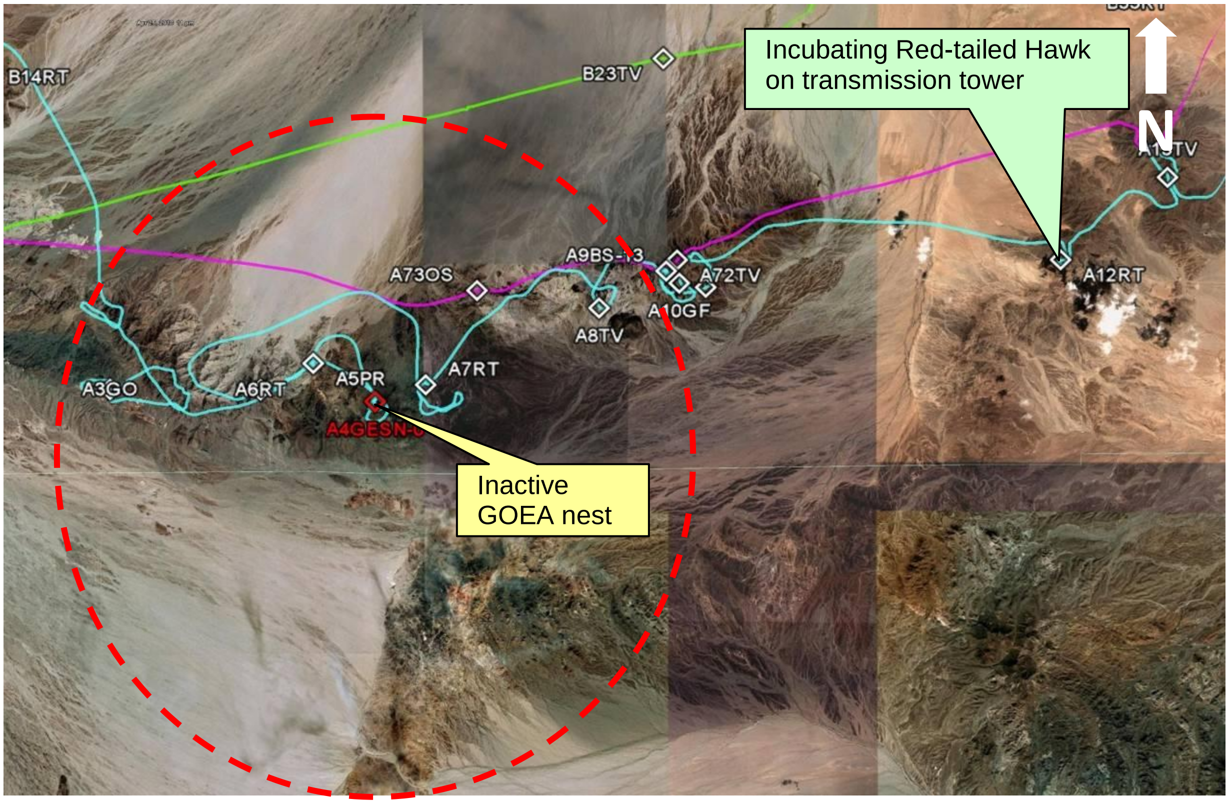


Figure 17. Little Chuckwalla Mountains and Hodges Mountains, inactive territory. All waypoints for species and nests observed, the helicopter flight paths, and an approximate 5-mile GOEA territory radius are provided.

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

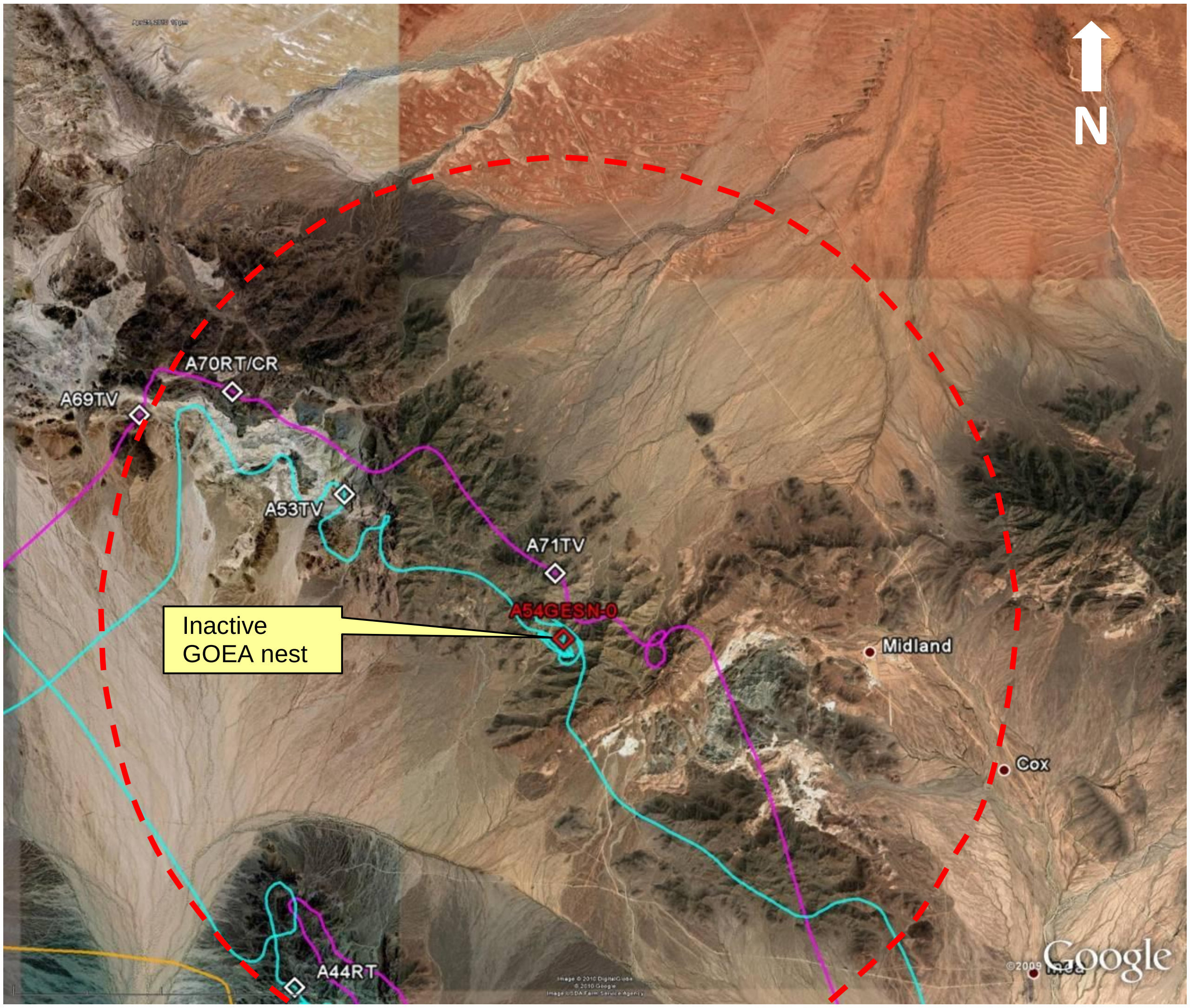


Figure 18. Little Maria Mountains, inactive territory. All waypoints for species and nests observed, the helicopter flight paths, and an approximate 5-mile GOEA territory radius are provided.

McCoy Mountains

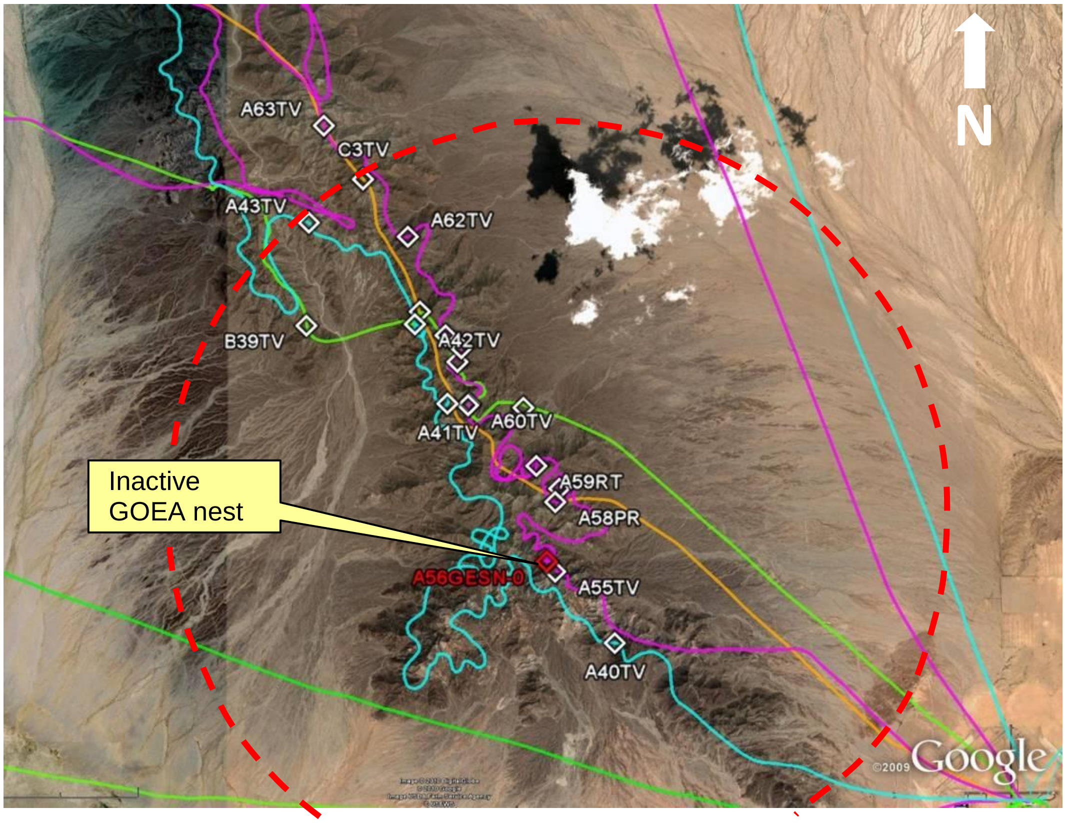


Figure 19. McCoy Mountains, inactive territory. All waypoints for species and nests observed, the helicopter flight paths, and an approximate 5-mile GOEA territory radius are provided.

An inactive GOEA nest (A56GESN-0); poor condition.

Orocopia Mountains

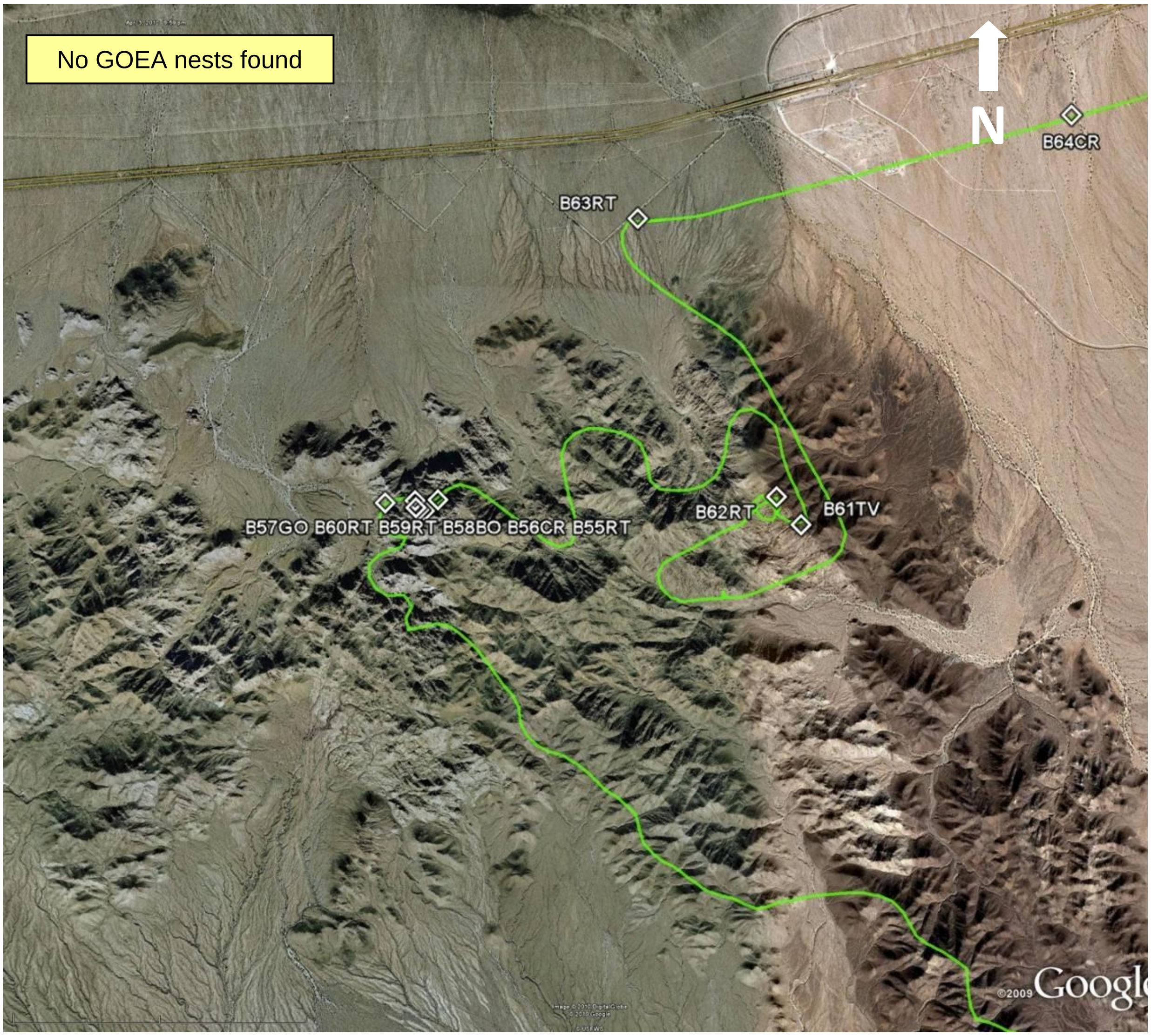


Figure 20. Orocopia Mountains. All waypoints for species and nests observed, and the helicopter flight path. A survey of this entire mountain range was not deemed necessary since the habitat was marginally sufficient to support GOEAs and did not provide adequate GOEA nesting substrate.

Palen Mountains

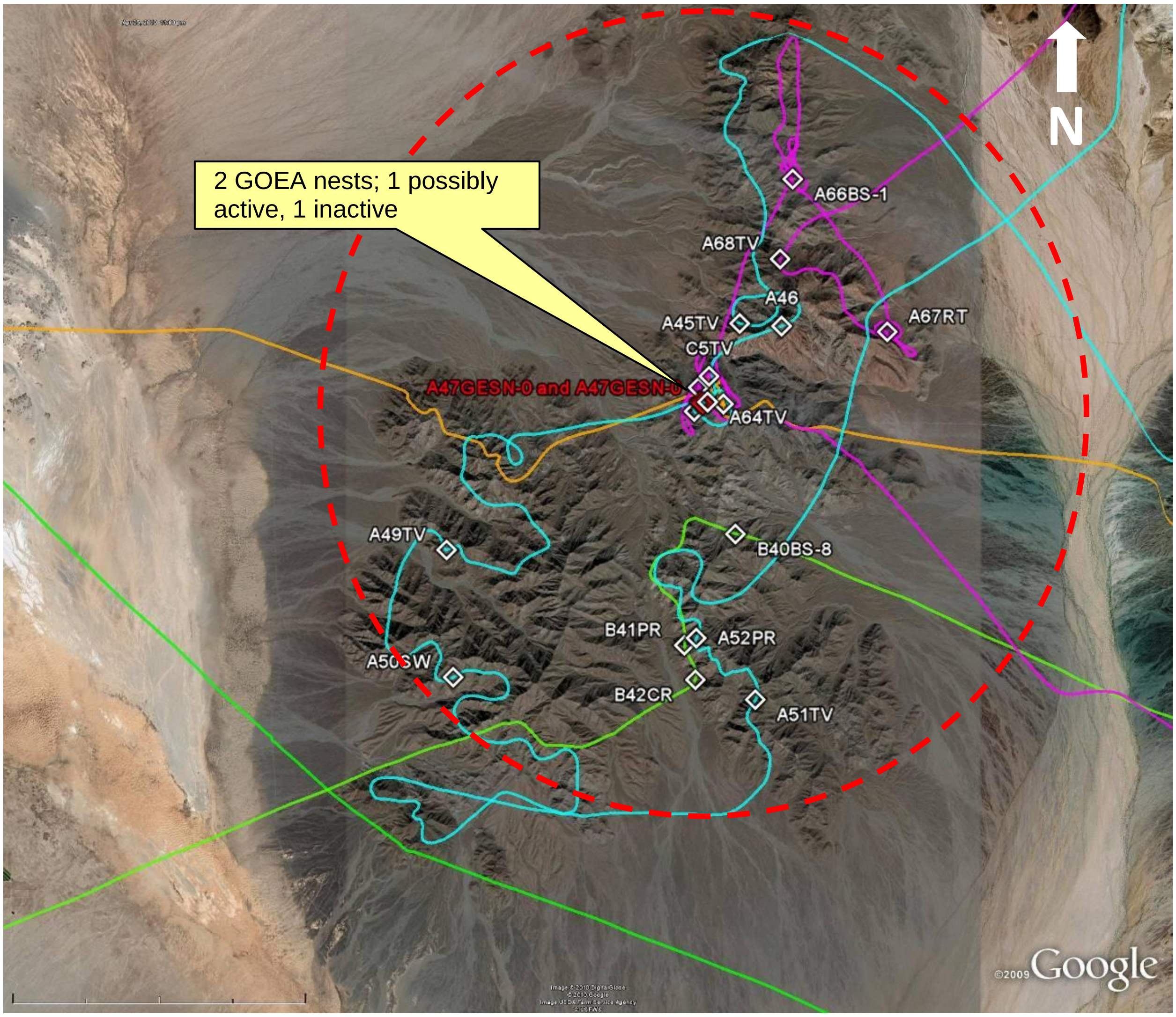


Figure 21. Palen Mountains, possibly active territory. All waypoints for species and nests observed, the helicopter flight paths, and an approximate 5-mile GOEA territory radius are provided.

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